# Investment Funds In Operation

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# Contents

# Preface

Our background knowledge for reliable macro-economic forecasts of business responses to the application of different contra-cyclical measures is at present rather scanty. This was the case, when the investment funds system was put into operation to prevent an anticipated recession during 1962/63. At that time little historical experience was at hand for a prediction of the effects of this measure. It is, however, now to some extent possible to estimate its stabilizing influences on the basis of the data to be presented in this investigation. An evaluation of this kind should be of value for future policies of the same type.

The only practicable way of securing the kind of information required for such an evaluation was by direct questioning of the entrepreneurs themselves. The mesurement technique thus employed is a controversial one and consequently the results obtained might be considered uncertain. The availability of certain additional independent check-point information together with quite an extensive analysis of the possible errors of measurement should, however, have reduced the drawbacks associated with studies of this kind.

This investigation was started during the autumn of 1963, when questionnaires were mailed to all firms that were utilizing their investment funds. A remarkably high answering percentage of well above 90 percent was secured, and the Institute wants to thank all firms for their generous and useful cooperation in this study.

The Institute is also very grateful to all those who have read the many preliminary versions of this report at various stages of completion and made valuable suggestions for its improvement. Essential parts of it have furthermore been discussed at the newly organized econometric seminar at the University of Stockholm, under the chairmanship of Professor E. Lundberg.

# I. The Swedish investment funds system – its purpose and legislative framework

## I:1. Introduction

In a Government Bill submitted to the Swedish parliament in 1938 the Minister of Finance stressed the importance of Government support of measures aimed at a levelling of cyclical variations in production and employment. It was now proposed to build into the assessment system a special mechanism, that would make it profitable and possible for private industry to maintain a stable level of employment even when business was slack, for "eligible construction works, to produce or procure necessary machinery and equipment, and, to some extent, to produce goods to be used when business prospects improved"[1]. Thus the Investment Funds System was instituted in 1938, and for a long time it remained a uniquely Swedish institution[2].

In principle the I-funds system functions briefly as follows. In good years, when business is flourishing, firms may set aside a certain share of their gross profits free of tax to an I-fund. At the same time these appropriations are supposed to exercise a deterrent effect on current investment activity. On the other hand, during a period of recession the funds can be released by the labour market authorities or the Government to secure a net increase in the level of employment. The shifting of investment activity from good years to bad is the essence of the I-funds system.

The *short run* character of the I-funds system as a business cycle regulator should be evident from this description. However, as will be seen from the next section, the institutional set-up of this particular instrument of contracyclical policy has gone through a series of successive revisions since 1938, which makes a description without reference to a

[1] See "Proposition nr 319, 1938", p. 18 (authors translation).
[2] In the following chapters, *investment funds* will be denoted *I-funds* or simply *IF*.

specific period of time, somewhat misleading. As will also be seen in the next section, the actual functioning of the I-funds system does not always seem to have been fitted very well into the ideal "model" outlined above.

The problems connected with an efficient operation of the I-funds system are manifold. For one thing the funds are supposed to complement traditional monetary and fiscal policies, which makes the specification of the desired effects of their implementation a rather complex problem[1]. Secondly the specification of these ends must rest on a reliable prediction of the alternative development of relevant "target variables", say investment activity or employment, over a future period of time. Thirdly the time-planning and the manner in which the I-funds are released have to be determined. If the "target variable" to be influenced is e.g. industrial investment activity, such a task requires a thorough knowledge of aggregate investment behaviour of firms and its determinants. Fourthly the evaluation of the results achieved, will constitute a desired conclusion of this listing of points to consider, when the operation of the I-funds system or of any instrument of contracyclical policy is concerned.

The present study is primarily devoted to an empirical investigation around the fourth and last point, namely the measurement of the net effects of the general release of I-funds on the level of investment activity and employment during the recession of 1962/63. The appraisal is particularly concerned with the timing of the net effects, but also with their magnitude. An evaluation of this kind will have to be made with reference to the actual ex post development of the business cycle and a specification of the goals of the I-funds release. That is, due consideration has to be paid to both point one and two above. Furthermore an essential purpose of the investigation is to use information secured for facilitating the handling of future releases of I-funds.

The following sections of this chapter present a survey of the institutional set-up of the I-funds system and their historical development. Also an attempt will be made to place the I-funds system in a more general economic framework. Chapter I ends with an outline of the institutional conditions of the release of 1962/63, the object of the empirical measurements. Chapter II defines the method or instrument of

[1] cf. Hansen, B. [14], ch. I.

measurements, and contains a general discussion of problems of interpretation met with. An attempt has been made to specify a set of assumptions for an intelligible questioning of the firms with regard to the crucial questions of appraisal put forwards. Also it is to be hoped that it has been possible to keep a clearcut distinction between the theoretical quantities examined and the operational quantities actually measured, i.e. to specify the validity of the measuring instrument with respect to its application. A formal exposition on this problem is given in a separate section (II:5). Lastly chapter III contains a discussion of the empirical findings. This chapter concludes with a suggestion for a simple method of predicting quantitatively some of the effects of an I-funds release from current sources of statistical information and a summary of the empirical findings.

## I:2. Historical review

The I-funds system has formally existed as an integral part of Swedish contracyclical policy for more than 25 years. The IF-system for a long time remained a uniquely Swedish institution, but modified variants have now been created in some European countries[1]. In 1938 mainly joint stock companies[2] were permitted to set aside a certain proportion of their profits free of tax to various kinds of I-funds each designed for a specific investment purpose. On authorization by the Labour Market Board these funds could be released in times of economic recession, to bring about an increase in investment activity. The legal formalities involved were rather complicated, though, and the system as such was an untried novelty to the firms. As can be seen from the table on page 11 allocations to the funds were relatively small far into the Fifties, and not until 1958 were they activated for the first time. By that time the legislation of 1938, originally rather provisional, had been revised several times.

[1] E.g. Denmark and Finland. For a fuller treatment in this respect, see "Promemoria med förslag till ändringar i 1955 års förordning om investeringsfonder för konjunkturutjämning avgiven den 9 juli 1962" (mimeographed) pp. 26 ff.

[2] Joint-stock companies and so called "economic societies". From July 1. 1963 also saving banks can make appropriations to I-funds. These three kinds of firms will simply be referred to as "firms" below.

It assumed its present character on July 1, 1963. In 1945 a new and more thorough investigation into the Swedish I-funds legislation was completed. Shortly after, in 1947, the provisional laws of 1938 and subsequent minor amendments were replaced by permanent legislation. When submitting the Bill to Parliament, the Minister of Finance underlined that this legislation "as far as possible should disregard other points of view, than those connected with the purpose of levelling business cycles"[1]. Still the conditions for use and operation of the I-funds system were rather complicated, and apparently did not entice firms to increase their appropriations.

Even though the purpose of business cycle stabilization includes both restraining effects upon too brisk an investment activity during periods of economic upswing and accelerating effects on production and employment when business is slow, the last point attracted most interest in the beginning. In fact I-fund appropriations according to the legislation of 1938 and 1947 only involved a formal transaction in the firm's balance sheet. They were not even obliged to separate the funds explicitly in their book-keeping. When fund money was set aside as an alternative to taxation, this meant an increase in the firm's liquidity, since no tax payments had to be made. The 1945 investigation considered an obligatory depositing of part of I-fund appropriations, but since such obligations were thought to constitute a powerful (not desired) deterrent to necessary fund-building, no propositions were made in this respect[2].

These problems became particularly embarrassing during the first few years of the Fifties, when there was a rapidly increasing level of business activity. Consequently a ten percent "investment tax" to be payed on I-funds appropriations was introduced in 1951 and in 1952 and 1954 I-funds legislation was temporarily repealed. The new legislation of 1955 contained a provision obliging firms to deposit 40 percent of their I-fund allocations to a blocked account in the Central Bank, a figure that was increased to 46 percent in 1960.

In many respects the new legislation of 1955 simplified the I-funds system. Among other things the number of funds was reduced from four to two, namely I-funds for investments in forestry and "ordinary"

[1] See "Proposition nr 86, 1947", p. 38. (Authors translation)
[2] See "SOU 1945:49", p. 47 f.

I-funds for other more differentiated investment purposes. Most of the regulations in the 1955 legislation, although somewhat modified, are still in force. Therefore a more detailed description will be left for the next section, which contains a brief account of IF-legislation in force after July 1, 1963. It will suffice to note here, that during the years following 1955 fund appropriations increased remarkably (cf. table below). This circumstance has to some extent been attributed to the simplification of the I-funds system that came into force in 1955, together with the corresponding restrictive amendments in Swedish tax legislation of business firms[1]. The very fact that the funds were used actively for the first time in 1958 should also have stimulated appropriations to them.

Funds accumulated by end of years (million kronor).

| | | | | | |
|---|---|---|---|---|---|
| 1951 | 247 | 1955 | 414 | 1959 | 1364 |
| 1952 | 247 | 1956 | 539 | 1960 | 2046 |
| 1953 | 251 | 1957 | 754 | 1961 | 2394 |
| 1954 | 249 | 1958 | 1143 | 1962 | 2663 |

*Source:* Labour Market Board.

The I-funds were activated during the recession of 1958 mainly for investments in construction. More than 400 firms were granted permission to use their funds on about 600 construction projects. Permission was granted individually for one, one and a half and in some instance two years, depending upon the kind of investment project. In February 1959 it was estimated that almost 4000 workers were employed on projects with calculated costs totalling about 320 million kronor. Even though no detailed analysis has been made, it is believed, however, that the effects of the 1958/59 release of I-funds came too late in relation to the recession[2]. Apart from a limited release in December 1961, when five licenses were granted to pulp- and paper producing firms, the funds were next released on a larger scale during a ten month period starting July 1, 1962. This release was intended to mitigate an expected slowing down of business activity in the construction sector and to some extent

[1] See Västhagen [41], pp. 62 ff.
[2] See Nitare [36], pp. 184 ff., "Konjunkturläget, Nov. 1960", p. 40 and Canarp [6].

also among the engineering industries during the winter half-year of 1962/63. This major I-funds release is the principal object of the present study. A detailed account of the institutional conditions surrounding it will be given in the last section of this chapter.

In 1963 further amendments were made to the I-funds legislation. Among other things steps were taken to stimulate firms to use the funds to stabilize production through investments in inventories. In the Bill to Parliament, the Minister of Finance also suggested the possibility of a regional use of the I-funds in unemployment areas. In expectation of more definite and separate legislation on discrete measures by the Government to stimulate industrial development in such areas, the I-funds were in fact released temporarily for such purposes already during 1963[1].

During 1960 and 1961, when the Swedish economy suffered from heavy inflationary pressures, a new device was tried in order to secure an extra drain on liquidity in the private sector of the economy. Firms were offered exceptionally favourable terms if they deposited 100 percent of their I-funds appropriations, instead of 46 percent, in blocked accounts in the Central Bank for about one year (see also p. 108). It was expected that this liquidity drain would exercise a deterrent effect upon investment activity. The consequences of this offer are clearly shown in Diagram III6 on p. 111, which depicts quarter by quarter the allocations to and the withdrawals from the blocked accounts in the Central Bank (see also table 2 A, appendix II). The inclusion of this device as permanent in I-funds legislation was contemplated but not recommended by the committee preparing the legislation of 1963[2].

## I:3. Present legislation—a brief outline

From the point of view of the individual firm the I-fund may be charac-

[1] See "Proposition nr 159, 1963", p. 63, and från Departement och Nämnder nr 17, 1964, "Riktlinjer för den samhälleliga lokaliseringspolitiken", p. 366.

[2] See "Proposition nr 159, 1963", p. 53. More general references of this chapter are: "SFS (Svensk Författningssamling) nr 384, 1938, nr 174, 1947, and 151, 1951, nr 380, 1952, nr 50, 1954, nr 256, 1955, nr 236, 1960, nr 529, 1961 and nr 215 1963". For a fuller treatment of the development of IF-legislation the reader should consult "Proposition nr 159, 1963", pp. 23 ff.

terized as appropriations free of tax for future investments[1], i.e. investment costs are charged before the actual realization of the investment project or the procurement of the fixed asset. Such provisions must of course be conceived as benefits for the individual firm. The same considerations also hold for the reduction of taxable income *(investment deduction)* amounting to 10 percent of funds actually used in compliance with the conditions stipulated by the labour market authorities[2], as well as an improvement in the firms liquidity position, when blocked fund money is released from the Central Bank. The idea of the IF-system is that these potential benefits accruing to the individual firm from the use of its I-fund, will appear sufficiently attractive to induce firms to comply with stipulations concerning above all the timing of investment projects. These conditions are supposed to be formulated in such a fashion as to produce a controlled and (at least in the aggregate) desirable effect on the business-cycle.

Each firm is allowed to set aside to an I-fund annually a maximum of 40 percent of profits before tax. Of this 40 percent, 46 percent has to be deposited in a blocked Central Bank account. This figure should be compared with the present rate of company taxation of approximately 49 percent. Hence there will still be a minor improvement in the firm's liquidity, if its only alternative to an I-funds appropriation is a 49 percent tax assessment on the corresponding part of profits. It should be noted, however, that these provisions apply particularly to joint-stock companies. Different rules are in force for so called "economic societies". Also the law for historical reasons still distinguishes between two kinds of I-funds, i.e. "ordinary I-funds" encompassing at present more than 99 percent of the total accumulated funds, and I-funds to be used only for investments in the forestry sector. These formal distinctions are of minor importance in this context, though, and can be neglected without loss of completeness in the following treatment of the I-funds system.

Principally the I-funds can be released in three different ways:

1. Five years from the year of appropriation, including that year, 30

[1] Cf. E. Andersson [1], p. 238.

[2] The "labour market authorities" referred to above should be identified with the Government (Kungl. Maj:t) and/or the Swedish Labour Market Board.

percent of the appropriation may be used freely by the firm for purposes specified in the law (see below). These 30 percent constitute the so called "*free sector*".

Apart from the free sector the I-funds can be released:

2. On a *compulsory* basis, i.e. the firms are required to use their funds in a specified way[1].
3. On a *voluntary* basis, i.e. the firms are granted permission to use their funds after application—provided certain requirements from the labour market authorities are, or will be, fulfilled.

It should be noted, however, that until now, all administered I-fund releases have been carried out on a strictly voluntary basis. A further distinction should also be made between releases of a general character and special releases limited to certain sectors of the economy. Thus the 1963 legislation provides for a widened use of special releases, i.e. with the primary purpose of stimulating investment activity in certain geographical areas of unemployment and also inside individual firms. As already mentioned, the funds were in fact used for such purposes shortly after the new legislation came into force on July 1, 1963.

Releases can also be made selective with regard to the possible types of investment projects that may be financed (wholly or partly) by I-funds. The main spheres of uses are (A) investments in *construction* works, and (B) in *machinery and equipment*. Moreover possibilities of (C) financing a temporary increase in *inventories* with the I-fund have improved substantially after July 1, 1963. Once permission to use the fund has been granted, the blocked reserves in the Central Bank may be drawn upon at any time up to the specified limit. However if the firm is partly or wholly unable to comply with the stipulations attached to the permission, there is no way of redepositing excess drawings. This provision has been inserted as a deterrent on premature drawings from the Central Bank account. Such excess withdrawals are instead regarded as income during the current assessment year with the imposition of an additional penalty assessment of 10 percent[2]. In this context,

[1] Cf. Johansson [18], p. S10.

[2] Suppose excess drawings amount to x kronor. The corresponding total of the I-fund used then is x/0.46, 0.46 being the fraction deposited in the Central Bank. Thus the addition to taxable income during the year will be: 1,1 · x/0.46 kronor.

it should also be noted that control and supervision, once permission has been granted, is the task of the assessment authorities.

When I-funds investments are in respect of inventories the mechanics of the system deviates somewhat from that for other kinds of investments. Thus the released part of the fund is temporarily transferred to an account labelled *investments in inventories,* and at the same time the corresponding blocked part in the Central Bank may be drawn upon. The temporary increase in inventories and a subsequent liquidation is supposed to be handled over this account. However, after a period not longer than five years the released deposits have to be blocked again in the Central Bank or the value of fund money used will be taxed as income during the last year of that period. Besides the temporary liquidity improvement the firm also benefits from an income deduction amounting at present to 10 percent of the increase in inventories during a stipulated time-period. The purpose is to shift the effects of fluctuations in the demand for the products of the firm, from production to inventories, thus stabilizing employment[1].

### I:4. Benefits derived from an I-funds release—profitability considerations by the individual firm

Logically a general discussion of the profitability of using I-funds should start from the act of appropriation. The mere act of fundbuilding by the individual firm must of course involve decisions with respect to profitability. As long as the firm has only a marginal choice between taxation and appropriation to an I-fund, appropriation will always be the best alternative when the rate of taxation is higher than the fraction to be deposited in the Central Bank, provided the firm does not count on an imposition to use its fund. However also the room for alternative dispositions of gross profits before tax for depreciation charges, or for increasing the hidden reserves in inventories, have to be weighed against various alternative kinds of fundbuilding etc. Some indications make it seem reasonable to expect that an IF-appropriation will be one of the

[1] Cf. Kjellander [21], pp. 46 ff. and [22], pp. 108 ff. and Edenhammar [10]. For more detailed information on the present IF-legislation see SFS nr. 215, 1963, and e.g. Sandström [39], pp. 207 ff.

last alternatives for profit equalization, and thus the marginal choice between appropriation and taxation may be the relevant problem for a great many of entrepreneurs[1]. A growing firm with an ample supply of profitable short run investment opportunities might not be as tempted to make IF-appropriations as a firm just leaving a period of rapid expansion and reaping large profits from past investment activity[2]. A further point to be stressed is the opportunity to use the "free sector" for long term investment planning, a fact that might stimulate the firm to maintain a fairly stable level of I-funds appropriations. It can be seen from table 2 A in Appendix II, however, that the free sector has as yet only played a minor role. It can be shown that a multitude of subjective and objective factors varying with circumstances, might affect the decision to accumulate I-funds. An attempt to formalize in compact form a realistic appropriation "model" for the individual firm will be an awkward task. Since this analysis, however, is concerned with a specific fund release rather than with the general decision making surrounding the utilization of the IF-system, the latter problem will be bypassed here. In fact, when facing the potential use of its I-fund during a release, it is not the past decisions preceding the IF-appropriation that are relevant for the firm, but future prospects[3].

The benefits accruing to the individual firm from using its I-fund can be summarized mainly under two headings:

1. An improvement of the firm's liquidity position, when the blocked fraction in the Central Bank is released.
2. An extra deduction from taxable income of 10 percent of the used part of the fund, at the tax-assessment of the same year (the *"investment deduction"*).

These benefits should be balanced against the loss of future depreciation possibilities and the probable increase in costs due to extra requirements regarding time-planning, etc. that will normally accompany the exploitation of an unforeseen opportunity. A possible change in the firm's planning might cause a deviation from an established optimum time location and a consequent increase in costs, unless compensated

[1] Cf. Rylander [38], pp. 4 ff, who reports on interviews with 5 firms.
[2] Cf. The discussion between Wickman, K. [43] and [44], and Nabseth, L. [35]
[3] Also cf. Johansson [18]), pp. S 13 ff.

for by benefits of the above kind. Such potential increases in costs, no doubt, will constitute an important determinant of the degree of rigidity in time planning of investments with respect to an I-funds release. They are, however, very difficult to estimate. The investment decision of the firm has to be based on a number of diversified considerations, the marketability of the products of the firm, the availability of credit, the liquidity position of the firm, etc. as well as "mere" profitability estimates. On account of the great variety among different types of investment projects it can be argued that many, if not all, investment projects simply cannot be subjected to exact economic evaluation. This issue is of particular interest when investment projects, that are not directly linked with production, such as the building of new and more modern office departments, etc. are concerned. Such projects probably will respond quite differently to an IF-release than will investments in equipment and machinery or construction works for direct production purposes. There is also the question about the volume of reinvestment, which affects the rigidity of planning. Sporadic evidence from the firms participating in this investigation, indicated a surprisingly high degree of flexibility in the time-planning of these kinds of investments. This was especially the case for investments in machinery and equipment. Altogether the implication seems to be that there exists considerable room for the accomplishment of net reallocations in the investment plans of the firms, both in an increasing and a decreasing direction, through monetary and taxation benefits, such as the use of I-funds.

The growth characteristics of the firms also have a bearing on the way in which the firms may react to I-funds stimulus. Rapidly growing firms with ample investment opportunities often seemed to have regarded the I-funds release as wind-fall benefits, not giving rise to any particular reallocations in their rigid plans of expansion. In those cases, which will be seen to be numerous, where the original, and established optimum time-planning of investment projects, coincided with the requirements of the labour market authorities, no net reallocations in the investment plans were necessary for the use of I-funds. If the total volume of investment activity partly or wholly financed by I-funds is denoted the "gross effect" of the IF-release, then the fraction thereof constituting a "*net* change" in investment activity for the period consi-

dered (the *net effect)* will depend not only upon the flexibility (or rigidity) in time-planning of individual projects, but also on the original timing of investments scheduled for the period of time considered. Approximate a priori information about the potential "room" for a net effect, is thus a vital requirement for an efficient operation of the I-funds system.

Despite the difficulties of economic evaluation outlined above, a simplified model of profitability estimation will be given. Such a model might also serve as a numerical illustration of the benefits that accrue to the individual firm from the utilization of its I-fund, although no conclusions whatsoever can be drawn as to what extent it might explain the mechanics of decision making of the firms. In fact empirical studies do not indicate much of a reliance on detailed profitability estimates by the entrepreneurs, but rather the opposite state of affairs[1]. Here the traditional method of discounting to present value the difference between the monetary benefits that accrue to the firm from using its fund and the consequent increase in costs will be used. The firms are supposed to possess a sufficient amount of fund money, and to have been granted a permission to use its I-fund for a specific investment project. The problem is now to decide, whether it is profitable to utilize the I-fund or not. Thus there is no question of a shifting of investment activity from one "optimal" period of time to another, with possible increases in costs, in accordance with the contracyclical intentions of the labour market authorities[2]. The following symbols will be used:

| | |
|---|---|
| Total costs of the investment project planned to be incurred within a specified period of release, during which the I-funds may be used | : A |
| The rate of taxation | : s |
| The investment deduction from taxable income, available only after the lapse of the current year | : k |
| The fraction of the I-fund deposited in the Central Bank | : r |

[1] See e.g. Lundberg [28] and [29], ch. 7 and p. 669 respectively and Rylander [38] pp. 7 ff.
[2] Cf. Johansson [18] pp. S 4 ff.

A discount factor i that signifies the "target" rate of return of the firm : $q = 1 + i$

*Benefits from using the I-fund*

Present value of released "liquid" fund-money from Central Bank : $rA$

Present value of the Investment deduction : $sk\frac{A}{q}$

*Increase in "costs"*

Present value of tax credits through future write-offs during T years: now lost (linear depreciation assumed): : $s\frac{A}{T}\sum_{0}^{T-1}\frac{1}{q^j}$

Net benefits (D) then become:[1]

$$D = rA + sk\frac{A}{q} - s\frac{A}{T}\sum_{0}^{T-1}\frac{1}{q^j} \qquad \text{(I:1)}$$

It might be argued that (I:1) is a comparison of inconsistent quantities. In fact the inclusion of "released fund-money" from the Central Bank implies, that this component in the above formulae is regarded as a "wind-fall" benefit by the firms. Even though formally a claim on the Central Bank the blocked deposits cannot be counted among liquid assets on the debit side of the firm's balance sheet[2], since drawings from this account can only be made for specified purposes (except for the free sector) after permission from the labour market authorities. Immediately after such a permission has been granted, however the firm can start making drawings successively or the whole amount specified, at one time. If the investment project had already been planned to be undertaken during the same period of time, irrespective of the fact whether an IF-permission had been granted or not, the drawings on the Central Bank account must be considered as momentary net additions to liquidity by the firm. Formulation (I:1) in fact corresponds to an evaluation by the firm of such net additions to liquidity as "wind-fall earnings". Such a way of looking at the matter implies a more or

[1] According to present legislation r=0,46 (cf. however p. 24), k=0,1 and s= (about) 0,49.

[2] See Kellgren [20] pp. 51 ff.

less complete disregard of the opportunity cost of not being able to take advantage of alternative possibilities of using the fund through the free sector or during future releases. There are also differences of opinion as to the interpretation of I-funds appropriations from the balance sheet point of view. One way is to look upon I-funds as part of own capital. It must be remembered then, that about half the fund constitutes a hidden tax credit[1]. A permission to use the I-fund might be considered as a potential cancellation of this tax credit, in which case the size of the tax credit may be locked upon as "income" during the period of release. Although, seemingly not as realistic an interpretation as (I:1) the results happen to coincide approximately since the fraction to be deposited in the Central Bank (as of now) is 46 percent compared to an average corporation tax of about 49 percent.

Despite these problems of measurement, it is known that similar estimates have in fact been used by some firms[2]. Expression (I:1) now indicates that it is advantageous to use the I-fund compared to not using it as a means of financing an individual investment project already planned to be undertaken during the same period of time, as long as $D>0$. Clearly D is a rising function of r (the fraction deposited in the Central Bank). The same holds for T. Thus the longer the allowed period of depreciation (T), the greater the potential benefits from an I-funds release. A construction project which can usually be depreciated at a rate of 2 á 3 percent a year will yield a larger benefit, than will an equally large investment project in machinery or equipment, which in Sweden can be written off during a period of five years.

It should once again be underlined that many important factors which can be expected to affect profitability are left outside this model. The assumption of a constant target rate of return over a period of several years is rather arbitrary. The target rate of return, whatever its proper definition, can be expected to vary substantially over time. A proper profitability estimate should also include variations in prices and in investment costs, due to changes in time planning of investment activity, in order to comply with the provisions for the use of I-fund money. Theoretical refinements of the microeconomic model will, how-

[1] See Asztély [3], p. 15 and 39 and Kellgren [20], pp. 23 ff.

[2] Rylander [38] finds that 1 out of the 5 questioned firms has.

ever, at the present level of empirical information, yield no returns for the main purpose of this investigation, i.e. to measure quantitatively the effects of the 1962/63 I-funds release[1].

## I:5. Macroeconomic aspects

For the present purpose, which is to discuss the prerequisites of a "perfectly" functioning I-funds system, it will be convenient to distinguish between fund-building periods and periods of release. In practice, however, considerable overlapping takes place as the firms are not prohibited from making appropriations to and using their I-funds during the same year. Moreover one has to bring into the open explicitly the relationship between monetary fundvariations and their effects on investment. More particularly monetary fundvariations are thought to provide the incentives for the firms to make reallocations in their investment planning over time. Thus fundaccumulation is supposed to take place voluntarily during periods of economic upswing, with contractive tendencies on current investment activity. Fund-money is released normally through controlled offers by the labour market authorities in voluntary cooperation with the firms. Usually the firms will have a free option to make use of these offers. For this reason actual fund-money used as well as investment activity financed with the help of I-funds cannot be fixed in advance by the labour market authorities, but will be dependent upon the firms' willingness to invest, in accordance with stipulated requirements. Nor does the matter end here. Investment activity financed partly or wholly through I-funds cannot be expected to equal the corresponding *net* variations in investment activity, until due allowance has been made for the investments that would have been made anyhow, irrespective of whether the I-funds had been released or not, and until the multitude of interaction effects throughout the economy have been, at least, considered. The problem of the firm is to find suitable investment opportunities to finance via the IF-system. The more projects already planned for the period of release, the easier

[1] The problems touched upon in this section are the object of an interview study, soon to be published by FFI (Företagsekonomiska Forskningsinstitutet), Stockholm.

for the firm to comply with stipulated time-requirements. The interest of the labour market authorities, on the other hand, focuses on accomplished time-reallocations in the firms' investment plans, which taken together constitute the net I-funds effect. One of the crucial problems to be faced here is the specification of some kind of quantitative relationship between monetary fund-variations and these reallocations, or net changes in investment activity. These relationships will be highly simplified in the following presentation.

$I^P$ in diagram I:1 signifies the exogenously determined hypothetic time-path that gross private industrial investment will assume in case no IF-system is put into operation and in case no other alternative measures of contracyclical policy are employed. Monthly data are supposed to be available. $I^P$ thus is the target variable that the policy maker want to change in a desired fashion. For the sake of simplicity this hypothetic time-path has been attributed the properties of a simple sinusoidal function. $I^f$ stands for a forecast of the target variable made by the policy maker at the date 0. In the diagram this forecast has been assumed to be correct, i.e. $I^f = I^P$. The desired development over time of the target variable is not, however, one with cyclical variations, but let us say rather one with a (for simplicity) constant level as pictured by $I^D$ (D here stands for "desired"). Basing its decisions on the forecast $I^f$ and on the properties of the model of the IF-system to be specified below, the Government thus seeks to accomplish this desired development by stimulating anticyclical variations in aggregate I-fund accumulation, F.

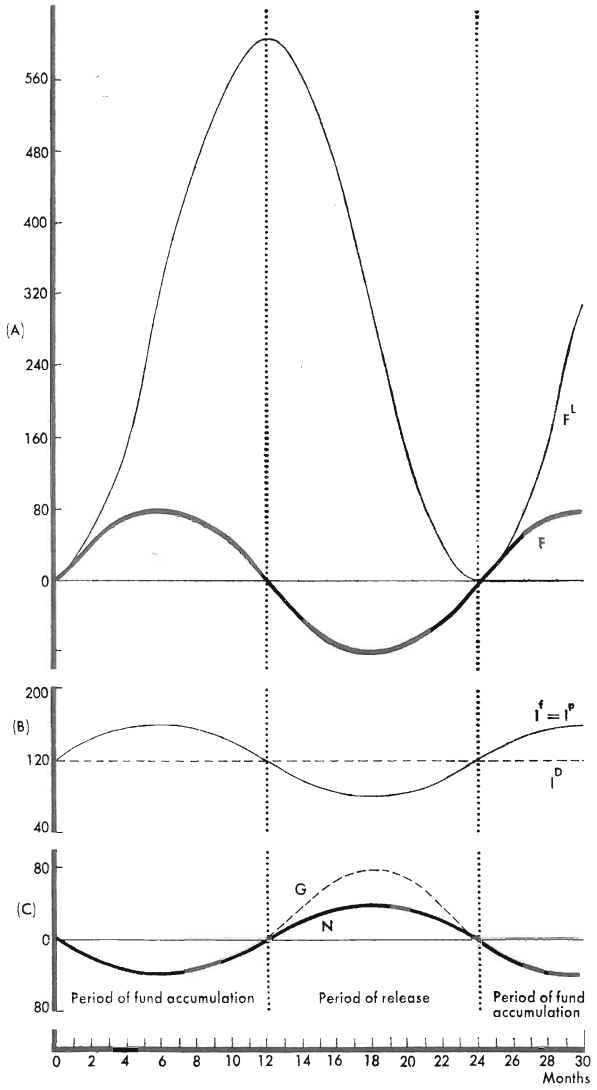
Thus firstly we propose that the Government or labour market authorities provide certain benefits to the entrepreneurs which constitute incentives for them to make desired IF-appropriations or to use their funds for investment purposes. Secured fund-variations are pictured in chart (A) diagram I:1.

Secondly we define the value of investment activity financed through I-funds, the *gross I-funds effect,* as identical with monetary fundvariations, but of opposite sign, i.e. $G = -F$. As only positive gross effects will be considered here G has been plotted only during the period of I-funds release in the diagram.

Thirdly it is simply assumed that one half of the gross I-funds effect so defined constitutes a net effect on investment activity, i.e. $N = 1/2\ G$.

*Diagram I: 1*

Million kronor



This only states a mechanical relationship between monetary fund-variations and the net effect, as between, say disposable income and consumption, in a linear, keynesian consumption function. If 500 million kronor of fund-money is used for investment purposes, 250 million thereof are always supposed to be a net positive effect during the same period. Similarly during a period of fund accumulation a reduction in investment spending of half the value of accumulated funds is assumed to take place. Note furthermore that N only stands for direct net variations in investment activity[1]. Secondary effects through e.g. some kind of multiplier mechanism are neglected for the time being. A priori it seems indeed far from realistic to assume such a powerful reduction in investment activity to take place because of normal IF-appropriations. However, the inclusion during the fund-building periods of the special device of 100, instead of 46 percent, Central Bank depositing tried during 1960 and 1961 gives this assumption a more realistic touch. See furthermore the technical digression below, and p. 108. Lastly fundvariations will always be matched by a corresponding variation in the liquidity flows to and from the blocked Central Bank accounts. From these introductory remarks it should be understood that no more attention has been paid to the problems of economic interdependence, than has been specified in the relationships between the variables in the diagrams. Furthermore in this investigation inside the period of release empirical data are in fact collected on all variables pictured in diagram I:1.

The above presentation of the IF-model may be stated more precisely in formal language. The reader, who is not interested in this kind of exercise may proceed directly to p. 27.

Suppose an "appropriation function" which describes aggregate fundvariations can be defined:

$$F = F_{(r,\, s,\, T,\, k,\, \chi)} \qquad (I{:}2)$$

The first four variables signifies the Government parameters. (r = the required rate of Central Bank depositing, s = the rate of corporate taxation, T = the allowed rate of depreciation, k = the investment deduction.) All of them have been defined in the preceding section (p. 18). At least r and also k may be varied over

[1] Cf. the notion of "direct" and "indirect" effects in Lindbeck [27], ch. IV and V.

time, to some extent, to secure a desired rate of fundvariation[1]. $\chi$ stands for a vector of all other relevant exogeneous variables affecting F, such as e.g. available investment opportunities, profitability considerations, gross business income during a sequence of periods, alternative possibilities of fundaccumulation, not used up depreciation allowances, etc. For the purpose of the subsequent discussion it is not necessary to specify any particular properties of this function.

Furthermore let the gross IF-effect, G, be introduced by the definitional identity:

$$G = -F \qquad (1:3)$$

This definition accounts for the fact that the amount of fundmoney released is calculated ex post in the assessment procedure from the ex post value of IF-investments realized, i.e. the gross effect G. The assessment procedure thus is supposed to take place continually over time, which is of course not realistic. Note also the somewhat artificial notion of a negative gross effect during periods of fund-accumulation, which is implied in (1:3). The relationship between the gross and the net effect is the crucial piece to be specified in the IF-model. For purposes of this exposition (which is to demonstrate in a simple manner the interaction between the different variables to be estimated in chapter III) it is believed—somewhat arbitrarily, though—that the aggregate "investment function" (I:4) below may perform quite well. Given F from (1:2) and (1:3) we expect the net effect N to be determined by:

$$N = -\gamma F$$

$$\gamma = \begin{cases} r-s & \text{when } F>0 \\ r & F<0 \end{cases} \qquad (I:4)$$

This is no doubt a very mechanical relationship, which deliberately avoids many complications of reality. In the aggregate, firms are simply expected to adjust their investment outlays over time to secure a certain flow of liquid fund-money between them and the Central Bank, the amount being restricted by profitability considerations, etc. which are implicit in the function (I:2). Such a formulation seems, however, an appropriate approximation[2].

[1] Both r and k are fixed by law to be r=0.46 and k=0.1 (see p. 19). However, by special legislation both parameters can be varied temporarily, k only if its definition is extended to take care of such special income-deductions as those associated with the excess Central Bank blocking during 1960 and 1961 (see p. 109).

[2] Cf. the notion of a "residual funds theory of investment", in Meyer-Kuh [32], e.g. ch. XII.
Maybe (I:4) would be more appropriately reformulated as: $|N| \leqq |-\gamma F|$ to take care of the fact that firms may not always find it profitable to make adjustments N as large as specified by (I:4). Indeed (I:4) presupposes that increased costs due to the adjustments in investment spending does not put a halt to N until (I:4) has been satisfied. Note however the empirical findings of chapter III, which in fact suggest a $\gamma$ somewhat larger than r (p. 70) and compare with the results from the analysis of errors of measurement (p. 44).

Furthermore suppose that the Government, or the labour market authorities relies upon this model as a good description of the functioning of the IF-system, and formulates their policy decisions accordingly[1]. As previously assume that the Government want to see a certain development over time of industrial investments, $I^D$. Basing its decisions upon a forecast made at the date 0, $I^f$, and the assumed knowledge of the IF-model, it now varies its parameters in (I:2) to secure a desired rate of fund-variation over the period $(0<t<30)$ in diagrams I:1—I:3.

The net effect desired will be:

$$N^D = I^D - I^f \qquad (I:5)$$

Provided the Government knows the IF-model (I:2—1:5) properly this effect will also be realized by definition.

$$N^D = N \qquad (I:6)$$

Thus the time-path of realized aggregate investment activity, $I^R = I^P + N$, is described by:

$$I^R = I^P - I^f + I^D \qquad (I:7)$$

Still, however, the desired development $I^D$ will only be realized when the forecast is correct, i.e. when $I^P = I^f$.

*Diagram I:1:* The forecast is correct. The government possesses complete knowledge of the IF-model, (I:2)—(I:4).

We assume:

$I^f = I^P = b\ (\sin a_1 t + 3)$ $\quad a_1 = \pi/12,\ b = 40$

$I^D = 120$ $\quad r = 0{,}5$ when $F<0$

$\quad r = 1 \qquad F>0$

$\quad s = 0{,}5$

These specifications mean that the requirements on Central Bank depositing are doubled to 100 percent during "boom periods". Excess deposits are kept blocked during the whole period considered (see however p. 109).

*Diagram I:2:* The forecast is the same as above, but incorrect. A prolonged and planned boom period has not been revealed in the forecast, i.e. $I^f \neq I^P = b\ (\sin a_2\, t + 3)$ $a_1 = 2a_2$

*Diagram I:3:* The forecast is perfect again and identical with that of the first example. However the Government this time acts according to an incorrect knowledge of the IF-model. $\gamma$ is small. Only a slight immediate adjustment in investment spending will thus be secured from occurred fund variations. However, as for the IF-*release,* 6 months later a lagged positive reaction in investment spending will take place, equalling the difference between the amount of fund-money previously released from the Central Bank and N[1].

[1] Cf. Hansen, B. [14], ch. I:4.

[2] Here in fact (I:4).

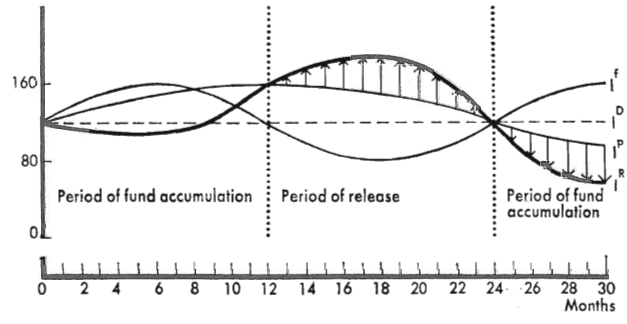
$$\gamma = 0{,}1 \text{ and } N = -\gamma F + \beta$$

$$\beta = \begin{cases} 0 & \text{for } 0 \leq t < 18 \\ r\ G_{(t-6)} - N_{(t-6)} & \text{for } 18 \leq t < 30 \end{cases}$$

During the first "fundbuilding" period, in diagram I:1 predicted (=planned) investment activity lies above the desired level. To eliminate this discrepancy on grounds of a correct forecast and a correct knowledge of the IF-model it is necessary to secure a net reduction of planned investment activity of the size depicted in (C) for the same period. According to the assumptions made, this can be accomplished only by increasing the value of accumulated I-funds, i.e. $F^L$, to about 600 million kronor by the end of the first period of fundaccumulation (A), using the standards of measurement plotted in the diagrams. If 100 percent depositing is required there must be a concomitant and equally large net deposit in the Central Bank (see p. 109). For the time being this liquidity drain has been assumed to exercise no indirect effects on other variables in the model (see further below). Correspondingly, the downturn of the "autonomously" planned investment cycle has to be counteracted by a release of built up funds during a period of 12 months. The magnitude and timing of the simultaneous variations in other variables are clear from the diagram. It is shown that the value of funds already accumulated puts a definite limit to the potential magnitude of the net positive effect on investment activity in (C). In fact, to secure an average positive net effect of slightly over 25 million kronor per month, during one year, this numerical example requires the whole amount of accumulated I-funds of about 600 million kronor to be depleted by the

*Diagram I:2*

Million kronor

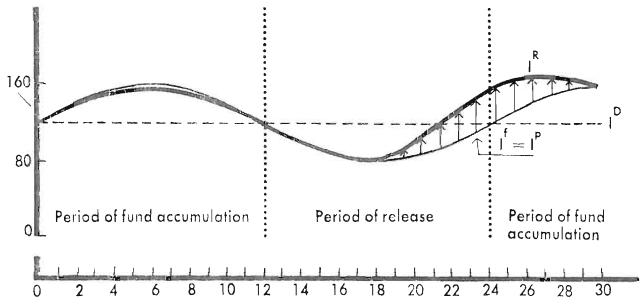


end of the period of release. No doubt, the slow rate of fundbuilding before 1955 imposed narrow limits on the I-funds system in this respect (see table on p. 11).

One should remember that the above illustration presupposes that planned entrepreneurial investment activity is correctly foreseen by the policymakers, i.e. $I^f = I^P$. But the labour market authorities, or the Government, might make arrangements according to an incorrect prediction, to secure the desired stable development, $I^D$. An underestimation of the duration of the planned investment boom might then accentuate instead of mitigate oscillations in investment activity as in diagram I:2.

*Diagram I:3*

Million kronor




A similar perverse effect may emanate from an incorrect knowledge of the relationships between fundvariations and the net effect, i.e. an incorrect knowledge of the IF-model. Thus suppose there is little "room" for a direct net effect, which turns out to be only 10 percent of actual fund-variations, instead of 50 percent as expected. However the net liquidity released from the blocked Central Bank accounts that is not matched by a corresponding net positive effect is assumed to give rise to an indirect net increase in investment activity of the same amount, but lagging, say, six months behind. Otherwise, all assumptions are the same as those of diagram I:1. In this case, pictured in diagram I:3, the target variable is only slightly affected during the first 18 months.

Thereafter on the other hand the turn of the downswing is succeeded by an accelerated upswing, with an enlarged positive amplitude during the first half of the third year.

Evidently a very large number of cases can be imagined, in which the I-funds system does not operate as desired. A more complex, and probably more realistic mechanism certainly can be modelled to describe the interactions between the economic development and the operation of the I-funds system. For one thing the firms' investment plans must clearly be revised from period to period also due to other exogenous influences than the I-funds, factors that have been abstracted from in the above, simple model. Furthermore, some kind of lagged multiplier mechanism might be expected to operate via the direct net effcts. Refining the approach still more, inventories should also be included, and perhaps even accelerator responses to the increased demand for investment goods. Also, indirect liquidity effects on the commercial banks may be relevant, in particular when the special devices of 1960 and 1961 are concerned (see p. 108). Since the firms will normally perform their transactions with the Central Bank via the commercial banks, a drainage in liquid assets in the banking system follows from excess depositing to the blocked IF-accounts. Even though counteracted by the banks secondary credit contractions are likely to occur. The opposite effect will take place in periods of IF-release. Further development of this reasoning will ensnare us in a confusing brushwood of more and more indirect interactions in the economy. While some of these interactions are of course essential, in most instances they will have a negligible bearing on the measurements to be performed in the present study. This is particularly so, since the investigation has been limited in time to a rather brief period, encompassing little more than the time, during which the funds were released. Many secondary effects, if generated, may be expected to have "lagged outside" this period.

The recently developed methods for the simultaneous estimation of structural econometric models, seem to provide what appears at present to be the only practicable tool, for tracking down throughout the economy such indirect effects from exogenous disturbances, although these methods are as yet only rudimentary, costly and cumbersome[1].

[1] See Johnston [19], part 2, particularly the introductory chapter.

Even though some attempts will be made to evaluate quantitatively effects of a more indirect nature, this empirical study aims first and foremost, at estimating the primary net additions to investment activity, generated by the general release of I-funds in Sweden during 1962/63. More particularly the timing of these direct effects is to be studied. Before proceeding on this point, however, it will be necessary to give a more detailed account of the institutional conditions governing the release of I-funds for investments in construction, machinery and equipment in 1962/63.

## I:6. Circumstances and conditions of the general release of I-funds in 1962/63.

During the first few months of 1962, an evaluation of the economic situation, by the labour market authorities, indicated a probable decrease in employment among the investment goods industries in Sweden, to be felt in full during the winter half year of 1962/63. The seasonal decline in investment activity, during the winter months, particularly in the construction sector, was expected to be reinforced by a general slowing down of business activity. The rate of increase in foreign demand for Swedish products, also seemed to retard compared to the preceding years. The development of domestic demand was more difficult to predict. Apprehensions centered around demand for investments in construction, particularly in industrial construction. The investment surveys of October 1961 and March 1962 among industrial firms, although hazardous to interprete, indicated a decline in planned construction investments. Engineering firms which had prospered during the previous years from an extended period of expansion were still optimistic about 1962, although expectations were no longer uniform. The rate of orders received had declined, and long term prospects for 1963 were deemed uncertain[1].

To prepare for a potential release of I-funds during 1962 the regional agencies of the Labour Market Board early in the year contacted firms

[1] See e.g. Kragh, B. [25]. 64 ff. Olsson, B. [37] and The Swedish Economy Nov. 1961 and April 1962.

possessing I-funds. On May 11, 1962 the release of I-funds for investments in construction was generally announced. Although formally on an individual basis—each firm had to apply for the use of its fund—permission was granted without exceptions for all investment projects that complied with certain conditions. The release of 1962/63 will therefore be referred to as the *general release of 1962/63*. One stipulation was that projects be *started* before November 1, 1962. Furthermore, only work performed and materials bought *during* the period July 1, 1962 and April 30, 1963, the period of release, could be financed via the I-funds. All firms possessing an I-fund were notified shortly after May 11, 1962 by a circular from the Labour Market Board.

In view of the ample preparatory work and the restrictive requirements on time-planning, it was hoped that a sizable increase in construction activity would be achieved during the critical winter period. The short ten-month period of release also made it possible to postpone further decisions regarding the operation of the I-funds system until more information about economic conditions had been gathered. In fact, use was made of this possibility on April 5, 1963, during the last month of the period of release, when it was seen that a seasonal upswing in construction activity during the summer of 1963 would propably make for an overactivization in certain geographical areas. Thus permissions already granted could be prolonged for the period November 1, 1963 to March 31, 1964, provided, among other things, that building activity on such projects was reduced to a minimum during the summer of 1963. However, the number of firms making use of this offer was small, compared to the total release. By the end of 1963, a total of 42 licenses of this kind had been issued, compared to the 860 projects in the general release.

On November 30, 1962 a release was announced for investments in machinery and equipment. Orders had to be placed before May 1, 1963 if the funds were to be used for such investments. In most cases the investment goods also had to be delivered not later than December 31, 1963 to become eligible for IF-financing.

In addition to these two releases of I-funds, complementary measures of fiscal and monetary policy were undertaken during 1962 and 1963 to increase employment. Thus both local authorities and Government

enterprises were urged to place orders for machinery and equipment, and to embark upon construction projects earlier that originally planned. The volume of housing under construction was increased considerably, and together with measures aimed at an easing of the credit market, the official discount rate was lowered in stages from 5 to 3 1/2 percent.

The main concern of this study is to isolate and to measure the impact of the two particular releases of I-funds during 1962 and 1963, described above. For practical reasons the period for which detailed information has been collected has been limited to July 1, 1962—September 30, 1963, thus including the ten-month period of release, and a subsequent period of five months, covering the important development during the summer season of 1963.

# II. Method of measurement

## II:1. Introduction

In order to deal with the complex of problems connected with a realistic and measurable definition of what should be meant by the "effects" of an I-funds release, a comprehensive discussion of the assumptions underlying these measurements will necessitate a rather cumbersome definitional apparatus. To simplify the reading of this chapter and its relation to the empirical findings in chapter III, this formal discussion is given in a last section of this chapter. Verbal and diagrammatical definitions of the effects measured are used to begin with. Also, it will be sufficient to list the important problems of measurement encountered together with an evaluation of empirical data secured. References will be made to the formal section whenever more precise information is deemed desirable.

For practical reasons this chapter will only be concerned with empirical data secured on construction projects. The kind of information collected on I-funds investments in machinery and equipment is of a quite different quality and is discussed only in section III:5 (p. 100).

## II:2. Basic empirical material

Appendix I contains abbreviated translations of the questionnaires sent out to each firm granted permission to use its I-fund for investments in machinery and equipment or in construction works. As far as construction investments are concerned, fortunately each firm has in general had no more than 2-3 IF-projects, so that it has been possible to formulate the questions in accordance with individual investment projects. Thus the number of forms B1 corresponds to the number of IF-projects. For each project, information was requested on the ex post distribution of costs and employment over the construction period (questions 1 and 2).

These distributions will be referred to here and in chapter III as *cost-* and *employment silhouettes*. However, the terms *cost-* and *employment functions* will sometimes be used as synonyms. Experience during the field work on this investigation suggest that in most cases the quarterly cost figures were taken directly from the firm's current accounts. They are thus expressed in *current costs* and cannot be expected to be periodized with respect to actual work performed and materials used. The monthly employment figures frequently seem to have been supplied by the construction department of the firms or directly by the supervisors of the construction projects. The quality of these data is believed to be relatively good. Apparently the economic contents of these two standards of measurement—costs and employment—are quite different. The cost silhouettes include total value added from all stages of production of the project, costs for intermediate production as well as final production on the building site. The employment silhouettes on the other hand, only refer to actual performance on the construction sites. The two measures will be used for different purposes in chapter III.

The cost-figures have been obtained only on a quarterly basis, and one can suspect a considerable lag between registered payments and actual work performed and materials used. In order to convert the quarterly cost-data to a monthly basis and to secure a better measure of actual investment activity over time on the I-funds projects, total registered costs of the project have been spread over the construction period according to the level of employment, measured by the number of workers (see p. 62). It will simply be noted that any errors of measurement in these figures are to be found in the estimates of total costs from registered payments of the firms and reported relative (not absolute) monthly levels of employment on the project. Since this information is believed to be of good quality, the *ex post, employment-weighted cost-silhouettes* will be used exclusively in the coming chapters as a measure of periodized costs, or investment activity over time. Implicit in this measure is the notion of a constant ratio between costs for labour input and other inputs over the construction period of the individual project[1], since the costs of materials used, etc. have also been spread over time according to the level of employment. It is

[1] Cf. p. 62 and the fotnote on p. 85.

thought that when a large number of cost-silhouettes are combined, individual variations in this (assumed) constant ratio are evened out. Large variations in prices of factor inputs might constitute a more serious problem. Either the cost-silhouette of the individual project should be deflated to constant prices, in some fashion, or changes in investment costs over time due to price movements will be spread over time according to the level of employment (which is definitely not desirable). In the period investigated, price changes do not seem, however, to have been large enough to necessitate any particular corrections.

*Cost-silhouettes aggregated over all I-funds projects*

Million kronor. Quarterly data

| | 1962 | | 1963 | | |
|---|---|---|---|---|---|
| | 3 Qr | 4 Qr | 1 Qr | 2 Qr | 3 Qr |
| A : Without weighting | 43.4 | 154.7 | 191.3 | 189.6 | 103.6 |
| B : Weigthed | 44.2 | 159.2 | 203.7 | 168.8 | 113.7 |
| A—B | —0.8 | —4.5 | —12.4 | +20.8 | —10.1 |

The above table gives a comparison between (A) aggregate registered quarterly payments on all I-funds construction projects belonging to the general release (raised to 100 percent) and (B) the corresponding payments spread over time according to the level of employment on the individual construction project. It will be seen that payments lag behind the weighted series during the period of release, suddenly to move ahead of the weighted series during the second quarter of 1963, only to lag behind again during the third quarter. The most plausible explanation of the positive residual (A—B) is a take home by the entrepreneurs of outstanding invoices during the last month of the period of release. Such a tendency was also clearly revealed by a pilot study in October 1963, in which cost-figures were requested for the last month of the period of release, April 1963. The fact that the sum of residuals A—B do not equal zero should be attributed to rounding errors in the EDP-calculations.

As will soon be seen a crucial piece of information requested from the firms concerns the alternative starting dates of individual construction projects, assuming that no I-funds had been released. Both the definition and the collection of information on the lengths of this *time-shift* pose tricky problems. These difficulties are dealt with explicitly in terms of a simple model of measurement in the last section of this chapter. For the time being the difference, s, measured in months between the alternative starting date and the one realized, will be introduced only as an operational quantity, determined from questions 4, 6, 7 and 8 on form B1 (see Appendix I and diagram II:1). A negative value for s means that the I-funds release has postponed the investment activity. Such a case will be denoted *negative time-shifting.* Similarly *positive time-shifting,* i.e. $s > 0$, implies an advance shifting in time of the starting date, and a *zero time shift* means that the project would have been started at the same time, even though no I-funds had been released, according to the estimate of the entrepreneur. Furthermore positive time-shifts have been divided into *"measured"* reallocations of starting dates between quarters of a year inside the *period of investigation, January* 1. 1962—December 31. 1963, and time shifts of *"unspecified length"* from a not reported date later than December 31, into a quarter of the above period of investigation. From the specified time-requirements of the general release (see p. 30) it should be evident that this in fact means that all starting dates have been shifted into the last half year of 1962. Furthermore an approximation has been used, when taking the middle month of each quarter reported, as the alternative starting period, in order to obtain a measure of the time-shift in months.

### II:3. The net effect operationally defined

The "box-diagrams" in diagram II:1 illustrate the estimations of the net effects of an individual investment project, in terms of a simple example. In the upper chart to the left the employment-weighted ex post cost-silhouettes, $g_{(t)}$, defined in the previous section is seen. The procedure employed is to move this ex post silhouettes s time-units to the right to its reported alternative position in time $g^{A'}_{(t)}$. The in-

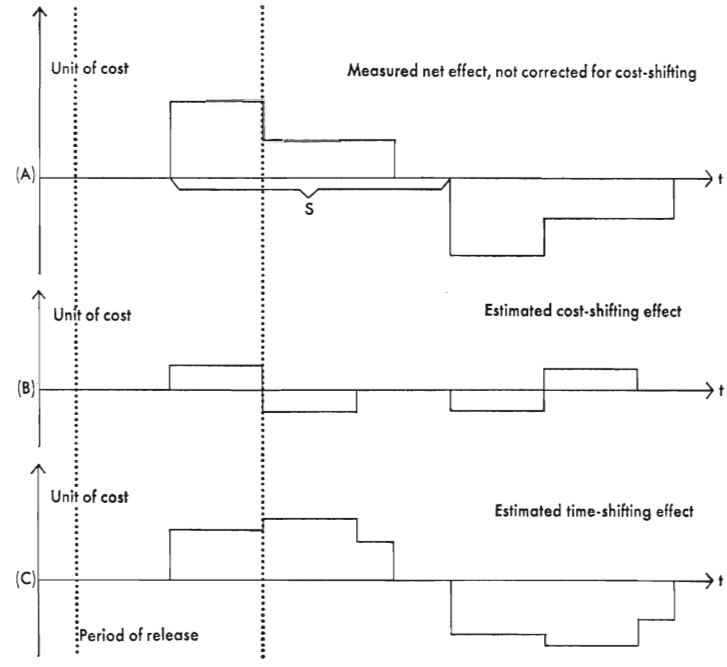
dividual net effect, not corrected for variations in the shape of the cost-silhouettes ("cost-shifting") is thus seen in chart (A). When adding these silhouettes vertically over all I-funds projects we obtain for each t-value:

The total *gross I-funds effect:* $G = \Sigma\ g_{(t)}$ (II:1)

The total alternative cost-silhouette:
not corrected for cost-shifting $A' = \Sigma\ g^{A'}_{(t)}$ (II:2)

The totalt net effect:
not corrected for cost-shifting $N' = G - A'$ (II:3)

*Diagram II:1*



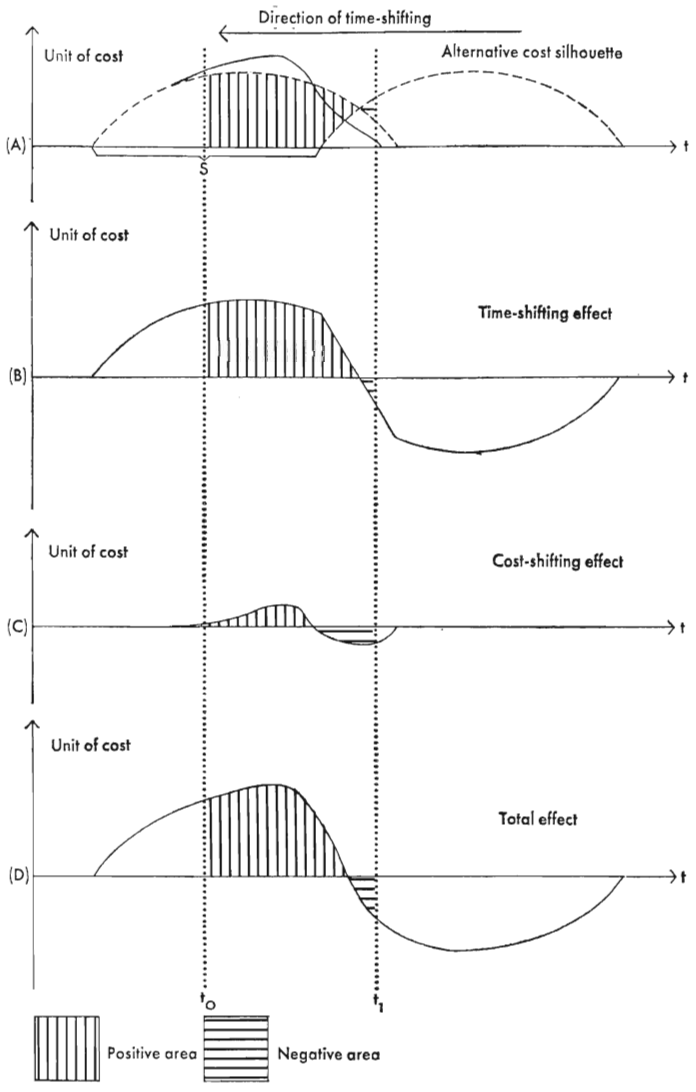
The effects have been defined as a flow of investment activity over time. When using instead the employment silhouettes, denoted by $e_{(t)}$ and $e^{A'}_{(t)}$ we obtain analogous definitions for the employment effects[1].

Evidently this procedure is not sufficient for a correct estimation of the net effects of an I-funds release. $g_{(t)}$ (or $e_{(t)}$) stands for the investment activity actually carried out. In the definitions above the alternative silhouette $g^{A'}_{(t)}$ (or $e^{A'}_{(t)}$) has been assumed to be identical in shape. But there is no apparent reason to expect that this alternative and hypothetic cost-silhouette would not change its shape during the time-shift. To the opposite effect, the stipulations of the general I-funds release of 1962/63 would rather induce the entrepreneurs to shift systematically as large a volume of costs as possible into the period of release, July 1, 1962 to April 30, 1963. One might therefore expect the presence of *at least* two kinds of effects: the *time-shifting* effect which concerns two identical silhouettes, and the *cost-shifting* effect which concerns the shape of the two silhouettes. These two effects are illustrated in diagram II:2. Figure (A) shows the shifting forward in time of the alternative cost-silhouette (broken line) to its ex post position. The difference between the ex post silhouette and this shifted (broken) alternative silhouette is defined as the cost-shifting effect, shown in figure (C). The difference between the shifted and unshifted alternative silhouettes is defined as the net time-shifting effect, pictured in figure (B). These two effects added vertically will give the total net effect silhouette in figure (D).

It is difficult to find out afterwards how investment costs would have been distributed assuming that no I-funds had been released, i.e. to estimate the cost-shifting effect. A priori considerations of technical rigidity suggest, however, that positive cost-shifting forward in time into the period of release, cannot be very large in volume compared to the total volume of costs of the project. Nevertheless an attempt has been made to question the firms on this point (form B1, question 9)[2]. Thus from the data secured on projects with reported zero time-shifts on form B1, it has been estimated that in 24 cases out of 100 an average of 17.6 percent of total costs has been shifted into the period of release.

[1] See e.g. diagrams III:4 and III:5.
[2] Cf. diagram III:1.

*Diagram II:2*


Direction of time-shifting
Unit of cost
Alternative cost silhouette
(A)
S
t
Unit of cost
Time-shifting effect
(B)
t
Unit of cost
Cost-shifting effect
(C)
t
Unit of cost
Total effect
(D)
t
$t_0$
$t_1$
Positive area
Negative area

Arbitrarily it has been assumed, that these figures are representative also for all construction projects shifted in time, as long as more than one third of the realized construction period falls outside the period of release. The method of approximation employed is to spread 17.6 percent of total reported costs evenly over the part of the ex post construction period that falls within the period of release, and to subtract the same constantly linear cost-silhouette during a period of equal length after the period of release. Adding these constantly linear approximations vertically and dividing the total monthly figures by $\frac{100}{24}$ gives the estimated total cost-shifting effect. Similar corrections have been made in the alternative cost-silhouettes located inside the period of investigation. The procedure is illustrated in diagram II:1, chart B. Chart C pictures the corresponding time-shifting effect, i.e. the total net-effect in A less the estimated cost-shifting effect. A more detailed description of the EDP program used for these calculations will be found in the last section of this chapter (p. 62). Apart from the difficulties of estimating the volume of cost-shifting—which have been left to the entrepreneurs[1]—the further assumptions necessary for this calculation are rather arbitrary. There is no a priori reason to expect that the group of projects with reported zero time-shifts are representative for all I-funds projects, as far as cost-shifting is concerned, nor that cost-shifting does not take place as soon as more than two thirds of the construction period falls within the period of release. Furthermore, total costs of the construction project have been assumed to remain constant during the course of cost-shifting (see the next section). The constantly linear spread of the volume of cost-shifting over time is not particularly realistic in relation to individual projects. On the other hand, when a large number of projects are aggregated, the errors arising out of this approximation tend to cancel out under reasonable assumptions (see the discussion in section III:7).

## II:4. Errors of measurement

This section is designed to form a link between the empirical data

[1] Cf. the discussion of Arvidsson, [2].

collected and described above, and the subsequent interpretation to be given in chapter III. More generally speaking, an appraisal—on rather subjective grounds—will be given on the method of measurement employed. Even though intended to be read separately, this appraisal will rely heavily on the formal exposition in the next section, which includes a simple "model of measurements". It is to be hoped that the subjective element of this evaluation will relate only to assumptions of this model. The main concerns of this section are firstly to see what quantities we are examining or want to examine compared to what quantities we are actually measuring, and secondly to inquire into the quality of the data secured, whatever their definition. The first point involves a discussion of the *validity* of the operational quantities measured, and the second an estimate of the *reliability* of the instrument of measurement employed[1].

Usually the validity problems will be considered in their empirical context in chapter III. Here only a few specific questions of a more general character will be disposed of rather briefly. The first question refers to the use of ex post silhouettes also as alternative ones, shifted to the reported alternative positions in time. Individual variations in the shapes over the construction period of these cost- and employment silhouettes during the course of time-shifting may be expected on a priori grounds. Still, the most probable direction of such cost- or employment shifting effects will be towards a more stretched out construction activity over time on the alternative silhouettes through work stoppages, limited supply of labour and materials, etc. Technical rigidity, on the other hand, puts rather narrow limits to the possibilities of speeding up at short notice the rate of building activity over the construction period on a project. An attempt to estimate quantitatively the extent of these effects has been described already. The empirical results, however, indicate a moderate volume of cost-shifting due to the I-funds release (se p. 72). This finding explains why no further attempts have been made to correct computed net effects in chapter III for cost-shifting.

One further validity problem has a bearing on the definition of the I-funds project. There is no apparent reason to expect that the

[1] These are concepts commonly met whith in psychological literature. For a simple introduction see Downie [9], Ch. 4. For a more extensive discussion se Husén [16], in particular Ch. 5.

I-funds projects listed by the Labour Market Board represents an indivisible unit, as far as its responses to the I-funds release are concerned. Thus maybe only part of it has in fact been shifted forward in time to its ex post construction period (while the rest would have been constructed anyway even if no I-funds had been released). To some extent form B1 has been designed to take care of such cases and the relevant question 8 has been made use of in about 50 instances. The empirical findings in chapter III also indicate that the "size" of an investment project measured in total costs is a rather loose concept, even when the effects of price movements have been taken care of (see section III:7). The method for estimating the cost-shifting effect described earlier, does not allow for a variation in total costs during the time-shifting, but only for a redistribution of fixed total costs over the different months of the construction period. It seems as plausible to expect that increases in costs due to an advance shifting in time of the starting dates might have reduced the "extent" of the project, as there are reasons for believing that "windfall" IF-benefits to projects already planned to be undertaken according to stipulated time-requirements might have increased it. For about one third of all construction projects this problem is of no importance for the net measurements, since the reported alternative construction periods fall outside the period of investigation (see p. 66). Also in many instances individual variations can be expected to cancel each other out, and it is believed that what is left is unimportant enough not to affect the inferences drawn in chapter III.

Finally, the *reliability* problem. Essentially, the reliability of measurements has a bearing on the quality of reported time-shifts, by far the most crucial piece of information, upon which the net effect estimates of this investigation rest. It is believed that the unique information available in the form of a complete listing of all construction projects has made possible the improvement of the IF-questioning technique necessary for a satisfactory precision in this respect. Still, however, the conditions required for a correct "backward estimation" of what would have been the alternative starting period of a single investment project had not the I-funds been released, cannot be expected to be satisfied in general. In many instances, especially among large firms, it is known that the questionnaires were handed over to people who cannot be

expected to participate in the firms' actual decision making. Such circumstances must constitute a serious source of errors, especially if no explicit planning of investment activity takes place regularly inside the firm.

Information from a large number of casual contacts with firms during the field-work of this investigation and further information from other sources (see the next section) suggest the possibility of formulating a few reasonable assumptions upon which—it is believed—a quite realistic evaluation of the probable qualities of reported time-shifts can be based. Thus it has been assumed that answers were based largely on the existence of very "simple" investment plans of the firm, only requiring information on whether the project had been scheduled to be started during one of the quarters of the period of investigation considered, or not. No doubt a rough, preliminary plan of this kind must exist inside the firms, a fairly long time ahead, at least when larger construction projects are concerned—plans that grow more rigid and detailed as time goes on. E.g. technical preparation of a large construction project often needs more time than the actual building of the project. These investment plans may have been drawn up explicitly, or only been memorized in the minds of the executives, from the time of the I-funds release. Thus the "properties" of this "planning" most probably will determine the qualities of reported time-shifts. Inserting a few further assumptions, it will be shown in the following technical section that the less precise these "simple" investment plans of the firms the more probable that we have obtained too large a number of "unspecified" time-shifts into the period of investigation from periods later than December 31. 1962 (see p. 55). Also reported "measured" time-shifts inside the period of investigation might be too short, on the average (see p. 56) since projects planned to be started during one specific period of time, often have a tendency to be delayed somewhat, due to many different factors not foreseen in the planning. These delays may not have been discounted in the estimates. However, such postponements normally should not move the project out of the quarterly intervals of precision required. It should furthermore be observed, that the alternative starting periods reported by the entrepreneur cannot represent anything but the alternative starting period *desired and/or*

*planned* by the entrepreneur assuming no I-funds had been released. Each construction project within the regulated sector of construction in Sweden, to which practically all I-funds projects belong, requires a licence to start from one of the regional agencies of the Labour Market Board[1]. Delays of the above kind thus can be attained, simply by postponing the granting of such licenses.

It can be shown that the factors discussed above suggest a more steeply rising alternative aggregate cost-silhouette in the beginning of the period of investigation, changing into a still steeper upward slope towards its end, thus reducing the positive net total I-funds effect proportionately more per month after the period of release, than inside it compared to what has been measured in this investigation (p. 60). This correction in fact has a tendency to improve the timing of the net I-funds effect most probably without affecting substantially the positive part inside the period of release, in particular if a large part of the positive net effect happens to lag outside the period of release. This is so, since the rising alternative cost-silhouette is subtracted from the unchanged gross cost-silhouette to give the net effect, by definition. However, the quantitative import of such a tendency cannot be estimated a priori.

One should finally not exclude the possibility that some entrepreneurs may have consciously reported too long time-shifts, in the belief that the effect would then look more impressive and stimulate further use of I-fund policies. Also such a tendency will probably make for too large a number of reported time-shifts of the "unspecified" kind.

## II:5. On the method of measurement—a theoretical exposition

***Introduction.*** This theoretical exposition is an attempt to formalize the framework of measurements briefly sketched in the earlier sections, and to define more strictly the economic content of the quantities measured in this investigation. It is desirable to define explicitly, whenever possible, the tools employed to secure information, and to list at least the most important assumptions used, since these are often too well hidden in the results obtained. In professor Haavelmo's terms this means that we will be studying the relationships between the

[1] See section III:7. It should be noted that in some geographical regions this regulation is at present only partly enforced.

"observational", the "true" and the "theoretical" variables of this investigation[1]. We need a model of "measurements", and this model will be formulated on the basis of the unique information available, namely, a complete listing of all individual investment projects directly affected by the IF-release. As a by-product of this exposition a few inferences will also be drawn concerning the probable qualities of reported data in the questionnaires. This formal analysis has been designed with particular reference to investments in construction. However, the same conceptual framework is also applicable to other kinds of investment activities, although the empirical substance for such a discussion will not be available as far as I-funds investments in machinery and equipment are concerned[2].

The point of departure is the specification of two different plan-concepts of the firm. From a specified investment plan of the firm, including all investment objects planned for and requiring information on the distribution of costs of the individual object over the construction period (i.e. the cost-function or cost-silhouette) will be singled out a more simple investment plan, requiring information only on the planned starting period of the individual investment object. It is thought that this abstraction corresponds realistically to two functionally diverse levels of decision-making inside the firm. The simple investment plan is believed to recognize the y e s o r n o type of decision, which determines whether the investment object is to be undertaken or not, and if yes, when. Normally this kind of decision is probably made at a rather high executive level, and once made, maybe at a regular board-meeting, is not easily revised. From this simple investment plan, related to the "need" and resources of the firm, will be kept distinct the chain of technical decisions determining the mere realization over time of the project. It is believed that such an arrangement conforms better to the mode of entrepreneurial thinking than a more aggregate approach would do[3].

*The simple investment plan of the individual firm.* To start with, it is convenient to define a general "framework" of measurements, including all investment objects of the *individual firm* planned for in a loose sense or simply considered as possible objects for some future period of time. This set[4] of investment

[1] See Haavelmo [15] pp. 5 ff.
[2] See section III:4.
[3] Cf. the results from an interview study by Eisner [11], ch. III, or Bohlin, [4].
[4] The concept of a "set" is used here simply to represent a bundle of certain well-defined objects or elements, clearly distinguishable from every other object, by the specification of certain properties.

Cf. Koopmans' verbal definition (Koopmans [23], p. 10): "A set A of points in a space is defined by any rule or criterion which allows us unambiguously to determine for every point x in the space whether it belongs to A or does not belong to A".

See also Cramer [8], part I or Marc-Wogau [31], ch. 4. The symbols used are taken from Cramer.

objects, called the *investment space* of the firm, will be denoted:

$$I_k \qquad \text{(II:4)}$$

as defined for an arbitrary period of time k. The specific property which makes an individual object belong to the investment space of the firm, is the very fact that it has in some sense been considered in a "long term" investment plan. Of course some investment objects in this investment space will have more exact properties of planning attached to them, when the time dimension is considered. One of the purposes of the first few paragraphs is to single out subsets of the investment space making up more definite investment plans, from period to period. Definitionally the manner in which these plans are realized and revised according to variations in the economic environment of the firm, will make up the net I-funds effects.

Contrary to practice in economic theory, the "framework" of entrepreneurial investment planning has been defined in terms of individual investment "objects". This approach is possible thanks to the unique information available in this investigation in the form of a complete listing of all individual investment projects subjected to an I-funds permission. As will be seen, it is also more suitable for the interpretation of empirical data secured in this investigation, to work in terms of well-defined investment objects than with an empirically more ambiguous concept of the investment volume or value per period of the individual firm.

Returning now to the investment space of the firm, defined during period o; towards the end of this period, two subsets of the investment space can be distinguished, such that:

$$I_0 = I_0^R + I_0^{R*} \qquad \text{(II:5)}$$

where $I_0^R$ comprises investment objects embarked upon during period 0, which can be separated from the investment space by the number 0 of the starting period. $I_0^{R*}$ is the complement of $I_0^R$ with respect to the investment space, and thus contains all the other investment objects. "R" stands for "realized". At the beginning of period 1 a new investment space has to be defined for this period. Thus:

$$I_1 = I_0^{R*} + I_0^A - I_0^S \qquad \text{(II:6)}$$

where $I_0^A$ stands for the set of investment objects added ("A") to the investment space during period 0. Similarly $I_0^S$ is the corresponding set of objects subtracted ("S") from the investment space during the same period. In this investigation it will be convenient to introduce the *short run* concept more specifically in a somewhat unusual disguise. This will be done by *assuming* that the sequence of additions to and subtractions from the investment spaces of the previous period, i.e. the sets $I^A$ and $I^S$, contain no investment objects for each period contained within the short-run interval of time considered, i.e.

$$I_k^A = 0 \qquad I_k^S = 0 \qquad k = 0,1 \ldots L \qquad (II:7)$$

L is the number of periods considered[1]. Thus (II:6) reduces to:

$$I_1 = I_0 - I_0^R \qquad (II:8)$$

Repeating this procedure L + 1 times under the assumption (II:7) we get:

$$I_L = I_0 - \sum_0^L I_k^R \qquad (II:9)$$

According to the notational apparatus above, the present period of time becomes L. The distinction to be made is to introduce an estimate of the last term or part of the last term in expression (II:9) as it can be determined or "planned" by the entrepreneur during an arbitrary previous period, $\alpha$, as the *"simple investment plan"* of the firm for the periods $\alpha+1, \ldots$ L, the "planning horizon"

$$\sum_{\alpha+1}^L I_k^{RP(\alpha)} \qquad (II:10)$$

It should be noted that as soon as $\alpha \geq 0$, (II:10) may contain less projects than the last term of (II:9), in so far as some projects may have been embarked upon during the periods 0,1, ... up to the period of planning, $\alpha$. This definition implies that the firm's short run investment plan comprises only those investment objects, the starting dates of which have in some sense been allocated during a period $\alpha$ to one of a future number of L-$\alpha$ periods. Moreover, all these "planned" investment objects belong to the investment space, or long term investment plan, originally defined during period 0. The longer the time-span 0,1, ... L the more unrealistic will be assumption (II:7)[2].

Clearly, the specification of the investment "object" is crucial in this context, and so is the question of what is meant by a "period". For one thing, each object must be clearly distinguishable from every other object in the investment space, at least during the sequence of L periods considered, so that decisions concerning the simple investment plan will pertain to the whole investment object, and not just to part of it. Such a definition calls for a detailed classification of the properties of the investment object, and only exceptionally will it be possible to regard one object as independent of all other objects where plan-decisions are concerned. Thus, e.g., one building project may have to be regarded as consisting of a bunch of individual investment objects linked together technically, but each of which is liable to be affected differently by changes in the economic environment of the firm. In the present treatment the term *object* will thus be reserved for the individual, well-defined part of what is usually a

[1] The results derived in the proposition on p. 54 do not depend on this assumption which has been inserted mostly in order to simplify the formal apparatus.

[2] Cf. the distinction between a "long term" and a "short term" investment plan in a large Swedish corporation, Bohlin, [4].

larger investment *project*. It may be noted here that one important approximation made in the empirical measurements is to regard each investment project listed by the Labour Market Board as an object in the above sense (see Appendix I, form B1). However, nothing has been said as yet about *how* the simple investment plans may react to changes in the economic environment, caused by, say, an I-funds release.

The second problem referred to is the length of the time periods. As long as only one firm is concerned at a time, this length may well be variable, without violating the results of this exposition. However, when the firms are aggregated and this model is applied to empirical data collected in this investigation, it will be necessary to transform the time-dimension into calendar time[1]. Thus the questioning of the firms as to their investment plans, has been dated to quarters of a year. Furthermore, the "time horizon" or *period of investigation* from which data have been collected on the simple investment plan, has been limited to 8 ($=L$) such quarters, namely *January 1. 1961—December 31. 1963.* One further property of the simple investment plan is implicitly assumed, namely that for each quarter of time k there is a *unique ordering* in time of investment objects in the simple investment plan (II:10) for the remainder of the period in question. What is left of the investment space of period k, are the investment objects with no explicit connection with any of the quarters of the period but which are nevertheless expected to be undertaken at some later although unspecified period of time. It should be observed that the number of such investment objects, with no explicit location in time when the I-funds are released, are later expected to be essential for the qualities of responses in this investigation. Note also that the assumption of a unique ordering of investment objects precludes the existence of alternative investment plans of the firm. As far as can be seen from the field work of this investigation, this fact, however, seems to be of little practical importance.

*The cost-function of the individual investment object.* Besides the starting period, each investment object is also characterized by other important properties, described here by the concept of a *cost-function* or *cost-silhouette.* Since this cost-function, constituting the specified investment plan hinted at in the introduction, is supposed to represent the level of "investment activity" over time on the individual object, the standard of measurement used must necessarily be periodized and expressed in constant costs, in order to eliminate the influence of changing prices on factor, inputs and lags in time between actual quantities of work performed and the corresponding payments registered. This cost-function will now be introduced by:

$$g^p_{(t)} \begin{cases} \geq 0 & t^p_s \leq t \leq t^p_r \\ \text{for} & \\ = 0 & t < t^p_s \text{ and } t > t^p_r \end{cases} \qquad \text{(II:11)}$$

[1] I.e. to *assume* "homogenous" decision-periods of equal length for all firms. Cf. the discussion on this problem by Modigliani and Cohen [33], pp. 129 ff.

$(t_s^p , t_r^p)$ stands for the (planned) *period of realization* of the investment object. The notation "p" always signifies "planned" quantities, subject to revisions over time. $t_s^p$ signifies the planned starting date of the construction object and correspondingly $t_r^p$ the planned date of tealization. The absence of "p" means that measurements have been performed ex post. With these symbols the planned process of realization or a current cost-plan of the project can be expressed by:

$$T^p = \int_{t_s}^{t} g_{(u)}\,du + \int_{t}^{t_r^p} g_{(u)}^p\,du \qquad t \rightarrow {}^{t^p}_{s} \qquad (II:12)$$

where t represents the present date or the date of planning. Note that planned total costs, $T^p$, may change, if revisions are made in the planned part of the cost-function. Furthermore, an analogous definition can be given with the help of the "employment function" of the investment object, $e_{(t)}$, denoting the number of man-hours or man-days worked per unit time (see p. 85).

*The investment decision.* The investment plan of the firms has hitherto been regarded as a momentary phenomenon. It has been defined as a sequence of numbered sets including investment objects (II:10), the number referring to the periods during which the objects have been planned to be started, or as a planned cost-function of the individual investment object, (II:11). The properties of these two plans should be regarded as being determined during one specific period of time, for a sequence of future periods. In a realistic setting, changes or revisions in these plans must also be allowed for. Revisions of this kind will constitute the net effects of an I-funds release. Apparently a necessary requirement for meaningful measurements of such effects is some kind of explicit or implicit ordering over time of future investment activity, as suggested by the two investment plans above. However, the dynamic properties of this planning procedure necessitate an elaboration on the time-dimension of the investment decision.

The first part of this paragraph will only be concerned with the decision process preceding the realization of a sequence of simple investment plans (II:10). For this purpose the economic environment determining the properties of this simple investment plan of period $\alpha$ is introduced by a finite *set of constraints,* denoted $\Theta\alpha$. The point to be made is that, whatever their nature, all factors determining the characteristics of the simple investment plan (II:10) amount to a finite number, and sufficient changes in the set of constraints will be assumed to constitute the sole causes of revisions in the investment plan (II:10) of the firm. It can thus be said, that a set of ordered couples

$$(\Theta_\alpha , \Sigma I_k^{R.P(\alpha)}),\ \alpha+1 \leq k \leq L$$

may be defined for each firm during each period of time $\alpha$, such that there will be only one pair with a given first component $\Theta_\alpha$. The second component

stands for the simple investment plan (II:10). This reformulation of the simple investment plan may be written more familiarly in functional form:

$$\Sigma\, I_k^{RP(\alpha)} = \sum_{\alpha+1}^{L} I^{RP(\alpha)}_{\{\Theta_\alpha\}} \qquad \text{(II:13)}$$

By excluding "practically" irrelevant parameters from the set of constraints, by making the number of periods investigated sufficiently small and each period long enough, the existense of such a plan for each period $\alpha$ should be a quite realistic assumption[1]. Our problem of interpretation, however, stems from the fact, that we have to postulate quite arbitrarily in this investigation that k be 8 in number and each period of a quarters length. Furthermore, this function is assumed to remain stable over time, the property of stability being marked by the absence of time as a separate element in the set of constraints[2]. As long as the set of constraints remains sufficiently stable from period to period, the investment plan will be assumed to be gradually realized as planned; this assumption may be explicitly formulated as:

if all $\triangle\, \Theta_k$ are sufficiently small, then

$$\Sigma\, I_k^{RP(\alpha)} = \Sigma\, I_k^R \qquad \alpha + 1 \leq k \leq L \qquad \text{(II:14)}$$

As long as the set of constraints is realistically allowed to vary over time, however, the "investment function" (II:13) will be revised in a step-wise fashion from period to period, a circumstance that makes it difficult indeed for the entrepreneur to estimate, what would have been the hypothetical properties of $\Sigma\, I_k^R$ for a sequence of periods, had not the I-funds been released during the first period of this sequense. This is requested in form B1, questions 6, 7 and 8 (see Appendix I).

Before proceeding to the specified investment plan, it should be noted that the economic environment of the simple investment plan as defined through the set of constraints, is supposed to express the impact on the plan not only of initial and known environmental circumstances, but also of anticipations about future conditions relevant for the investment planning of the firm in terms of plan (II:10). More particularly, the simple investment plan does not pretend to express the optimal investment behaviour of the firm under full knowledge of future relevant conditions, but the proper mix of optimal plan solutions determined in the light of an uncertain future economic environment. Thus the strategy of the firm, with respect to risk-taking, as determined through an appraisal of the dispersion of anticipations, is also defined in investment plan (II:10). During the realization of the investment plan, only one line of action is thinkable. On the other hand, different lines of action might have been

[1] Cf. Modigliani and Cohen [33] e.g. pp. 55 ff. and Haavelmo [15] p. 50.
[2] Note that this is the mathematical requirement for "stability" in the above sense. The allowance for any kind of "shifts" in this function will at the same time violate the "stability" assumption.

planned for different contingencies. This difficulty is ruled out, however, by the prescription of a unique ordering of the investment objects in the simple investment plan, a limitation that seems to be of little practical importance (see p. 48)[1].

Obviously the introduction of planned cost-functions as defined by (II:11) complicates things further. Owing to the increased demands for specification, the cost-plan (II:12), if it exists, should be very sensitive to variations in the set of factors determining its realization. An enlarged set of constraints has to be introduced, taking care of a multitude of factors influencing the day-to-day work on the investment project. For obvious reasons such a day-to-day performance on, say, a construction object cannot be settled many days ahead. The planning period assumed has to be shortened considerably, and there is reason to doubt its very existence in a meaningful sense, as well as the presence of a stable relationship between a hypothetical, planned cost-function of the investment object, and its determinants. These difficulties become even more acute when it is considered that the production of most investment projects included in the I-funds release has taken place outside the firm making decisions as to the simple investment plan (II:10). Under such circumstances, one of the necessary requirements disappears for an intelligible questioning of the firms on the alternative shape of the individual cost-functions had no I-funds been released. As can be seen from section II:3, only a vague attempt has been made to estimate the influence of the I-funds release on the shape of the cost-functions of individual investment objects (the cost-shifting effect). In general the cost-functions registered ex post have been used also as alternative ones for the situation with no I-funds release.

*Rearrangements in the investment plans.* The simple "investment function" of the firm as defined in (II:13) in the previous chapter, related present and known environmental conditions and future expectations to a planned future

[1] For a similar approach, cf. Modigliani, F. and Cohen, K. J. [33]. In their formal framework of entrepreneurial planning, these authors define three "structural" functions: the "decision function", the "enforcement function" and the "anticipation function". The decision function describes the "decision" or decided "first move" of the firm for a subsequent period, as a function of actual environmental conditions and anticipated values for a set of relevant variables over the restricted time-horizon of the firm. At the same time the enforcement function determines actual realization of plans as a function of the realization of anticipated values. As long as the anticipated values of the variables of the decision function are being realized as anticipated during the period in question by definition, the planned quantities of the decision function will be realized. The "plan" and the decided "first move" of the firm generally do not coincide, except for the period following immediately upon the decision period. This is so since the actual first move chosen is expected to impose constraints on the optimal composition of later moves. The "plan" and in our case the "investment plan" is rather looked upon as the "best judgement" or "forecast" the firm can make as to a future course of action. See e.g. pp. 54 f.f. and chapter II.

investment behaviour in a unique way. This definition implied that, given the properties of a certain set of constraints for one firm during one period of time, one unique preference ordering could be obtained of potential investment objects by the sequence of their planned starting periods, given a stable and known function (II:13).

Suppose now, that there is a single well-defined change in the set of constraints, because of the I-funds release, during period 0. Revisions in the plans for a sequence of L periods now have to be made, thus giving rise to a new simple investment plan (II:10) for the sequence of L periods considered. Using expressions (II:9) and (II:10) and assumptions (II:7), this may be written symbolically:

$$\begin{aligned} &(*)\quad I_0 = I^{P}_{L*} + \Sigma\, I^{RP(0)}_{k*} \rightarrow I_{L*} + \Sigma\, I^{R}_{k*} = I_0 \\ &(**)\quad I_0 = I^{P}_{L**} + \Sigma\, I^{RP(0)}_{k**} \rightarrow I_{L**} + \Sigma\, I^{R}_{k**} = I_0 \end{aligned} \qquad \text{(II:15)}$$

where the arrow ($\rightarrow$) signifies the realization of the two plans,
(*) the hypothetical process with no I-funds release, and
(**) the actual case after the release.
The summation goes from k = 1 to k = L.

In general the planned sets of investment objects, distinguished by a "P", will not be identical with the corresponding ones realized ex post, whether hypothetical or not, since the set of constraints most probably will not remain sufficiently stable over the sequence of L periods considered. Further revisions in investment planning may occur. To simplify the discussion, suppose now that no more variations take place in the set of constraints after period 0. Then the planned sets, marked with "P", will be identical with the corresponding ones realized. Discarding indices, it is now easily seen that the only possible differences between realized investment behaviour and the alternative investment behaviour for the case with no I-funds release, can be described by:

a) A shifting of investment objects from $\Sigma\, I^{RP(0)}_{k*}$ to $I^{P}_{L**}$
b) A shifting of investment objects from $I^{P}_{L*}$ to $\Sigma\, I^{RP(0)}_{k**}$ or
c) A reallocation of investment objects from one period to another between the plans $\Sigma\, I^{RP(0)}_{k*}$ and $\Sigma\, I^{RP(0)}_{k**}$

The measurement of the length and direction of these *time-shifts* of each individual I-funds object is one of the primary aims of this investigation. Taking the sequence of L periods considered as the period under investigation, inside which measurements are being performed, it can be seen, under the simplifying assumptions made, that (*a*) corresponds to a postponement of investment objects out of the period of investigation, due to the I-funds release[1] while (*b*) cor-

[1] Projects shifted in this direction will probably be registered as an effect under definition (II:25) on p. 59.

responds to time-shifting into the period of investigation from outside. Both these kinds of time-shifts are of the "unspecified" kind, since investment objects in the investment space of period L have been allotted no planned starting period by definition. (*c*) on the other hand takes care of "measurable" time-shifting between quarters of a year, inside the period of investigation (see p. 36), including also "zero" time-shifts, i.e. no time-shifts at all (see table on p. 67).

*Example:* This discussion can easily be exemplified by the help of expression (II:15). Suppose we have an investment object Ö. Suppose further that this object during period 0 was not assigned any particular starting period but belonged to the "planned" investment space $I^{P}_{L*}$ to the left in (*). In fact, however, it would have been embarked upon during period $k=6$, had not the I-funds been released (this we happen to know). Thus Ö will be a member of the set $I^{R}_{0*}$ of the realized hypothetical plan $\Sigma\ I^{R}_{k*}$ to the right in (*). Now object Ö was instead started during period 2, because of the I-funds release, and thus is a member of the set $I^{R}_{2**}$ to the right in (**). The length of the true time-shift "s" will now be $s=6—2=4$ periods. According to the assumptions of the proposition below, however, it will be reported as a time-shift of unspecified length into, from outside, the sequence of L periods considered.

Already in the simplified setting used above, the conceptual framework has become rather cumbersome for relating the simple frame-work of entrepreneurial decision making to the real environment of this investigation. Allowing for a current variation in the economic environment or the set of constraints, determining entrepreneurial investment behaviour (see II:13), which must be realistic, will make the problem complex indeed. The question to be posed is, to what extent the entrepreneurs or the firms can be expected to be capable of a reliable estimation of the alternative hypothetical starting periods that would have been realized, had not the I-funds been released. For lack of an empirical basis, an outline of the complex of problems will have to suffice.

One crucial piece in this puzzle is, whether an approximately stable relationship between the relevant economic environment and the corresponding investment behaviour, like (II:13), can be assumed to exist for each firm, a relationship that is also known to the persons inside the firm, who have been assigned the unenviable task of compiling the answers to our questions. More particularly, the prime difficulty is whether identical sets of constraints will provoke the same responses if presented ex ante for the drawing up of investment plans, currently for the execution of plans, or ex post, as in this investigation, for an appraisal. If this assumption cannot be *approximately* maintained, reported estimates on time-shifts may be dependent upon the date of questioning as well as on the set of constraints, and the outcome *may* be quite arbitrary compared to the information desired. Very little can be said about this a priori. It is believed that the approximately stable relationship postulated above cannot simply be accepted as a foundation for this investigation, despite the "simple"

requirements of specification attached to the simple investment plan (II:10) and despite the rough quarterly intervals of time defining the degree of precision required[1]. This problem will be serious at least in the case of big firms, where a great many persons are usually involved at different stages in the decision process[2].

To break this deadlock a slightly different approach is attempted in order to shed further light on the qualities of reported time-shifts. Thus it seems rather plausible to expect that some kind of more or less explicit planning in terms of the simple investment plan (II:10) will exist from period to period inside the firms, explicitly worked out or simply in the minds of the executives. This is more probable, the larger the investment objects, and particularly if they are large enough to be formally subjected to executive committee decisions which probably is the case for a large number of IF-projects. Furthermore, the technical preparation or planning of a large industrial construction often requires more time than is needed for the actual erection of the building. If such plans existed from some period of time prior to the I-funds release, it might be realistic to expect that reported answers will be based in the first instance on these plans. For this purpose *let the symbols in (II:15) represent aggregates for all firms granted permission to use their I-funds.* This aggregation can easily be obtained by imagining e.g. $\mathbb{I}_0$ as a sum or union of all investment spaces of individual firms during period 0.We also expect this aggregation to be permissible over time, i.e. that the divison of time into decision periods of equal length will be relevant to each firm and investment object (see p. 48). *Furthermore, abstract from all investment objects of the original investment space $I_0$ other than those objects ex postly financed through I-funds.* Thus:

Proposition: Assume (A′) that (II:7) is still valid. Furthermore, suppose (A″) that one property of the simple investment plan is that each object included in the plan already prior to the announcement of the I-funds release, i.e. in the set $\Sigma\ I_{k*}^{RP(0)}$, will also be included in one of the corresponding, hypothetical realized sets $I_{k*}^{R}$, $k = 1,2 \ldots$ or L. Also assume (A‴) that reported time-shifts have been based on the difference between the original investment planning (*) prior to the announcement of the I-funds release and realized ex post behaviour according to (**) in (II:15). Under these conditions the number of reported "unspecified" time-shifts into the sequence of L periods considered from a period later than period L, *may be correct or too large, but not too small.*

*Proof:* A‴ $\Rightarrow$ each investment object in the product set $I_{L*}^{P}\ \Sigma\ I_{k**}^{R}$ has been assigned an "unspecified" time-shift because of the

[1] Cf. the discussion in Modigliani-Cohen [33], pp. 120 ff.
[2] Cf. Bohlin, [4].

I-funds release, but in fact only the objects of the product set $I_{L*} \Sigma I^{R}_{k**}$ have been shifted from later periods into the sequence of L periods considered[1].

$A'' \Rightarrow \Sigma I^{RP(0)}_{k*} \subseteq \Sigma I^{R}_{k*}$ which according to A′ and (II:15)

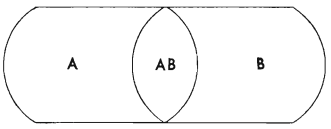
$\Rightarrow I_{L*} \subseteq I^{P}_{L*}$

Thus: $I_{L*} \Sigma I^{R}_{k**} \subseteq I^{P}_{L*} \Sigma I^{R}_{k**}$

(cf. the example on p. 53) Q.E.D.

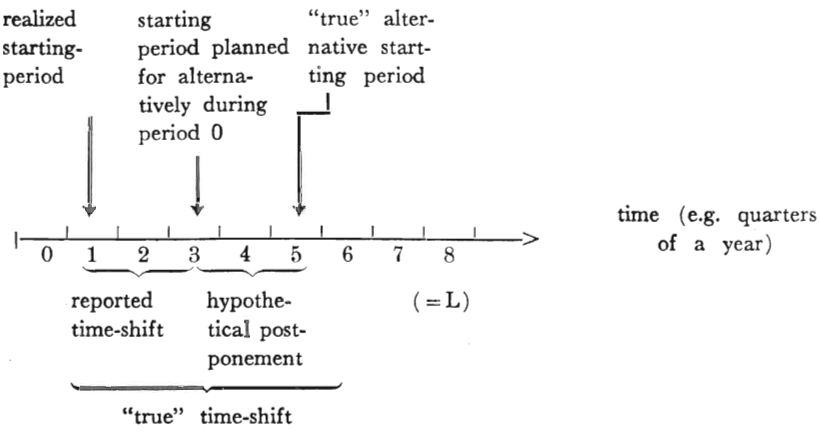
Even though it may still be held that the links between reality and the assumptions of this theorem are too approximate, the results arrived at here have been exploited for the interpretation of empirical data (see further p. 60). It should be noted that the assumption (A″) means that investment objects actually planned for in the sense of plan (II:10) will not "normally" be postponed outside the sequence of L periods considered while, on the other hand, projects not explicitly timed might very well be gradually shifted into this sequence of L periods as plans grow more definite. This assumption seems to conform, at least partly, with the "entrepreneurial pessimism" observed in regular investment surveys in different countries, i.e. entrepreneurs tend to underestimate the volume of planned future investments[2]. Also, the less elaborate the planning, the more probable that investment objects will be forgotten and will have to be added to the plan during the course of time, and thus the more realistic assumption (A″). Frequent contacts by telephone with more than 100 firms during the field work of this investigation suggested the formulation of assumption (A‴), which simply states that plans, if formulated for the particular project, prior to the IF-release, will determine the reported answer. Plans being too losely shaped or non-existing an alternative starting period beyond the sequence of L periods has been reported.

[1] The product AB of two sets A and B symbolizes the set of objects that is common to both sets. This concept is often seen in an alternative guise, as an *intersection* between two sets, and denoted $A \cap B$. Geometrically this "intersection" may be pictured:




[2] Cf. Mouchart, Theil and Vorst [34], p. 289. This assumption, which in fact implies that a number of projects normally will not be explicitly timed in advance in terms of the short run plan (II:10) but rather will be kept as a "reserve" in the remaining part of the investment space or "long term investment plan", is also supported to some extent by an interview study carried out by the National Institute of Economic Research (Konjunkturinstitutet) in cooperation with the Central Bureau of Statistics, the report of which is now being prepared.

It might be argued as well that planned objects normally tend to be delayed compared to the plans, unless there are exceptional incentives, such as the time limit of the I-funds release. Assumption (A″) states that no postponements of planned objects will be made beyond the last period of the period of investigation, numbered L. Of course this cannot be maintained for each individual IF-investment object, but it seems reasonably realistic as an approximation apart from those fringe objects originally planned to be started towards the end of the period under investigation. Also, if this postponement occurs, which is possible according to assumption (A″), it should be intuitively clear that reported "measurable" time-shifts have a tendency to be too short. The proposition made can easily be illustrated:




Furthermore it should be observed that the above discussion implies that we are interested in the difference between the two right-hand expressions in (II:15). However, it is by no means evident that the change in the set of constraints caused by the I-funds release does not affect future variations in the economic environment. Thus discrete Government measures, alternative to the release of I-funds, should strictly speaking have affected the realization of plan (*) in (II:15). For that reason our definition of the net effect implicitly assumes an *alternative* development in the absence of *alternative* Government measures[1]. Finally, variations in the time-structure of individual investment objects, due to the I-funds release, should also be listed as probable effects of the I-funds release:

1. Changes in the distribution of costs over time, i.e. in the shape of the cost-

[1] I.e. a "neutral" Government. Cf. the discussion on this point in Hansen, B. [14], IV:6.

functions, of individual investment objects not yet embarked upon at the time of the I-funds release (the "cost-shifting effect").

2. Similar changes in the distribution of costs over time on investment objects already started at the time of the I-funds release.

Point 2 represents variations in the backlog of investment activity under performance. For the sake of simplicity, "cost-shifting" in this backlog due to the I-funds release will not be explicitly introduced below in the formal definition of the net effect. Note, however, that past commitments of this kind must be an important determinant of the investment behaviour of the firm, affecting its responses to the I-funds release[1].

*The net effect defined.* The simple investment plan (II:10) and the specified plans or cost-functions (II:11) will now be tied together definitionally to give the net effects of the I-funds release, via a variation in the set of constraints, $\triangle\Theta$. Without inquiring again into the theoretical and statistical problems of measurements, let s stand for the hypothetical or "true" length of the time-shift of an individual investment object, caused by $\triangle\Theta$. Furthermore, let $g^{A}_{(t)}$ represent the *alternative cost-function* which has been shifted s periods in time[2] and altered its shape to become $g_{(t)}$ ex post. Both these functions are defined as $=0$ outside their alternative resp. ex post construction periods (cf. definition (II:11)). We can write this symbolically:

$$\triangle\Theta \Rightarrow g^{A}_{(t)} \rightarrow g_{(t)} \qquad \text{(II:16)}$$

Firstly the alternative cost-function has been shifted in time to its ex post position, as described by the horizontal transformation:

$$g^{A}_{(v)} \quad v = t + s \qquad \text{(II:17)}$$

Secondly a hypothetic variation in the shape of the cost-function, during the course of time-shifting may have occured, as described by:

$$\varphi^{H}_{(t)} = g_{(t)} - g^{A}_{(t+s)} \qquad \text{(II:18)}$$

(II:18) will now be defined as the momentary *cost-shifting* effect of the I-funds release. Similarly:

$$g^{A}_{(t+s)} - g^{A}_{(t)} \qquad \text{(II:19)}$$

will be called the momentary net *time-shifting effect*. The alternative cost-function stands for entirely hypothetical quantities, and as can be seen from the discussion in previous paragraphs the prospects of measuring these are slim.

[1] Cf. an interesting econometric study by de Leeuw [26]. Also see p. 75 and the discussion on IF-effects originated in the pulp, paper and printing industry.

[2] $s>0$ stands for "positive time-shifting" according to the definitions on p. 36. This means that the investment object has been started earlier than would have been the case, had no I-funds been released. This case is pictured in diagram II:2 on p. 39.

For this reason a definition of the time-shifting effect is introduced from the outset, using the equally hypothetical concept of a cost-shifting effect. Using (II:18) this new definition now reads:

$$g_{(t)} - g_{(t-s)} + \varphi^{H}_{(t-s)} - \varphi^{H}_{(t)} \qquad (II:20)$$

This redefinition of the time-shifting effect is explained by the fact that despite the difficulties of measurement encountered, an heroic attempt has been made to estimate for the I-funds projects the cost-shifting effect (II:18) (see Appendix I, form B1, question 9 and p. 62).

Until now the net effects have been defined as a momentary concept. It will also be necessary to define them for a period of time. Assuming the mathematical requirements fulfilled (cf. (II:11)), the *total net effect* during an arbitrary period ($t_0$, $t_1$) can be expressed by:

$$\int_{t_0}^{t_1} E^{H}_{(t)}\,dt = \int_{t_0}^{t_1} (g_{(t)} - g_{(t-s)} + \varphi^{H}_{(t-s)} - \varphi^{H}_{(t)})\,dt + \int_{t_0}^{t_1} \varphi^{H}_{(t)}\,dt \qquad (II:21)$$

The first component to the right represents the time-shifting effect during the period specified and the second component the corresponding cost-shifting effect. It should be understood that the period ($t_0$, $t_1$) may represent the whole period under investigation as well as a very short interval of time, say, a month. The formal representation in (II:21) is easily illustrated with the help of diagram II:2 on p. 39. Thus (A) pictures the advance shifting ($s>0$) of the alternative cost-function to its ex post position in time (the arrow) according to (II:16)—(II:19). The shaded area in (B) represents the time-shifting effect during period ($t_0$, $t_1$), and in (C) the corresponding cost-shifting effect calculated. Adding these two effects, we obtain the total net effect in (D). Note that different shadings indicate different signs of the net effects.

*The aggregate net effect.* The previous argument has been devoted to the I-funds effect, as defined for one single investment object, irrespective of whether this has been financed via the I-fund or not. In this chapter all investment objects will be aggregated that are included in the investment spaces of all firms at a time immediately prior to the I-funds release. A distinction must now be made between:

1. The group of IF-objects partly or wholly financed with the help of I-funds (denoted by "IF" on top of the summation signs below).
2. Another group containing all other investment objects contained in the original investment spaces of all firms immediately prior to the I-funds release (denoted by "non-IF" on top of the summation signs).

The definitions in this paragraph are in terms of a vertical summation over all cost-functions in each of these two groups. Suppose further, that the period

investigated can be divided into one *period of release* ($t_0$, $t_1$) and a subsequent period ($t_1$, $t_2$). This is not entirely true in this investigation, since the period in question also includes the half year preceding July 1, 1962, or the period of release (see section II:2). In order to keep the notational apparatus simple, this complication will be ignored in the formal definitions below, although the empirical data presented in chapter III also cover the first half year of 1962.

Using (II:18), (II:20) and (II:21), the total *direct* net I-funds effect during the period of release can be written:

$$N_{(t_0,t_1)} = \overset{IF}{\Sigma} \int_{t_0}^{t_1} E^H_{(t)}\, dt \qquad (II:22)$$

This effect should be contrasted to the corresponding gross I-funds effect during the period of release ($t_0$, $t_1$):

$$G_{(t_0,t_1)} = \overset{IF}{\Sigma} \int_{t_0}^{t_1} g_{(t)}\, dt \qquad (II:23)$$

The ratio:

$$\frac{N_{(t_0,t_1)}}{G_{(t_0,t_1)}} \qquad (II:24)$$

will be used frequently in chapter III, as a measure of the proportion between the net and the gross effects (see e.g. table 6 A.).

Without integral signs, expression (II:22) stands for the net total momentary effect corrected for cost-shifting and measured in the middle part of diagram III:1 on p. 69. Similarly (II:23) represents the gross cost-function in the lower part of the same diagram. Still without integral signs, discarding all quantities of cost-shifting from (II:22) (i.e. $\varphi^H_{(t)}$ and $\varphi^H_{(t-s)}$ in (II:21)) we obtain a definition of the total net I-funds effect, not corrected for cost-shifting, corresponding to expression (II:3) in chapter II.

Lastly the effect on all other non IF-objects in the firms' original investment spaces, immediately prior to the I-funds release, corresponding to (II:22), may be written:

$$\overset{\text{non IF}}{\Sigma} \int_{t_0}^{t_1} E^H_{(t)}\, dt \qquad (II:25)$$

In the general setting of the previous chapters this net effect is seen to encompass investment objects belonging also to firms not possessing or not using their I-funds, but excluding the backlog of investment activity in hand by the

time of the I-funds release. Strictly speaking, investments in machinery and equipment should also be included in (II:25), represented by cost-functions shifted in time. It should be noted that for one thing the empirical data requested on form S3 have been divided into three groups, expressed in different standards of measurement, machinery and equipment being measured by the value of orders placed, while construction and maintenance investments are evaluated in terms of (II:25). Secondly, construction investments (question 1a) include also variations in the backlog of investment activity in hand by the time of the release, and thirdly, it should be clearly understood that the data collected on form S3 comprise information *only* from firms granted IF-permission. Indirect effects of the I-funds release on other firms are of course not covered by this questioning[1].

*Errors in the time-shifts, and their impact on the aggregate measurements.* It now remains to be seen how the potential errors in the time-shifts derived in this section (p. 54) may have affected the aggregate net effects defined. However, a strict mathematical treatment of this matter becomes more of a formal exercise than a true contribution to the point. Therefore a simple diagrammatic exemplification will do.

Diagram II:3, (C), below, pictures the reported individual alternative positions of 11 arbitrary cost-functions, stacked on top of each other. All cost-functions are assumed to be horizontal in shape, and no cost-shifting is expected to take place. The corresponding alternative aggregate cost-silhouette A is drawn in chart (B). Similarly the contour of an arbitrarily chosen aggregate gross effect, G, is drawn in (B), which gives the net effect, N, in (A).

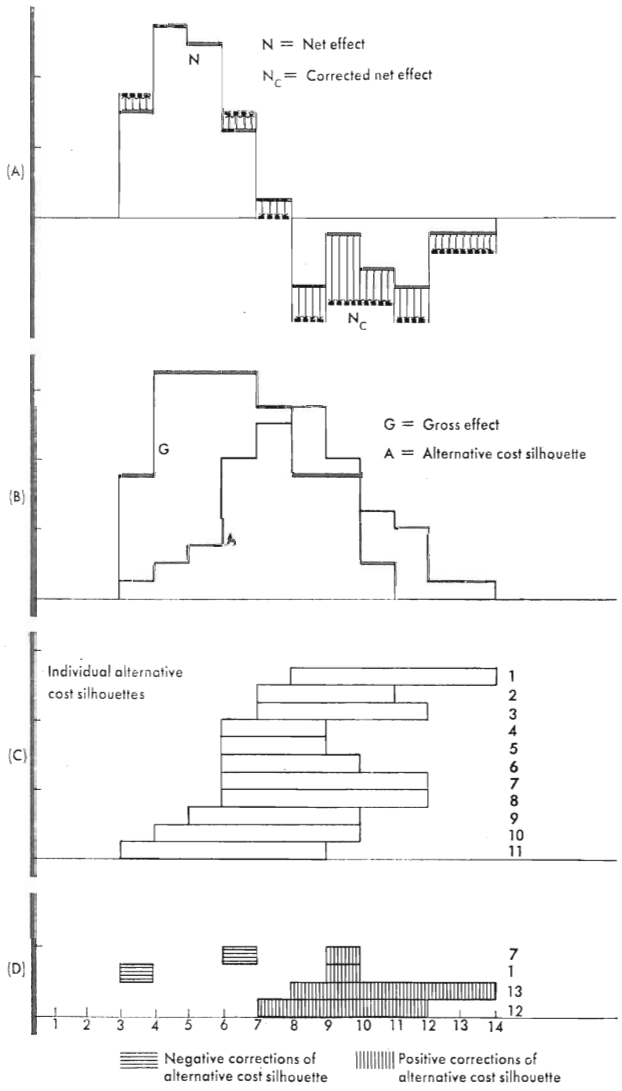
Suppose now, that time-shifts of "unspecified" length have been reported for two projects (numbered 12 and 13) which would in fact have been embarked upon during periods 7 and 8 respectively, had not the I-funds been released (this we happen to know). Similarly, projects 5 and 11 in (C) would in fact have been delayed one period each compared to their reported alternative starting periods, had not the I-funds been released. The consequent corrections of the alternative aggregate cost-function are drawn in (D) (note that the two shadings indicate different signs of the corrections) and the corresponding corrections of the net effect are shown in (A), the direction being indicated by the arrows.

Suppose now, that the period of release encompasses periods 3, 4, 5, 6 and 7. The hypothetical delays of projects 5 and 11 are then seen to have raised the positive net effect during the period of release, while the corrections for projects 12 and 13 only slightly reduce the net effect during period 7, but accentuate the negative "vacuum effect" beyond the period of release. Although not empirically supported to the extent desired, the author's contention is that particular attention should be paid to the results derived in the proposition on p. 54. This point of

[1] See the discussion in sections III:2 and III:3. In particular table III:2 on p. 78.

*Diagram II:3*

Unit of cost



view being adopted it is suggested that the aggregate direct net IF-effect defined and measured in this investigation has been slightly overrated during the period of release as well as still more so in a positive direction the backlog effect following immediately thereupon.

*EDP computations on the empirical data secured.* This section should be read together with section II:2 and II:3 in chapter II. The data requested from the firms will be defined in terms of the preceding formal apparatus and the calculations on the raw figures received from the firms will in some instances be explained here in more detail. Besides a simple transformation of percentage figures on investments in machinery and equipment into cost data, three programs for IBM 1401 have been used to calculate the individual and aggregate cost-functions for the IF-investments in construction. These programs are (a) a cost-employment weighting program, (b) a time-shifting program and (c) a cost-shifting program. This three-step procedure is warranted among other things by the need for flexible punch-card sorting.

(a): *The cost-employment weighting program* (see chapter II, pp. 34 ff.): From form B1 (question 1) the quarterly distribution of costs (book-keeping figures) or the cost-function $g^{Q}_{(t)}$, and the monthly employment of workers, the employment function $e_{(t)}$ (question 2), have been obtained for each individual construction project. These two functions have been weighted together, to give a new cost-function $g_{(t)}$ reflecting the level of employment on each project. In formal language this procedure can be expressed:

$$g_{(t)} = e_{(t)} \frac{\int_{t_s}^{t_r} g^{Q}_{(t)}\, dt}{\int_{t_s}^{t_r} e_{(t)}\, dt} = K\, e_{(t)} \qquad \text{(II:26)}$$

The symbols are explained in (II:11). Note that K is unique and constant over time for each individual construction project, by definition. On the other hand K may vary substantially between individual projects (see in particular p. 85).

(b): The *time-shifting program* is described in sections II:2 and II:3.

(c): The *cost-shifting program* proposes to correct formulae (II:3) (see p. 37) for the three missing cost-shifting quantities $\varphi^{H}_{(t-s)}$ and $\varphi^{H}_{(t)}$ in (II:21). For this reason a number of arbitrary assumptions have had to be introduced. These assumptions will be explicitly stated below; their implications on the measurements have been discussed already in section II:3.

*The program*

INPUT DATA: X1 , total calculated costs for the individual construction project (question 3, form B1, Appendix I)
X2 , the length of the construction period (question 5)
X3 , the number of the starting month (question 4)
X4 , the alternative starting month (questions 6, 7 and 8)

READ : X1, X2, X3, X4

DO : $X6 = X4 - X3$ the length of the time-shift (s, see chapter II, p. 36)

$X7 = 16 - X3$ the part of the construction period falling within the period of release. *The numbering of the months starts with a 1 for January 1962, i.e. 16 stands for April 1963, the last month of the period of release*

$X5 = X2 + X3$ number of month for finishing the project

$$X8 = \frac{v \; X1}{100 \; . \; X7}$$

v is "exogenously" determined to be 0.176. It also constitutes an assumption as to the extent of cost-shifting. From question 9 on form B1 (see Appendix I) the average v has been estimated for those projects not shifted in time (i.e. with "zero" time-shifts). The estimated figure of 17.6 percent (for each 4.2 projects) has been assumed to be characteristic also for those projects shifted in time as long as at least one third of the construction period falls outside the period of release, thus:

IF $X7 > 2$ $(X5 - 16)$ READ THE NEXT PUNCH CARD
$X7 \leq 2$ $(X5 - 16)$ CONTINUE WITH THE NEXT INSTRUCTION

FIELD I { ADD X8 TO THE SUM OF ALREADY MEMORIZED VALUES TO EACH MONTH X3, X3+1, ... 16
ADD —X8 TO THE SUM OF ALREADY MEMORIZED VALUES TO EACH MONTH 17, 18, ....., 17+16—X3

FIELD II ADD +X8 TO THE SUM OF ALREADY MEMORIZED VALUES TO EACH MONTH X4, X4+1, ....., X4+X7

FIELD III ADD —X8 TO THE SUM OF ALREADY MEMORIZED VALUES TO EACH MONTH X4+X7+1, ....., X4+2X7+1

WHEN ALL PUNCH CARDS (i.e. the data for all projects) HAVE BEEN READ, WRITE OUT THE MONTHLY SUMS FOR FIELDS I, II and III.

*Note* that X4—X3 = X6 is the *length of the time-shift.* When *each monthly sum has been divided by 4.2,* FIELD I thus constitutes the estimated aggregate cost-shifting effect, while similarly FIELDS II and III subtracted from the aggregate alternative cost-function in definition (II : 2), chapter II, gives the aggregate alternative cost-function *corrected for cost-shifting* pictured in the lower part of diagram III:1 (p. 69). Because of the different lengths of the individual time-shifts, a large number of these corrections have fallen beyond September, 1963, the last month in the diagram.

# III. Empirical findings

## III:1. IF-investments in construction—description of data

Preceded by a minor pilot study and a few interviews with entrepreneurs to test the question forms, the questionnaires were sent out in December 1963 to the 693 firms granted permission to use their I-funds for investments in construction works or in machinery and equipment, or both. By the end of March 1964 no less than 645 firms had replied. For investments in construction works this meant that manageable information had been secured on almost 91 percent of the individual investment projects. The figures to be used in this investigation refer only to projects granted IF-permission in accordance with the general conditions stipulated on May 11, 1962 (cf. I:6). The 53 projects started before May and after December 1962 have been excluded. We are thus left with 858 construction projects or granted licences making up the *general release of 1962/63*. Of these 858 projects, manageable answers have been obtained for 778 projects, of which actually 86 were never started. The basic material thus concerns 692 projects. Data on IF-investments in machinery and equipment will be presented in section III:4.

*Lengths of construction periods (L) (ex post). Number of projects*

| $L \leq 5$ months | $5 < L \leq 10$ months | $10 < L \leq 15$ months | $L > 15$ months |
|---|---|---|---|
| 124 | 311 | 177 | 80 |

The registered construction periods of the IF-projects are on the average unusually short, or about 10 months. Almost half the number of projects have construction periods ex post ranging between 5 and 10 months. While there are no comparable figures on "normal" building periods for industrial construction projects they probably lie well above

10 months maybe close to 15 months on the average[1]. It is plausible that this shortening of the building-periods is to some extent explained by the cost-shifting effect, i.e. the shortening is due to an attempt to concentrate more than the "normal" investment activity to that part of the individual construction period falling within the period of release. It is also probable, that "short" and consequently small projects can be expected to be more flexible with regard to time-planning than larger ones, and therefore are more liable to become I-funds projects. This being the case, the average I-funds project should tend to be smaller than the average "normal" industrial construction project[2].

*Realized and alternative starting periods (quarters) for IF-projects. Number of projects*

| | Before 1962 | 1962 | | | | 1963 | | | | Later than 1963 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1. Qr | 2. Qr | 3. Qr | 4. Qr | 1. Qr | 2. Qr | 3. Qr | 4. Qr | |
| Realized starting periods | | | 14 | 268 | 410 | | | | | |
| Alternative starting periods | 7 | 2 | 29 | 125 | 149 | 13 | 88 | 37 | 16 | 226 |

The above table illustrates the quarterly distribution of realized starting periods, and the corresponding distribution of reported alternative starting periods in the event that no I-funds had been released. As can be seen a large number of projects were not shifted in time from

[1] A rough calculation made from *planned* figures from the Labour Market Board indicates a 13—15 months building period for all industrial construction projects during the 3rd and 4th quarters of 1961 and average total costs of less than 600 million kronor. During 1962 the average building period was down to 11—13 months, while at the same time average total costs seem to increase. This lowering of the average building period must at least to some extent be ascribed to the I-funds release.
*Sources:* The Labour Market Board and National Institute of Economic Research (Konjunkturinstitutet).

[2] As will be seen later, however, only vague empirical evidence has been secured supporting the hypothesis of a larger flexibility in time-planning and a larger relative net effect, the shorter the construction period (see p. 81).

alternative positions, i.e. there is a relatively high frequency of alternative starting periods especially during the 3rd and 4th quarters of 1962. It can also be seen that the starting periods of a small number of projects, originally planned to be started before or early in 1962, were postponed to the autumn months of 1962 (negative time-shifting). Some of these projects had long construction periods and were planned to be started early in 1962. To become eligible as fund-projects, it was stipulated that they be not started until after the summer of 1962, so that the construction periods would cover two winter periods instead of two summer periods. As expected a fairly large number of alternative starting dates, almost 90, was reported for the 2nd quarter of 1963. Technically, the 2nd quarter seems to be the most suitable and preferred period during which to start ground works on construction projects. In 226 instances (almost one third of the projects) no precise alternative starting periods later than the fourth quarter of 1963 were reported.

*Distribution of reported time-shifts*[1]

| | 1. Negative time-shifts | 2. Zero time-shifts | 3. "Measured" reallocations within the period of investigation | 4. Time-shifts of unspecified length into the period of investigation from not specified periods later than Dec. 31, 1963. |
|---|---|---|---|---|
| Number of projects (answers) | 50 | 221 | 195 | 226 |

As can be seen from the table the different kinds of time-shifts are rather evenly distributed. Apart from the small group of 50 negatively shifted construction projects the three other groups comprise about 200 projects each. The average "measured" time-shift inside the period of investigation Januari 1, 1962—December 31, 1963 is 7,0 months, projects with zero time-shifts being excluded. The large proportion of the reported zero and measured time-shifts inside the period of investigation

[1] The time- shift is defined as the length (in months) of the period between the alternative reported position of the starting date, i.e. the middle month of the reported quarter (see form Bl, question 7), and the realized starting date.

intuitively suggest that there is little room left for the presence of conscious and unconscious "errors" in time-shifts discussed in section I:4 as far as an overestimation of the number of unspecified time-shifts is concerned (see p. 43).

In a very simple fashion, the figures given above indicate the type and direction of the net effects of the IF-release. The following sections will make use of the reported ex-post cost-silhouettes of individual construction projects in combination with reported time-shifts, to calculate in more compact form the aggregate gross and net effects of the IF-release, as defined in chapter II.

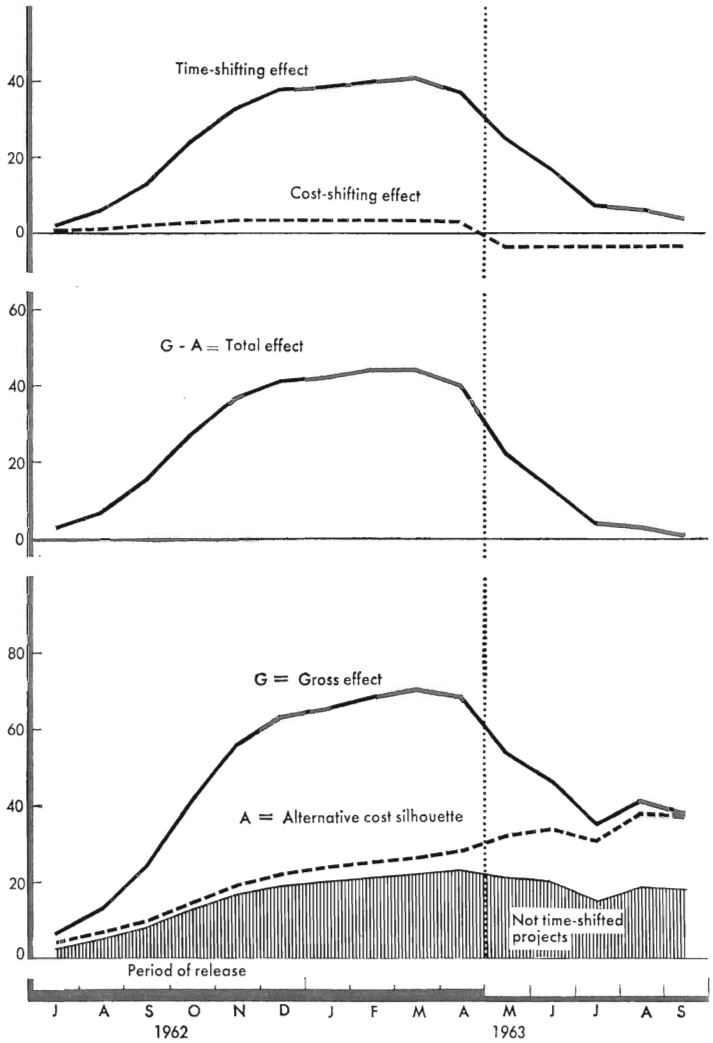
### III:2. Investments in construction—the aggregate effects measured

*The total net effect.* Diagram III:1 pictures the timing of the total direct net effects of the I-funds release, as measured in this investigation. We recollect the definitions from section II:3. The gross effect (G) and the alternative cost-silhoutte—corrected for cost-shifting—(A) are pictured in the bottom figure. The net effect (N), defined as the difference between the two (N=G—A) is seen in the middle chart. Furthermore we obtain the time-shifting effect in the first figure by subtracting the estimated cost-shifting effect from the total net effect (N).

It seems that the time between the announcement of the I-funds release on May 11, 1962 and earlier preparations (see section I:6), and the autumn months of the same year, was, sufficient in the aggregate, for the undertaking of necessary reallocations in investment plans, the speeding up of technical preparations for the construction projects, the hiring of new workers etc. Already during August 1962 the total net effect starts rising rapidly, to reach a maximum of about 40 million kronor monthly from December 1962 to the end of the period of release, April 1963. From May 1963 the net effect rapidly tapers off, most probably to reach negative values during October 1963 and later. Evidently the bulk of the net direct positive effect seems to have fallen within the crucial winter-period, during which a slowing down of investment activity in the construction sector had been expected to take place, ceteris

*Diagram III:1. Gross and net effects corrected for cost-shifting. Whole country*

Million kronor




*Source:* Tables 3 and 7, Appendix II.

paribus. For the whole period of release July 1, 1962—April 30, 1963, this means a net positive impact on construction activity of no less than 300 million kronor, or an average of almost 30 million kronor monthly. These figures should be compared to the corresponding gross effect in the lower part of diagram III:1 of approximately 475 million kronor. On the average more than 60 percent of the gross effect or the value of investment activity partly or wholly financed through the I-funds thus has constituted a net direct addition to construction activity during the period of release. The table below shows furthermore, that this ratio (designated $\gamma$ in section I:5) remained relatively constant throughout

*Percentage ratios between net and gross effect, monthly.*

| | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1962 | | | | | | 1963 | | | | | | | | |
| Ratio (Percent) | 39 | 51 | 60 | 65 | 66 | 65 | 64 | 64 | 63 | 59 | 40 | 28 | 12 | 8 | 2 |

*Source:* Table 3, Statistical Appendix.

the period of release, except for the first two months. It is also interesting to observe the positive slope of the alternative cost-silhouette in the lower part of diagram III:1, and the maxima of the gross and the net effects which both occur during the same month, March 1963. These properties will be made use of in section III:7, where a simple method of predicting the effects of an I-funds release from current statistical data is described.

It can also be seen that during the summer succeeding the period of release, the net I-funds effect changes into a positive "backlog" effect. An approximate extrapolation made from data after September 30 (not presented here) indicates that this "backlog" effect although quite small does not turn negative until October 1963. During the fourth quarter of 1963 and the first quarter of 1964 it has furthermore been estimated that industrial construction activity has been reduced by about 100 millions of kronor, ceteris paribus[1]. Evidently this was not an intended

[1] Cf. Canarp [5], p. 36.
From the "stock-figures" presented on IF-construction activity during the

development, since the seasonal upswing in construction activity during the summer half year was now exaggerated, as was the seasonal downswing during the subsequent winter half-year 1963/64. As will be seen later in this chapter, however, a positive "backlog" of this kind may be unavoidable, if the primary purpose of the I-funds release is to secure a *substantial* positive net addition to investment activity during the period of release. It should also be noted that a bias, if any, in the proportion between reported time-shifts, discussed in section II:4, probably would make for a reduction of this positive "back-log". Furthermore, discrete measures were actually employed to correct unintended aftereffects as already mentioned. Thus, it was announced during the last month of the period of release, that IF-licences would be extended to cover the subsequent winter half-year, provided construction activity on the project was reduced to a minimum during the summer of 1963 (see section I:6). This effect has not been explicitly accounted for in the diagram but according to a rough calculation made on the 42 projects granted such prolongations it appears to have been rather insignificant. It thus remains to be seen whether arrangements such as the prolongations of April 5, 1963, employed on a larger scale, constitute an effective correction for the timing of these problematic "after-effects". Summarizing so far, the findings of this investigation suggest that a quite powerful impact *can* be secured at short notice, i.e. the "effect lag" is short. Furthermore it seems possible to limit at least approximately this net effect to a comparatively short period of time.

Also the total net IF-effect has been divided into a *time-shifting* and a *cost-shifting* effect. The upper part of diagram III:1 shows that the major part of the total net effects has been obtained through time-shifting, as defined in section II:3. This circumstance underlines the importance of a careful inquiry into the qualities of reported time-shifts, since a systematic error of measurement in these, may alter the properties of the total net effect considerably. The time-distribution of the

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*release of 1958/59,* one gets the impression that no substantial net increase in IF-construction or employment took place until during the second half year of 1959, while on the other hand a high net positive increase in IF-construction activity lagged behind throughout 1960. Compared to these figures a vastly superior timing of, at least, the positive net effect during the period of release seems to have been accomplished during 1962/63.

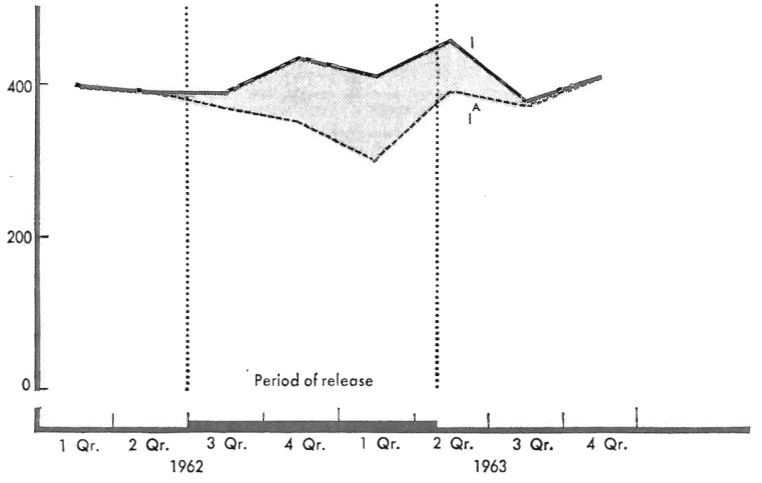
aggregate cost-shifting effect amounting monthly to about 3 million kronor during the period of release and to about minus 3 million kronor during a subsequent period of equal length in diagram III:1 is by no means ascertained. Its small relative size over time, however, can be expected to have been fairly well determined. This is also the main reason why no further corrections for cost-shifting have been made.

About 80 percent of the gross I-funds effect (according to a rough calculation made) consists of industrial (mining and manufacturing) investments in construction. To get some idea about the relative magnitude of this effect one might therefore compare it with the total volume of industrial construction in Sweden registered on a quarterly basis according to the national accounts. Thus diagram III:2 pictures seasonally adjusted gross industrial investments in construction (including maintenance) ex post in 1959 prices. The dotted line represents the same investment activity, after the net direct I-funds effect has been subtracted for each quarter between January 1, 1962 and September 30, 1963. On the average the net direct I-funds effect amounts to more than 15 percent of total industrial investments during the last half year of 1962 and the first half year of 1963. This fraction reaches a maximum of slightly over 25 percent during the first three months of 1963. (cf. however table III6A in the next section.) These figures look rather impressive at first sight. However, when placed in relation to the absolute level of Swedish construction their significance shrinks considerably (see section III:3). Furthermore a comparison of this kind should be treated with great caution. Even if reported answers were all true, it cannot simply be said that if no I-funds had been released, the economy would have suffered from the substantial contraction in industrial investments as pictured by the dotted line during the winter half year of 1962/63. For one thing the Government and the labour market authorities would no doubt have taken other measures to correct such a development. Secondly we do not know whether a net increase in primarily industrial construction for different reasons has been accompanied by a contraction of investment activities in other sectors of the economy. This problem will be discussed in a subsequent section.

*Net effects by size and branch of firm.* In table III:1 the gross and net effects of the I-funds release have been roughly classified according to

*Diagram III:2*

Million kronor




I ; *Industrial* (mining and manufacturing) investments in construction quarterly, *inclusive of maintenance,* 1959 prices, seasonally adjusted (source: Central Bureau of Statistics).

$I^A$ ; Industrial investments in construction minus the direct net I-funds effect, 1959 prices.

Millions of 1959 kronor

| | 1962 | | | | 1963 | | |
|---|---|---|---|---|---|---|---|
| | 1 Or | 2 Qr | 3 Qr | 4 Qr | 1 Or | 2 Qr | 3 Qr |
| I | 395 | 389 | 390 | 435 | 409 | 453 | 378 |
| N | —1 | —3 | 20 | 87 | 107 | 62 | 7 |
| $I^A$ | 396 | 392 | 370 | 348 | 302 | 391 | 371 |

size and branch of firm. It can be seen that large firms with 500 employees or more account for about two thirds of the gross effect in construction. This figure is a little less than what could be expected, since 75 percent of accumulated funds by the end of 1961 belonged to firms of this class. In so far as it is reasonable to expect small firms to have had difficulties in financing their planned spending compared to

*Table III:1 Effects of I-funds release*

Million kronor

| *Size of firm* | (1) Gross effect during period of release | (2) Percentage distribution of gross effect | (3) Percentage distribution of funds accumulated by end of 1961[2] | (4) Net effect during period of release | (5) Net effect as percentage of gross effect $\frac{(4)}{(1)}$ 100 |
|---|---|---|---|---|---|
| >500 employees | 315 | 66 | 75,8 | 194 | 61,6 |
| <500 „ | 163 | 34 | 24,2 | 94 | 57,7 |
| +unclassified group | | | | | |
| Total | *477* | *100* | *100*[2] | *288* | *60,4* |
| Branch of firm | | | | | |
| 1. Metal manufacturing | 88 | 41,7 | 42,7 | 63 | 71,6 |
| 2. Mechanical engineering industries | 49 | | | 30 | 61,2 |
| 3. Electrotechnical industries | 22 | | | 16 | 72,7 |
| 4. Producers of transport equipment | 40 | | | 33 | 82,5 |
| 5. Wood processing industries[1] | 57 | 11,9 | 14,4 | 25 | 43,9 |
| 6. Producers of direct consumption goods[1] | 52 | 10,9 | 11,8 | 38 | 73,1 |
| 7. Other branches[1] | 170 | 35,6 | 31,1 | 83 | 48,8 |
| Total | *477* | *100* | *100*[2] | *288* | *60,4* |

[1] For details see table III:8, p. 102.
[2] 100 percent equals 2 394 million kronor by end of 1961. See table p. 11.
*Source:* Labour Market Board.

large firms during the boom period of 1960—61 the large relative percentage of the gross effect compared to accumulated funds for firms with less than 500 employees, might be interpreted as an effort to recoup for this disadvantage now by exploiting the I-funds release more intensely. Still there is no marked difference between the two net effect shares of the gross effect, a circumstance which does not, however, contradict the above suggestion.

A similar classification has been computed by branch of firm. More than 40 percent of the gross effect comes from engineering industries of different kinds (branches 1—4). A considerable share, almost 36 percent, is also accounted for by the "residual group" (branch 7), which, apart from a few industrial branches includes also enterprises in the trade and transport sectors, etc. As has been mentioned earlier (according to a rough calculation made) the industrial group proper (mining and manufacturing) accounts for approximately 80 percent of the gross IF-effect. It is interesting to note that the percentage distribution among branches of funds accumulated by the end of 1961 corresponds quite well to the percentage distribution of the gross effect.

Some other interesting findings might be extracted from table III:1. With a smooth start already 1954 the pulp, paper and printing industry (branch 5) reached the peak of an indeed pronounced investment boom during 1961 and 1962. The following year 1963 the level of investment outlays dropped by about one third the volume of the previous year and the branch entered the 1962—63 recession with much exhausted internal financial resources[1] but with an expanded capacity to produce. From this follows that the industry group probably entered 1962 with a considerable number of construction projects under way or to be started early during the year, but not as many projects planned to be started late during the year or during 1963, projects that could be shifted easily into the period of I-funds release. These circumstances together suggest a quite large gross effect, a rather small share of which, however, should be a net effect according to our definition. This hypothesis is not rejected by table III:1 which shows that branch 5 which is dominated by the pulp, paper and printing industries has scored a net to gross effect ratio far

[1] See e.g. The Swedish Economy, October 1964, p. 47 and 76.

below the average of the total IF-release. A somewhat similar picture is displayed by other metal and engineering industries, which constitute part of branch 2. Unfortunately the overlapping industrial grouping used, makes further detailed analysis on this point impossible. In particular the "residual branch" 7 raises puzzling questions in this respect. No apparent reasons can be found to explain the low ratio measured between the net and the gross effect.

*A complementary checking of data against the regular investment surveys.* The above indications of industrial investment behaviour are supported to some extent by data from the regular investment surveys now carried out by the Central Bureau of Statistics. For reasons of space these data cannot be reproduced here. However the series of yearly ex ante and ex post data of the 6th branch, i.e. producers of direct consumption goods, displays an irregularity during 1962, in so far as the small "normal" discrepancy between planned and ex post construction widens substantially to contract again during 1963. Since plans were delivered during the autumn of the previous year, i.e. during 1961 far in advance of the IF-release, it seems as if a planned decrease in construction investments for 1962 has been largely offset, most probably by the IF-release. Engineering and electro-technical industries and producers of transport equipment (branches 2, 3 and 4) roughly lumped together displays a similar pattern, although not as pronounced. A planned reduction of construction investments in 1963 also here seems to have been partly offset. Another interesting finding is, however, that for wood-processing industries a substantial planned reduction in construction investments both for 1962 and 1963 has not been affected according to the ex post figures. This seems to be quite in harmony with the small net IF-effect reported for this group of firms. The conclusions drawn previously thus are not rejected by the survey material referred to here. However, an appropriate warning should be submitted in this context. The survey data used at present are indeed difficult to interprete. For one thing *useful historical* data on planned and ex post industrial construction do only extend back in time to the year 1958, too short a period of experience to allow for any definite conclusions. Furthermore the differences between plans and ex post data cannot of course be expected to have been determined solely by the release of I-funds,

however important they may be. Also other explanations to the above findings are thinkable.

*Secondary and indirect I-funds effects.* The problem of economic interdependence now has to be brought into the picture. A few attempts have been made to trace empirically repercussions on alternative investment activities, i.e. investment activities not explicitly financed by I-funds, caused by the IF-release. Form S3 (see appendix I) asks for information on such effects concerning interdependent investment projects inside the individual firms. One factor which might be expected to restrict the total volume of investment, and thus investments other than those financed by I-funds, concerns the firm's liquidity. Contractive tendencies are probable when the net positive effect of the firm during the period of release has been large compared to the gross effect. It should be remembered that the benefits derived from using the I-funds (stated as in section I:4) amount to no more than about half the value of gross IF-investments measured in current costs and realized during the period of release, i.e. the amount of money released from the Central Bank. A firm using its I-fund might be forced to contract alternative investments if its liquidity position is not satisfactory. On the other hand IF-investments might bring with them a chain of parallel investments. Thus the erection of a new factory building with the help of I-funds might make the firm order new and complementary machinery and equipment. In fact both tendencies might be plausible inside the same firm.

Table III: 2 indicates the presence of both kinds of effects among the firms using their I-funds, though the positive tendencies dominate. IF-investments, whether in construction or machinery and equipment, seem to have carried with them during the period of release a parallel increase in both construction investments and in orders placed for machinery and equipment. As expected, the largest increase was registered in orders placed for machinery and equipment, even though the absolute value of extra orders placed is small compared to the total net IF-effects measured (cf. section III:4). Most of this effect on investments in machinery and equipment is believed to constitute investment activity directly linked to IF-construction projects. Contrary to what had been expected, there were no reports of an apparent contraction of alternative

*Table III:2. Reported "indirect" IF-effects on alternative and/or complementary investment activities, during the period of release, July 1, 1962—April 30, 1963 (See form S 3, Appendix I), million kronor.*

| | Total *increase* (Million kronor) | Number of firms | Total *decrease* (Million kronor) | Number of firms |
|---|---|---|---|---|
| 1. Investments in CONSTRUCTION | 13 | 63 | 3 | 13 |
| 2. Investments in MACHINERY and EQUIPMENT (*orders placed*) | 40 | 136 | 8 | 24 |
| 3. MAINTENANCE investments, etc. | 1,4 | 42 | 1,6 | 19 |

maintenance investments due to a desire to be able to sqeeze as much IF-investments as possible into the period of release. However, the question posed in form S3 might have been difficult to answer in a meaningful way, which makes any interpretation uncertain. Moreover the figures presented in table III:2 do *not* include indirect effects either on the large number of firms not possessing any I-funds or on those firms not using their funds during the release of 1962/63. It is known for instance that during the period of release scarcity of e.g. skilled construction workers was felt intensely in some regions circumstances that most probably have caused delays on a number of construction activities not covered by this investigation (see section III:3). Also secondary, or multiplier effects, have to be left outside the picture. It is not possible here to evaluate neither their timing nor their magnitude in the specific historical setting discussed[1].

[1] *Preliminary* results from a structural econometric model under construction at the National Institute of Economic Research (Konjunkturinstitutet) suggest, however, that variations in industrial construction outlays normally seem to be accompanied by quite small variations in disposable income during the current timeperiod (half a year). If so, secondary increases in spending from wage income during this period will be correspondingly small and consequently it is doubtful whether multiplier reactions of sufficient magnitude to require special attention need to be feared.

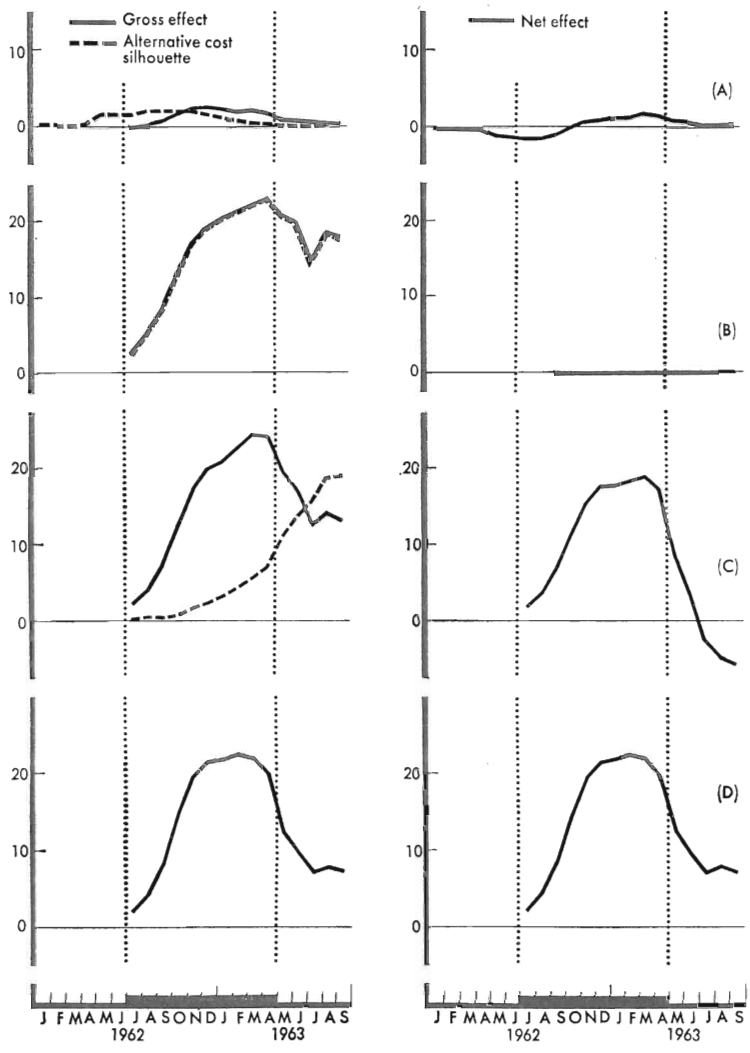
*The net effect generated from different kinds of time-shifts.* It has previously been noted that a distinction can be made between different types of reported time-shifts. It will be useful to evaluate also the influence on the net measurements of these different types, and in particular to get an idea of the relative magnitude of the gross effect from projects not shifted in time. A negative time-shift was reported for about 50 construction projects. In a few instances this negative time-shift can be traced back to certain special requirements for "long" investment projects to be started not until late during the autumn of 1962 to become eligible for IF-financing. The purpose was to make the building period cover two winters instead of two summers. However, the average building period for this group of projects was in fact somewhat shorter than that for the rest of the IF-projects. It thus seems probable that many other factors have determined the negative direction of the time-shift. Early in 1962, for instance, there was talk of a recession later in the year. Unemployment problems, particularly in the building trade, were apprehended. With this in mind, it seems reasonable that at least some entrepreneurs may have postponed less urgent construction projects in expectation of an I-funds release later in the year. Nevertheless, both the gross and the net effects of investment projects shifted negatively in time are small compared to the total effects of the IF-release, as can be seen from diagram III:3.

The direct net effect caused by projects with starting periods that were shifted from periods later than December 31, 1963 into the period of investigation, i.e. orginating a 100 percent net effect during the period of release (group (D)), seems to be of about the same size, as well as time-shape, as the corresponding effect generated by "measured" time-shifts inside the period of investigation (group (C)). These figures should be compared with the rather heavy volume of unmoved investment activity (group (B)), averaging about 20 million kronor a month during the winter months and the spring of 1963.

As should be clear from the discussion on errors of measurement in chapter II doubts may arise as to the advisability of making a clearcut distinction between the groups. Borderline cases may by numerous. Even though their influence on the total net effect measured is probably comparatively small, the proportions in diagram III:3 may have been

*Diagram III:3. Gross and net effects by type of reported time-shifts*
(figures not corrected for cost-shifting)

Million kronor




(A) Projects with negative time-shifts
(B) „ „ zero „
(C) „ „ measured time-shifts inside the period of investigation Jan. 1, 1962—Dec. 31, 1963.
(D) Projects with "unspecified" time-shifts into the period of release from periods later than the period of investigation.

*Source:* Table 4, Appendix II.

distorted. One more technical point should be noted, however, i.e. the steep rise of the alternative cost-silhouette throughout the period of investigation for group (C). The proportion of time-shifts of specified (measured) length compared to the total number of projects will to a large extent determine the properties of the alternative cost-silhouette towards the end of the period of investigation. This result will be utilized, when a simple method of predicting some of the properties of the net effect is developed later on (section III:7).

*Size of construction project and length of time-shift.* It is possible to take one further step and try to relate systematically the time-shift of each project to its size. Such a grouping has been made in table III:3.

It is of special interest to know which group or groups of projects account for the positive "back-log" effect during the summer season of 1963, which has been discussed in the beginning of this section. It seems a priori probable that this after-effect should mainly have been generated by long construction projects. It can, however, be argued that large construction projects are not as easily shifted in time by exo-

*Table III:3. Distribution according to time-shifts of projects with different building periods, (L).*

| CONSTRUCTION PERIODS | Number of negative time-shifts | zero time-shifts | reallocations within the period of investigation, July 1, 1962—Dec. 31, 1963 | time-shifts from periods later than Dec. 31, 1963, into the period of investigation | average total costs of projects (thousand kronor) |
|---|---|---|---|---|---|
| GROUP A $L \leq 5$ | 16 | 43 | 27 | 38 | 160 |
| GROUP B $5 < L \leq 10$ | 27 | 91 | 84 | 109 | 490 |
| GROUP C $10 < L \leq 15$ | 6 | 60 | 53 | 58 | 1410 |
| GROUP D $L > 15$ | 1 | 27 | 31 | 21 | 6030 |
| | 50 | 221 | 195 | 226 | |

genous influences such as an IF-release, as are small construction projects. Large investment projects might tend to be more integrated with the firm's over all long-run production plans and consequently are less flexible with respect to time-planning. Thus very long and large IF-projects would be combined with small net effects compared to the gross effects, and consequently also with minor positive contributions to the aftereffects during the period following the period of release.

However, table III:3 gives no more than a slight indication of an increasing inflexibility in time-planning the larger and longer the construction project. The proportions between the number of projects time-shifted and not time-shifted, remain fairly stable through the four groups, as far as can be seen from the answers. This finding suggests that the positive lag-effect will be explained chiefly by the length of the construction period[1]. Diagrams III:4 also support this conclusion. It can be seen that the total net effect generated from projects with construction periods equal to or less than 5 month has been almost perfectly planned, being positive during the period of release and turning negative immediately after[2]. The magnitude of this effect is, however, small compared to the effects generated by the other three groups.

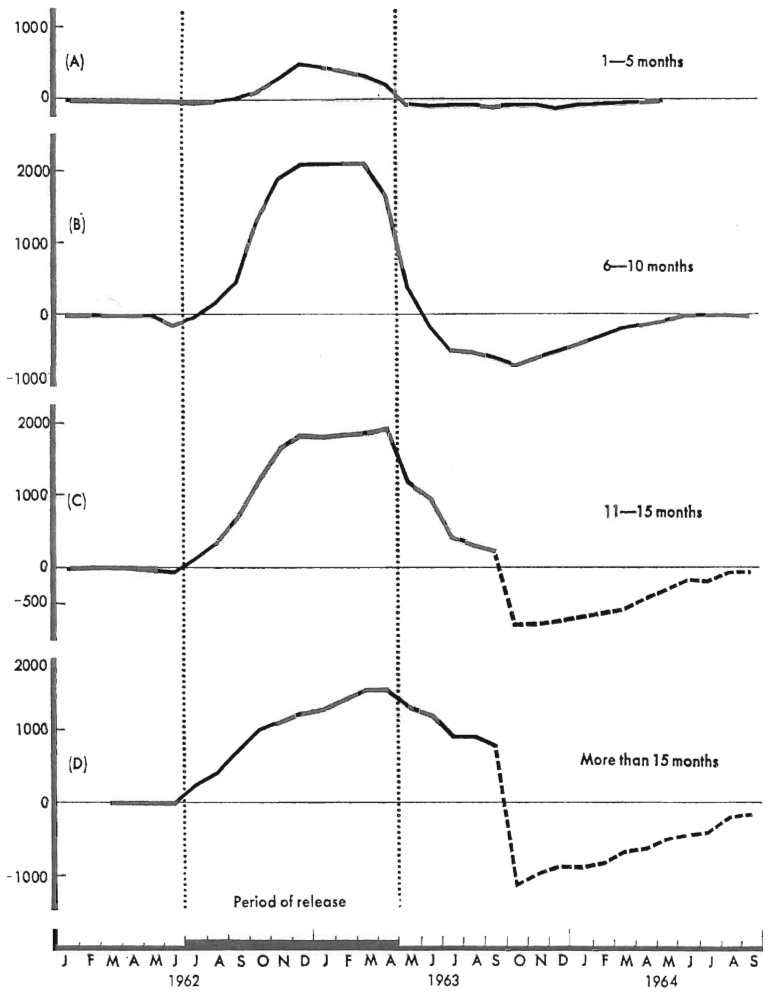
The net effect originating from the second group of projects with an average building period of 7,8 months has also been timed successfully. This group contains almost half the total number of IF-projects, and the net positive effect generated during the period of release is also the largest in volume or about 35 percent of the corresponding total

[1] This empirical "evidence" on independence between length of construction period and length of time-shift reported cannot be left wholly unassailed. Table III:3 only combines time-shifts with construction periods, neglecting variability in total costs among projects, and the distribution of these costs over the construction period. A measure using the total net effect during the period of release divided by the corresponding gross effect (cf. table III:1, the last column) shows the percentage ratios 65, 64, 59 and 51 respectively for groups A, B, C and D. These figures give a vague indication of an in the aggregate decreasing proportion between the net and gross IF-effects, the longer the construction period.

[2] For technical punch-card reasons "number of men employed" has been used instead of "costs periodized per month", i.e. employment- silhouettes have been used instead of cost-silhouettes to compute the net effects (see section II:3). Even though this "employment function" has been used to spread total costs of the individual project over the construction period, these two measures are not readily interchangeable. The related problems are discussed in the next section.

*Diagram III:4. Total net effects on projects with different construction periods*

Number of extra workers employed




*Source:* Table 5, Appendix II.

(measured by the number of workers employed). Still, almost 60 percent of the total net effect comes from projects with construction periods of more than 10 months (groups (C) and (D) in diagram III:4). These two groups thus explain practically the whole positive lag-effect after the period of release, the largest part falling on group (D) which contains only about 12 percent of the total number of IF-projects, and accounts for about 30 percent of the total net effect during the period of release. Generalizing this observation somewhat an effort to bring about a substantial net positive effect during the period of release—i.e. by including a considerable number of large projects in the release—also is likely to bring with it a not desired net positive lag-effect during a subsequent period of time, if no correctives can be designed. A discrimination in favour of short construction projects with small "back-log" effects, probably will reduce the total net positive effect substantially during the period of release, while granting permissions also to long construction projects, will automatically create lagged positive effects.

One interesting feature of diagram III:4 is the development of the net effect on to September *1964*. The short projects of groups (A) and (B) have left an "investment vacuum" (here measured in employment figures) at their alternative positions in time, which in the aggregate reaches its largest negative values during the late summer of 1963. This means a dampening of the seasonal upswing in construction activity during the summer but also, ceteris paribus, an intensification of the seasonal downswing during the subsequent winter period. With regard to groups (C) and (D) the precision of the net effect measurements after September 1963 is more or less illusory (hence the broken lines). A great many of the long projects belonging to these groups were not complete by the end of September 1963. Thus, the sharp turn of the net employment effect to negative values is to a large extent dependent upon the treatment of the "cut off" individual employment silhouettes in the computational procedure. Consequently the negative effect is overestimated during the first few months after September 1963, and underestimated some time early in 1964. Even so, it can be rather safely concluded that ceteris paribus the bulk of the negative "vacuum effect" created, has been allocated to the winter period of 1963/64 or later.

## III:3 Investments in construction—measurements regionally sectorized (the employment effect)

From the point of view of the stated purposes of the I-funds the regional employment effects are of prime interest. The related problems to be discussed in this section consist in an interpretation of regionally disaggregated data on IF-investments measured in current costs monthly, and a comparison between these data and the corresponding measures of the number of workers employed monthly. A satisfactory treatment of the employment effect also requires a brief inquiry into the unemployment situation of the geographical regions of the country during the period of release.

Before interpreting the empirical data, a few introductory remarks will have to be made, since the change of standards of measurement causes certain definitional difficulties. The first question is to what extent the figures on net current costs periodized can be regarded as a useful measure of the corresponding net employment effect. This will normally be the problem in an investigation of this kind, since employment data are usually not possible to secure. Let F stand for the total volume of investment activity planned for a certain period of time. The standard of measurement is supposed to be costs in constant prices. Thus the problem of price-movements is assumed to be non-existing for the time being. Suppose further that the volume of investment is directly proportional to labour input measured in time-units of work performed, Q. This highly simplifying assumption allows us to dispose of the problem of a varying proportion between labour input and other factor inputs (capital etc.) from project to project and from month to month in the volume of investment. The volume of investment is thus represented by the quantity of labour input times a weighted index of prices on labour and other factor inputs, P, which has been assumed to stay constant.

Since labour input is measured in time-units of work performed, a net increase in investment during the period, over and above the planned volume F, can be separated into two components, the one expressing a change in investment volume due to an increase in hours worked per day, by workers already employed, and the other denoting the change caused by an increase in the number of employed workers[1]. Now the *"desired"* net employment effect no doubt should be interpreted

[1] i.e. if: $F = P_{labour}\, Q_{labour} + P_0 Q_0$ (0 stands for "other" factor inputs)
we assume: $Q_0 = k\, Q_{labour}$
k, the wage rate ($P_{labour}$) and average prices on "other" factor inputs ($P_0$), are assumed to stay constant during the period considered. The Q's represent quantities. We now get:
$F = Q_{labour} \underbrace{(P_{labour} + P_0 k)}_{P} = PQ_{labour} = PQ$ (cont.)

as a net increase in the number of workers employed. This draws attention to a conceptual problem, referring to the degree of "directness" of the effects measured. Using figures from the Swedish input-output study of 1957 around 38 percent of the value of the final product in the construction sector itself (buildings, structures and grounds) constitutes costs for direct labour inputs, while total consumption of labour is almost 65 percent of final product[1]. Thus only about one third of the total net effect measured in costs can be expected to correspond to payments for wages on the building sites. Moreover this "direct" employment effect will explain only a little more than half the total increase in wage payments generated by the I-funds release, since labour input is also required to produce materials etc. needed for final production on the building sites. Still, this indirect effect on employment might have occurred during previous periods as well as during the current period. We do not know whether materials bought have been drawn from inventories, to be replenished during later periods, or from current production. Furthermore the statistical data used in the input-output study are not necessarily typical of the kind of construction production encompassed by the IF-release.

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Suppose further that: $Q = d\, n_o\, h_o$

$n_o$ stands for the number of workers originally employed, $h_o$ represents the original average number of hours worked a day and d is the number of working days in the period considered. d is thus a constant.

Thus: $\triangle F = P\, d\, n_o \triangle h + P\, d \triangle n\, h_o + \varepsilon$

$\varepsilon \approx O$ if $\triangle h$ and $\triangle n$ are small.

This can be rewritten:

$$\triangle F = \underbrace{P_{labour}\, dn_o\, \triangle h}_{(1)} + \underbrace{P_{labour}\, dh_o\, \triangle n}_{(2)} + \underbrace{kP_0\, dn_o\, \triangle h}_{(3)} + \underbrace{kP_0\, dh_o\, \triangle n}_{(4)}$$

(1) stands for the increase in wage payments due to an increase in overtime work while (2) is the increase in wage payments due to an increase in the number of workers. (3) and (4) are the corresponding increases in costs for other factor inputs, using constant costs ($P_{labour}$ and $P_0$ are assumed to be constant) as a standard of measurement.

(1) + (3) may be called the "overtime-effect" and

(2) + (4) the "employment effect", investment costs being used as a standard of measurement.

(1) + (2) furthermore stands for the increase in total wage payments for final production on the building sites, and

(3) and (4) represents the corresponding costs for other factor inputs (material, capital etc.). When *abstracting from* all costs of production (from all stages) other than labour input, (3) + (4) might be said to represent the indirect employment effect (measured in million kronor of wages paid) referred to in the input- output study below.

[1] See Höglund and Werin [17], table VI:6, p. 96. Commodity group 119. The Norwegian input-output study of 1954 gives a figure of about the same magnitude for direct labour consumption. See Sevaldsen [40], tabell 14, p. 87.

It is thus important to distinguish between an indirect and a direct employment effect, in the sense of the input-output study referred to above. Moreover this indirect IF-effect can be expected to have occurred during a sequence of periods preceding the period of release as well as currently or during later periods. At the same time, as long as the value of labour input is used as a standard of measurement, both these kinds of effects can be split up into one part reflecting the increase in the number of workers employed, and another part measuring the increase in the number of hours worked per day by workers already employed, the "over-time-effect". Unfortunately there seems to be no way of statistically separating these four effects. However a priori reasoning suggests that the direct overtime effect is of moderate size during the period of release. The working hours restriction act and other institutional factors can be expected to limit effectively an extensive use of overtime work to speed up IF-construction projects during the period of release. Although not as interesting, the indirect employment effects can be expected to display quite different qualities. Since orders for material inputs, etc. most probably will be distributed to a large number of production units, it seems plausible to expect that a substantial portion of the net increases in intermediate deliveries preceding final production, is achieved by drawings on inventories, to be replenished successively during later periods, and/or through temporary overtime-production, instead of via employment of new workers, to meet the increase in demand.

As an introduction to the interpretation of regional data the general character of the IF-release should furthermore be stressed. More particularly, *no* discrimination as to geographical location, branch, size or type of firm, etc. is supposed to have taken place when granting IF-licences during the IF-release of 1962/63. The only means of discrimination used was the specification of certain conditions about time-planning. (See section I:6.)

*The employment effect.* Looking first at the total *net* employment effect for the whole country, it can be seen from table 8 in Appendix II that from November 1962 there was a net increase in employment on IF-construction projects of more than 5 000 workers, reaching a maximum of more than 5 700 workers in March 1963. Part of this table is reproduced in table III:4. For the whole period of release, the average net employment effect amounts to more than 3 900 workers (table III:6B, row 2). After the end of the period of release in April 1963, the net positive employment effect rapidly tapers off, probably to take on negative values during October or November 1963. In table III:4 it can be seen that the corresponding *gross* employment effect, measuring the

number of workers employed on IF-construction projects corresponds fairly well to the estimates obtained from the stock-takings of constructions in hand, carried out by the Labour Market Board quarterly (see section III:7). The figures from the Labour Market Board are generally above the estimates of this investigation. The explanation is that some projects which do not belong to the general I-funds release have also been counted in the stock-takings (see section III:1). A maximum of about 10 000 workers employed on IF-construction projects was, however, measured from both sources of information during February 1963.

*Table III:4. Gross and net employment effects of IF-construction projects.*

| | Total gross employment effect according to stock-takings by the Labour Market Board | Total gross employment effect according to this investigation | Total net employment effect measured in this investigation |
|---|---|---|---|
| 1962 August | 1300 | 1900 | 800 |
| November | 8200 | 8000 | 4900 |
| 1963 February | 10200 | 9600 | 5700 |
| May | 8200 | 7500 | 2900 |
| August | 5700 | 5600 | 600 |

*Source:* Table 8, Appendix II, and Swedish Labour Market Board.

*A regional disaggregation of measurements.* Diagram III:5 depicts for each of the seven geographical regions first the direct *employment effect,* ($N^e$), measured by the number of additional workers directly employed on IF-construction projects. Below the corresponding direct effect (N=G—A) is shown expressed in current *costs* but uncorrected for cost-shifting. The bottom figure of each regional diagram shows the *gross* effect (G) and the *alternative* cost-silhouette (broken line A). The shaded area represents the gross effect of projects with zero time-shifts, i.e. those projects, that have not been shifted in time. As can be seen from the diagrams, the far north Sweden, region 1, is clearly different from the rest of the country. Region 1 is predominantly rural

*Table III:5*

| | Total industrial employment 1961 (thousands of workers) | Total population by end of 1961 (number of heads, thousands) |
|---|---|---|
| 1. Far North[1] | 28 | 501 |
| 2. Dalarna and Southern Norrland | 87 | 1004 |
| 3. Metropolitan area and county of Stockholm | 90 | 1270 |
| 4. Other Mälar counties | 109 | 890 |
| 5. East Götaland | 118 | 1092 |
| 6. Skåne, Halland and Blekinge | 119 | 1197 |
| 7. West Coast and Väner counties | 169 | 1541 |
| The whole country | *719* | *7495* |

[1] *Far North*; the counties of Västerbotten and Norrbotten
*Dalarna and Southern Norrland*; the counties of Kopparberg, Gävleborg, Västernorrland and Jämtland
*Other Mälar counties*; the counties of Upsala, Södermanland, Örebro and Västmanland
*East Götaland*; the counties of Östergötland, Jönköping, Kronoberg, Kalmar and Gotland
*Skåne, Halland and Blekinge*; the counties of Blekinge, Kristianstad, Malmöhus and Halland
*West Coast and Väner counties*; the counties of Gothenburg and Bohus, Älvsborg, Skaraborg and Värmland.
*Source:* Central Bureau of Statistics

(forestry), and the degree of industrialization is low compared to the total population (cf. table III:5). It can therefore be expected that the supply of suitable investment opportunities will be small in this region, compared to the others. Table III:6 A also shows, that the total gross effect of the I-funds release in region 1. does not exceed 30 million kronor or about 21 percent of estimated total industrial constructions (exclusive of maintenance) in the region during the ten-month period of release, compared to an average for the whole country of about 39 percent (rows 3 and 7). Similarly the net positive effect during the period of release, whether measured in current costs or the number of workers employed, deviates significantly from those of the other regions. The ratio between total net and total gross effect measured in costs during the period of release does not even reach half the level for the

rest of the country, which shows rather stable percentages around 60 percent (row 5, table III:6 A). It can be seen from table III:7 that in region 1. a large numerical proportion of unshifted projects with extremely long construction periods account for the low level of the net effect compared to the gross effect. Thus many water-power projects seem to belong to these long unshifted projects. It seems plausible to expect that projects of this kind and size should be rather inflexible in time-planning with respect to the I-funds release (cf. however table III:3 and comments). Except for region 1., however, there seems to be no significant tendency for projects not time-shifted to be "longer" than the average for the region. This circumstance also largely explains why such stable quotas between the net and gross effects have been obtained for these regions (see table III:6 A, row 5). The pattern of the I-funds effects seems to be rather similar for regions 2—7, in spite of certain structural differences between them. Some regional characteristics might be gathered from table III:5, which shows industrial employment (the number of workers) and the total population in each region. Roughly speaking, regions 3, 4, 6 and 7 might be characterized as highly industrialized areas with heavy industries, while the inhabitants of regions 2 and 5 to a larger proportion are occupied with agriculture and forestry. Also, the position of the city of Stockholm as the administrative and commercial centre of Sweden is revealed by a comparatively low proportion between industrial employment and total population. The data collected in table III:6 do not, however, display any definite tendencies. This outcome may be the result of too rough a geographical sectorization.

According to diagrams III:5 the maxima of the net effects are reached around the turn of the year 1962/63 or somewhat later in all instances except for regions 1. and 2. In all instances the alternative cost-silhouettes are upwards sloping (broken lines) during most of the period of release. This property will yield information on some characteristics of the net effect from a given knowledge of the gross effect, which will turn out useful for prediction purposes in section III:7. Furthermore note, that the dominating part of the alternative cost-silhouette always consists of the gross effects of projects not shifted in time (shaded areas).

In terms of employment the marginal nature of the net IF-effects is clearly brought out. Table III:6 B (row 4) shows that on the average

*Map of Sweden*

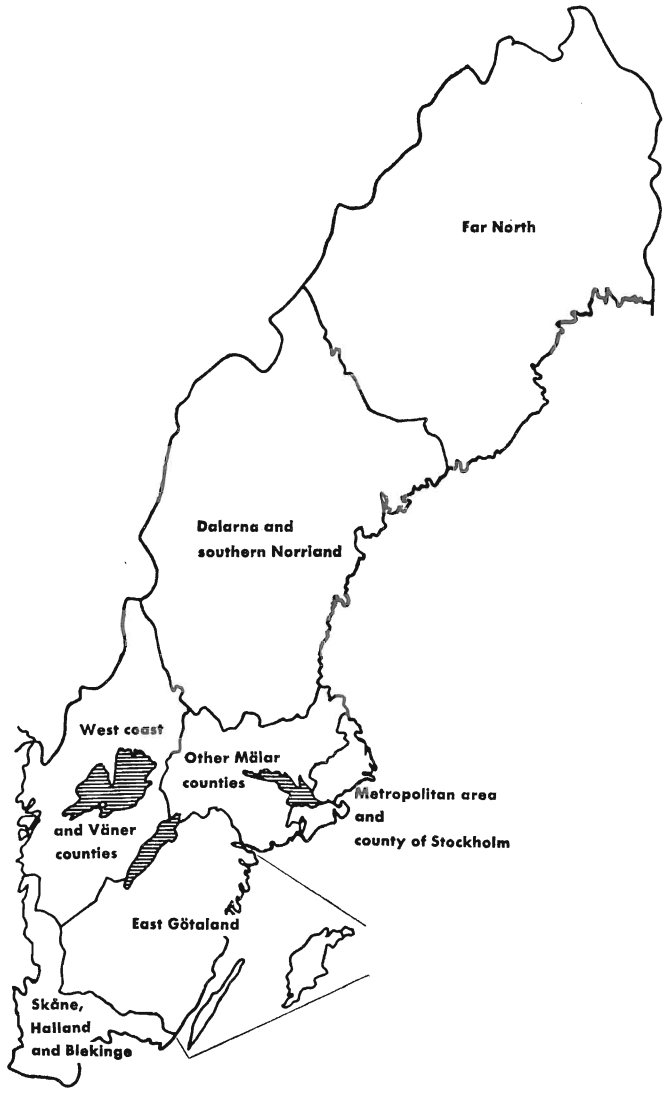
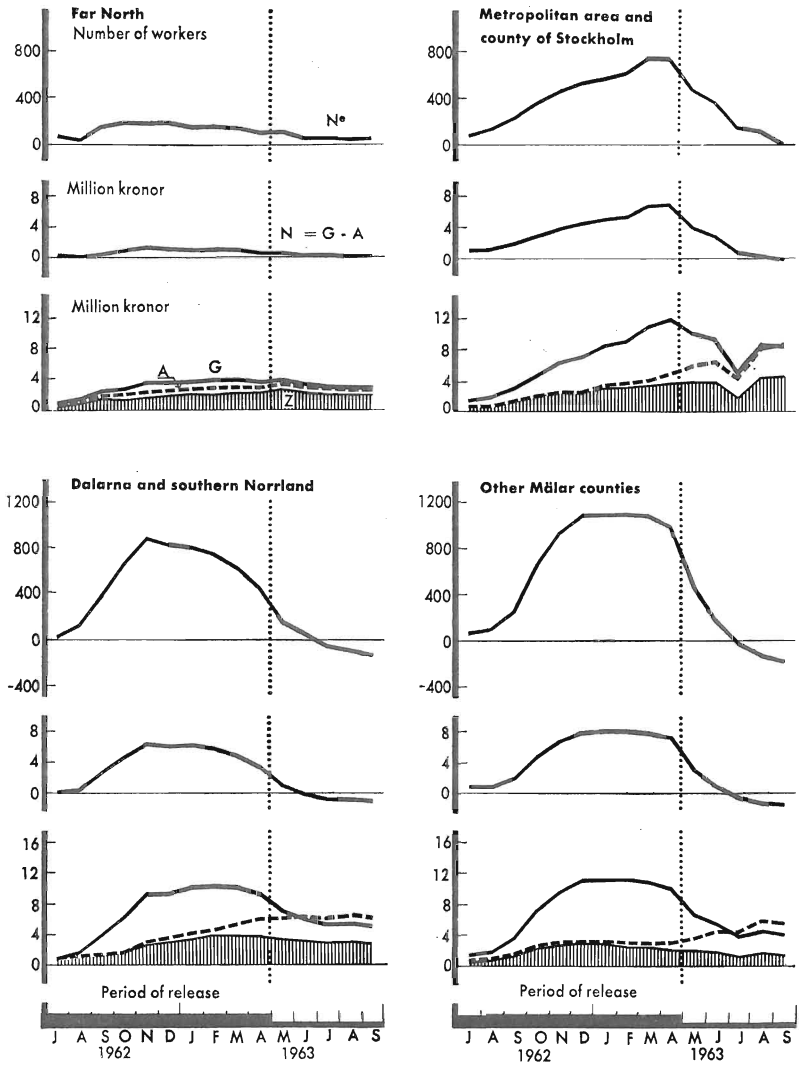
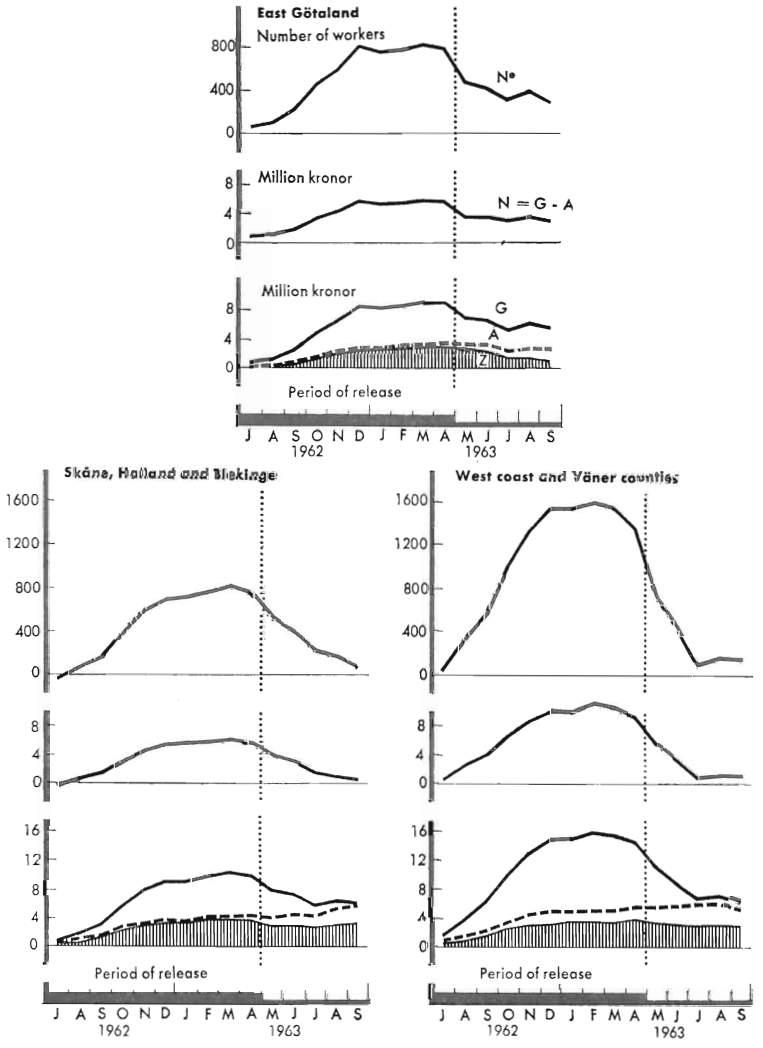


*Diagram III:5. IF-effects distributed according to regions*




$N^e$; net employment effect (number of extra workers employed).
N = G—A; net effect (million kronor).
G; gross effect (million kronor).
A; alternative cost-silhouette (million kronor).

*Diagram III:5* (continued)




Z; gross cost-silhouette from projects with zero time shifts.
*Source:* Tables 7, 6 and 8, Appendix II. For the regional grouping see Table III:5.

*Table III:6A*

| | Region 1 | Region 2 | Region 3 | Region 4 | Region 5 | Region 6 | Region 7 | Whole country |
|---|---|---|---|---|---|---|---|---|
| 1. Industrial investments in construction[1] during period of release, million kronor | 136 | 152 | 180 | 198 | 101 | 194 | 267 | 1227 |
| 2. Total net effect during period of release, million kronor | 7 | 39 | 39 | 54 | 39 | 36 | 72 | 286 |
| 3. Total gross effect during period of release, million kronor | 29 | 71 | 63 | 77 | 60 | 66 | 110 | 476 |
| 4. Total number of projects | 37 | 90 | 64 | 148 | 160 | 148 | 211 | 858 |
| 5. Net effect (2) as a percentage of gross effect (3) | 24 | 55 | 62 | 69 | 65 | 55 | 66 | 60 |
| 6. Net effects (2) as a percentage of total industrial construction (1) | 5 | 26 | 22 | 27 | 38 | 19 | 27 | 23 |
| 7. Gross effect (3) as a percentage of total industrial construction (1) | 21 | 47 | 35 | 39 | 59 | 34 | 41 | 39 |

[1] The figures are estimated by $\frac{10 \cdot I}{6}$, where I is ex post investments excl. maintenance, by region first half 1963, registered in the quarterly investment surveys and raised to 100 percent.
*Source:* Central Bureau of Statistics and Labour Market Board.

*Table III:6B.*

| | Region 1 | Region 2 | Region 3 | Region 4 | Region 5 | Region 6 | Region 7 | Whole country |
|---|---|---|---|---|---|---|---|---|
| 1. Average number of workers in the regulated construction sector during period of release[1] | 9190 | 12230 | 19290 | 12720 | 11860 | 13290 | 18340 | 96910 |
| 2. Average net effect during period of releage, number of workers | 130 | 540 | 440 | 730 | 540 | 490 | 1080 | 3940 |
| 3. Average gross effect during period of release, number of workers | 480 | 950 | 740 | 1080 | 880 | 900 | 1720 | 6760 |
| 4. Net effect (2) as a percentage of average employment (1) | 1,4 | 4,4 | 2,3 | 5,7 | 4,6 | 3,7 | 5,9 | 4,1 |
| 5. Gross effect (3) as a percentage of average employment (1) | 5,2 | 7,8 | 3,8 | 8,5 | 7,4 | 6,8 | 9,4 | 7,0 |
| 6. Net effect as a percentage of gross effect (3) | 27 | 57 | 60 | 67 | 61 | 54 | 63 | 58 |
| 7. Average unemployment in construction sector during period of release, number of workers[2] | 1630 | 2080 | 1360 | 1160 | 1150 | 1650 | 2010 | 11030 |

[1] Estimated as the average of three stock-figures from the quarterly stocktakings of construction projects under erection during period of release.
[2] Defined as unemployed workers registered at the unemployment offices, who had previously been working in the "building trade".
*Source:* Labour Market Board (cf. Table 9, Appendix II).

*Table III:7. Average construction period by region*

| | All projects (months) | Projects not time-shifted (months) | Total number of projects (answers) | Number of projects not time-shifted |
|---|---|---|---|---|
| Far North | 12,7 | 15,9 | 31 | 17 |
| Dalarna and southern Norrland | 11,4 | [1]12,4 | 74 | 23 |
| Metropolitan area and county of Stockholm | 10,4 | 10,1 | 51 | 17 |
| Other Mälar counties | 10,2 | 10,1 | 117 | 33 |
| East Götaland | 9,0 | 9,3 | 135 | 41 |
| Skåne, Halland and Blekinge | 9,7 | 9,1 | 113 | 52 |
| West coast and Väner counties | 9,2 | 9,6 | 171 | 38 |
| *Whole country* | 9,9 | 10,3 | 692 | 221 |

[1] This figure includes one project (unshifted) with a construction period of 64 months (water- power plant). The exclusion of this project lowers the average construction period for unshifted projects in Dalarna and southern Norrland to 10,0 months.

about 4 percent of total average employment in the regulated constructions sector (see p. 118) during the period of release can be referred to as the net direct effect of the IF-release. Moreover the regulated sector accounts for approximately only half of the total employment on building activities. It should be observed, however, that the variation in the net quotas around the 4 percent mean is rather sizeable. It exceeds the average by more than 1,5 percent in the most industrialized areas (i.e. other Mälar counties and the West Coast and Vänercounties) where average net employment effects during the period of release of 730 resp. 1 080 extra workers employed have been registered. On the other hand a very small percentage, 1,4 percent or 130 additional workers employed has been measured for the Far North. This finding suggest a rather skewed distribution of the net IF-effects geographically compared with the unemployment situation (see more below).

*Indirect effects in the Labour Market.* The contrasting disequilibrium situations between demand for and supply of labour prevailing in the

far north and the south of Sweden should be particularly stressed in this context. The northern parts suffer from involuntary unemployment among construction workers and the southern parts struggle with problems of scarcity of the same factor input[1]. One of the difficulties of operating the IF-system undoubtedly is to reduce the margin of temporarily unemployed workers in some regions, without introducing at the same time disorderly tendencies in other geographical sectors of the labour market. Table III:6 B throws some light on the unemployment situation in each geographical region. The measure used will be "registered unemployed workers, previously employed in the building trade" on an monthly basis. This measure is probably very sensitive to short-term cyclical variations in employment. As can be seen from table III:6 B (row 7) average unemployment remained at a rather high level during the period of release, despite the IF-effects. However these figures must have been considerably influenced in the upward direction by the extremely cold and snowy weather in January and February 1963[2].

Compared to reported average unemployment in the construction sector, the net positive effect measured on the IF-projects during the period of release is relatively high in the West Coast and Väner Counties, region 7. Here the ratio between the average net employment effect and average employment in the regulated construction sector lies almost 2 percent above the national average of 4,1 percent. The effects of the cold winter were felt most in the southern parts of the country, where registered unemployment temporarily rose to a very high level, and consequently also the average figure for the whole period of release (row 7, table III:6 B). The conclusion must be that a rather narrow margin of unemployed workers was left during the period of release, compared to the rest of the country (except maybe for January and February 1963). This is well in line with experience in region 7, during the period of release. In some parts of the southern and middle

[1] Cf. Canarp [7], p. 1184.

[2] See Appendix II, table 9. It can be seen that the level of total reported unemployment increased almost four times from December 1962 to January 1963, and almost doubled compared to the level in January 1962. The sudden increase in reported unemployment, during January and February 1963 should largely be a matter of very short term unemployment inside the monthly intervals.

regions of Sweden scarcity of construction labour was experienced in conjunction with unemployment. This scarcity, however, referred to *skilled* rather than untrained workers. A lack of skilled construction workers, brick-layers, carpenters, etc. thus seems to have formed sporadic bottle-necks in the supplies of factor inputs to the construction sector also during the period of I-funds release. The other extreme is represented by region 1, the Far Northern counties of Sweden. An almost negligible average net increase in employment has been measured, in conjunction with a high level of unemployment. Here the level of unemployment also seems to have been left more or less unaffected by the cold winter months (see Appendix II, table 9).

As long as the releases are performed on a non-discriminatory basis, the presence of an uneven supply of immobile factor inputs (in the short run) will undoubtedly constitute a serious obstacle to an efficient operation of the I-fund system. The achievement of a certain net influence on employment in certain geographical unemployment areas or certain sectors of the economy, might have to be combined with an inflationary pressure on resources in other areas. An inflationary pressure on resources might on the other hand attract the resources in demand. Skilled construction workers may be induced to move out of unemployment areas into sectors where work-opportunities are ample, thus helping to remove bottle-necks in the economy[1].

The above reasoning needs to be qualified, however. The problems of interpedence have to be taken into account. Thus, the net increase in employment desired ideally should correspond to a net decrease in unemployment. However the net increase measured may be composed of this desired effect as well as a reduction of workers already employed somewhere else. If a sufficient number of workers cannot be procured, it may even be impossible to embark upon the construction project in time. Perhaps one reason for the small percentage net effect registered for the metropolitan area and county of Stockholm lies in the relatively large proportion between the number of IF-licences not utilized and the total number of IF-projects (table 1 B, Appendix II), which in turn reflects difficulties in getting construction workers to the projects. The data referred to are, however, not really suited for interpretations of

[1] Cf. Canarp [6].

this kind. Substitution may be possible to some extent between construction workers and workers in other sectors of the economy, although institutional considerations indicate that only a minor part of the increase in employment on IF-projects can be expected to have been drawn from outside the construction sector.

One should also distinguish between employment in the regulated construction sector and the stock of workers employed outside this sector. Employment in the regulated construction sector is fairly well covered by the quarterly stock-takings carried out by the Labour Market Board for buildings under construction (see section III:7). For the rest of the construction sector, however, current and reliable statistical information on employment is practically non-existing. It is known that the relative sizes of the two sectors, measured by employment, may vary substantially over time. A rough estimate indicates that total employment in the construction sector is rather more than twice that of the regulated construction sector. The unregulated sector is predominantly concerned with small house building reparation and maintenance works, while the regulated sector produces the bulk of industrial construction and other large buildings. Notably in the case of skilled construction workers, the supply of whom suddenly became very insufficient in some areas during the latter part of the period of release, there was probably a drainage from the unregulated construction sector as well as from regulated projects not included in the IF-release. From a purely technical point of view it seems reasonable to assume that most untrained construction workers are to be found on large projects inside the regulated sector. The presence of a fairly large supply of unemployed, untrained workers along with a scarcity of skilled labour, suggest that a shifting of skilled workers from small house building and minor constructions to larger IF-projects will probably increase work-opportunities for unskilled and unemployed labour. Still, if such a shifting of resources has been attained through a reduction in small-house building, this reduction, if known, should of course be subtracted from the net effects measured on the IF-projects. Unfortunately, neither the empirical data collected in this investigation nor current sources of statistical information permit a reliable quantitative appraisal of the extent of these interactions in the labour market.

## III:4. Investments in machinery and equipment

*Problems of measurement.* In the case of I-funds investments in machinery and equipment no less than 95 percent or 249 of the 262 firms granted permissions to use their I-funds have delivered the answers requested. The information is, however, by nature less suitable for interpretation than the construction data discussed above. Even though it is still possible to secure a more or less complete listing of each specific I-funds project for the individual firm from the records of the Labour Market Board it is in practice no longer feasible to formulate questions in accordance with individual projects. In most instances each firm granted an IF-licence for investments in machinery and equipment has ordered a large number of heterogeneous objects. Ideally a classification of investment objects in "homogenous groups" technically linked together in some fashion, should have been made (cf. section II:5, p. 46). However such a procedure was also too cumbersome in practice. Instead questions were asked about the whole set of investment objects ordered by each firm (see appendix I, form M2). Since the net effect is partly defined as a reallocation in time of individual investment-objects in the firm's "investment plan", most of which can be expected to have been affected quite differently by the IF-release, this procedure of lumping the investment objects together undoubtedly makes for more imprecise answers, than in the case of construction investments.

Clearly it would be meaningless to deal with the problems of investments in machinery and equipment in terms of individual cost-functions. In practically all instances the investment goods have been bought from outside the ordering firms. There are no routine procedures for collecting statistical information, as in the case of the regulated construction sector, and it may be seriously doubted whether an engineering firm would be able to provide a reliable estimate of periodized costs for the production of the investment goods, even if willing to do so. For these and other reasons most of the technique developed in chapter II has to be discarded in the treatment of empirical data on IF-investments in machinery and equipment. Since it seems more or less unfeasible, in this case, to secure periodized cost figures reflecting the actual process of production of investment goods, information has been

requested *on orders placed with producers monthly*[1]. The problem of net measurements can now be restated as follows: Given the value of IF-orders for machinery and equipment placed during the period of release, December 1, 1962—April 30, 1963, how large a part would not have been ordered, had no I-funds been released? That is to say, how large a value of orders has been shifted *into* the period of release because of the IF-release?

No attempts have been made to estimate the alternative positions in time from which these time-shifts have been made. Clearly, this is the place where the problem of imprecision arises. It can be seen from the table below that there has been a strong tendency to order the in-

*Orders placed in* (million kronor):

| Dec. 1962 | Jan. 1963 | Febr. | March | April | *Total* |
|---|---|---|---|---|---|
| 12 | 26 | 42 | 51 | 176 | *308* |

vestment goods during the last few months of the period of release. Such a tendency can be very well explained of course by the narrow time-limits of ordering stipulated by the labour market authorities, but serious border-line problems arise out of this fact. The question is to what extent the shifting of investment value has been a matter of a few days around the turn of the months April/May 1963. These appraisals have been left altogether to the entrepreneurs (see appendix I, form M2, question 3) and consequently may have been open to a number of interpretations[2].

*The gross effect.* Measurements on the *gross value of orders placed* will be considered first. Table III:8 gives the percentage distribution of gross orders for machinery and equipment placed, by branch of producers and ordering firm. It can be seen that the bulk of IF-orders went to mechanical work-shops and abroad. As expected a large portion

[1] Since deliveries were not required to be completed until December 31, 1963 in most cases, it is a matter of definition whether the whole value of orders placed should be counted as IF-projects or not. Replies were in fact requested before the lapse of the year of 1963, i.e. before all deliveries could be supposed to have been completed.

[2] Cf. the questioning technique used by Arvidsson [2] and Wickman [42].

*Table III:8. Distribution of orders placed with different producers by branch of ordering firms*

Million kronor

| | (A) Iron and metal manu-facturing | (B) Mechanical workshops | (C) Producers transport equipment | (D) Electro-technical industries | (E) Shipyards | (F) Other industries | (G) Orders placed abroad | (H) Total |
|---|---|---|---|---|---|---|---|---|
| Metal manufacturing | 1 | 33 | 1 | 16 | — | — | 16 | 67 |
| Engineering industries | 1 | 29 | 3 | 3 | — | 1 | 23 | 61 |
| Electrotechnical industries | 1 | 17 | 1 | 7 | — | 1 | 13 | 40 |
| Producers of transport equipment | 2 | 9 | 1 | 3 | — | 3 | 12 | 30 |
| Wood processing industries etc. | 4 | 23 | 1 | 6 | — | 2 | 9 | 45 |
| Producers of direct consumer goods | — | 10 | — | 2 | — | 1 | 7 | 20 |
| Other branches | 3 | 17 | 4 | 6 | 1 | 1 | 12 | 44 |
| *Total* | *12* | *138* | *12* | *44* | *1* | *9* | *91* | *308* |

*Note.* Total volume of gross orders placed, raised to 100 percent. *Wood processing industries* also include printing and allied industries. *Producers of direct consumer goods* encompasses food, beverage, tobacco, textile and clothing industries and leather and rubber production. *Other branches* include: Mines, Non-metallic quarrying, Manufactures of chemical products etc. plus the Non-industrial (manufacturing) group.

of total orders was placed with the former, since the kinds of products eligible for IF-financing are predominantly manufactured by this sector of the engineering industries. Similarly the small part of total IF-orders, placed with the iron and metal manufacturing industries compared to the size of this sector, can be explained by the nature of its products, most of which are not eligible for the use of I-funds.

Another factor to consider when interpreting table III:8 are the time-restrictions stipulated by the labour market authorities both for the ordering of investment goods and the period of delivery. In most instances it was thus required that orders be placed before April 30, 1963 and deliveries should take place before the end of 1963. Unless the order had already been planned to be placed during the five-month period of release (December 1, 1962—April 30, 1963)—in which case no, or few revisions in plans were necessary to comply with the provisions stipulated —such restrictions call for rather light machinery or equipment, i.e. rather small investment objects with short periods of planning both in ordering and in production (see further below). Products with these qualities are certainly unlikely to be found inside sector E (shipbuilding industries) but rather inside sectors B, C and D in table III:8. Unfortunately the empirical data collected do not permit a distribution of investment objects by size, as in the case of IF-investments in construction. Moreover, to meet the time-requirements on delivery, producers must have enough spare capacity, to be able to deliver at short notice. Excess capacity may be expected among industries suffering from a temporary decline in production and the rate of orders received, which is of course, a supposition of the I-funds release. However, a "screening effect" may be obtained in this respect if the business cycles are sectorwise out of step with each other. Thus producers of transport equipment were not involved in the 1962/63 recession in the engineering industries and for this reason may have had some difficulties in delivering at short notice. It can be seen that sector C has received an unusually small percentage of gross IF-orders, in relation to its size. However, the production of both sector A (iron and metal manufacturing) and particularly sector C (producers of transport equipment) to a large extent concern production for direct consumption purposes, which might well explain why such low percentages of gross IF-orders for machinery

and equipment has been placed within these sectors compared to their size.

An interesting feature of the release of I-funds for investments in machinery and equipment, is the large portion of orders going abroad. The 30 percent figure, however, can be regarded as rather normal for this kind of investment goods[1]. Note in table III:9 the small share of IF-orders placed abroad by small firms. Evidently orders placed abroad constitute a leakage of IF-effects in so far as part of the direct positive effect upon investment activity takes place abroad. Such leakages, may have to be regarded as a rather necessary affliction to the I-funds system, as far as investments in machinery and equipment are concerned[2]. It could be argued that the "cheapening" of the investment goods through the use of I-funds should or might induce entrepreneurs to substitute Swedish machinery and equipment for foreign, if only Swedish products can be financed via the I-funds. But institutional rigidity and the complex system of subcontractors forming the link between the investment goods industries and their customers, suggest that much more remunerative benefits than those provided by the I-funds system are necessary for the achievement of such substitution effects in the short-run. Furthermore many complementary investment goods simply cannot be produced inside Sweden. If now an investment undertaking includes many individual objects, some of which can and some cannot be bought and produced inside Sweden, a discrimination against foreign produced goods might very well prevent the whole undertaking. Arguments similar to these, although qualitative in character and resting on the assumption of small possibilities of substitution, indicate that the problem is rather a matter of discrimination with a decreased net total effect in Sweden, as an alternative to the "extra costs" of a leakage abroad, together with also a higher total effect inside Sweden.

*The net effect.* We now turn to a short discussion of the *net effect* on investments in machinery and equipment. As can be seen from table

[1] In 1963 the import value of capital goods excl. ships, aeroplanes and weapons amounted to almost 2,300 million kronor, in current prices. The same year, private and government investments in machinery etc. (excl. maintenance) amounted to about 5,900 million kronor in current prices, which gives a ratio of almost 39 percent.
*Source:* National Institute of Economic Research, Stockholm.

[2] Cf. "proposition nr 159, 1963, p. 121.

III:9 there is a moderate variation, in the percentage net effects measured, around a mean value of almost 53 percent. Still this table does not reveal a substantial variation among reported percentage figures for individual firms (see appendix I, form M2, question 3), ranging between 0 and one hundred percent, the largest number falling at the two extremes. On the average almost half the volume of IF-investments in machinery and equipment is reported to have been ordered irre-

*Table III:9*

| *Size of ordering firm* | Total value of IF-orders placed | | Orders placed abroad (percent) | Net IF-effect, percent of total | Percentage distribution of I-funds accumulated by end of 1961 |
|---|---|---|---|---|---|
| | million kronor | percentage distribution | | | |
| >500 employees | 259 | 84 | 32 | 51 | 76 |
| <500 employees+unclassified group | 49 | 16 | 19 | 63 | 24 |
| Total | 308 | 100 | 30 | 53 | 100 |
| *Branch of ordering firm:* | | | | | |
| 01; metal manufacturing | 67 | 64 | 24 | 66 | 43 |
| 02; mechanical engineering industries | 61 | | 37 | 52 | |
| 03; electrotechnical industries | 40 | | 32 | 39 | |
| 04; producers of transport equipment | 30 | | 38 | 49 | |
| 05; wood processing industries[1] | 45 | 15 | 19 | 52 | 14 |
| 06; producers of direct consumption goods[1] | 20 | 7 | 36 | 51 | 12 |
| 07; other branches[1] | 44 | 14 | 28 | 50 | 31 |
| *Total* | 308 | 100 | 30 | 53 | 100 = 2 394 million kronor |

[1] See further p. 102.

spective of the fact that they were financed via the I-funds. Thus slightly more than half the value of gross IF-orders constitutes a net shifting of orders into the period of release. The share of the "net value" that has "leaked" abroad cannot be determined. It seems reasonable to expect, however, that this share does not deviate substantially from the corresponding one of the gross effect, i.e. about 30 percent.

When disaggregating the empirical data according to firms of different sizes, a very high share of the value of IF-orders is shown to have been placed by large firms. In fact almost 85 percent can be seen in table III:9 to emanate from (99) large firms with more than 500 employees. Table III:9 also illustrates the relative importance of large firms with a large stock of accumulated I-funds, a circumstance that must be regarded an important determinant of the gross outcome of an I-funds release (cf. p. 74).

### III:5. A comparison between IF-investments in machinery and equipment and in construction.

In section I:4 it was pointed out that the benefits derived from the use of I-funds for investments in machinery and equipment are slighter than those obtained from an equally large value of investments in construction works, because of the shorter allowed depreciation periods. For this reason it might be argued that a separate release of I-funds for investments in machinery and equipment cannot be expected to give rise to as large a gross value of investments as that brought about in the construction sector. Similarly the proportion between the net and the gross effect during the period of release should be smaller in the case of investments in machinery and equipment. However, also other factors than those accounted for in the simple profitability estimate, should determine both the gross and the net outcome of an IF-release. The size and distribution of available investment opportunities or the "investment potential", and flexibility in time-planning have been loosely referred to several times in the previous sections. Empirical indications suggest that the planning period for the ordering and production of investments in machinery and equipment is on the average much shorter

than that for construction works[1]. By way of example, the planning or technical preparation of an apartment building usually takes between once and twice as long as the construction period. Such circumstances suggest a larger flexibility in time-planning, and a correspondingly larger proportion between the net and the gross effects, in the case of machine-investments. Also the expected importance of liquidity financial considerations in short run investment planning suggests a high sensitivity of machine-investments towards the IF-release[2].

The data of this investigation show a definitely larger absolute effect of the IF-release on construction than on machinery and equipment. The total gross effect amounted to 475 million kronor for investments in construction during the ten-month period of release, July 1, 1962—April 30, 1963. This figure may perhaps be compared with almost 310 million kronor worth of IF-orders placed within the five-month period of release, December 1, 1962—April 30, 1963, for investments in machinery and equipment. The net outcome of these two releases has been estimated to about 60 percent for construction investments and slightly more than 50 percent, for investments in machinery and equipment (see sections III:2 and III:4). A comparison between the net effects measured and the *total* volume of investments (of approximately the same kind) during the same periods of time, indicates that on the average no less than *23 percent* of total industrial investments in construction (*excl.* maintenance) is accounted for by the net effect of the I-funds release (table III:6A). The net increase in orders placed during the five month period of release for machine-investments amounts only to about *5 percent* of total industrial investments in machinery etc. (including the net effect leakage abroad) in the year 1963, during which practically all IF-deliveries can be expected to have taken place[3]. It should be noted, though that neither the denominators nor the numerators of these quotas are directly comparable quantities. It might be concluded,

[1] Cf. e.g. Williams [45], p. IX:5

[2] Cf. the findings of Meyer — Kuh [32], ch. XII.

[3] Total industrial (mining and manufacturing) gross investments in machinery and equipment (excluding maintenance) amounted to about 3.000 million kronor in current prices during 1963. However note the different definitions of industrial construction here, and in diagram III:2, p 73.
*Sources:* National Institute of Economic Research, Stockholm and Central Bureau of Statistics.

however, that out of the gross I-funds effects, a proportionately somewhat larger net effect seems to have been generated in construction activity, than in machinery and equipment. The former effect has had a proportionately much larger impact on the total level of industrial construction, than the latter has had most probably on both the absolute level of orders placed, and on the production of machinery and equipment among the engineering industries, during the five month period of release, December 1, 1962—April 30, 1963. We have, however, been concerned here with two particular cases of separate releases. A general release of I-funds restricted to a comparatively short period of time, might produce an absolutely larger gross as well as net effect in million kronor worth of orders placed on machinery and equipment, than in million kronor worth of construction activity because of the shorter supposed planning period and the larger flexibility in the former type of investment activity.

### III:6. I-funds effects and the credit market

Credit market aspects of the IF-system so far have not been brought into the empirical discussion. It is convenient to introduce the credit market separately in three steps, the first one referring to the act of fund-accumulation. Even though such an extension will bring us somewhat outside the framework of this empirical study, it seems appropriate to begin with a brief study of the special "blocking-effects" of 1960—61. Secondly the release of I-funds is considered and finally a few suggestions are made on possible effects on the liquidity position of the firms during the years 1960—1963.

*The special blocking of 1960—61.* From the earlier discussion on profitability problems in chapter I it seems realistic to expect from the outset that IF-accumulation is one of the last alternatives tried in order to avoid taxation of profits during the current year, an alternative contemplated only when other means of fund-building, depreciation allowances and the creation of hidden inventory reserves, etc. have been exploited in full (p. 16). Such being a normal case, I-fund accumulation with 46 percent required depositing in the Central Bank can be consider-

ed roughly as an alternative to taxation of the amount appropriated. Whatever alternative chosen—the IF-appropriation now normally will be the most profitable—during the current assessment year (p. 13) *both* will entail a liquidity loss to the firm of slightly less than 50 percent of the amount funded or taxed. A reasonable outset seems to be, to expect that "normal" IF-appropriations thus will have a quite insignificant bearing on the liquidity position of the firms. Problems of this nature urgently called for consideration during the cyclical upswing of the years 1960—61. Aggregate business spending suddenly rose to a very high level. An attempt to temper this development and to encourage private industry to postpone less urgent outlays was deemed necessary. Under those circumstances (among other things) the particular IF-liquidity device, previously referred to several times, was instituted by special legislation (p. 12). The idea was to offer very favourable terms to firms with excess financial resources if they deposited temporarily 100[1], instead of 46 percent of their IF-appropriations to blocked Central Bank accounts. These terms were tailored in such a fashion that they could not possibly be secured by ordinary means elsewhere with the same effort and with the same degree of risk-taking. Thus during the summer and the autumn of 1960 premature Central Bank blocking of 100 percent of intended IF-appropriations was stimulated. Deposits in excess of the 46 percent requirement would be repaid at the end of 1961. Provided the deposit had been made before August 1, 1960 an extra income deduction of 12 percent of the IF-appropriation was granted in the assessment of 1961. This income reduction was reduced to 8 percent if the deposit had not been made until before November 1, 1960. During 1961 an equal offer was made for IF-appropriations with premature Central Bank depositing before the dates July 1, and October 1, 1961 respectively. Also firms which had utilized the offer of the previous year were encouraged to keep their excess deposits tied for another year—i.e. to the end of 1962—by an additional income deduction of 10.5 percent of the retained Central Bank deposit[2]. The benefits were thus offered according to a gliding scale depending upon the period during which fund-money was kept blocked.

[1] I.e. the government parameter in the IF-model on p. 25.
[2] See further "SFS, nr 236, 1960 and nr 529, 1961".

It was hoped that these offers would encourage a shifting of liquid balances primarily from the commercial banking system to the Central Bank. They were coupled with further monetary measures to choke off commercial banks' lending capacity, among others increased liquid asset ratio requirements. At the same time the generous rates of return offered on excess IF-depositing meant effective competition for liquid funds normally kept outside the regular credit market for lending between firms. Thus IF-excess depositing should at least theoretically exert a temporary drain also on this "grey" credit market, and all-together on most ordinary sources of external short-term business finance.

*Table III:10.*

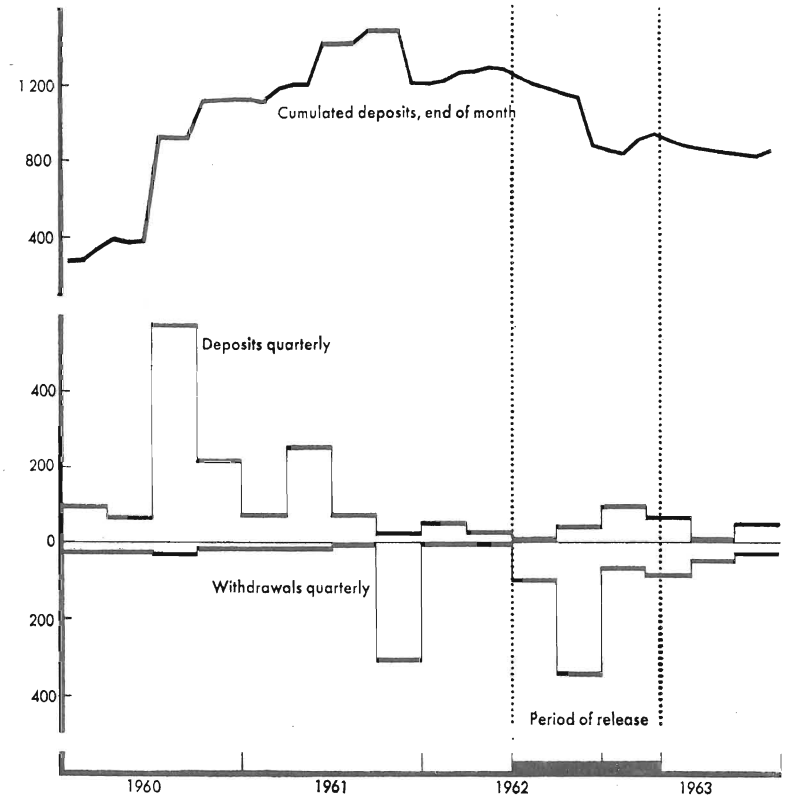
| | | Change in[1] liquid assets of the commercial banks | | Net variation in blocked Central Bank IF-accounts (+means withdrawals) | |
|---|---|---|---|---|---|
| 1960 | I | +145 | | —75 | |
| | II | —1138 | | —40 | |
| | III | —886 | | —543 | |
| | IV | +1071 | *—808* | —203 | *—861* |
| 1961 | I | —1031 | | —58 | |
| | II | —350 | | —242 | |
| | III | +60 | | —65 | |
| | IV | +1520 | *+199* | +279 | *—86* |
| 1962 | I | +120 | | —49 | |
| | II | —183 | | —21 | |
| | III | +82 | | +98 | |
| | IV | +1661 | *+1680* | +305 | *+333* |
| 1963 | I | —1532 | | —27 | |
| | II | —598 | | +24 | |
| | III | +111 | | +52 | |
| | IV | +1064 | *—955* | —17 | *+32* |

[1] Liquid assets of the commercial banks include cash treasury bills, Swedish bonds and foreign currencies.
*Source: The Swedish Economy.*

The effects of these policy measures can be traced in table III: 10. During the last two quarters of 1960 almost three quarters of a billion kronor were shifted into blocked Central Bank accounts. Similarly a

*Diagram III:6*

Million kronor




*Source:* Table 2 A, Appendix II.

quarter of a billion kronor of IF-depositing took place in the second quarter of 1961. The corresponding repayments of excess deposits can be seen during the last quarter of 1961 and 1962 respectively. A closer inspection of diagram III: 6 furthermore reveals that the bulk of these transactions between firms, commercial banks and the Central Bank occured in each case during a period shorter than a month. The very suddenness of these large transactions probably imposed both unprepared

for and substantial strains on the lending capacity of the commercial banking system, even though variations in the stock of liquid assets of the commercial banks most often are determined chiefly by other factors than variations in the blocked IF-accounts, in particular Government borrowing and to some extent variations in the foreign exchange reserves of the banks. An estimate of the quantitative import of such IF-effects isolated is impossible to provide. Altogether, however, the stock of commercial banks' liquid assets underwent a substantial reduction during 1960. During the third quarter the banks had been forced to unload a considerable volume of Government securities and their joint cash position was strained temporarily. In table III: 10 this decrease is partially offset by large seasonal Government borrowing during December, which temporarily provided the commercial banks with ample liquid reserves[1]. The second quarter of 1961 provides us with a similar example. However the picture this time is muddied by several other intervening factors. In the main the operation of this particular liquidity mechanism of the IF-system can be said to exercise the same kind of effect upon the regular credit market and the commercial banks as open market operations in Government securities. The particular advantage this time being, that Central Bank borrowing was not associated with the issue or selling of Government securities, which could partly be purchased by commercial banks and be counted in their liquid reserves thus indirectly offsetting the attempt to decrease their liquidity[2].

*The IF-release of 1962—63.* The direct effect in the credit market of the I-funds effects via withdrawals from the blocked Central Bank accounts have been calculated approximately in the diagram below. The difficulties involved here arise from the fact that the definitions of the gross effect of the general I-funds release for construction in 1962/63 is not wholly consistent with the value of withdrawals from the blocked Central Bank accounts according to licences from the labour market authorities, as registered in table 2A, Appendix II. These figures also include withdrawals for large and "long" construction projects granted special IF-permission, for IF-investments in machinery and equipment,

[1] Compare the seasonally adjusted monthly figures in the diagram on p. 37°, Statistical appendix to The Swedish Economy, October 1964.

[2] For an extensive discussion on the related problems see Lindbeck [27], chapter VII, in particular section 4:2.

and also for projects already started at the time of the release, i. e. before May 11, 1962. Form S3 asks each firm for an estimate of quarterly withdrawals from the Central Bank account for the fundprojects listed on the question forms. Registered monthly withdrawals from the Central Bank accounts according to permissions of the labour market authorities were reduced according to reported data on forms S3, to give, an approximate monthly measure of the withdrawals related to the gross I-funds effect for investments in construction. In order to obtain the corresponding total fundvariations, the withdrawals (distributed monthly) have been "inflated" with the help of the 40 and 46 percent reserve requirements each being given equal weight (see section I: 2), and the average of the two values obtained has been used to express monthly fundreductions of the gross I-funds effect. The results are pictured in diagram III: 7[1].

Note first that there seems to be very little covariation between computed fund reductions and the gross effect (cf. the assumptions of the simple model in diagram I: 1). The granting of licences after May 11, 1962 and during the first few months of the period of release, seems to have been followed by immediate excess drawings on the Central Bank accounts, in particular during the months July and August 1962. Except for those instances where built up I-funds of the individual firms were not sufficient to cover the whole gross effect, the aggregate gross effect during the whole period of release should be identical with a corresponding reduction of the I-fund ex post, for each firm[2]. In fact the amount of fund-money actually used is directly linked to the value of the gross effect in the assessment procedure (see p. 25. Nevertheless withdrawals from the Central Bank accounts can be seen in chart (A) to have been

[1] Let L stand for reported total quarterly withdrawals from the blocked Central Bank accounts as reported by the firms on form S3, question 2 (Appendix I) and $x_1 + x_2 + x_3$ the corresponding sum of monthly withdrawals during the same quarter according to Central Bank statistics (table 2A column 3, Appendix II). The difference between $\Sigma x_i$ and L is made up of withdrawals not connected with the two general releases (construction and machinery) included in this investigation. Computed monthly drawings ($L_i$) and monthly fundvariations ($F_i$) during the quarter will then be defined by:

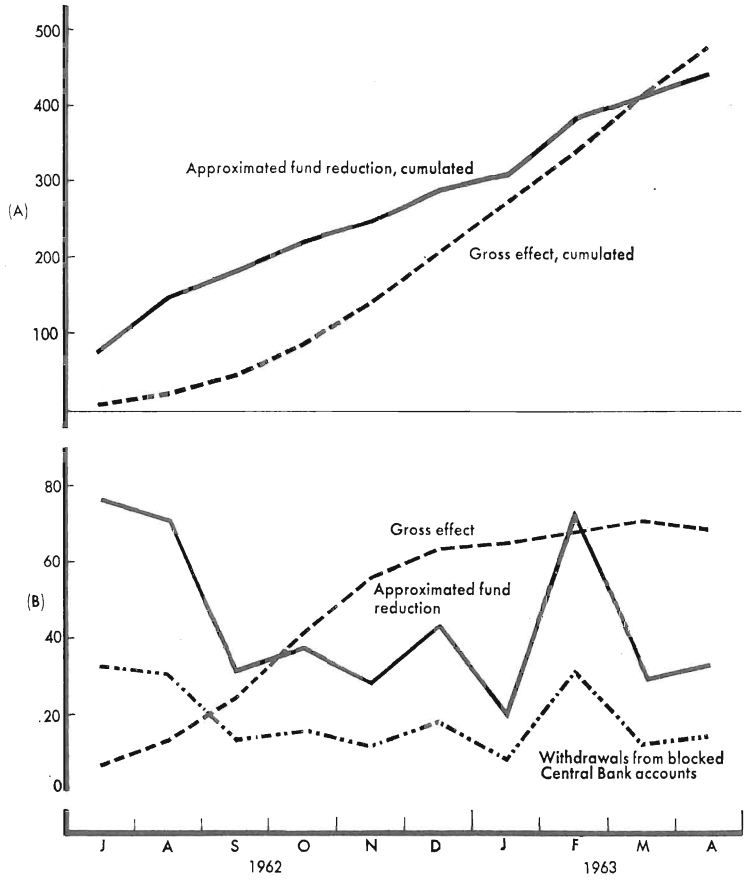
$$L_i = \frac{x_i}{x_1 + x_2 + x_3} L \qquad F_i = \frac{0{,}86}{2 \cdot 0{,}40 \cdot 0{,}46} L_i$$

$i = 1, 2, 3$

[2] Provided no IF-appropriations are made by the firm during the same period.

*Diagram III:7*

Million kronor




*Source:* See footnote on p. 113.

in excess of current IF-construction activity until March 1963, the last month but one of the period of release, and then suddenly to be "too small" during April 1963. Principally the intersection between the two curves in chart (A) should occur when total cumulated fund reductions, connected with IF-construction activity, equalled the total cumulated gross effect. It is believed, though, that this intersection in March was a little "delayed" as a result of the influence on Central Bank withdrawals connected with the IF-release for investments in machinery and equipment of November 30, 1962 (see further below).

The monthly variations in the withdrawals from the Central Bank accounts are difficult to interpret. Tax payments every second month and similar exogenous factors may have been an important explanative factor. However, work stoppages or fear of work stoppages during the extremely severe winter months of January and February 1963 and a consequent desire to reduce the value of excess withdrawals compared to the value of completed IF-construction may be one reasonable explanation of the sudden reduction in aggregate withdrawals from the Central Bank accounts in January 1963. Similarly, the fact that IF-construction activity after all does not seem to have suffered from a decline during these two winter months, might explain part of the sharp increase during February. However, this increase is believed to be dependent largely on the IF-release for investments in machinery and equipment (cf table on p. 101).

*The liquidity position of industrial firms.* A meaningful appraisal of the reciprocal relationship between industrial liquidity and the net IF-effects over the business cycle 1960—1963 cannot be presented without *extensive* further research. Also such an extension falls outside the task of the present empirical study. However, available data do permit some tentative remarks.

During the investment boom of 1960 and 1961 heavy industrial spending together with combined Government measures to choke up external sources of finance exerted an increasing financial pressure on firms, not reaching its peak impact, however, until the turn of the investment boom. The table below provides a rough indicator of these relationships. Thus a computed index of investment volume raises steadily from 1959 to a peak level in 1963, with a temporary halt during 1962. On the other hand accumulated liquid balances are diminishing from the end of 1959

| | 1959 | 1960 | 1961 | 1962 | 1963 |
|---|---|---|---|---|---|
| Change in industrial cash-holding and bank deposits (billion kronor) | 1.3 | —1.3 | —0.5 | 0.7 | 0.0 |
| Index of industrial investment volume. Constant prices Base year = 1959 | 100 | 109 | 128 | 129 | 132 |

*Sources:* Central Bureau of Statistics and National Institute of Economic Research, Stockholm.

through the boom years 1960 and 1961 to recover temporarily in 1962. The firms entered the 1962 "recession" with very much depleted liquidity reserves. The combined impact of contracyclical monetary measures and a high level of business spending thus was not reached until the beginning of the downswing period. This seems to be a typical picture of the firms cyclical liquidity pattern[1]. Thus even though a reduction of planned investments was secured, through the restrictive contracyclical policies implemented during the years 1960—61, this effect probably lagged far into the *recession* period, reinforcing the downswing.

Empirical evidence from two special investigations during the cyclical upswing of 1955—1957[2] to some extent favours such an interpretation. The impact of the restrictive credit market policies implemented then was reported by the entrepreneurs to have been felt most intensely during later stages of the upswing period. The same empirical evidence also suggests an uneven impact among firms, only a relatively small number of firms being affected and small firms suffering most heavily from disappointments in realizing their investment plans due to difficulties of acquiring external finance, large firms remaining more insensitive. It is of course quite impossible to transfer quantitatively these results to the period 1960 and 1961, even though the qualities of the effects might be expected to have been similar in nature. It can be mentioned, however, that in the investigations referred to it was estimated — on rather loose grounds, though, — that the blend of restrictive monetary policies em-

[1] Cf. e.g. Lundberg [30] and Kuh-Meyer [24], p. 367. Also see the Swedish Economy, October 1964, p. 50.

[2] See G. Arvidsson [2], and Wickman [42], also see Konjunkturläget, hösten 1957, pp 67 ff.

ployed in combination with the imposition of temporary investment taxation, has been reported by the firms to have *incurred on* the average a 14 percent reduction of planned investment outlays during each of the years 1955 and 1956.

During 1962 industrial liquidity is seen to improve again. To some extent the release of I-funds undoubtedly contributed to this improvement. However, withdrawals associated with the gross IF-effect were quite small and seem to have been partly offset by concomitant IF-appropriations (see also table 2A, Appendix II). Still the liquidity additions associated with a use of the IF-system for investment purposes, if any, must have had a favourable effect upon the firms' willingness to invest during the recession period, considering the depressed liquidity position early during 1962. A more detailed attention to this problem has, in fact, been paid already in section III: 2. It can furthermore be expected, that the 300 million kronor release of blocked IF-reserves during the last quarter of 1962, seen in table III: 10, contributed substantially to improve industrial liquidity. These liquid balances, which mainly consisted of repaid excess deposits from the years 1960 and 1961, were now mostly shifted back to the commercial banking system, thus improving its credit capacity.

### III:7. Information from current statistics — a simple method of prediction

This chapter contains a brief description of a simple ex ante method of estimating the aggregate *gross effect* of an IF-release, from current statistical information[1]. The results arrived at will be compared with those of this ex post investigation. Clearly it would be highly desirable to secure a rough estimate of the probable outcome of an I-funds release already during the actual carrying out of the release of shortly after. Particularly if the release is to be administered in a stepwise fashion, information as

[1] This section is partly a summary of a mimeographed paper on this method of forecasting by the author. See G. Eliasson [13], also cf. an abbreviated version [12]. When technicalities are concerned a general reference is made to the first paper, which is available upon request from the National Institute of Economic Research, Stockholm.

to the responses to the first or initial measures taken in fact are necessary requisites to improve or correct the timing of these effects through secondary measures. In a way such a "stepwise" policy was tried during the release of 1962/63 to correct for a positive backlog effect during the summer of 1963 (see p. 31). As a matter of fact the quarterly stocktakings[1] of the regulated construction sector carried out by the Labour Market Board and its regional agencies, provides us with the figures needed to predict the aggregate gross effect on investments in construction at a very early stage of the release. The next step would be to inquire into the possibilities of deducting some kind of information on the net effect from this predicted knowledge of the gross effect.

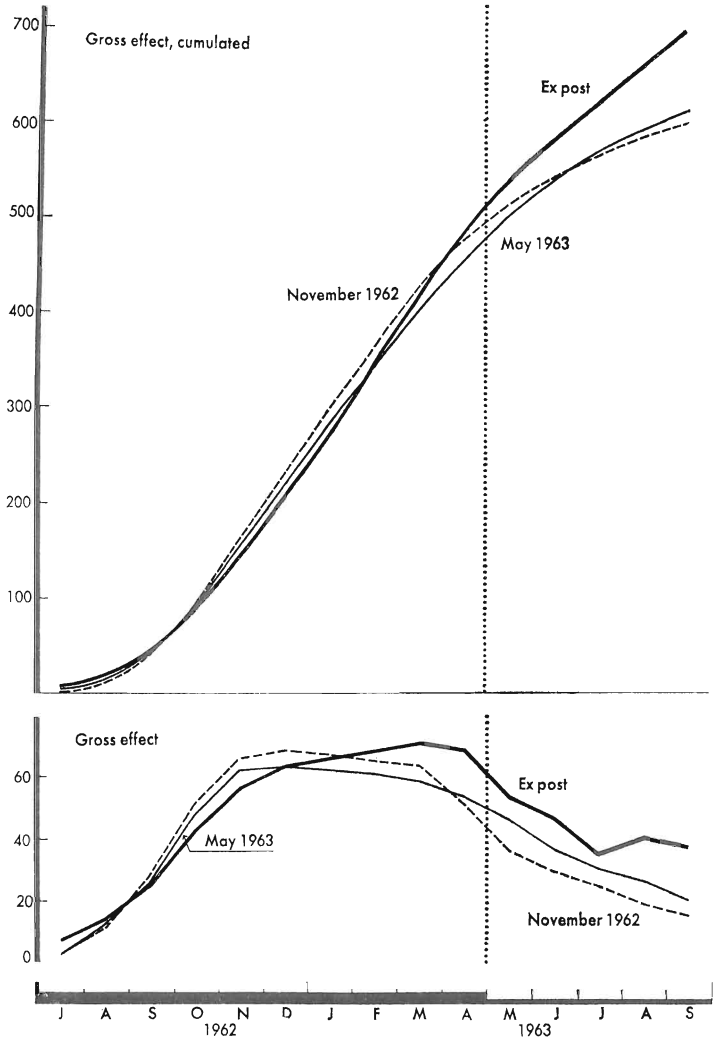
*The gross effect predicted — the method defined and tested.* The stock-takings of the Labour Market Board cover most of the construction sector except for investments in maintenance, part of Government investments in construction, and small house building. Practically the whole set of IF-projects in hand had therefore been registered in a series of stock-takings during 1962 and 1963. Information could be obtained on the starting month, planned total costs and the planned building period. By a simple punch-card procedure each IF-project can be separated from the other construction projects. By spreading the costs evenly over the planned building period month by month for each project[2], and summarizing vertically over all projects in hand or planned to be in hand each month, an estimate can be obtained of the gross effect as "planned" at the date of stock-taking. The prediction of gross costs has been calculated manually from data from the stock-takings of November 15, 1962 and May 15, 1963. These predictions are compared in diagram III:8 with actual ex post data secured in this investigation. With

[1] These stock-takings encompass a quarterly survey of all larger construction projects in hand in Sweden. Each future proprietor or contractor is required by law to deliver to the regional agencies of the Labour Market Board for *each project* in hand certain cost and employment data and an estimate of the planned construction period. Furthermore a licence to start is required from the Labour Market Board before embarking upon the project.

[2] I.e. if $T^p$ stands for total planned costs of the project (million kronor as in formula (II:12) in section II:5) and L signifies the length of planned construction period (in months), then each month of the planned construction period will be attributed a value of $g^a = \frac{T^p}{L}$ million kronor.

*Diagram III:8*

Million kronor. 1963 prices




*Source:* Tables 10 A, Appendix II.

electronic computers it would have been possible to obtain these predictions of the gross outcome of the IF-release for investments in construction for the whole period of release, possibly before the end of 1962, i. e. shortly after the deadline date, November 1, when all IF-projects were to have been started.

As can be seen from diagram III:8 a fairly good agreement has been obtained between the ex ante estimates and the ex post figures registered in this investigation. In fact the deviation between *cumulated* planned and ex post data during the period of release never exceeded ± 30 million kronor or ± half a month measured in time units (see also table 10 B, Appendix II). The estimated gross effects from the November and May stock-takings represent "planned" quantities. There is, however, no necessary agreement between these planned figures and the ones registered ex post, even if there were no errors caused by the method of approximation. Prices on building inputs fortunately do not seem to have affected the comparability of the three estimates appreciably in this case, but a gradual revision of planned figures must be expected during the realization of the investment project. Thus e. g. the extremely cold weather in January and February 1963 was thought to have affected the realization of the IF-projects considerably. However, the only information used when estimating the individual cost-silhouettes are the planned building period and planned total costs. For this reason registered differences between the two estimates of planned investments based on data from two approximately identical sets of investment projects, can only be attributed to changes in reported total costs, and/or reported planned months of completion.

Both in the individual and the aggregate case it will now be convenient to distinguish between an error of *approximation* and an *error of prediction* which together account for the differences between ex ante and ex post estimates in diagram III:8. The error of approximation can be defined at each moment as the deviation of the value approximated on the basis of the stock-taking from the corresponding one actually "planned" by the entrepreneur at the time of the stock-taking. The prediction error refers to actual changes in planning, as the building project is being realized. It is therefore defined, at each moment, as the difference between the above planned figure and the corresponding one measured

ex post[1]. Evidently we have to deal with two different sets of errors in this context, since two cost-functions have been computed from two different stocktakings. It now remains to be seen to what extent the two kinds of errors discussed may influence the interpretation of empirical data.

By definition the aggregate cumulated error of approximation tends towards zero, as we approach the end of the ultimate individual construction period. This will hold true in all cases irrespective of the shapes of the individual cost-functions. An instance of this kind of "effect" is thought to be present in the upper part of diagram III:8. When cumulating the two predicted gross effects and that measured ex post, variations of different signs around the ex post curve balance each other out over time, making for a better agreement between the three curves, at least during the period of release. In the simple case, when total costs, and the construction period remained exactly the same for each project on November 15, 1962, May 15, 1963 as well as ex post, the project being finished, the full deviation between the "planned" estimates and the gross cost-function registered ex post would be composed simply of individual errors of approximation, a deviation that should rapidly tend towards zero after the period of release, when cumulated. The fact, that the curves in the upper part of diagram III:8 do not approach each other in the long run reveals the presence of an error of prediction.

Under reasonable assumptions it can be shown that individual errors of approximation tend to cancel each other out when summarized in large numbers vertically, if there is no significant over-representation of projects with extremely shaped cost-silhouettes. There thus seems to be

[1] At each moment this can be formally expressed by the definitional identity:

$$g^a = g + \underbrace{(g^p - g)}_{D1} + \underbrace{(g^a - g^p)}_{D2}$$

This expression can be verbally stated as: The approximated cost-function $g^a$ is composed of the "true" ex post function g plus an *error of prediction,* D1 and an *error of approximation,* D2 defined by the help of the hypothetic, planned cost-function $g^p$. There might be differences of opinion as to how to interpret the concept of a planned cost-function. The very existence of such a planned function may be doubted on reasonable grounds. Nonetheless, since planned total costs and the planned building period "exist" from the stocktakings of the Labour Market Board it will be assumed that a planned cost-function can also be defined as a hypothetic momentary concept.

little reason to fear, that the method of computing the "planned" cost-functions from the stock-takings of the Labour Market Board gives a distorted picture of the aggregate planned cost-function[1]. Except maybe for a slight overestimation in the beginning of the period of release, and maybe also later on but to a smaller extent towards the spring and summer of 1963, the aggregate error of approximation may be regarded as negligible.

By definition the total error is the sum of the error of approximation and the error of prediction. This sum is seen from diagram III:8 and tables 10 A, B in Appendix II, to have been satisfactorily small throughout the *period of release*. From the above results, it may now be concluded, that the *error of prediction* has been small, too, during the period of release, maybe slightly positive in both instances during 1962, and then negative during 1963, though on a minor scale. Thus only few or negligible revisions in the aggregate investment "plans" first specified on November 15, 1963 seem to have been made during the period of release through revisions in planned total costs and the lengths of planned construction periods. Under such circumstances the method of approximation outlined here, simple though it is, obviously represents a powerful tool for evaluating in advance at future occasions the effects of IF-releases.

It should be noted furthermore that the planned cost-function of November 1962 does not entirely fulfil the requirements of identical sets of investment projects being measured as far as the number of projects is concerned. This is so because not all the IF-projects had been started at the date of the stocktaking. Most probably the addition of later projects to the distribution of costs "predicted" in November 1962 would only lift the aggregate silhouette somewhat from the t-axis, maybe with a tendency to move the maximum to the right, in which case the fit would be even more satisfactory.

A special point to consider is the fact that the extremely cold winter of 1962/63 resulted in a large number of work-stoppages in the construction sector during the critical months of January and February. The effect of these work-stoppages, if registered as prolonged building pe-

[1] This tendency is illustrated in the form of numerical examples in Eliasson [13] pp. 23 ff.

riods in the May stock-taking, will not be revealed by a dip in the May cost-function during January and February 1963, but rather be spread over the whole building period as a result of the constantly linear approximation used. Since price movements on factor inputs in the construction sector had been moderate during the whole period of release it was originally believed that most of the discrepancies between the November and May estimates could be explained by prolongations of construction periods partly caused by the cold winter. The very fact that actually registered discrepancies had not been larger, suggested that a considerable number of entrepreneurs (or contractors) had simply reported the originally calculated planned figures, without bothering to correct them for later revisions. In such a case discrepancies would instead show up in the ex post material collected from the entrepreneurs through the IF-questionnaires. Since information on both quarterly costs and the monthly number of workers employed was requested on each construction project a recognizable dip in employment could be expected during January and February 1963. As can be seen however, from the ex post employment weighted gross cost-function in diagram III:8 no such dip can be seen[1]. On the contrary, the ex post gross cost function shows larger figures than do the estimated "plans". The cold winter thus seems to have had a very moderate influence on construction activity *on the IF-projects* and/or delayed construction activity through known work-stoppages was rapidly recovered inside the monthly intervals[2].

[1] Cf. the effect of the general industrial holidays of about three weeks in July 1963, which is clearly distinguishable in diagram III:8.

[2] It should be noted, that possible increases in costs, due to unexpected, unfavourable weather conditions will not be reflected in the gross cost-functions, during January and February, due to the employment weighting procedure (see ch. II). Only variations in the number of men employed, can affect the time-distribution of total costs.
Furthermore the conclusion arrived at should be viewed in the light of the considerable technical experience in winterbuilding, esp. concrete casting, gained during the last few years, and utilized in particular in northern and central Sweden. Also Cf. the regionally disaggregated gross cost-functions, diagram III:5 in section III:3. Only in the southern regions are vague indications of reductions discernible in employment during January and February 1963, figures that should be compared to the striking increases in registered unemployment in the same regions in particular from December 1962 to January 1963, (table 9, Appendix II). The above findings suggest that the majority of work-stoppages are to be found among construction projects not financed by the help of I-funds.

Another factor bearing on the exactness of the firm's reporting concerns a possible, systematic "optimism" with regard to the lengths of the construction periods. Entrepreneurs might have thought that short construction projects, most of which being located inside the period of release, would be more eligible to become IF-projects, than would long construction projects, when applications were assessed by the labour market authorities. It was thus expected that construction periods too short to be realistic had consciously or unconsciously been reported to the stock-taking of November 1962 and also, though not to the same extent, facing occurred delays, in May 1963. The slight overestimation of IF-construction activity during the last quarter of 1962, as a matter of fact might be the result of such an "underestimation" of the lengths of construction periods. However, the deviation is too small to be of much economic import in this context or to allow for any far-reaching conclusions. Besides, the constantly linear spread of costs over the construction period will give a similar result in this case, if individual cost-functions had a systematic tendency to reach maxima around the middle of the construction periods, which seems reasonable to expect. In conclusion it seems as if the aggregate "planning" of IF-construction activity as estimated from data of November 15, 1962 and May 15, 1963, has been realized more or less "as planned", during the ten-month period of release.

One further point still remains to be dealt with before leaving the gross cost-function. In section II:5 a distinction was made between the investment project, in this case the construction project, and its components, the investment objects. By definition the investment object will form a homogenous unit with respect to its reactions to variations in the economic environment of the firm, say via an I-funds release. It will be recollected, that an important approximation has been to regard the IF-projects, as listed by the Labour Market Board, as an object in this sense. To put the same thing somewhat differently, even though a construction project ex post can be said to be composed of a certain number of distinguishable components (objects), the same project does no necessarily have to have been composed of the same number or kind of components at a planned stage, or in an alternative hypothetical position in

time[1]. Apparently this is an important question to be faced in this investigation and some light might be shed on it by comparing the planned gross cost-functions estimated in this chapter with the ones measured ex post, and utilizing the previous argument on the method of prediction.

It can be seen from the upper part of diagram III:8, that the close fit maintained during the period of release rapidly deteriorates from April 1963 onwards. Although the deflation to 1963 prices cannot claim to eliminate pricemovements completely, the increasing deviation of the ex post figures from the corresponding planned ones after the period of release, cannot be explained either by price increases or by cold winters or entrepreneurial optimism. Furthermore, the cumulated error of approximation cannot realistically be expected to display properties of this kind. Thus the discrepancy most likely should be regarded as an error of prediction, the most probable explanation of which is, that the individual investment projects have altered between the planned stage at the stocktakings, and later phases of completion. New investment *objects* seem to have been substituted for old ones and/or added to the investment projects during its realization, thus increasing the "volume" of investment in a functional sense. It might be regarded as a matter of definition whether to refer to part of this effect as the result of miscalculations in investment planning or not. Apart from mere miscalculations it still seems highly probable that the "extent" of a construction project is rather variable in an increasing direction during its realization. For prediction purposes it is comforting to observe, however, that this effect does not become significant until late in the period of release.

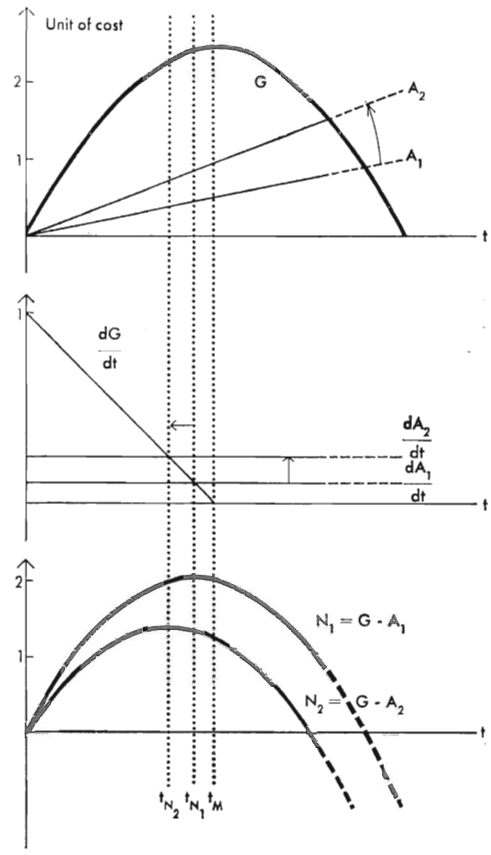
*Properties of the net effect predicted.* Despite the difficulties of measurement discussed above, the simple method of constantly linear approximation of the individual cost-functions employed, must in this case be said to have provided a fairly good prediction of the ex post measured gross cost-function during the period of release. It still remains to be

[1] Note that question 8, form B1 (see appendix I) is supposed to take care of part of this problem. Also note that the general definition of the individual ex post and alternative cost-function allows for variability of total costs of the investment *object,* (see formula II:18) depending upon its location in time. The computations described in ch. II, on the other hand do not even allow for varying total costs when the construction *project* is concerned (see diagram II:1). E.g. the cost shifting program assumes the increase in costs during the period of release to be matched by an equivalent contraction immediately after the end of the period of release.

seen whether some information could have been secured or might in the future be obtained on the direct net effect from a given knowledge of the gross effect. The net effect undoubtedly is the most important one from the point of view of cycle stabilization. Given a fairly accurate estimate of the gross effect, what can be said about the net effect? Restricting ourselves to the period of release, it can be shown that the alternative aggregate cost-function is rising during most of the period of release, so long as the starting dates of a substantial number of projects have been shifted positively in time, but inside a short interval of time somewhat longer than the period of release, i. e. in this case the period of investigation. It can be seen from diagram III:1 (p. 69) as well as diagrams III:5 (p. 92—93), that the number of positive "measured" time-shifts inside the period of investigation has prolonged the positive slope of the alternative cost- function and/or has made its downward slope less steep, after a maximum has been reached. The monotonous rise of the alternative aggregate cost-function during practically the whole period of release is born out also on a rather disaggregated level by the empirical material obtained. It can now easily be shown, that assuming this positive or zero derivative of the alternative cost-function, *the maximum of the net effect will be arrived at prior to the maximum of the gross effect or at the same time,* but not later. Without violating this result a moderate decrease in the alternative cost-function can be allowed for, too, after a maximum has been reached[1]. Still the location in time of the maximum point is a very specific piece of information on the aggregate net effect function. It does not in itself contain any information on the time-distribution of the total value of investment activity. Assuming the alternative aggregate cost-function to be approximately linear during the period of release it can be shown under reasonable assumptions, that given the gross cost-function, *the steeper the slope of the linear alternative cost-function inside the period of release, the earlier the maximum of the net effect will be reached compared to the maximum of the gross effect. Also the volume of the net effect placed inside the period of release will decrease the larger this positive slope of the alternative cost-function*[1]. Though limited in scope, the information theoretically derived is undoubtedly valuable from an operational point of view.

[1] For formal proofs see appendix to this section.

*Diagram III:9*




The last two conclusions arrived at can easily be illustrated as in diagram III:9. Let G denote the gross cost-function which is assumed to be known for each point in time, and to be fixed in shape. Its derivate with respect to time, $\frac{dG}{dt}$, is the downward sloping line in the middle chart. Its linear property is due solely to the rather arbitrarily chosen functional representation of G. Similarly two assumed linear, alternative cost-functions $A_1$ and $A_2$ and their constant derivatives are plotted in the upper two charts respectively. In the bottom chart the corresponding net effects $N_1 = G—A_1$ and $N_2 = G—A_2$ are drawn. The necessary conditions for a maximum of the net effects are satisfied when the

slopes of the gross effect and the alternative cost-function are equal, i.e. at the intersections $t = t_{N_1}$ and $t = t_{N_2}$ in the middle chart. Evidently a pivoting of the alternative linear cost-function leftwards around the origin will move the maximum of the net effect leftwards, away from the corresponding fixed maximum of the gross effect. At the same time the area under the net effect during the period of release decreases the larger the slope of the alternative cost-function. (The above charts graphically pictures the results of propositions 2 and 3 in the appendix of this section.)

The *potential* achievement of a comparatively large net effect during an expected period of recession, is one of the prerequisites for an IF-release. It therefore seems reasonable to expect from the outset that an approximately correct forecast of the potential future properties of the business cycle has been made. Thus the conditions for a relatively large volume of investment activity to be shifted into the period of release, owing to the IF-release may a priori be assumed fulfilled. In this specific instance a fairly accurate estimate of the total gross-effect could have been obtained maybe as early as during December 1962 if the numerical computations had been performed by electronic computers, i. e. shortly after the middle of the period of release. Under the assumptions made above it would then have been possible to conclude with a reasonable degree of confidence, that the timing of the net effect was fairly well illustrated by the shape of the gross effect during the period of release. The problem would then have been to approximate, inside rather narrow limits, the relative size of the net effect by making certain assumptions as to the slope of the alternative cost-function.

In conclusion it should be noted that the theoretical results arrived at are general in scope as long as the assumptions made can be realistically maintained. Given the gross cost-function from, say, the regionally disaggregated measurements in section III:3, similar conclusions could have been made concerning the properties of the regional net-effects. The problem here, however, is that the simple method of constantly linear approximation of individual cost-functions does not provide a reliable estimate of the aggregate cost-function, due to the small number of IF-projects in each region. Of course a more refined method of approximation might have provided a better fit between predicted and ex post data. At the same time, however, this loses the advantage of simple and fast computations from few and comparatively reliable data.

*A formal appendix:*

Define: $G_{(t)}$ as the gross cost-function, and
$A_{(t)}$ as the alternative cost-function. Then
$N_{(t)} = G_{(t)} - A_{(t)}$ will be called the net effect-function,
according to definition (II:3) in section II:3.

Make the following assumptions as to these functions:

(I) : Both the gross and the alternative cost-functions have continuous first order derivatives inside the closed interval $(t_0, t_2)$.
Assume further, that within this inverval:

(II) : $\frac{dG_{(t)}}{dt} \gtreqless 0$ for $t \lesseqgtr t_M$
i.e. $G_{(t)}$ reaches one and only one maximum point for $t = t_M$

(III): $G_{(t)} > A_{(t)}$ for $t < t_M$ furthermore $G_{(t_0)} = A_{(t_0)} = 0$

(IV): $\frac{dA}{dt} > 0$ for $t < t_A$

(V) : $\frac{dA_{(t)}}{dt} > \frac{dG_{(t)}}{dt}$ for $t_M \leq t_A < t$
$t_A$ being the t-value for which the alternative cost-function reaches its only maximum value inside the interval $(t_0, t_2)$

*Proposition 1:* The net effect function reaches its maximum point(s) for $t \leq t_M$

*Proof*[1] : Derivating $N_{(t)}$ with respect to t and making the derivative equal to zero, 0, yields the condition for extreme values of $N_{(t)}$ :

$$\frac{dG_{(t)}}{dt} = \frac{dA_{(t)}}{dt}$$

This condition is not satisfied for $t > t_A$ because of assumption (V), nor in the interval $t_M < t < t_A$ because of (II) and (IV), nor for $t = t_A$, unless $t = t_M = t_A$
Furthermore (V) tells us that $N_{(t)}$ is a decreasing function of t, for $t > t_A$. We have thus proved, that all maximum values, if any, will be reached for $t \leq t_M$. Finally (III) assures us that at least one maximum, which is positive, will exist.

To make the following two proofs less awkvard a few simplifications have been introduced, concerning the properties of the gross and the alternative cost-functions. The gross cost-function has thus been assumed to be described by a second degree plynominal, and defined inside the interval bordered by its intersections with the t-axis, $(0, -b/a)$:

[1] *Note,* that proposition 1 will be proved again, in a simplified case under proposition 2.

$$G_{(t)} = at^2 + bt \qquad a < 0, b > 0$$

Furthermore the alternative cost-function is approximated by a straight line through the origin of the xy-coordinates.

$$A_{(t)} = kt \qquad k > 0$$

The net effect-function can now be written:

$$N_{(t)} = G_{(t)} - A_{(t)} = at^2 + bt - kt$$

*Proposition 2:* Using the symbols of the previous proposition, the net effect function $N_{(t)}$ will reach its only maximum value for $t = t_N \leq t_M$. Furthermore, the positive distance $(t_M - t_N)$ increases with the positive slope k, of the alternative linear cost-function $A_{(t)}$.

*Proof* : Making the first derivative of the net effect and the gross cost-function equal to zero gives:

$$t_N = \frac{k}{2a} - \frac{b}{2a}$$

$$t_M = -\frac{b}{2a}$$

The second order derivatives are both negative, thus the two functions reach maxima for $t = t_N$ and $t_M$ respectively.

Furthermore define $D = t_M - t_N = -\frac{k}{2a} \geq 0$,

since $a < 0$. Evidently the net effect-function and the gross cost-function reach their maximum points simultaneously if $k = 0$, i.e. if the alternative cost-function coincides with the t-axis. The more positive the slope k, the larger D[1].

The last proposition, reads af follows:

*Proposition 3:* Suppose the period of release, is any closed interval of time $(0,t_1)$, $t_1 \leq -b/a$. Then the total positive net effect placed within the period of release:

$$N(0,t_1) = \int_0^{t_1} N_{(t)}\, dt \quad \text{(see section II:5)}$$

is smaller the larger the positive slope of the assumed linear alternative cost-function[2].

[1] *Note,* that D represent the distance between $t_M$ and the t-value for which a tangent parallel to the alternative linear cost-function touches the gross cost-function, where the net effect reaches its maximum value.

[2] *Note,* that this proposition only expresses the trivial circumstance, that the larger k the larger the alternative cost-function subtracted from a given gross cost-function, according to the definitions given on p. 37, and the smaller the net effect, whether measured momentarily, or during a period of time.

*Proof* : $N(0,t_1) = \int_0^{t_1} (at^2 + bt - kt)dt$

$= T_1 - T_{2k}$

$T_2 > 0$, and $T_1 \gtreqless 0$ depending upon the size of $t_1$, a and b.

Evidently $N(0,t_1)$ decreases with k.

### III:8. Concluding remarks

The previous sections of the empirical part has given a rather detailed account of the findings of this investigation and the problems of interpretation connected with secured data. The following main points can be made. A substantial and well timed net impact of about 300 million kronor has been measured from the I-funds release on gross industrial *construction* during the ten month period of release, July 1, 1962 to April 30, 1963, even if a minor but seemingly unavoidable net positive backlog effect remains during the summer of 1963 (p. 71). This means an average of about 15 percent of total industrial construction during the 12 month period beginning on July 1, 1962. However, this comparison refers to industrial construction, which constitutes only part of the approximately 11 billion total of construction investments during 1962. When the net I-funds effects on employment are measured and compared to total employment in the construction sector they also reduce to the marginal but still stabilizing "ripples" that were intended (p. 96).

A note of warning concerning the method of measurement employed should properly be submitted here. There are indeed limited means of testing the reliability of reported individual *net* effects. The two last sections of chapter II have been devoted to an inquiry into possible effects of errors of measurement. Basing this inquiry on the favourable circumstance that it has in fact been possible to question the entrepreneurs on individual and well defined construction projects and a few more assumptions suggested mainly by experience during the field-work of this investigation, it seems reasonable to infer that the aggregate net positive effect defined and estimated is somewhat overestimated during the period of release as well as still more so the backlog effect during the

summer of 1963 (p. 62). Further checking against ex ante reported industrial investment plans and corresponding ex post estimates on investment spending from the quarterly investment surveys — although still qualitative in nature — has yielded results which favour the findings of this investigation (p. 76). Ideally each firm reporting a substantial net IF-effect should have been checked individually, the difference between investment plans for 1962 reported during the fall of 1961 and the corresponding ex post figures delivered early in 1963 being compared with normal or average differences for the industry group and reported net IF-effects. However, such a checking was in practice not possible to perform.

With regard to the geographical distribution of the net effects the verdict does not turn out equally favourably. The most powerful impact seems to have taken place in regions with no particular unemployment problems, and rather have occasioned inflationary pressures on scarce resources of skilled labour. On the other hand only moderate effects have been registered in typical unemployment areas, particularly in the far northern region. This outcome to a large extent must be attributed to the "general" character of the I-funds release with no discrimination against any geographical region of the country, when the granting of IF-licences was concerned (p. 87). The individual net effects thus seem to have been distributed geographically, roughly in accordance with the availability of potential investment opportunities, normally concentrated to expanding industrialized regions, especially to Skåne, Halland and the West coast counties (p. 96). It is probable, however, that a screening of IF-licencing in favour of the unemployment areas would have reduced the total net effect measured for the whole of the country considerably. Still it is difficult to tell on grounds of this investigation, whether such a screening would stimulate entrepreneurs to make geographical reallocations in their investment plans, inducements that were not tried during this particular IF-release. This is a far reaching issue since it concerns the basic purposes of the IF-system, i. e. whether the effects should be limited to short term stabilization of industrial investments, or whether they should also entail a long run localization effect.

An attempt has also been made to measure the effects of the parallel release of I-funds for investments in *machinery and equipment* announ-

ced on November 30, 1963 for a subsequent five month period. In this case problems of measurement make the interpretation of obtained data particularly difficult. However, a net increase in *orders placed* on machinery and equipment of about 160 million kronor has been registered. It is interesting to note that about 30 percent of gross IF-orders have been placed abroad, a circumstance which is in itself not desirable, but which might have to be regarded as necessary for the achievement of a substantial effect inside Sweden (p. 104).

Available empirical data do not make possible a quantitative evaluation of the impact via the credit market of the IF-system. There are some very vague indications, however, of a dampening effect on industrial outlays during 1960—61 when the special device of 100 instead of 46 percent IF-depositing was introduced (p. 116). This uncertainty is also associated with indirect and lagged repercussions on other economic activities, e. g. multiplier effects, originating from the direct effects measured. These last indirect effects have only partially been taken care of in this investigation. However, scattered information suggest that they be of minor importance, for the efficient operation of the IF-system (p. 78).

There are many important requisites for an efficient operation of the I-funds system. For one thing the crucial need for good methods of short-term forecasting and a thorough insight into relevant macroeconomic relationships, should be stressed. It was shown by a mechanical I-funds model that the lag-structure of the IF-system and the probable nature of its functioning requires an indeed good foresight of the policy makers, in order not to accomplish a perverse timing of the IF-impact (p. 28). These problems also were quite well illustrated by the too late impact of the 1958—59 I-funds release. Still the prerequisites of reliable and precise methods of short-term forecasting the IF-system shares with all other weapons of contra cyclical policy. On the other hand the IF-system possesses quite a few distinguished features which makes it rank in a class to itself compared to other alternatives.

Firstly the findings of this investigation suggest, that as far as a *release* of funds is concerned, a *powerful impact* of *short duration* can be secured at *short notice*. The "effect lag" is comparatively small. The announcement of the I-funds release for investments in construction on May 11, 1962 was succeeded already in September by a substantial net

addition to industrial construction, which reached its maximum impact in February—March the next year, soon to reduce to a small positive value already after May (p. 68).

Secondly the IF-system is symmetric in the sense that it can be designed to act both as a deterrent to spending during periods of business upswing and as a stimulator when business is slack.

Thirdly the operation of the IF-system can be tempered gradually over the business cycle, varying the intensity of its impact as continually information thereon is being collected. In this context it should be stressed that the possibilities that exist of measuring both currently and ex post the performance of an IF-release are probably unique. These possibilities, which normally will not be available for the operation of alternative economic policy measures, have been both exploited in full and accounted for in this empirical study. In fact, a by-product of this study is the construction of a quite powerful tool of forecasting the gross IF-effect, once the release has been started (pp. 45 and 117).

Fourthly, if desired, the effects of an IF-release can be made selective both with respect to geographical location, type of investment object as well as size and branch of firm. Even if this possibility was not used in the particular release of 1962/63, it means that the uneven impact which is usually associated with the employment of general monetary policies that work via the credit market, such as open market operations in government securities, interest rate variations or the prescription of certain liquid asset ratios or cash reserve requirements for the commercial banks, can be at least partly mitigated.

A fifth and indeed appealing quality of the IF-system is its functioning via voluntary cooperation with the firms both during periods of fund-accumulation and periods of release. There are very few elements of regulation involved as for instance in the case of temporary investment taxation, credit channelling through priority criteria, e. g. in the capital market, etc. These are circumstances that should make the system attractive both to the entrepreneurs and the policymaker. Furthermore the IF-effects if properly effectuated do not necessarily involve a potential long run misallocation of productive resources as may be the case with e. g. relief-works. The firms make the decisions as to kind of investment activities. The Government in its turn stimulates a desirable time-

allocation of these activities via an appropriate timing of the different tax-benefits inhernent in the IF-system.

A last point to consider refers to the restrictive corporate taxation rules enacted in 1955. By this legislation the road was paved for an extensive use of the IF-system for contracyclical purposes, in so far as alternative possibilities of tax-free funding and liberal depreciation charges became limited. As has been shown earlier large amounts of money actually began to be channelled into the I-funds only after 1955. The tax-restrictions from that point of view can be considered as the initiating factor for a substantial accumulation of I-funds — which in itself represents the basic requirement for the IF-system to become operative.

*Appendix I*

# Question forms

CONFIDENTIAL

QUESTIONNAIRE B1

(Abbreviated)

concerning the use of I-funds for investments in CONSTRUCTION

The questions on this form are concerned with those construction works erected according to the permission of the Labour Market Board in (geographical location, number of investment objects, date of permission):

---

The above mentioned works will be referred to as "PROJECT" below

1. Specify periodized costs of the project, quarterly:

| | | COSTS, thousand kronor |
|---|---|---|
| 1962 | 3 Qr. | |
| | 4 Qr. | |
| 1963 | 1 Qr. | |
| | 2 Qr. | |
| | 3 Qr. | |
| | 4 Qr. | |

2. Specify average monthly employment on the project for:

| | | Average number of workers |
|---|---|---|
| 1962 | July | |
| | Aug. | |
| | Sept. | |
| | Oct. | |
| | Nov. | |
| | Dec. | |
| 1963 | Jan. | |
| | Febr. | |
| | March | |
| | April | |
| | May | |
| | June | |
| | July | |
| | Aug. | |
| | Sept. | |

Form B1 (cont.)

3. Total costs of the project, calculated or planned, thousand kronor: [ ]

4. Starting month: ..... 196 ...

5. Planned or realized construction period exclusive of work stoppages etc. in months: [ ]

6. According to YOUR appraisal, do You believe, that the project would have been started at about the same time, even though no IF-money had been available

| | |
|---|---|
| YES, WHOLLY | [ ] |
| YES, PARTLY | [ ] |
| NO | [ ] |

7. **If NO:** mark by X the most probable alternative starting period

8. If YES, PARTLY: mark by percentage of total costs the most probable alternative starting periods for each part of the project

| | X or percent |
|---|---|
| 1961 or earlier | |
| 1962 1 Qr. | |
| 2 Qr. | |
| 3 Qr. | |
| 4 Qr. | |
| 1963 1 Qr. | |
| 2 Qr. | |
| 3 Qr. | |
| 4 Qr. | |
| 1964 or later | |

9. If YES, WHOLLY: according to Your appraisal, do You think that it has been possible to increase the volume of investment activity on the project, over and above what is considered "normal", during the period of release, by concentrating as much work as possible to this period

| | |
|---|---|
| YES | [ ] |
| NO | [ ] |

If YES, by how much, thousand kronor [ ]

QUESTIONNAIRE M2

(Abbreviated)

concerning the use of I-funds for investments in MACHINERY and EQUIPMENT

The questions on this form are concerned with orders for machinery and equipment placed during the period December 1, 1962 - April 30, 1963 according to the permission of the Labour Market Board of: ..... (date)

---

1. Specify the value of orders placed, monthly

| | Thousand kronor |
|---|---|
| 1962 Dec. | |
| 1963 Jan. | |
| Febr. | |
| March | |
| April | |

2. Specify the approximate percentage apportioning of this volume of orders on different groups of producers in Sweden and abroad:

| | Percent |
|---|---|
| Iron and Metal Manufacturing | |
| Mechanical workshops | |
| Producers of transport equipment | |
| Electro-technical industries | |
| Shipyards | |
| Other industries | |
| Abroad | |
| Total | 100 |

3. How large a part of this volume of IF-orders do You estimate would have been placed during the same five-month period if no IF-money had been available

| |
|---|
| |

Percent

SPECIAL QUESTIONS

(form S3, abbreviated)

1. Do YOU think that the investments financed via the I-fund has affected other investment activities inside the firm during the period July 1, 1962 - April 30, 1963?

a) Has the extent of other investments in construction been affected? YES ☐ NO ☐

If YES: In which direction? larger ☐ smaller ☐

Estimated size of effect, thousand kronor: ☐

b) Has the extent of other orders placed on machinery and equipment been affected? YES ☐ NO ☐

If YES: In which direction? larger ☐ smaller ☐

Estimated size of effect, thousand kronor: ☐

c) Has the extent of maintenance works, etc. been affected? YES ☐ NO ☐

If YES: In which direction? larger ☐ smaller ☐

Estimated size of effect, thousand kronor: ☐

2. a) A license has been granted to use I-fund money amounting to

for investments in construction: _____ thousand kronor

for investments in machinery and equipment: _____ thousand kronor

b) Out of this fund-money, deposits according to rules in force before 1955 constitutes: _____ thousand kronor

c) From blocked Central Bank accounts has been withdrawn quarterly:

| | | Thousand kronor |
|---|---|---|
| 1962 | 3 Qr. | |
| | 4 Qr. | |
| 1963 | 1 Qr. | |
| | 2 Qr. | |

*Appendix II*

# Tables

# Contents

**Table 1 A. Answers and non-response. Construction projects (Form B 1)**

| | | |
|---|---|---|
| Number of Forms B 1 used for computations | | [1]692 |
| IF-projects never started | | 86 |
| No, or incomplete answers | | 80 |
| | Total | 858 |
| Answering percentage | | **90.7** |

[1] 55 IF-projects started before May 11, 1962 or after November 1, 1962 are not included (cf. p. 65).

**Table 1 B. Answers and non-response. Number of IF-construction projects by region[1]**

| | Number of Forms B 1 used for computations | Number of projects not started | Number of Forms B 1 not answered | Total |
|---|---|---|---|---|
| Far North | 31 | 2 | 4 | 37 |
| Dalarna and Southern Norrland | 74 | 5 | 11 | 90 |
| Metropolitan area and county of Stockholm | 51 | 10 | 3 | 64 |
| Other Mälar Counties | 117 | 9 | 22 | 148 |
| East Götaland | 135 | 16 | 9 | 160 |
| Skåne, Halland and Blekinge | 113 | 19 | 16 | 148 |
| West coast and Väner counties | 171 | 25 | 15 | 211 |
| Whole country | **692** | **86** | **80** | **858** |

[1] Cf. Table III:5, p. 89.

**Table 1 C. Answers and non-response. Number of IF-construction projects by size and branch**

The "triple" x, y, z stands for: x = number of projects (answers) used for computations; y = number of IF-projects not started; z = non-response. Example: 61, 6, 11 means that 61 + 6 answers have been received out of 61 + 6 + 11. 6 of these IF-projects were never started during the period of release.

| | 1 | | | 2 | | | 3 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | x | y | z | x | y | z | x | y | z | x | y | z |
| Metal manufacturing | 61 | 6 | 11 | 16 | 2 | 8 | 34 | 4 | 7 | 111 | 12 | 26 |
| Engineering industries | 46 | 3 | 1 | 13 | 2 | 0 | 10 | 0 | 1 | 69 | 5 | 2 |
| Electrotechnical industries | 15 | 1 | 1 | 10 | 1 | 0 | 0 | 0 | 1 | 25 | 2 | 2 |
| Producers of transport equipment | 20 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 21 | 0 | 3 |
| Wood processing industries | 31 | 0 | 9 | 29 | 7 | 3 | 43 | 6 | 2 | 103 | 13 | 14 |
| Producers of direct consumer goods | 50 | 4 | 5 | 20 | 2 | 3 | 24 | 3 | 3 | 94 | 9 | 11 |
| Other branches | 118 | 15 | 9 | 38 | 8 | 4 | 113 | 22 | 9 | 269 | 45 | 22 |
| Total | **341** | **29** | **39** | **126** | **22** | **18** | **225** | **35** | **23** | **692** | **86** | **80** |

Size: 1. More than 200 employees. 2. Between 50—199 employees. 3. Less than 49 employees + unclassified group.
Branch: Fort details cf. Table III:8, p. 102.

**Table 1 D. Answers and non-response. IF-investments in machinery and equipment**

| | | |
|---|---|---|
| Number of Forms M 2 (number of firms) used for computations | | 215 |
| Number of firms not utilizing their IF-permissions | | 34 |
| No or incomplete answers | | 13 |
| | Total | 262 |
| Answering percentage | | **95.0** |

**Table 2 A. Withdrawals from and deposits in blocked Central Bank accounts[1]**
Million kronor

| | Deposits | Withdrawals | | | | Cumulated deposits by end of month |
|---|---|---|---|---|---|---|
| | | Total | On permission by Labour Market Board | For use of "free sector" | Other | |
| 1960 Jan. | 0.3 | 2.8 | | | | 266.6 |
| Febr. | 18.5 | 2.9 | | | | 282.2 |
| March | 80.6 | 18.7 | | | | 344.1 |
| April | 48.5 | 4.3 | | | | 388.3 |
| May | 0.5 | 16.7 | | | | 372.1 |
| June | 16.1 | 4.2 | | | | 384.0 |
| July | 573.6 | 25.9 | | | | 931.8 |
| Aug. | 0.7 | 1.4 | | | | 931.1 |
| Sept. | 0.2 | 3.8 | | | | 927.5 |
| Oct. | 197.7 | 2.1 | | | | 1 123.1 |
| Nov. | 4.4 | 5.5 | | | | 1 122.0 |
| Dec. | 12.7 | 6.4 | | | | 1 128.2 |
| 1961 Jan. | 2.8 | 2.4 | | | | 1 128.5 |
| Febr. | 7.2 | 11.1 | | | | 1 124.6 |
| March | 60.0 | 0.6 | | | | 1 184.0 |
| April | 27.6 | 9.8 | | | | 1 201.8 |
| May | 4.0 | 0.5 | | | | 1 205.3 |
| June | 223.3 | 2.8 | | | | 1 425.8 |
| July | 3.6 | 3.2 | | | | 1 426.2 |
| Aug. | — | 0.6 | | | | 1 425.6 |
| Sept. | 65.7 | 0.2 | | | | 1 491.1 |
| Oct. | 0.2 | 5.1 | | | | 1 486.2 |
| Nov. | — | 0.2 | | | | 1 486.0 |
| Dec. | 26.3 | 300.5 | | | | 1 211.7 |
| 1962 Jan. | 0.2 | 1.5 | 0.1 | 0.7 | 0.7 | 1 210.5 |
| Febr. | 6.7 | 0.1 | — | 0.1 | 0.1 | 1 217.1 |
| March | 45.5 | 1.9 | 1.5 | — | 0.4 | 1 260.7 |
| April | 12.4 | 0.1 | — | — | 0.1 | 1 273.0 |
| May | 14.0 | 0.6 | 0.5 | — | — | 1 286.4 |
| June | — | 4.1 | 4.1 | — | — | 1 282.3 |
| July | 0.5 | 42.5 | 41.2 | 0.3 | 1.1 | 1 240.3 |
| Aug. | — | 38.5 | 38.4 | — | — | 1 201.9 |
| Sept. | — | 17.3 | 17.2 | — | — | 1 184.6 |
| Oct. | — | 23.2 | 23.1 | — | 0.1 | 1 161.4 |
| Nov. | 0.2 | 17.7 | 17.5 | — | 0.1 | 1 143.9 |
| Dec. | 42.2 | 305.3 | 26.5 | 0.1 | 278.7 | 880.7 |
| 1963 Jan. | 0.7 | 16.9 | 9.2 | 0.9 | 6.8 | 864.4 |
| Febr. | 15.7 | 36.3 | 34.1 | 1.2 | 1.0 | 843.8 |
| March | 79.6 | 14.9 | 13.7 | 0.1 | 1.0 | 908.5 |
| April | 56.6 | 26.2 | 25.8 | — | 0.4 | 939.0 |
| May | 7.3 | 39.1 | 38.8 | — | 0.3 | 907.3 |
| June | 0.1 | 20.9 | 20.8 | — | 0.2 | 886.4 |
| July | — | 21.0 | 20.8 | — | 0.2 | 865.4 |
| Aug. | 0.1 | 12.5 | 12.3 | — | 0.3 | 852.9 |
| Sept. | — | 16.8 | 16.6 | 0.1 | — | 836.1 |
| Oct. | 0.3 | 10.8 | 10.0 | 0.3 | 0.3 | 825.7 |
| Nov. | — | 6.0 | 6.0 | — | — | 819.7 |
| Dec. | 47.1 | 12.3 | 11.7 | 0.6 | 0.1 | 854.5 |

[1] Excl. I-funds for investments in forestry.
*Source:* Central Bank of Sweden.

**Table 2 B. Gross effect of investments in construction and corresponding estimated fund variations and withdrawals from blocked Central Bank accounts**

Million kronor

| | Withdrawals from blocked Central Bank accounts[1] | Fund variations[1] | Fund variations cumulated | Gross effect | Gross effect cumulated |
|---|---|---|---|---|---|
| 1962 July | 32.4 | 75.8 | 75.8 | 6.6 | 6.6 |
| Aug. | 30.2 | 70.7 | 146.5 | 13.2 | 19.8 |
| Sept. | 13.5 | 31.7 | 178.2 | 24.3 | 44.1 |
| Oct. | 15.9 | 37.2 | 215.4 | 40.9 | 85.0 |
| Nov. | 12.1 | 28.2 | 243.6 | 55.6 | 140.6 |
| Dec. | 18.3 | 42.8 | 286.4 | 62.7 | 203.3 |
| 1963 Jan. | 8.4 | 19.7 | 306.1 | 65.2 | 268.5 |
| Febr. | 31.3 | 73.1 | 379.2 | 68.2 | 336.7 |
| March | 12.6 | 29.5 | 408.7 | 70.4 | 407.1 |
| April | 14.3 | 33.3 | 442.0 | 68.5 | 475.6 |

[1] For the method used, see p. 113.

**Table 3. Total gross (G) and net effects (N) corrected for cost-shifting and total time- and cost-shifting effects (C)**

Million kronor. Figures raised to 100 percent

| | Gross effect (G) | Alternative cost silhouette (A) | Net effect (N = G — A) | Cost-shifting effect (C) | Time-shifting effect (N — C) |
|---|---|---|---|---|---|
| 1962 Jan. | 0.0 | 0.1 | —0.1 | . . | . . |
| Febr. | 0.0 | 0.2 | —0.2 | . . | . . |
| March | 0.0 | 0.3 | —0.3 | . . | . . |
| April | 0.0 | 0.3 | —0.3 | . . | . . |
| May | 0.0 | 1.2 | —1.2 | . . | . . |
| June | 0.0 | 1.4 | —1.4 | . . | . . |
| July | 6.6 | 4.0 | 2.6 | +0.5 | + 2.1 |
| Aug. | 13.2 | 6.5 | 6.7 | +1.0 | + 5.7 |
| Sept. | 24.3 | 9.7 | 14.6 | +2.0 | +12.6 |
| Oct. | 40.9 | 14.3 | 26.6 | +3.0 | +23.6 |
| Nov. | 55.6 | 19.1 | 36.5 | +3.3 | +33.2 |
| Dec. | 62.7 | 21.7 | 41.0 | +3.4 | +37.6 |
| 1963 Jan. | 65.2 | 23.4 | 41.8 | +3.4 | +38.4 |
| Febr. | 68.2 | 24.6 | 43.6 | +3.4 | +40.2 |
| March | 70.4 | 26.3 | 44.1 | +3.4 | +40.7 |
| April | 68.5 | 28.2 | 40.2 | +3.4 | + 36.8 |
| May | 53.4 | 31.9 | 21.5 | —3.4 | +24.9 |
| June | 46.9 | 33.5 | 13.3 | —3.4 | +16.7 |
| July | 34.8 | 30.7 | 4.1 | —3.4 | + 7.5 |
| Aug. | 40.7 | 37.5 | 3.1 | —3.4 | + 6.5 |
| Sept. | 38.2 | 37.4 | 0.8 | —3.3 | + 4.1 |

**Table 4. Net effects by kind of time-shift**

Million kronor. Figures raised to 100 procent, but not corrected for cost-shifting

| | Group I | | | Group II | | | Group III | | | Group IV | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | G | A | N | G | A | N | G | A | N | G | A | N |
| 1962 Jan. | . . | 0.2 | —0.2 | . . | . . | . . | . . | . . | . . | . . | . . | . . |
| Febr. | . . | 0.3 | —0.3 | . . | . . | . . | . . | . . | . . | . . | . . | . . |
| March | . . | 0.3 | —0·3 | . . | . . | . . | . . | . . | . . | . . | . . | . . |
| April | . . | 0.3 | —0.3 | . . | . . | . . | . . | . . | . . | . . | . . | . . |
| May | . . | 1.2 | —1.2 | . . | . . | . . | . . | . . | . . | . . | . . | . . |
| June | . . | 1.4 | —1.4 | . . | . . | . . | . . | . . | . . | . . | . . | . . |
| July | 0.0 | 1.6 | —1.6 | 2.6 | 2.6 | 0 | 1.9 | 0.0 | 1.9 | 2.0 | 0 | 2.0 |
| Aug. | 0.3 | 1.9 | —1.6 | 4.9 | 4.9 | 0 | 3.8 | 0.2 | 3.6 | 4.2 | 0 | 4.2 |
| Sept. | 0.6 | 1.9 | —1.3 | 8.3 | 8.3 | 0 | 7.0 | 0.2 | 6.8 | 8.2 | 0 | 8.2 |
| Oct. | 1.7 | 1.9 | —0.2 | 13.0 | 13.0 | 0 | 11.8 | 0.5 | 11.3 | 14.4 | 0 | 14.4 |
| Nov. | 2.3 | 1.9 | 0.4 | 16.9 | 16.9 | 0 | 16.9 | 1.6 | 15.2 | 19.5 | 0 | 19.5 |
| Dec. | 2.5 | 1.7 | 0.8 | 19.0 | 19.0 | 0 | 19.7 | 2.3 | 17.4 | 21.4 | 0 | 21.4 |
| 1963 Jan. | 2.3 | 1.2 | 1.1 | 20.3 | 20.3 | 0 | 20.8 | 3.2 | 17.6 | 21.7 | 0 | 21.7 |
| Febr. | 1.9 | 0.9 | 1.1 | 21.3 | 21.3 | 0 | 22.6 | 4.3 | 18.3 | 22.4 | 0 | 22.4 |
| March | 2.1 | 0.5 | 1.6 | 22.0 | 22.0 | 0 | 24.3 | 5.5 | 18.8 | 22.0 | 0 | 22.0 |
| April | 1.7 | 0.3 | 1.4 | 22.7 | 22.7 | 0 | 24.1 | 6.9 | 17.2 | 19.9 | 0 | 19.9 |
| May | 0.9 | 0.2 | 0.7 | 20.7 | 20.7 | 0 | 19.4 | 10.8 | 8.6 | 12.4 | 0 | 12.4 |
| June | 0.7 | 0.1 | 0.6 | 19.8 | 19.8 | 0 | 17.0 | 13.5 | 3.5 | 9.4 | 0 | 9.4 |
| July | 0.4 | 0.1 | 0.3 | 14.7 | 14.7 | 0 | 12.7 | 15.4 | —2.7 | 7.1 | 0 | 7.1 |
| Aug. | 0.4 | 0.1 | 0.3 | 18.5 | 18.5 | 0 | 14.1 | 18.5 | —4.4 | 7.7 | 0 | 7.7 |
| Sept. | 0.3 | 0.0 | 0.3 | 17.9 | 17.9 | 0 | 13.0 | 18.8 | —5.7 | 7.0 | 0 | 7.0 |

Group I: Negative time-shifts. Group II: Zero time-shifts. Group III: Measured time-shifts inside the period of investigation (Jan. 1, 1962—Dec. 31, 1963). Group IV: Time-shifts of unspecified length into, from outside the period of investigation.

G = Gross effect; A = Alternative cost-silhouette; N = Net effect.

**Table 5. Net effects by length of construction period**

Number of workers extra employed. Figures raised to 100 percent, but not corrected for cost-shifting

| | Group I $L \leqq 5$ | | | Group II $5 < L \leqq 10$ | | | Group III $10 < L \leqq 15$ | | | Group IV $L > 15$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | G | A | N | G | A | N | G | A | N | G | A | N |
| 1962 Jan. | . . | 10 | — 10 | . . | 10 | — 10 | . . | 20 | — 20 | . . | 0 | 0 |
| Febr. | . . | 10 | — 10 | . . | 20 | — 20 | . . | 20 | — 20 | . . | 0 | 0 |
| March | . . | 10 | — 10 | . . | 20 | — 20 | . . | 30 | — 30 | . . | 10 | — 10 |
| April | . . | 0 | 0 | . . | 20 | — 20 | . . | 30 | — 30 | . . | 10 | — 10 |
| May | . . | 20 | — 20 | . . | 10 | — 10 | . . | 50 | — 50 | . . | 10 | — 10 |
| June | . . | 30 | — 30 | . . | 140 | — 140 | . . | 70 | — 70 | . . | 10 | — 10 |
| July | 20 | 50 | — 30 | 140 | 180 | — 40 | 270 | 150 | + 110 | 480 | 250 | + 230 |
| Aug. | 60 | 60 | — 10 | 480 | 330 | + 150 | 590 | 280 | + 320 | 770 | 390 | + 380 |
| Sept. | 120 | 100 | + 20 | 930 | 480 | + 450 | 1 140 | 460 | + 680 | 1 250 | 540 | + 710 |
| Oct. | 260 | 130 | +130 | 2 020 | 730 | +1 300 | 1 970 | 770 | +1 210 | 1 720 | 710 | +1 010 |
| Nov. | 480 | 190 | +290 | 2 850 | 960 | +1 900 | 2 690 | 1 070 | +1 630 | 2 010 | 900 | +1 120 |
| Dec. | 680 | 190 | +490 | 3 130 | 1 040 | +2 090 | 2 980 | 1 180 | +1 800 | 2 280 | 1 050 | +1 230 |
| 1963 Jan. | 590 | 150 | +440 | 3 110 | 1 030 | +2 080 | 2 990 | 1 200 | +1 800 | 2 570 | 1 280 | +1 280 |
| Febr. | 500 | 120 | +380 | 3 180 | 1 080 | +2 100 | 3 120 | 1 310 | +1 820 | 2 810 | 1 410 | +1 400 |
| March | 420 | 100 | +320 | 3 100 | 1 020 | +2 070 | 3 270 | 1 440 | +1 840 | 3 130 | 1 610 | +1 530 |
| April | 320 | 100 | +210 | 2 520 | 950 | +1 560 | 3 250 | 1 380 | +1 870 | 3 280 | 1 750 | +1 530 |
| May | 50 | 110 | — 60 | 1 300 | 880 | + 420 | 2 760 | 1 500 | +1 270 | 3 390 | 2 090 | +1 300 |
| June | 30 | 140 | —100 | 780 | 930 | — 150 | 2 330 | 1 380 | + 950 | 3 410 | 2 210 | +1 200 |
| July | 20 | 100 | — 80 | 330 | 810 | — 480 | 1 650 | 1 260 | + 390 | 3 160 | 2 260 | + 900 |
| Aug. | 20 | 100 | — 80 | 300 | 830 | — 520 | 1 770 | 1 480 | + 290 | 3 460 | 2 560 | + 900 |
| Sept. | 20 | 110 | —100 | 170 | 820 | — 650 | 1 570 | 1 350 | + 220 | 3 330 | 2 580 | + 750 |
| Oct. | . . | 70 | — 70 | . . | 700 | — 700 | . . | 810 | — 810 | . . | 1 140 | —1 140 |
| Nov. | . . | 80 | — 80 | . . | 640 | — 640 | . . | 810 | — 810 | . . | 1 010 | —1 010 |
| Dec. | . . | 120 | —120 | . . | 530 | — 530 | . . | 740 | — 740 | . . | 910 | — 910 |
| 1964 Jan. | . . | 80 | — 80 | . . | 400 | — 400 | . . | 700 | — 700 | . . | 910 | — 910 |
| Febr. | . . | 60 | — 60 | . . | 280 | — 280 | . . | 650 | — 650 | . . | 840 | — 840 |
| March | . . | 60 | — 60 | . . | 200 | — 200 | . . | 620 | — 620 | . . | 690 | — 690 |
| April | . . | 30 | — 30 | . . | 160 | — 160 | . . | 440 | — 440 | . . | 640 | — 640 |
| May | . . | 30 | — 30 | . . | 90 | — 90 | . . | 320 | — 320 | . . | 520 | — 520 |
| June | . . | . . | . . | . . | 10 | — 10 | . . | 200 | — 200 | . . | 480 | — 480 |
| July | . . | . . | . . | . . | 10 | — 10 | . . | 190 | — 190 | . . | 430 | — 430 |
| Aug. | . . | . . | . . | . . | 10 | — 10 | . . | 80 | — 80 | . . | 220 | — 220 |
| Sept. | . . | . . | . . | . . | 10 | — 10 | . . | 80 | — 80 | . . | 180 | — 180 |

L = Length of construction period: months. G = Gross effect; A = cost-silhouette; N = Net effect.

**Table 6. Measurements by region, gross and net effects**

Million kronor. Figures raised to 100 percent, but not corrected for cost-shifting

| | Far North (37) | | | Dalarna and Southern Norrland (90) | | | Metropolitan area and county of Stockholm (64) | | | Other Mälar counties (148) | | | East Götaland (160) | | | Skåne, Halland and Blekinge (148) | | | West cost Väner counties (211) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | G | A | N | G | A | N | G | A | N | G | A | N | G | A | N | G | A | N | G | A | N |
| 1962 Jan. | | | | | | | | | | | | | | | | | | | 0.1 | —0.1 | |
| Febr. | | | | | | | | | | | | | | | | | | | 0.2 | —0.2 | |
| March | | | | | | | | | | | | | | | | | | | 0.3 | —0.3 | |
| April | | | | | | | | | | | | | | | | | | | 0.2 | —0.2 | |
| May | | 0.0 | —0.0 | | +0.8 | —0.8 | | | | | 0.2 | —0.2 | | | | | 0.3 | —0.3 | 0.4 | —0.4 | |
| June | | 0.0 | —0.0 | | +0.8 | —0.8 | | | | | 0.3 | —0.3 | | | | | 0.4 | —0.4 | 0.5 | —0.5 | |
| July | 0.8 | 0.6 | 0.2 | 0.7 | 0.7 | 0.0 | 1.3 | 0.6 | 0.8 | 1.3 | 0.6 | 0.7 | 0.8 | 0.1 | 0.7 | 0.4 | 0.8 | —0.4 | 1.4 | 0.9 | 0.4 |
| Aug. | 1.4 | 1.4 | 0.0 | 1.6 | 1.2 | 0.3 | 1.8 | 0.6 | 1.2 | 1.7 | 0.9 | 0.8 | 1.3 | 0.4 | 0.9 | 1.6 | 1.1 | 0.5 | 3.8 | 1.4 | 2.5 |
| Sept. | 2.3 | 1.9 | 0.4 | 3.9 | 1.3 | 2.6 | 2.9 | 1.1 | 1.8 | 3.5 | 1.4 | 2.0 | 2.6 | 0.9 | 1.7 | 2.9 | 1.6 | 1,3 | 6.2 | 2.2 | 3.9 |
| Oct. | 2.7 | 1.9 | 0.8 | 6.2 | 1.6 | 4.5 | 4.6 | —1.9 | 2.8 | 7.1 | 2.5 | 4.6 | 4.9 | 1.6 | 3.3 | 5.6 | 2.7 | 2.9 | 9.9 | 3.3 | 6.6 |
| Nov. | 3.5 | 2.3 | 1.2 | 9.2 | 2.9 | 6.2 | 6.0 | 2.2 | 3.8 | 9.5 | 2.9 | 6.6 | 6.6 | 2.4 | 4.2 | 7.8 | 3.3 | 4.5 | 12.9 | 4.4 | 8.5 |
| Dec. | 3.4 | 2.5 | 1.0 | 9.3 | 3.5 | 5.8 | 6.9 | 2.4 | 4.5 | 11.0 | 3.2 | 7.8 | 8.4 | 2.8 | 5.6 | 8.9 | 3.7 | 5.2 | 14.7 | 4.8 | 9.9 |
| 1963 Jan. | 3.6 | 2.7 | 0.9 | 10.1 | 4.1 | 6.0 | 8.3 | 3.3 | 5.0 | 11.2 | 3.2 | 8.0 | 8.2 | 2.9 | 5.3 | 9.0 | 3.6 | 5.4 | 14.8 | 4.9 | 9.9 |
| Febr. | 3.7 | 2.8 | 0.9 | 10.3 | 4.6 | 5.7 | 9.0 | 3.6 | 5.4 | 11.2 | 3.1 | 8.1 | 8.5 | 3.2 | 5.4 | 9.7 | 4.1 | 5.6 | 15.8 | 5.1 | 10.8 |
| March | 3.7 | 2.9 | 0.9 | 10.1 | 5.3 | 4.8 | 10.9 | 3.9 | 6.9 | 10.9 | 3.1 | 7.8 | 9.1 | 3.3 | 5.8 | 10.2 | 4.3 | 5.9 | 15.4 | 5.1 | 10.3 |
| April | 3.6 | 2.9 | 0.6 | 9.3 | 5.9 | 3.4 | 11.8 | 4.8 | 7.0 | 10.2 | 3.0 | 7.2 | 9.2 | 3.5 | 5.7 | 9.8 | 4.3 | 5.5 | 14.6 | 5.5 | 9.2 |
| May | 3.8 | 3.3 | 0.5 | 7.1 | 6.1 | 1.0 | 10.0 | 5.9 | 4.0 | 6.7 | 3.6 | 3.1 | 6.9 | 3.3 | 3.5 | 7.8 | 4.0 | 3.9 | 11.1 | 5.5 | 5.6 |
| June | 3.3 | 3.0 | 0.2 | 6.1 | 6.3 | —0.2 | 9.2 | 6.3 | 2.9 | 5.5 | 4.5 | 0.9 | 6.7 | 3.2 | 3.5 | 7.3 | 4.4 | 2.9 | 8.9 | 5.6 | 3.3 |
| July | 3.0 | 2.8 | 0.2 | 5.2 | 6.1 | —0.9 | 5.0 | 4.3 | 0.6 | 3.9 | 4.4 | —0.5 | 5.4 | 2.5 | 2.9 | 5.7 | 4.2 | 1.5 | 6.7 | 5.8 | 0.8 |
| Aug. | 2.9 | 2.8 | 0.1 | 5.4 | 6.4 | —1.0 | 8.4 | 8.2 | 0.2 | 4.6 | 5.9 | —1.3 | 6.2 | 2.7 | 3.4 | 6.2 | 5.2 | 1.0 | 7.0 | 5.9 | 1.1 |
| Sept. | 2.9 | 2.7 | 0.2 | 5.0 | 6.2 | —1.2 | 8.4 | 8.6 | —0.2 | 4.1 | 5.7 | —1.6 | 5.6 | 2.7 | 2.9 | 6.1 | 5.6 | 0.5 | 6.1 | 5.1 | 1.0 |

*Note.* G = Gross effect; A = Alternative cost-silhouette; N = Net effect. Figures in brackets indicate number of projects.

**Table 7. Cost-silhouettes for zero (not) time-shifted construction projects by region**

Million kronor. Figures raised to 100 percent

| | 1962 | | | | | | 1963 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Febr. | March | April | May | June | July | Aug. | Sept. |
| Far North | 0.5 | 1.1 | 1.5 | 1.3 | 1.6 | 1.8 | 1.9 | 2.0 | 2.2 | 2.2 | 2.6 | 2.2 | 2.1 | 2.0 | 2.0 |
| Dalarna and southern Norrland | 0.6 | 1.0 | 1.2 | 1.6 | 2.6 | 2.9 | 3.3 | 3.8 | 3.8 | 3.7 | 3.3 | 3.1 | 2.8 | 2.9 | 2.8 |
| Metropolitan area and county of Stockholm | 0.5 | 0.6 | 1.1 | 1.8 | 2.1 | 2.3 | 2.9 | 3.0 | 3.3 | 4.1 | 4.3 | 4.2 | 1.6 | 4.3 | 4.5 |
| Other Mälar counties | 0.3 | 0.6 | 1.3 | 2.3 | 2.6 | 2.8 | 2.8 | 2.5 | 2.5 | 2.2 | 1.9 | 1.8 | 1.1 | 1.7 | 1.4 |
| East Götaland | 0.0 | 0.3 | 0.6 | 1.3 | 2.1 | 2.6 | 2.7 | 2.8 | 3.0 | 3.0 | 2.7 | 2.4 | 1.6 | 1.4 | 1.1 |
| Skåne, Halland and Blekinge | 0.3 | 0.6 | 1.2 | 2.2 | 2.9 | 3.3 | 3.2 | 3.7 | 3.8 | 3.7 | 2.9 | 2.9 | 2.6 | 2.9 | 3.2 |
| West coast and Väner counties | 0.3 | 0.8 | 1.5 | 2.4 | 3.0 | 3.3 | 3.5 | 3.4 | 3.4 | 3.8 | 3.2 | 3.1 | 2.9 | 3.1 | 2.9 |
| Whole country | 2.4 | 4.9 | 8.3 | 13.0 | 16.9 | 19.0 | 20.3 | 21.3 | 22.0 | 22.7 | 20.7 | 19.8 | 14.7 | 18.5 | 17.9 |

**Table 8. Net employment effects by region**

Number of workers. Figures raised to 100 percent

| | | 1962 | | | | | | 1963 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Febr. | March | April | May | June | July | Aug. | Sept. |
| Far North (37) | G | 140 | 220 | 390 | 470 | 570 | 570 | 600 | 630 | 630 | 600 | 650 | 580 | 520 | 500 | 500 |
| | A | 90 | 200 | 260 | 300 | 390 | 410 | 450 | 480 | 500 | 500 | 550 | 520 | 470 | 470 | 460 |
| | N | 60 | 20 | 130 | 170 | 180 | 170 | 150 | 150 | 130 | 100 | 110 | 50 | 50 | 30 | 40 |
| Dalarna and southern Norrland (90) | G | 120 | 260 | 540 | 870 | 1 250 | 1 270 | 1 310 | 1 340 | 1 350 | 1 240 | 1 020 | 860 | 740 | 730 | 710 |
| | A | 100 | 160 | 180 | 220 | 380 | 450 | 520 | 600 | 730 | 810 | 870 | 820 | 800 | 830 | 840 |
| | N | 10 | 110 | 360 | 640 | 870 | 820 | 790 | 740 | 620 | 440 | 150 | 40 | —60 | — 90 | —130 |
| Metropolitan area and county of Stockholm (64) | G | 140 | 210 | 360 | 580 | 730 | 840 | 960 | 1 020 | 1 220 | 1 320 | 1 140 | 1 080 | 850 | 970 | 920 |
| | A | 70 | 80 | 140 | 240 | 280 | 310 | 390 | 410 | 470 | 580 | 670 | 710 | 710 | 870 | 910 |
| | N | 70 | 130 | 210 | 350 | 450 | 530 | 570 | 610 | 750 | 740 | 480 | 370 | 140 | 100 | 10 |
| Other Mälar counties (148) | G | 160 | 220 | 470 | 1 010 | 1 360 | 1 540 | 1 560 | 1 550 | 1 540 | 1 440 | 1 020 | 830 | 600 | 680 | 620 |
| | A | 110 | 140 | 220 | 360 | 430 | 470 | 470 | 450 | 470 | 450 | 560 | 660 | 630 | 820 | 810 |
| | N | 50 | 80 | 240 | 650 | 930 | 1 070 | 1 080 | 1 100 | 1 080 | 990 | 460 | 180 | —30 | —130 | —190 |
| East Götaland (160) | G | 100 | 190 | 360 | 710 | 970 | 1 260 | 1 230 | 1 280 | 1 360 | 1 340 | 1 020 | 940 | 730 | 840 | 720 |
| | A | 20 | 80 | 140 | 260 | 380 | 460 | 470 | 510 | 530 | 560 | 540 | 510 | 410 | 450 | 430 |
| | N | 70 | 110 | 220 | 450 | 590 | 810 | 760 | 770 | 830 | 790 | 480 | 430 | 320 | 390 | 290 |
| Skåne, Halland and Blekinge (148) | G | 60 | 220 | 380 | 780 | 1 070 | 1 230 | 1 220 | 1 320 | 1 420 | 1 340 | 1 060 | 960 | 740 | 830 | 770 |
| | A | 100 | 150 | 220 | 390 | 490 | 530 | 510 | 580 | 610 | 590 | 540 | 560 | 530 | 670 | 700 |
| | N | —40 | 70 | 160 | 390 | 590 | 690 | 710 | 750 | 810 | 750 | 520 | 400 | 210 | 160 | 70 |
| West coast and Väner counties (211) | G | 200 | 580 | 940 | 1 570 | 2 090 | 2 360 | 2 380 | 2 470 | 2 410 | 2 220 | 1 590 | 1 300 | 970 | 1 000 | 850 |
| | A | 160 | 250 | 400 | 580 | 760 | 830 | 840 | 890 | 870 | 860 | 870 | 860 | 880 | 850 | 710 |
| | N | 40 | 330 | 550 | 990 | 1 320 | 1 530 | 1 530 | 1 580 | 1 540 | 1 360 | 730 | 440 | 100 | 150 | 140 |
| **Whole country (858)** | G | **900** | **1 890** | **3 440** | **5 980** | **8 030** | **9 070** | **9 250** | **9 610** | **9 920** | **9 510** | **7 500** | **6 540** | **5 160** | **5 550** | **5 080** |
| | A | **640** | **1 050** | **1 570** | **2 330** | **3 110** | **3 460** | **3 660** | **3 910** | **4 170** | **4 340** | **4 580** | **4 650** | **4 430** | **4 950** | **4 860** |
| | N | **260** | **840** | **1 870** | **3 640** | **4 930** | **5 610** | **5 590** | **5 700** | **5 750** | **5 170** | **2 920** | **1 890** | **730** | **600** | **220** |

*Note.* G = Gross effect; A = Alternative cost-silhouette; N = Net effect. Figures in brackets indicate number of projects.

**Table 9. Reported unemployed workers previously employed in the building trade**

| | 1962 | | | | | | 1963 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Febr. | March | April | May | June | July | Aug. | Sept. |
| Far North | 670 | 1 020 | 950 | 1 280 | 2 030 | 2 180 | 2 750 | 1 900 | 1 550 | 1 970 | 1 470 | 970 | 700 | 1 060 | |
| Dalarna and southern Norrland | 650 | 920 | 920 | 1 040 | 1 420 | 2 090 | 4 790 | 3 420 | 2 680 | 2 830 | 1 540 | 1 000 | 640 | 930 | |
| Metropolitan area and county of Stockholm | 230 | 410 | 500 | 540 | 710 | 1 210 | 3 010 | 2 650 | 2 390 | 2 000 | 930 | 430 | 170 | 310 | |
| Other Mälar counties | 190 | 320 | 420 | 390 | 550 | 940 | 4 100 | 1 940 | 1 440 | 1 290 | 640 | 330 | 200 | 330 | |
| East Götaland | 160 | 280 | 320 | 370 | 480 | 690 | 4 430 | 2 580 | 1 500 | 690 | 290 | 230 | 130 | 220 | |
| Skåne, Halland and Blekinge | 170 | 290 | 260 | 300 | 410 | 500 | 7 630 | 4 220 | 2 100 | 570 | 240 | 170 | 140 | 210 | |
| West coast and Väner counties | 390 | 770 | 850 | 860 | 1 040 | 1 310 | 7 220 | 3 590 | 2 510 | 1 560 | 780 | 520 | 280 | 530 | |
| Whole country | **2 450** | **4 010** | **4 220** | **4 780** | **6 650** | **8 920** | **33 940** | **20 310** | **14 160** | **10 910** | **5 890** | **3 640** | **2 260** | **3 590** | |

*Source:* Labour Market Board.

**Table 10 A. Total gross effect estimated from current statistics of November 1962 and May 1963 and ex postly measured in this investigation**

Million kronor. 1963 prices

| | Gross effect | | | Cumulated gross effect | | |
|---|---|---|---|---|---|---|
| | Nov. 1962 | May 1963 | Ex post | Nov. 1962 | May 1963 | Ex post |
| 1962 July | 2.7 | 4.2 | 6.8 | 2.7 | 4.2 | 6.8 |
| Aug. | 11.6 | 12.1 | 13.5 | 14.4 | 16.3 | 20.3 |
| Sept. | 27.1 | 26.4 | 25.0 | 41.5 | 42.7 | 45.4 |
| Oct. | 51.2 | 47.5 | 42.1 | 92.6 | 90.2 | 87.4 |
| Nov. | 66.4 | 62.8 | 56.2 | 159.1 | 153.0 | 143.6 |
| Dec. | 68.6 | 64.1 | 63.6 | 227.6 | 217.0 | 207.2 |
| 1963 Jan. | 67.5 | 62.4 | 66.1 | 295.1 | 279.4 | 273.4 |
| Febr. | 65.8 | 61.0 | 69.0 | 361.0 | 340.4 | 342.4 |
| March | 63.5 | 59.2 | 71.0 | 424.5 | 399.6 | 413.4 |
| April | 51.1 | 53.8 | 68.9 | 475.5 | 453.4 | 482.3 |
| May | 36.1 | 45.9 | 53.6 | 511.6 | 499.2 | 535.8 |
| June | 29.3 | 36.5 | 46.9 | 540.9 | 535.7 | 582.7 |
| July | 24.4 | 30.4 | 34.8 | 565.3 | 566.1 | 617.5 |
| Aug. | 19.3 | 25.7 | 40.5 | 584.6 | 591.8 | 658.0 |
| Sept. | 15.3 | 20.0 | 38.0 | 599.9 | 611.8 | 696.1 |

May 1963: estimate from the stock-taking of May 1963 of construction projects under erection, carried out by the Labour Market Board quarterly.

November 1962: estimates from corresponding stock-takings of November 1962.

**Table 10 B. Deviations of ex post data from predicted cumulated estimates**

| | Million kronor 1963 prices | | Months[1] | |
|---|---|---|---|---|
| | Nov. 1962— ex post | May 1963— ex post | Nov. 1962— ex post | May 1963— ex post |
| 1962 July | — 4.1 | — 2.6 | +0.4 | +0.5 |
| Aug. | — 5.9 | — 4.0 | +0.3 | +0.2 |
| Sept. | — 3.9 | — 2.7 | +0.1 | +0.1 |
| Oct. | + 5.2 | + 2.8 | —0.2 | —0.2 |
| Nov. | +15.5 | + 9.4 | —0.2 | —0.3 |
| Dec. | +20.4 | + 9.8 | —0.3 | —0.3 |
| 1963 Jan. | +21.7 | + 6.0 | —0.4 | —0.2 |
| Febr. | +18.6 | — 2.0 | —0.2 | —0.2 |
| March | +11.1 | —13.8 | 0.0 | 0.0 |
| April | — 6.8 | —28.9 | +0.4 | +0.4 |
| May | —24.2 | —36.6 | +0.8 | +0.7 |
| June | —41.8 | —47.0 | +1.5 | +1.2 |
| July | —52.2 | —51.4 | +1.7 | +1.7 |
| Aug. | —73.4 | —66.2 | +2.3 | +2.3 |
| Sept. | —96.2 | —84.3 | | |

[1] Interpolated horizontally in Diagram III:8.

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