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BUY-BACK FINANCING OF INTERNATIONAL SALES OF FACTORIES *

by

André Tiano **

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Traditional sources of finance are completely inadequate to meet the enormous financial requirements generated by the desire expressed at Lima by the international community to transfer industrial capacity to the developing countries.[1]

Aid from the developed countries is stagnating, and neither the unfavourable economic situation nor the prospect of the European Economic Community being enlarged with countries that have substantial financial needs offers any prospect of a reversal of the trend. The relative concentration of aid on the least developed countries will accentuate the needs of other countries, more concerned with the transfer of industrial capacity.

Recourse to the international capital markets involves expensive terms, and the irregularity of supply particularly affects the developing countries, which are the first to feel the increase in costs or to be excluded. Moreover, only a few countries have regular access to the international markets.

Direct investment is regarded by some (but only by some) as being increasingly unsuitable for the general financing of real industrialization, because they see it as too often supporting marketing operations alone. But all agree that most of the developing countries have excluded themselves from direct financing or have been excluded by investors.

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[1] See note by A. Tiano distributed at the expert group meeting on industrial financing (Vienna, 6-8 December 1978).

What is left, then, is the possibility of coupling sales of
factories with contracts for the buying back of part of the output
of those factories. One of the merits of such contracts is that
they enable new factories to take advantage of economies of scale
during the period before the domestic markets of the countries that
acquire the factories become sufficiently large. However, internal
compensation contracts (internal to the unit transferred) will not
become widely used unless they are consistent with the interests
not only of the direct partners but also of the two countries involved.
The developed country, in particular, will be afraid that buy-back
purchases will aggravate its employment problems.

The purpose of this paper is to show statistically that internal
compensation operations do not harm the employment situation in the
developed countries that transfer technology.

I.   THE METHOD USED

The author has chosen for consideration five concrete cases of
sales of factories, assuming the buy-back of their output in the
real context of the transferring country (in this study, France).
The cases were chosen mainly for reasons of convenience, but the study
will show what the criteria should be for a scientific choice and
that the list is in fact not far from what one would arrive at. The
units chosen are:

A textile mill
A petrochemical plant
A steel plant
A household appliances factory
A starch-based sugar plant.

For each sale, the aim was to draw up first a balance-sheet
of jobs created in the sectors supplying the equipment and services
sold and the jobs lost in sectors whose products are being bought back.
Thus firms of engineering consultants, manufacturers of machine
tools and transformers and transport concerns will have given work
to their personnel, while imports of fabric or cotton, steel rod,
urea, gas stoves, etc., will take the place of sales by factories
in the transferring country and thus reduce the work requested of
the active population of those sectors.

The effects on employment, however, go beyond the sectors
directly involved. Those sectors are supplied by others, which in
their turn purchase their intermediate inputs. An increase in final
demand in one sector (export of a factory) will create jobs indirectly
just as a reduction in another final demand (because foreign products
are purchased) will indirectly cause jobs to be lost. In some coun-
tries there is an analytical tool that permits such calculations:
the industrial input-output table expressed in work equivalents[1]
rather than monetary values.

The jobs created and those lost may differ qualitatively. The
author has selected one characteristic - skill level. In other words,
it is considered that the value of the job of an engineer or an
executive is greater than that of a technician, whose value in turn
is greater than that of a skilled manual worker or office employee,
and still more so than that of an unskilled labourer. The balance-
sheets mentioned above must therefore be weighted by the level of
skill of the jobs lost or gained.

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[1] The table was prepared by Nicole Dubrulle and Patrick Ranchon
and presented in booklet 14 of the Centre d'études de l'emploi (Demande
finale et emploi, PUF, 1977). These research workers agreed to let
the author have a more detailed industrial input-output table, without
which he would have been unable to do anything.

All the balance-sheets produce fairly reliable results, but they can be drawn up only on the basis of a number of simplifications. A cut-off was made, for example, in the search for indirect effects upstream and downstream. Upstream, the tables do not take account of variations in investment policy prompted by variations in the activity of the sectors, although this affects employment. Downstream, the calculations do not include the multiplier effects of sales of factories on income distributed and spent, which also creates jobs (or can reduce them if it decreases). The effect of these simplifications on our demonstration must therefore be estimated, in a less precise way.

To do this, a great deal of information, constituting some of the annexes, had to be collected. The specific cases had first to be described, and this has been done in the "profiles" (annexes I-V), which cover such items as: the output of the factory transferred; a breakdown of the value of the contract into services and various categories of capital goods (varying from six to twelve); the factory work-force, classified into four categories by level of skill; and the value of the contract and of the output.

These figures, which were given for the year of the contract, had to be converted to base 1973 so that they could be included uniformly in the general table for the economy of the transferring country, to which the other figures refer.

The author had at his disposal an industrial input-output table for 78 sectors in monetary values (prepared by INSEE) and another for 69 sectors in work equivalents (prepared by the Centre d'étude de l'emploi). The relevant extracts appear in annex VI. As we wanted more refined statistics for direct employment than those of the sectors of the input-output table, we used the Ministry of Industry's estimates or those in our profiles (annex VII).[1]

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[1] It was possible to eliminate contradictions between the Ministry statistics and those of the profiles without too much difficulty except in two cases where the Ministry figures seemed too precise to be discarded without additional information. It was therefore necessary to prepare alternative balance-sheets taking into account the two sets of statistics for the jobs gained in engineering and those lost in cotton mills (A and B; A' and B').

A knowledge of the technical structure of employment in the sectors involved (annex VIII) permits the weighting of the jobs created or lost within the sectors. For the effects on other sectors, the technical structure of the sectors that were the main suppliers of those directly affected had to be investigated (annex IX).

It is not possible to deal in the same balance-sheets with production units and work equivalents calculated with prices from different years. To bring all the figures back to the year of the input-output table (1973), the price indices in annex X had to be assembled and used.

Once all the data were collected (plus some others to enable the effects of the simplifications to be assessed), only a little further work is needed to arrive at the results set out in the following sections.

II. THE RESULTS OF THE MODEL

Annexes XVII-XXXI (three for each case study) give all the following intermediate results:

> Number of work years lost or gained in each sector directly affected by the operation, broken down into four social and occupational categories: engineers and managers; technicians (including junior managers); skilled workers (including foremen); unskilled workers (operatives and office workers).

> Number of work years lost or gained elsewhere in the economy as a result of the previous variations, broken down into the four social and occupational categories mentioned above.

A synthesis can be made from the 15 tables.

(a) <u>Balance-sheet of unweighted direct jobs</u>. This balance-sheet corresponds to the propositions found from time to time in the economic press but generally not backed up by figures. Four

operations out of five show a positive balance-sheet. Jobs gained exceed those lost by a factor of 1.3 (household appliances factory case A) to 7.5 (petrochemical plant case B). In the fifth case (the textile mill), which is unfavourable for all variations (losses are 1.3-2.2 times greater than gains), the main reason for the failure is the price of the output purchased. On account of the competition on the textile market, the ex-mill prices are extremely low. To pay off the mill, therefore, a sizable output is needed, which means a loss of many jobs.

Table 1

Unweighted balance-sheet of direct jobs gained and lost

(work years for 1 million French francs)

	Jobs gained		Jobs lost	Balance	
	A	B		A	B
Steel plant	5.41	6.66	2.55	+2.86	+4.11
Petrochemical plant	7.81	8.27	1.10	+6.71	+7.72
Textile mill A' B'	7.22	8.16	16.08 / 10.3	-8.86 / -3.08	-7.92 / -2.14
Household appliances factory	8.28	9.17	6.49	+1.8	+2.68
Starch-based sugar plant	5.93	7.28	1.04	+4.89	+6.24

A: Direct estimate of direct jobs gained in engineering.

B: Ministry of Industry estimate.

A': Direct estimate of direct jobs lost in cotton.

B': Estimate by the Centrale des bilans.

The textile mill would have to deliver 31 per cent of its output each year, while deliveries would be only 25 per cent for urea (for which the raw materials are cheaper than those used by the textile mill), 23.5 per cent for the sugar plant, and 16.85 per cent for the steelworks.

(b) <u>Unweighted balance-sheet of total jobs</u>. In this balance-sheet, all inter-industry relationships will be taken into account through an investigation of their work equivalents.

<u>Table 2</u>

<u>Unweighted balance-sheet of total jobs gained and lost</u>

(Work years for F 1 million)

| | Jobs gained | | Jobs | Balance | |
	A	B	lost	A	B
Steel plant	8.77	10.02	2.89	+5.88	+7.13
Petrochemical plant	10.21	10.67	2.4	+7.81	+8.27
Textile mill A' B'	10.43	11.37	17.44 11.66	-7.01 -1.23	-6.07 -0.29
Household appliances factory	12.10	12.98	11.19	+0.91	+1.79
Starch-based sugar plant	8.9	10.24	A" 7.16 B" 1.98	+1.74 +6.92	+3.08 +8.26

A, B, A', B': See table 1.

A": Purchase of four associated products in proportions as produced.

E": Purchase of animal feeds only.

Four out of the five cases still show a positive balance - the steel plant, the petrochemical plant, the sugar plant, and the house-hold appliances factory - although the household appliances factory has lost some of its advantage because the gains are only 1.1-1.2 times the losses (cf. table 5). The same is true for the petrochemical plant, whose coefficients are nevertheless still 4.25-4.45. The steel plant, on the other hand, increases its lead with coefficients of gain of 3.03-3.47. The previously unfavourable case (the textile mill) is still unfavourable, but with a slight uncertainty because gains equal losses for one of the four combinations of statistical sources (BB'). In the other combinations, the losses have diminished (maximum co-efficient 1.64). The balance for the sugar plant is still favourable,

but the net gains vary greatly, depending on whether all the products
of the plant are purchased (gains 1.24-1.43 times losses) or only
animal feeds (coefficients of 4.48-5.17). The explanation for this
is given in annex VI: the ratio of indirect jobs to direct jobs is
very high in the agro-food sector when the latter is coupled to
domestic agriculture, as happens with sugar and fats, unlike the
animal feeds industry, which runs on imported raw materials. In
sugar, 73 per cent of all jobs come from sectors other than sugar
itself, and the same is true for 79.5 per cent of the jobs component
of oils and fats.

(c) <u>Introduction of skills</u>. Not all jobs are of equal value,
and they could be classified by many criteria: whether the job is
in a more or less advantaged region, or a more or less depressed
sector; cost of maintenance for the community; etc. The author
has chosen a more universal criterion for weighting, in respect of
which individual and collective preferences coincide: both the
authorities and the employees themselves are happy when the level
of skill rises.

Weighting can be introduced at the two stages considered earlier.

<u>Table 3</u>

<u>Balance-sheet of direct jobs gained and lost, weighted for skill</u>

(work years for F 1 million)

	Jobs gained		Jobs lost	Balance	
	A	B		A	B
Steel plant	10.94	14.85	4.24	+6.7	+10.61
Petrochemical plant	16.5	17.9	1.80	+14.7	+16.1
Textile mill $\begin{array}{c}A'\\B'\end{array}$	12.845	15.81	20.31 13	-7.46 -0.15	-4.50 +2.81
Household appliances factory	14.97	17.73	7.81	+7.16	+9.92
Starch-based sugar plant	11.92	16.14	2.07	+9.85	+14.07

A, A', B, B': As in table 1.

Weighting coefficients: Unskilled = 1
Skilled = 1.5
Technicians = 2.5
Engineers and managers = 5

If the balance of operations for direct jobs alone before weighting for skill is compared with that after weighting, the result is very clear: the gains increase everywhere. In other words, the jobs created are more skilled than those lost. The only unfavourable case for direct jobs (the textile mill) becomes uncertain because, depending on the statistics chosen, losses are 1.6 times gains or gains are 1.2 times losses (cf. table 5).

Table 4 weights total jobs lost or gained by skill.

Table 4

Balance-sheet of direct and indirect jobs gained
and lost, weighted by skill (work years for F 1 million)

		Jobs gained			Jobs lost		Balance	
		A	B				A	B
	A'				Dw 20.31		−4.39	−1.43
					Iw 2.35			
		Dw 12.85	15.81		T 22.66			
Textile mill		Iw 5.42	5.42					
		T 18.27	21.23					
	B'				Dw 13.00		+2.92	+5.88
					Iw 2.35			
					T 15.35			
Petrochemical plant		Dw 16.50	17.90		1.80		+18.02	+19.42
		Iw 5.47	5.47		2.15			
		T 21.97	23.37		3.95			
Steel plant		Dw 10.94	14.85		4.24		+9.41	+13.32
		Iw 4.65	4.65		1.94			
		T 15.59	19.50		6.18			
Household appliances factory		Dw 14.97	17.73		7.81		+5.02	+7.78
		Iw 6	6		8.14			
		T 20.97	23.73		15.95			
Starch-based sugar plant		Dw 11.82	16.14	A"	Dw 2.07		+5.82	·10.04
		Iw 4.75	4.75		Iw 8.78			
		T 16.67	20.89		T 10.85			
				B"	Dw 2.07		+13.25	+17.47
					Iw 1.35			
					T 3.42			

Dw: Direct jobs weighted

Iw: Indirect jobs weighted

A, A', B, B': As in table 1.

A", B": As in table 2.

Weighting coefficients: As in table 3.

Four of the cases remain unquestionably favourable - the steel plant, the petrochemical plant, the sugar plant, and the household appliances factory. The fifth case, the textile mill, is doubtful but shows improvement: for two combinations of statistical sources (AA' and BA') losses are 1.06-1.23 times the gains; for the two others, the gains are 1.19-1.38 times the losses. All the coefficients mentioned are shown in table 5.

Table 5
Coefficients of jobs gained or lost for the cases studied
(ratio gain/loss)

	Direct jobs unweighted	Total jobs unweighted	Direct jobs weighted	Total jobs weighted
Steel plant	2.12 - 2.61	3.03 - 3.47	2.5 - 3.5	2.5 - 3.2
Petrochemical plant	7.10 - 7.52	4.25 - 4.45	9.20 - 9.90	5.60 - 5.90
Textile mill	0.45 - 0.79	0.60 - 0.99	0.63 - 1.22	0.81 - 1.38
Household appliances factory	1.30 - 1.40	1.10 - 1.20	1.90 - 2.30	1.30 - 1.50
Sugar plant	5.7 - 7	1.24 - 5.17	5.76 - 7.8	1.54 - 6.11

A number greater than unity means that gains exceed losses.

All of these results were obtained only with the help of simplifications whose effect on the model must now be determined.

(d) The simplifications of the model and their effect on the conclusions

The main simplifications are explained in annex XVI. For some of them, it was impossible to assess the effects on the model. For example, the author selected a price for the buy-back of output in accordance with the indications for 1973. It is known only that if the prices of the

manufactures sold by the acquirers of the factory fall, there will
be more jobs lost as a result of the buy-back operations than the
calculations show. The opposite will occur if the terms of trade
for manufactures from the developing countries improve. The effect
of variations in productivity is also unknown. On the other hand,
it is possible to estimate approximately the effect of four other
factors on the model:

1.   An inter-industry input-output table was used for the
estimate of indirect labour. The result of this was an overestimate
of the indirect jobs lost by the buy-back of household appliances;
these are included with products of precision engineering, which are
more highly finished. The correction of this anomaly appears in the
first line of table 6.

2.   In all cases it has been assumed that the output is purchased
at the expense of competing enterprises in the transferring country.
This will not happen with products that are imported in large quantities.
Here, imports linked with the sales of factories will be at least
partial substitutes for imports from other countries. The statistics
in annex XI shows that such substitution can take place for the animal
feeds produced by the sugar plant, cotton fabric, and household appliances.
The correction for this omission is given in the third line of table 6.

3.   It has already been explained, as an example, that no allowance
was made for the effects of variation in final demand on investment and
hence employment. This omission works against sectors that are more
capital-intensive than others (cf. annex XII) when the quantity of output
purchased may be sufficiently high to affect demand for capital goods in
the sector. The petrochemical plant is the only such case (cf. table 6).

4.   Finally, it has been assumed that the export of the factory
and importation of its products are immediate and simultaneous, which is
not true. Once the contract has been concluded, most exports of goods

and services connected with the sale of the factory will take place within two years. The output will be imported only after the factory is built and will be spread over a period of eight years (usual duration of credits for such operations). This is very important because the income multiplier effects of increased demand in exporting sectors will be felt immediately and will last longer than the negative effects on the importing sectors. An attempt has been made to estimate the difference over a period of 10 years (two years for the building of the factory and eight for payment for it). Annex XV summarizes the figures for the two income multipliers constructed for the increase in final demand associated with the sale of factories (annex XIII) and the reduction caused by the buy-back of output (annex XIV). All the corrections are shown in the following table.

Table 6

Correction of the over-all unweighted employment balance-sheet through the elimination of simplifications

	Textile mill	Petrochemical plant	Steel plant	Household appliances factory	Sugar plant
Sectors too aggregated	-	-	-	Improvement of 0.5-1.0	-
Upstream effects (on plant)	-	Deterioration of about 1.0	-	-	-
Omission of effects of buy-back on imports (jobs abroad)	Improvement of about 3-6	-	-	Improvement in both cases of about 3-4	
Omission of down-stream effects on incomes	Improvement in all five cases of about 7.5 work years (6-9)				
Total corrections:					
Jobs gained	9-15	5.0-8.0	6-9	9.5-14	9-13
Jobs gained, weighted	14.9-24.8	8.3-13.2	9.9-14.9	15.7-23.1	14.9-21.5
Balances from balance calculated earlier	AA' -4.39 BB' +5.88	A +18.02 B +19.42	A +9.41 B +13.32	A +4.02 B +7.78	AA" +5.82 BB" +17.47

It would be wrong, however, to attach the same value to these corrections as to the statistical results of the preceding tables. The simplifications were adopted precisely because it was impossible to make reasonably exact calculations. In view of the results shown in table 6, however, there is no doubt about the final result: in all five cases, the sale of factories financed by the buy-back of their output is favourable to the employment situation in the transferring countries.

III. THE LESSONS TO BE DRAWN FROM THE DEMONSTRATION

As regards the demonstration itself. One preconception has undoubtedly been demolished: factory sales financed by buy-back are not detrimental to employment in the developed countries, and the authorities and unions would be wrong to oppose them. We have even provided them with an analytical instrument which makes it possible to distinguish cases that present no danger from those that require some thought. Has it been shown that buy-back financing improves the employment situation in the developed countries? The author believes so. For those who would like to broaden the study and have more than five cases, there are already pointers for preparing a larger sample: cases can be chosen initially according to the capital goods and services sold. There will be a difference between projects in which there is considerable engineering consultancy involved and others: the former will show less favourable results despite weighting for skill - it is fine to sell brainpower, but it must be packaged in equipment! The results will also differ according to the level of sophistication of the equipment sold; projects with a high percentage of electrical equipment and machine tools will have more favourable effects than others. However, the criteria for selection also apply to the output purchased: the agrofood sector with products supplied by domestic agriculture on the one hand, and the rest of industry on the other. Doubtful cases may arise in the former.

<u>For the policies of the transferring countries</u>. The lessons
here are really question-marks regarding aspects not developed above.
The first aspects that will need to be developed are the commercial
ones, which are of two kinds.

Firstly, internal compensation must be incorporated in the
regulation of the foreign trade of the developed countries. Quotas
and duties may be obstacles to the importation of products that are
the counterpart of sales of factories. It is, however, possible to
find in customs legislation procedures for removing the obstacles.
The legislation gives advantages to "job work done outside the
national territory", under the designation of "passive improvement".
The production of counterpart output could be regarded as passive
improvement and, in the assessment of the output purchased, the value
of capital goods and services sold by the country could be deducted.
In the same way that the value of recordings on tape is deducted from
records pressed abroad, depreciation of capital goods and the training
and technical services provided by the country would be deducted from
the value of urea.

More fundamentally, however, internal compensation must take its
place in world foreign trade policy, which is currently characterized
by protectionist inclinations. It is clear that our model is a weapon
against protectionism, not at the level of worthy sentiments, but at
the level of solid national interests. The invocation of safeguard
clauses under article 19 of GATT, agreements like the multifibre agree-
ments and informal arrangements that result in "voluntary" restrictions
by exporting countries are too firmly entrenched to be disregarded.
The situation can be improved, however, and internal compensation opera-
tions provide one way of doing this. When imports are frozen at a
certain level, exceptions can be allowed for the benefit of those
operations. The practical means of application remain to be studied.
Other logical consequences of our study belong to the realm of financing

techniques. A study must be made of the effects of these operations, if any, on supplier and buyer credits. Does the existence of a security in the form of a flow of products back into the country where the credits were granted modify the conditions of the credit itself? Does the buy-back obligation, on conditions whose realization is uncertain, complicate the credit, or should the obligation and credit be completely independent of each other?

Finally, the economic and legal problems raised by internal compensation have not been adequately studied. The subject of the buy-back may be the product itself as marketed in the country that buys the factory (urea, household appliance). It may also be a part of the output involving no need for adaptation of the production unit (purchase of animal feeds alone from the starch-based sugar plant, for instance). In this case, the main problems would seem to be the buy-back price, adjustment to the tastes and requirements of the future buyers in the transferring country, and the legal incorporation of the buy-back obligation and the obligations regarding performance assumed by the transferrer.[1] If the subject of the buy-back is not exactly the product destined for the market of the acquiring country, other problems will arise. This will be the case if the product must undergo adaptation to suit the tastes and requirements of the transferring country. The problem will be even more acute if the output purchased is a special product that is incorporated in the transferrer's production. In both cases, the production unit transferred must be adapted accordingly (special workshops) and, in the second case, all the questions involved in subcontracting will arise (quality control, regularity of supply, etc.).

But the foregoing is not without its problems for the acquiring country, too.

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[1] Note prepared by A. Tiano for participants in the Vienna meeting on industrial co-operation contracts (November 1977).

For the policies of the acquiring countries. In this paper, the author has deliberately taken the point of view of the transferring countries, not because of ignorance or neglect of the problems of the acquiring countries, but because those problems will not arise unless the developed countries accept this method of financing the transfer of industrial technology, and it is they that must be persuaded.

Once they are persuaded, care must be taken to see, in accordance with realistic stipulations regarding respect for the interests of all the parties concerned, that the methods of internal compensation are not biased to the disadvantage of the acquiring countries. This can happen if the buy-back prices do not cover the cost of the unit transferred. The observance of this principle has implications for the method used in the economic calculation that must be made by the acquiring country before it asks for such an operation, and for the legal approach that must be adopted in the conclusion of the contract. But it is not the author's intention to go into these matters here. It may be noted in passing, however, in connexion with the textile mill, whose employment balance is the only doubtful one, that the concern of the developed countries with employment and that of the developing countries with economic prices are mutually consistent.

The acquiring country may not derive the expected advantages from this means of payment if the products bought are substituted for other products that it would have sold without the buy-back contract. This brings up once again the question of the relevance of such operations in the context of the neo-protectionist trends mentioned above.

Finally, the economic cost for the acquiring country could be too high in certain sectors if the buy-back contract were to induce it to choose lines better suited to the requirements of the transferring country than to its own.

All the points mentioned above deserve consideration, but, as has already been said, the primary condition is that the responsible authorities of the countries that transfer industrial technology should be persuaded that there is no inconsistency between the need for compensation operations to finance the sales of factories and their proper concern with employment levels.

Annexes

Annexes (continued)

Annex I

Typical operation 1

Description: Supply to an African country south of the Sahara
of an integrated textile mill (cotton mill; unbleached
weaving 2,619 m/h; bleaching 8,000 m/day; dyeing
15,000; printing 42,000; calendering unbleached
8,300),"monitoring" contract. [a]

Buy-back of unbleached cotton fabric at the price for
the year of contract evaluation (1975).

Increase in final demand in France: distribution of F 1 million among sectors

	Thousands of francs
Engineering:	
Total 50.1, made up of general engineering and co-ordination (17.3), site and installation management (15.5), commissioning, technical assistance and training (17.3)	274
Site insurance (1.1)	6
Marine transport (8.4)	46
Boiler-making (1.5)	8.2
Fittings (1.6)	8.8
Ventilation and thermal equipment (4.3)	23.5
Small and medium power transformers and rotating plant: water and electricity installations (9.5), plus fire-fighting equipment (0.3) and compressed air installations (0.2)	54.6
Machine tools (maintenance shop) (1.6)	8.8
Textile industry machinery and spares (104.2)	570

Decrease in final demand in France

Goods of spun yarn (unbleached cotton fabric)   1,000

At the import price for the year in which the
factory was sold, one million francs represented
478 km of fabric.

One million francs worth of unbleached cotton
fabric required the following direct labour:

   0.05 engineer and management jobs
   0.79 technician jobs
   5.16 skilled worker jobs
   9.02 unskilled worker jobs

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[a] Originally the contract provided only for commissioning; subsequent
contract provided for assistance for three years. "Commissioning, technical
assistance and training" thus increased from 5.3 to 17.3 million. This often
happens when the purchaser is an under-developed country.

Textile factory at 1973 prices

Cost of the factory in 1975:	F 182.7 million
Price of cotton in 1975:	F 2.61 per metre (less 20 per cent)
i.e. for F 1 million:	478 km
Total cost of the factory in 1973, adjusted for prices, globally:	139.6 million
Price of cotton in 1973:	F 2.44 per metre (less 20 per cent)
i.e. for F 1 million:	512 km
Total cost of the factory in 1973, adjusted sectorally:	133.4 million

	1975	1973 equivalent		
Engineering	50.1	37.1	Weight ./..	278.1
Insurance	1.1	0.8		6
Marine transport	8.4	9.5		71.2
Boiler-making	1.5	1.3		9.8
Fittings	1.6	1.4		10.5
Ventilation and thermal equipment	4.3	8.1		60.7
Rotating plant	10	5.9		44.2
Textile machinery	104.2	68.1		510.5
Machine tools	1.6	1.2		9

Decrease in final demand in France (cotton fabric) in 1973

Quantity for F 1 million: 478 km (1975)   512 km (1973 equivalent)

Direct labour:	1975	1973
Engineers and management	0.05	0.05
Technicians	0.79	0.85
Skilled workers	5.16	5.52
Unskilled workers	9.02	9.66

Note: Rail transport in France is included in the value of plant, and can be estimated at 4 per cent of that value.

Annex II

Typical operation 2

Description: Supply to a Mediterranean country of a petrochemical
plant (1,000 tonnes of ammonia/day converted into
1,050 tonnes of urea/day, including storage, packing
and loading facilities; with utilities), "monitoring"
contract. [a/] Total contract value is about 1 billion
1975 francs. Buy-back of urea.

Increase in final demand in France: distribution of F 1 million among sectors

	Thousands of francs
Engineering (117.5 million):	
This includes licences and processes, of which 2/3 were eliminated as supplied from abroad (remainder 4.5 million), mechanical and civil engineering (1/2 eliminated, remainder 29 million), commissioning and training (13.5), technical assistance (70)	138.4
Marine transport (14.5 million):	
Deduction of 20 per cent for costs in the foreign country	17
Civil engineering(construction work) (72 million):	
Four fifths was provided by France. The effect on employment is influenced by the fact that France does not provide the manual workers. Three quarters of the item is therefore accounted for by the salaries of engineers (25 per cent) and technicians (50 per cent). The remainder represents materials and equipment hire.	84.7
Installation [b/] (182.5 million):	
Three quarters of this item was spent in France.	
The salaries of engineers account for 20 per cent, and those of technicians 45 per cent.	214.7
Manufacture of furnaces and thermal equipment (139 million)	163.5
Boiler-making (116 million):	
This includes piping (51)	136.5

Small and medium power transformers and rotating
plant (27.8 million):

Pumps (13), electric motors (14.8)	32.7 (15.3 and 17.4)
Thermal turbines (27 million)	31.8
Compressors (33.2 million)	39
Fittings (41.7 million)	49
Machinery for the food, chemical and specifically nuclear industries (18.5 million)	21.8
Electrical machinery (27.8 million)	32.7
Miscellaneous mineral chemicals (catalysts), etc. (9.3 million)	10.9
Sundry (23.2 million)	
Paint and varnish, construction, metal constructions classified under construction	27.3

Decrease in final demand in France

Urea 1,000

At the international European price in 1975 (F 1,001 per tonne),
F 1 million represented 999 tonnes of urea. This quantity required the
following direct labour:

0.029 engineer and management jobs

0.087 technician jobs

0.45 skilled worker jobs

0.17 unskilled worker jobs

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a/   A turnkey project would have a smaller engineering component;
there would be no technical assistance component. With a "monitoring" contract,
however, it has probably been underestimated and could be as high as 240
million (instead of 70) in a very under-developed country.

b/   Participation by a French enterprise in the installation of a factory
abroad is not the same as in France, and its effect on employment is different
(more skilled labour).

<u>Typical operation 2 at 1973 prices</u>

Cost of the plant in 1975:	F 850 million
Price of urea in 1975: 1/	F 1,001 per tonne
i.e. for F 1 million, 999 tonnes	
Total cost of the plant in 1973, adjusted globally:	F 590 million
Price of urea in 1973: 2/	F 667.50 per tonne
i.e. for F 1 million, 1488 tonnes	

Total cost of the plant in 1973, adjusted sectorally: 635.5 million

	1975	1973 equivalent		
Engineering	117.5	87.1	Weight ./..	137
Marine transport	14.5	16.5		26
Civil engineering	72	52.2		82
Installation	182.5	126.7		199.5
Furnaces and thermal equipment	139	96.5		152
Boiler-making	116	99.1		156
Rotating plant				
Pumps	13	5.95		9.36
Motors	14.8	10.45		16.44
Thermal turbines	27	18.7		29.4
Compressors	33.2	25.3		39.8
Fittings	41.7	36.3		57.1
Machinery for chemical industry	18.5	14.6		23
Electrical equipment	27.8	23.4		36.8
Mineral chemicals	9.3	6.5		10.2
Sundries	23.2	16.2		25.5

1/   Average 1974-1976 at the exchange rate for 1975.

2/   Average 1972-1974 at the exchange rate for 1973.

Reduction in final demand in France (urea) in 1973

Quantity for F 1 million:	999 tonnes	1,498 tonnes

Direct labour:

Engineers and management	0.029	0.043
Technicians	0.087	0.13
Skilled workers	0.45	0.67
Unskilled workers	0.17	0.26

Annex III

Typical operation 3

Description: Supply to an African country south of the Sahara
of a steel plant (two electric furnaces of 50 tonnes
each) with a continuous casting shop (one machine with
four lines) and a rolling mill producing 210,000 tonnes
a year of rod and bar. The contract is a turnkey
contract $\underline{a}/$ and includes the buy-back of 5-12 mm rod
at the price for the year of the contract (1976).

Increase in final demand in France: distribution of F 1 million among sectors

	Thousands of francs
Engineering (171 million):	
Divided into general engineering (13 for the steelworks and 13.2 for the rolling mill), supervision of installation and civil engineering (30 and 52), training (7.8 and 13.2) and technical assistance estimated for three years (22 and 19.8)	402.5
Marine transport:	
Steelworks 12.6, and rolling mill 5	41.5
Handling and public works equipment and plant for the iron and steel industry:	
Steelworks 25.9, and rolling mill 74	236
Furnaces and thermal equipment:	
Steelworks 50.5, and rolling mill 10	142
Boiler-making (28.1 for the steelworks)	66
Electrical equipment	
Steelworks 7.5, and rolling mill 40	112
Decrease in final demand in France	1,000

Rod of 5-12 mm: for F 1 million, 769 tonnes are required.

This quantity required the following direct labour:

0.10 engineers   (steelworks 0.02; rolling mill 0.08)
0.24 technicians   (steelworks 0.12; rolling mill 0.12)
0.82 skilled workers (steelworks 0.56; rolling mill 0.26)
0.54 unskilled
     workers   (steelworks 0.18; rolling mill 0.36)

$\underline{a}/$ Almost a "monitoring" contract, since the technical assistance lasts
for three years, although the contract is for very limited assistance. Responsibility for the civil engineering was given mainly to the buyer, which is not
always the case.

Steelplant at 1973 prices

Cost of the plant in 1976:	424.6 million
Cost of rod in 1976 (without VAT):	F 1,300 per tonne
i.e. for 1 million, 769 tonnes	
Cost of the plant in 1973, adjusted globally	265.4 million
Price of rod in 1973:	F 864
i.e. for F 1 million, 1,157 tonnes	
Cost of the plant in 1973 adjusted sectorally:	306.2

	1975	1973 equivalent		
Engineering	171	112.8	Weight ./..	368.5
Marine transport	17.6	21.2		69.2
Handling, public works and steelworks equipment	99.9	75.7		247
Furnaces	60.5	37.8		123.5
Boiler-making	28.1	21.3		69.6
Electrical equipment	40.7	37.4		122.2

Decrease in final demand in France (steel rod) in 1973

Quantity for F 1 million: 769 tonnes (1975)   1,157 tonnes (1973)

Direct labour:

0.15 engineers

0.36 technicians

1.23 skilled workers

0.81 unskilled workers

Typical operation 4

Description: Supply to a socialist country of a factory to manufacture 500,000 household appliances a year. The civil engineering, transport and installation of machinery are provided by the customer.

Buy-back of appliances at ex-factory price less 10 per cent for the year of evaluation (1973).

Increase in final demand in France: distribution of F 1 million among sectors

Engineering:	Thousands of francs
General co-ordination, transfer of know-how, preliminary study, general supervision, installation, some technical assistance	259.4
Rail transport	48.3
Insurance	9.5
Machine tools and spares	604.3
Presses and spares	39.25
Thermal furnaces	39.25

Decrease in final demand in France

At import prices, the total contract value represented 178,169 appliances, and F 1 million 2,058 appliances. The latter quantity required the following direct labour:

0.1 engineer and management jobs

0.2 technicians

1.25 skilled workers

4.94 unskilled workers.

Typical operation 4 at 1973 prices

Since the project was prepared in 1973, no processing of the raw data is required.

Annex V

Typical operation 5

> **Description**: Supply to a socialist country of a plant to convert
> maize starch into liquid sugar and by-products (sorbitol
> syrup, oil, and cattle feed). The contract provides for
> training and technical assistance for five years. Only the
> amounts paid to France have been counted, excluding licence
> fees paid to the United States or expenditure in the pur-
> chasing country. The value of the contract on 1 January 1978
> was F 280 million.

Increase in final demand in France: distribution of F 1 million among sectors

Engineering:

Engineering consultancy, transfer of know-how, installation, commissioning, training, technical assistance	388.6 $^o/oo$
Marine transport	22.2 $^o/oo$
Boiler-making and steam production	117.8 $^o/oo$
Fittings	88.4 $^o/oo$
Electrical industrial machinery	88.4 $^o/oo$
Food industry machinery and spares	294.6 $^o/oo$

The plant operates with 12 engineers and senior staff, 26 technicians,
72 skilled workers, and 14 unskilled workers. It can manufacture 35,000 tonnes
of dry material equivalent to 35,000 tonnes of sugar, 7,500 tonnes of sorbitol
syrup (calculated as dry material), 2,000 tonnes of raw maize-seed oil, and
18,000 tonnes of cattle feed. In 1977-1978, a tonne of cattle feed cost F 1,200 ex-
refinery, and raw oil F 4,500. Glucose syrup could be valued at F 1,235
a tonne from the world prices (Paris exchange) or F 1,940 (EEC price).
Sorbitol syrup was worth F 2,500 a tonne. If the world sugar price is used
as a basis, the annual output of the plant was worth F 92,575,000. One million
francs worth of output required the following direct labour:

> 0.13 engineer and management jobs
> 0.28 technicians
> 0.78 skilled workers
> 0.15 unskilled workers

Typical operation 5 at 1973 prices

Cost of the plant, 1977-1978:   280 million

Price of the products, 1977-1978: annual production was worth 92,575,000,

i.e. F 1 million represented 1.08 per cent of plant output.

Cost of the plant in 1973, adjusted: 157.3 million

Price of the products in 1973:   annual production was worth 119,320,000,

i.e. F 1 million represented 0.84 per cent of plant output.

Cost of the plant in 1973, adjusted sectorally: 163.7 million

	1975	1973 equivalent	New weight
Engineering	108.8	64.75	396 ^{o}/oo
Marine transport	6.2	5.08	31 ^{o}/oo
Boiler-making	33	10.25	62.5 ^{o}/oo
Fittings	24.75	13.10	80 ^{o}/oo
Electrical machinery	24.75	13.60	83 ^{o}/oo
Chemical industry machinery	82.5	56.9	347.5^o/oo

Decrease in final demand in France in 1973

For F 1 million: 0.84 per cent of annual output

Direct labour:

      0.10 engineers

      0.22 technicians

      0.60 skilled workers

      0.12 unskilled workers

Annex VI

Extracts from the industrial input-output tables for 1973

Sector	Total labour included in final product of sector (years)	Direct labour of the sector (years)	Indirect labour of the sector (years)	Sector output (millions)	Indirect labour for 1 million (years)
0 20 E/6 Sugars	54 800	14 741	40 059	3 758	10.66
0 20 F/7 Animal feeds	10 592	1 294	9 298	9 874	0.94
0 20 J/10 Oils and fats	66 856	13 700	53 156	3 986	13.34
0 72 / 24 Iron and steel products	70 664	37 569	33 095	27 705	1.19
0 94 A/32 Heavy capital equipment	969 639	591 638	378 001	80 680	4.69
0 94 B and 0 94 C/33 Precision engineering and household appliances	266 337	179 159	87 178	18 541	4.70
0 95 A/34 Electrical equipment	293 456	179 002	114 454	33 662	3.40
101/42 Inorganic chemistry	46 572	31 544	15 028	11 597	1.30
115 A + 110 N and 114/47 Spun yarn goods, fibres and yarns, natural textile raw materials	246 404	191 728	54 676	40 123	1.36
130/61 Buildings and public works	2 341 802	1 832 947	508 855	211 526	2.41
140, 141 and 143/62 Transport and auxiliary services	372 172	281 511	90 661	63 259	1.43
160/65 Services rendered mainly to enterprises	158 371	119 879	38 492	82 245	0.47

Annex VII

Labour included directly in the output of the sectors

(jobs for F 1 million)

Sector	Ministry estimate 1973	Estimate by the Centrale des Bilans		
		1973	1975	1976
Industrial electrical equipment	11.99			
Furnaces and thermal equipment	6.08	2.83	2.99	2.90
Boiler-making [1]	10.7	8.21	6.37	5.07
Industrial fittings	9.37	7.74	5.43	5.31
Ventilation and thermal plant	8.4	7.57	5.67	5.33
Internal combustion engines and compressors [2]	8.22	8.23	5.70	4.71
Pumps and hydraulic transmissions		7.94	5.87	5.30
Handling, public works and steelworks equipment	6.98	6.58	5	4.33
Machine tools and associated industries	10.5	9.99	6.83	6.22
Machinery for the food and chemical industries	7.19	7.39	5.48	4.88
Machinery for the textile industry	9.26	7.63	8.39	7.40
Buildings and public works (metal construction for building, public works and civil engineering; mixed construction enterprises; general infrastructure and industrial construction)	8.6	9.04	6.37	5.75
General public works and civil engineering enterprises		8.75	6.84	6.20
Paints and varnishes	6.65	6.23	4.38	3.88
Miscellaneous inorganic chemicals	5.35	4.05	3.95	3
Marine transport		5.96	3.94	3.65
Rail transport	20.7			
Technical consultancy offices	5.9			
	Direct estimate [3]			
Machine rod (1976)	(2.55)			
1973	1.7			
Urea (1975)	(0.74)			
1973	1.1			

./...

Annex VII (cont'd)

Sector	Ministry estimate 1973	Estimate by the Centrale des Bilans		
		1973	1975	1976
Unbleached cotton fabric (1975)[4]/	(15.02)			
1973	16.08			
Engineering services (1973 and 1975) 5/	2.51 and 2.26			
Household electrical appliances, 1973	6.49			
Refinery products, case 5, 1978	1.34			
1973	(1.04)			

1/ In the statistics from the Centrale des bilans, figures for workshop boiler-making have been used rather than site boiler-making.

2/ The Ministry statistics cover only compressors.

3/ The direct estimates for specific products are very different from the estimates for highly aggregated sectors: iron and steel products, 6.1 (Ministry); fertilizers and nitrogen industry, 3.63 (Ministry); unbleached cotton fabric, 10.3 in 1973 and 9.81 in 1975 (Centrale des bilans). The same is true for engineering services, but it is particularly disturbing in the case of cotton fabric, in view of the precision of the two estimates.

4/ The estimate of jobs in cotton weaving was made on the basis of the price of calico 160 in May 1975 (net of tax, ex-mill in France) less 20 per cent to take into account the import prices usually applied.

5/ The direct estimate was made on the basis of statistics and the budgetary control of a large "general enterprise". To allow for the gap between the date of signature of the contract and the jobs generated by it, the moving average for three years of the volume of contracts signed was taken. It was assumed that, for all the contracts of a given year, the value of services provided by the enterprise personnel alone was 12.33 per cent of the contract value, the remainder being subcontracted.

Annex VIII

Technical structure of employment in the sectors

Sector	Engineers and management (%)	Technicians (%)	Skilled workers (%)	Unskilled workers (%)	Source
Household appliances (1973)	1.5	3.2	19.3	76	Direct
Sugar refinery products (1978)	9.7	20.9	66.4	3	"
Urea (1975)	4.3	11.6	60.6	23.5	"
Machine rod (1976)	5.5	14.8	48.3	31.4	"
Cotton fabric (1975)	0.3	5.3	34.3	60.2	"
Engineering services (1973)	37.7	34	25.6	2.7	"
(1975)	43.4	35.6	19.5	1.5	
Motors and compressors (NAE 206)	7.14	14.31	53.69	24.86	CEREQ
Pumps and hydraulic equipment (NAE 208)	7.85	15.34	56.44	20.37	"
Machine tools (NAE 213)	5	10.1	60	24.9	"
Machinery for food and chemical industry	7	12	61.5	19.5	"
Machinery for textile industry	4.5	9.1	51.6	34.8	"
Paints and varnishes	9.1	15.4	41.5	34	
Foundry, heavy boiler-making, mechanical motors and pumps (NAP 20) 1/	6.85	7.95	53.2	32	
Marine transport 2/	13.5	8.9	43.9	33.7	
Rail transport	12	12	57	19	
Electrical and electronic construction 1/	14.4	11.76	45.84	28	
Installation 3/	20	45	35	-	
Civil engineering 3/	25	50	25	-	
Inorganic chemistry 1/ (NAP 35)	14.7	9.95	53.05	22.3	

1/ DAS statistics: the engineers and management category includes senior management and 1/3 of the technicians and middle management category. The skilled worker category includes foremen, skilled operatives and 3/4 of the office workers. The unskilled category includes labourers, semi-skilled workers, juniors, apprentices, and service personnel.

2/ DAS statistics: "Engineers and management" consists of senior staff only. All the technicians and middle management staff have been left in the technician category. Seamen have been classified under skilled workers (2/3) and unskilled workers (1/3).

3/ Cf. the typical operation 2 profile.

Annex IX

Technical structure of indirect employment (percentages)

Sector	Calculation	Engineers and management	Technicians	Skilled workers	Unskilled workers
Sugar refinery products	(Structure of agriculture (2/3) (Structure, whole of France (1/3)	2.9	5.1	48.1	43.9
Cotton fabric	(Structure of whole (3/4) (Structure of services (1/4)	7	12.5	48.4	32.1
Fertilizers and mineral chemical products	Structure of whole (2/3)	6	11.2	49.7	33.1
Steel rod	(Structure of whole (2/3) (Primary processing of metals (1/3)	5.7	10.8	47.3	36.2
Household appliances	(Whole (1/3) (Services (1/3) (Electrical engineering (1/3)	7.7	13.3	44.9	34.1
Engineering, insurance, civil engineering, installation	(Publishing (1/4) (Whole (3/4)	7.1	11.1	49.5	32.3
Transport	(Whole (1/2) (Services (1/4) (Buildings and public works (1/4)	6.7	12.3	48.8	32.2
Electrical equipment and rotating plant	(Whole (4/5) (Services (1/5)	6.8	12.2	48.7	32.3
Other equipment	(Whole (55%) (Services (25%) (Primary processing of metals (20%)	6.8	12.3	46.9	34

Prepared from data from the Centre d'études de l'emploi (booklet 14, page 187).

Annex X

Prices or price indices

	1972	1973	1974	1975	1976	1977	Sources
Cotton calico, index 100 in 1973 (85 cm)		100	142	106	106		INSEE Cotton Industries Union (Syndicat des industries cotonnières)
price per metre ex French mill net of tax (160 cm)		2.44 (April)		2.61 (May)			
Machine rod NFM 81 (T)		1 031	1 371	1 446	1 552.5		INSEE
index (100 cm 1973)		100	133	140	151	160	
Urea ($/tonne, March)	70	110	270	310	120		UNIDO ID/WG.236/2 of 29 Oct. 1976
(index)	63.6	100	245	282	109		
Sugar plant products		100				77.6	
Turnkey plant (case 1)		100		144	160	178	Author of project (general enterprise)
French machine tools		100	116.7	138.2	154.6		INSEE
Public works index (June; base 100 in 1973)		100		137.9	159.2		Usine nouvelle
Engineering services index (June)		103	116.8	139	156.1	173.1	Idem
Glycerophthalic paint		100	139	140	148	155	Industrial statistics yearbook 1/
Metal construction		100	124	144	177		"
Boiler-making		100	99	117	132	322	"
Industrial fittings		100	114	115	173	189	"
Ventilation and thermal equipment		100	108	53	56		"
Pumps		100	126	170	153		"
Compressors		100	113	131	187		"
Machinery for the chemical industry		100	126	127	142	145	"
Machinery for the textile industry		100	125	153	154		"
Handling, public works and steel-works equipment		100	112	129	132		"
Electrical and electronic engineering		100	113	119	127		Industrial statistics yearbook
Rotating plant		100	137	170	193	182	"
Marine transport (freight rates)		100		88	83	82	OECD
Value of dollar in francs (annual averages)	5.04	4.45	4.80	4.29	4.78	4.91	INSEE

1/ Value of exports divided by physical quantities.

Annex XI

Foreign trade situation of products purchased in compensation

				1973	1975	1976
Urea (3102)15	(	Imports	(thousands of tonnes)	137	138	168
	(	Exports	(thousands of tonnes)	120	121	122
Cotton fabric (5509)	(	Imports	(thousands of tonnes)	51	67	88
	(	Exports	(thousands of tonnes)	37	28	40
Machine rod	(	Imports	(thousands of tonnes)	301	307	401
	(	Exports	(thousands of tonnes)	1 281	1 035	955
Gas cookers of type	(	Imports	(thousands of units)	345.6	281.6	357
concerned (73 36 500)	(	Exports	(thousands of units)	127.1	173.7	150.5
Glucose syrup and	(	Imports	(thousands of tonnes)	425	335.3	410.4
raw sugar (1701,	(					
1702230, 1702281)	(	Exports	(thousands of tonnes)	1 534	928	1 310
Animal feeds	(	Imports	(thousands of tonnes)	142.1	110	135.6
(2306 and 2307)	(	Exports	(thousands of tonnes)	235	210.5	285.4

Annex XII

Capital coefficient in the sectors involved
(Operating fixed assets/production) 1/

	Thousand francs per million			
	1973	1975	1976	
Furnaces and thermal equipment	(65.1)	(57)	(60.9)	90.7
Boiler-making	(213.5)	(216.6)	(187.6)	233
Industrial fittings	(278.6)	(239)	(244)	288.6
Ventilation and thermal equipment	(189.3)	(175.8)	(175.9)	191.6
Internal combustion engines and compressors	(368.6)	(273.6)	(244.9)	216.9
Pumps and hydraulic transmissions	(293.8)	(281.8)	(270.3)	268.4
Handling, public works and steelworks equipment	294.8	251.6	244.2	
Machine tools and associated industry	395.7	346.2	339.9	
Machinery for the food and chemical industry	218.7	202.4	181.3	
Machinery for the textile industry	255.8	299.6	289.5	
Construction (industrial)	180.5	162.4	164.8	
General public works and civil engineering enterprises	351.1	283.7	302.7	
Paints and varnishes	258	221.9	220.9	
Miscellaneous inorganic chemicals	528.6	458.3	390.2	
Marine transport	1 221	1 343	1 327.6	
Sugar plants			654	
Steelworks			1 553	
Household appliances			277	
Rail transport			1 995	
Unbleached cotton fabric			550	
Fertilizers			2 200	

1/ Three methods of estimation were used according to the data available:

   (a) Quotient of fixed assets by production (figures underlined);

   (b) Product of the median value of the fixed assets/employees ratio
        and the employees/production ratio (figures in brackets);

   (c) Product of the median value of the fixed assets/value added ratio
        and the value added/production ratio.

Annex XIII

Income multiplier from the sale of a factory

Years	Country transferring technology (T)				Income multiplier from the sale of a factory			Exterior (E)				
	ΔR_T cumulative	ΔC_T	ΔS_T	ΔM_T	ΔX_T induced by X	ΔX_T autonomous	ΔR_T	ΔC_E	ΔS_E	ΔM_E	ΔX_E induced by T	ΔR_E
1	0	0	0	0	0	500	500	0	0	0	0	0
2	500	200	100	200	0	0	200	0	0	0	200	200
3	700	80	40	80	10	0	90	150	40	10	80	230
4	790	36	18	36	11.5	0	47.5	172.5	46	11.5	35	208.58
5	837.5	19	9.5	19	10.5	0	29.5	156	42	10.5	19	175
6	867	12	5.5	12	9	0	21	131	35	9	12	143
7	888	8	5	8	7	0	15	107	29	7	8	115
8	903	6	3	6	6	0	12	86	23	6	6	92
9	915	5	2	5	5	0	10	69	18	5	5	74
10	925	4	2	4	3.5	0	7.5	55.5	15	3.5	4	59.5
11	932.5											

R = income
C = consumption
S = savings
M = imports
X = exports

Assumptions:

C_T : 0.4	C_E : 0.75	(marginal propensity to consume)	
s_T : 0.2	s_E : 0.2	(marginal propensity to save)	
M_T : 0.4	M_E : 0.05	(marginal propensity to import)	

Since we are interested only in what happens in the transferring country, we have simplified the backward linkages. The table is still subject to the immense reservations caused by the simplifications of the theory.

Annex XIV

Income multiplier from buy-back of output of the factory sold

Country transferring technology (T)

Years	ΔR_T cumulative	ΔC_T	ΔS_T	ΔX_T	ΔX_T induced by E	ΔM autonomous	ΔR_T
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	125	- 125
4	- 125	- 50	- 25	- 50	6	0	- 44
5	- 169	- 18	- 9	- 18	2	0	- 16
6	- 175	- 6.4	- 3.2	- 6.4	0.75	0	- 5.65
7	- 180.5	- 2.3	- 1.05	- 2.3	0.25	0	- 2.05
8	- 183	- 0.8	- 0.4	- 0.8	0.05	0	- 0.75
9	- 183.75	- 0.3	- 0.15	- 0.3	0.01	0	- 0.2
10	- 183.85	- 0.08	- 0.04	- 0.08	ε	0	- 0.08
11	184						

Exterior (E)

ΔC_E	ΔS_E	ΔM_E	ΔX autonomous	ΔX_E induced by T	ΔR_E
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	125	0	125
94	25	6	0	- 50	44
33	9	2	0	- 18	15
11.25	3	0.75	0	- 6.4	1.85
3.6	1	0.25	0	- 2.3	1.3
1	0.25	0.05	0	- 0.8	0.2
0.15	0.04	0.01	0	- 0.3	0.12
0.09	0.02	ε	0	- 0.09	0.01

Assumptions: cf. annex XIII.

Annex XV

Balance-sheet of income effects (thousands of francs)

	Effect	
	Positive	Negative
Effects of initial sale of factory (year 1) (multiplication for nine years)	932.5	
Effects of second sale of factory (year two) (multiplication for eight years)	925	
Effects of first buy-back (year 3) (multiplication for seven years)		-184
Effects of second annual buy-back (year 4) (multiplication for six years)		-183.95
Effects of third annual buy-back		-183.75
Effects of fourth annual buy-back		-183
Effects of fifth annual buy-back		-180.5
Effects of sixth annual buy-back		-175
Effects of seventh annual buy-back		-169
Effects of eighth annual buy-back		-125
Total	1 857.5	-1 384.2
Balance	473.3	

Gross industrial product 1973 (millions) 1 014 000

Work years (millions) 16 082

Work years for one million 15.86

Underestimate of jobs gained 15.86 x 0.473 = 7.5 work years

Annex XVI

The assumptions made and the errors they introduce
into the model

1. The application of the industrial input-output table in work
equivalents put together in 1973 means that the 1973 price system is
used. Except for case 4, however, the projects studied are from other
years. The amount and structure of the costs of the projects must
therefore be converted to what they would have been in 1973. Two
methods are conceivable for this: an over-all adjustment, applying
to each total value a price index for the sale of turnkey factories;
or a sectoral adjustment, applying to the value of each item of each
factory the price index for the products of the corresponding sector
(engineering services, boiler-making, machine tools, electrical equip-
ment, etc.). The second method requires the establishment of as many
price indices as there are sectors (cf. annex X), but is the only
acceptable one, since the purpose of adopting the 1973 price system is
to allow for changes which differ from sector to sector. The over-all
result is in any case fairly close:

	1973 value obtained by over-all adjustment (millions of francs)	1973 value obtained by sectoral adjustment (millions of francs)
Case 1 (textiles)	139.6	133.4
Case 2 (petrochemicals)	590	635.5
Case 3 (steel plant)	265.4	306.2
Case 4 (household appliances)	86.6	86.6
Case 5 (sugar plant)	157.3	163.7

The price of the output bought back may, however, vary considerably
and in an irregular manner in some cases. In the two cases where there
are such variations, a moving average over three years (urea) or two crop
years (sugar) was therefore used. It is not possible, however, to predict
the prices of products over eight years.

<u>Effect on the model</u>: An underestimate of the jobs lost if the terms of trade of manufactures from the developing countries deteriorate, and an overestimate if the terms of trade improve. The error cannot be quantified.

2. The use of an industrial input-output table means that sectors of the table are used which, although fairly detailed (the table for 1973 covers 78 sectors), are not homogeneous: seven sectors for the five products purchased, and seven sectors for the goods and services constituting the factories sold (cf. annex VI). To reduce the effect of the assumption involved, an estimate has been made of the direct jobs gained or lost for the products themselves, by using organization charts for the factories, and for the factors from narrower sectors (19 for the factory components) (cf. annex VII).

What may the effect of the assumption regarding sectors have been on the indirect labour? This is equivalent to asking whether the real goods and services induced more or less work than the average for the sectors in which they appear. In general, it would seem that the goods and services are close to the average for each sector except in the case of household appliances. The latter are included with the products of precision engineering, which should induce more indirect jobs in other sectors.

<u>Effect on the model</u>: A slight overestimate of the jobs lost as a result of the buying back of household appliances (0.5/1).

3. An industrial input-output table takes into account intermediate inputs purchased by one sector from another, but not plant bought from other sectors. An increase or reduction in the economic activity of French factories will, however, influence their investment policies and the jobs they induce. Researchers at the Centre d'études de l'emploi have explained why they were unable to allow for this (booklet 14, pages 42-43). They suggest two methods, but have not followed either of them.

If every variation in economic activity caused a variation in demand for capital goods according to the capital coefficient of the sector (cf. annex XII), the omission of this variation would produce an underestimate of the negative effects on employment of all the factories except the one producing household appliances. The effect would be negligible, however, for the sugar plant and the textile mill (about 0.3 jobs). It would be less negligible for fertilizers (2.2 jobs per million) and for the steelworks (1 job per million).

It is unlikely, however, that the relation between the variations in demand for products and demand for the capital goods needed to produce them would be so rigid. There must be a threshold of variation below which amortization policy will not be affected. Now, although the sales of factories have a positive affect on a small number of sectors, the negative effects (buy-back) are much more dispersed. It is thus unlikely that, for a production of 2.5 million tonnes of machine rod, sufficient numbers of steelworks could be sold each year for the annual buy-back of 1/8 of their value (about 45,000 tonnes of rod per works in 1973) to seriously modify investment policy in that sector. Almost the same is true for fertilizers (production 1,730,000 tonnes; annual buy-back of 1/8 the value of a factory, 75,000 tonnes).

Effect on the model: Underestimate of jobs lost in petrochemicals (about 1 job per million).

4. With the adoption of static job equivalents, it is assumed first of all that the work-forces vary rigidly with production. This is not the case in the short and medium term, because manpower is retained. The jobs gained and lost are thus overestimated. Which are the more important? This depends on the time of the analysis and on the country. Unused production capacity in each sector and the reaction thresholds of the enterprises would have to be known. This simplification also assumes that there is no increase in productivity as a result of differentiated capital renewal from branch to branch, which is not true. It is difficult to predict, however, what the effect will be.

Effect on the model: Unknown.

5. It has been assumed that the output purchased is substituted for production. This will not necessarily be so if the products are also imported, as in the case of cotton fabric, animal feeds and gas cookers (cf. annex XI). France imports what it would be obliged to buy back if it sold 20 textile mills and household appliance factories and 13 starch-based sugar plants every 10 years.

A more realistic assumption for most developed countries (except the United States, perhaps) should reduce job losses by 1/3 or 1/4 for the sugar plant, the textile mill and the household appliances factory: an overestimate of jobs lost of 3-6 for the textile mill, and 3-4 for the household appliances factory and the sugar plant.

6. It has been assumed that the sale of the factory and the buy-back occur simultaneously. This is not so, however, because the period for the installation of equipment and most of the services provided by the transferrer of technology will be about two years, while the repayment in kind will take 8-10 years.

The secondary effects of the variation in final demand (creation or reduction of jobs induced by these variations in the expenditure of employees who benefit or are disadvantaged by the operations envisaged) will therefore be very different. In order to obtain a very approximate idea, use has been made of a Keynesian tool, the multiplier in an open economy (annex XII).

The multiplier effect of incomes from the sales of factories was studied (annexes XII and XIV). They last nine and eight years respectively for the incomes distributed as a result of the realization of each of the two instalments of the factory sold. We then examined the multiplier effects of buy-back incomes (annexes XIII and XIV) from each of the eight deliveries. Each delivery has a multiplier effects duration

reduced by one year, two years, three years, and so on. The difference
in income effects is F 473,300 for an initial change of 1 million.
In work equivalents (cf. annex XIV), this would be 7.5 work years,
which is only an approximate order of magnitude. What is beyond
question, however, is the direction of the correction.

   Effect on the model: Underestimate of jobs gained in all cases
of the order of 7.5 jobs.

Annex XVII

Textile mill

Direct employment balance-sheet (1973)

		Total direct jobs	Engineers and management	Technicians	Skilled workers	Unskilled workers
Engineering services	A	0.698	0.263	0,237	0,179	0.019
	B	1.641	0,619	0,558	0,420	0.044
Insurance		0.035	0.002	0,007	0,016	0,010
Marine transport		0.424	0,057	0,038	0,186	0.143
Boiler-making [1]/		0.105	0,007	0,008	0,06	0,03
Fittings [3]/		0.098	0.007	0,008	0.05	0.03
Ventilation and thermal equipment [1]/		0.51	0.03	0,04	0,27	0.17
Rotating plant [2]/		0.53	0.08	0,06	0,24	0.15
Textile machinery		4.73	0,21	0.43	2.44	1.65
Machine tools		0.09	0.005	0,009	0,052	0.020
Total	Direct estimate (A)	7.22	0.65	0,89	3,50	2.22
	Ministry estimate (B)	8.16	1.01	1,16	3,74	2.25
Cotton	Direct estimate (A')	16.08	0.050	0,850	5,520	· 9,660
	Estimate by the Centre des bilans (B')	10.3	0,031	0.55	3,533	6.190
Balance	AA'	− 8.86	+ 0.60	+ 0.04	− 2,02	− 7,44
	AB'	− 3.08	+ 0,62	+ 0,34	− 0,03	− 3.97
	BA'	− 7.92	+ 0,96	+ 0,31	− 1.78	− 7.41
	BB'	− 2.14	+ 0,98	+ 0,61	+ 0.21	− 3.94

1/ Here the structure of employment in the "foundry, heavy boiler-making, mechanical motors and pumps" sector has been used.

2/ Employment structure of "electrical and electronic engineering"; employment volume of "electrical and electronic industrial equipment".

3/ Employment structure of "pumps and hydraulic transmissions".

A: Direct estimate of gains in engineering services.

B: Ministry of Industry estimate.

A': Direct estimate of jobs lost in the cotton sector.

B': "Centrale des bilans" estimate.

Annex XVIII

Textile mill

Over-all employment balance-sheet by sector

(work years)

Sector	Weight	Direct jobs for 1 million	Indirect jobs for the activity of the sector	Indirect jobs for 1 million	Total jobs for 1 million	Jobs for the weight of the sector
Engineering services (160/65)	278.1 °/oo	2,51/5,9 a/	38 492	0,47	2.98/6.37	0.83/1.70
Insurance (160/65)	6 °/oo	5,9	38 492	0,47	6,37	0.04
Marine transport (141/62) b/	71,2 °/oo	5,96	90 661	1,43	7.38	0.53
Boiler-making (0 94 A/32)	9,8 °/oo	10,7	378 001	4,69	15,39	0.15
Fittings (0 94 A/32)	10,5 °/oo	9,37	"	4,69	14,06	0.15
Ventilation and thermal equipment (0 94 A/32)	60,7 °/oo	8,40	"	4,69	13,09	0.79
Rotating plant (0 94 A/32)	44,2 °/oo	11,99	114 454	3,40	15,39	0.68
Textile machinery (0 94 A/32)	510,5 °/oo	9,26	328 001	4,69	13,95	7.12
Machine tools (0 94 A/32)	9 °/oo	10,5	"	4,69	15,19	0.14
Cotton fabric (115 A/47) c/	1000 °/oo	(16.08/10.3) a/	54 676	1,36	17.44/11.66	17.44/11.66

a/ The first figure was estimated directly, the second is from Ministry of Industry estimates (engineering services) or the Centrale des bilans (cotton).

b/ Merged in practice with 140 and 143.

c/ Merged with 110 N and 114.

Annex XIX

Textile mill

Indirect employment balance-sheet by social and occupational category and by sector

(in work years)

Sector	Indirect jobs for the weight of the sector	Engineers and management	Technicians	Skilled workers	Unskilled workers
Engineering services	0.131	0.009	0,015	0.065	0.042
Insurance	0.003	ε	ε	0.002	0.001
Marine transport	0.102	0,007	0.013	0.050	0,032
Boiler-making	0.046	0.003	0,006	0,022	0.015
Fittings	0.049	0,003	0,006	0,023	0.017
Ventilation and thermal equipment	0.285	0,019	0,035	0.134	0.097
Rotating plant	0.150	0,010	0,018	0.073	0.048
Textile machinery	2.394	0,163	0.294	1,123	0,814
Machine tools	0.042	0,003	0,005	0,020	0.014
Total for mill	3,20	0,22	0.39	1.51	1,08
Cotton fabric	1,36	0.10	0.17	0,658	0.437

The coefficients used are the same as in annexes VIII and IX.

Annex XX

Petrochemicals plant

Direct employment balance-sheet

(jobs 1973 and structure 1973)

	Jobs	Engineers and management	Technicians	Skilled workers	Unskilled workers
Engineering services	(0,808 (0,344	0,305 0,130	0,275 0,117	0,208 0,088	0.02 0.009
Marine transport	0,155	0,021	0,014	0,068	0,052
Civil engineering	0,718	0,180	0.359	0,179	—
Installation	1,716	0,343	0,772	0,601	—
Furnaces and thermal equipment 1/	0,924	0,063	0,073	0,492	0.296
Boiler-making 1/	1,669	0.114	0,133	0,888	0,534
Pumps	0,074	0,006	0,011	0,042	0.015
Electric motors 2/	0,197	0.028	0,023	0,090	0,055
Thermal turbines 5/	0,315	0,022	0,025	0,168	0,101
Compressors	0,327	0,023	0,047	0.176	0.081
Fittings 6/	0,535	0.042	0,082	0.302	0,109
Chemical industry machinery	0,165	0.012	0,020	0,101	0,032
Electrical equipment 2/	0,441	0,064	0,052	0,202	0,123
Miscellaneous inorganic chemicals 4/	0,055	0,008	0,005	0.029	0,012
Miscellaneous 3/	0,170	0.015	0,026	0 071	0.058
Total	7.805/6.269	1.071/1.246	1,759/1.917	3.497/3.617	1,477 /1.4
Urea	1,10	0.047	0,128	0,666	0,258
Balance	+ 6.705/7,169	+ 1.024/1.199	+ 1.631/1.789	2,831/2.951	1,219/1.2

1/ The employment structure used here is that of the "foundry, heavy boiler-making, mechanical motors and pumps" sector.

2/ The employment structure used here is that of the "electrical and electronic engineering" sector.

3/ The employment structure used here is that of the "paint and varnish" sector, which accounts for much of this item.

4/ Employment structure of inorganic chemistry.

5/ Employment volume of "boiler-making"; employment structure of "foundry, heavy boiler-making, mechanical motors and pumps".

6/ Employment structure of "pumps and hydraulic equipment".

Annex XXI

Petrochemical plant

Over-all employment balance-sheet by sector

(work years)

Sector	Weight	Direct Jobs for F 1 million turnover	Indirect Jobs for over-all activity	Indirect Jobs for F 1 million turnover	Total Jobs for F 1 million	Jobs for the weight of the sector
Engineering services (160/65)	137 °/oo	2.51/5.9	30 492	0.47	2.98/6.37	0.41/0.87
Marine transport (141/62)	26 °/oo	5.96	90 661	1.43	7.39	0.19
Civil engineering (130/61)	82 °/oo	8.75	508 855	2.41	11.16	0.92
Installation (130/61)	199.5 °/oo	8.6	508 855	2.41	11.01	2.20
Furnaces and thermal equipment (0 94 A/32)	152 °/oo	6.08	378 001	4.69	10.77	1.64
Boiler-making (")	156 °/oo	10.7	"	4.69	15.39	2.40
Rotating plant (0 95 A/34) Pumps	9.36 °/oo	7.94	114 454	3.40	11.34	0.11
Electric motors and equipment	53.24 °/oo	11.99	"	3.40	15.39	0.82
Turbines and compressors (0 94 A/32)	69.2 °/oo	8.22	378 001	4.69	12.91	0.89
Fittings (")	57.1 °/oo	9.37	"	4.69	14.06	0.80
Chemical industry and miscellaneous machinery (")	48.5 °/oo	7.19	"	4.69	11.88	0.58
Miscellaneous inorganic chemicals (101/42)	10.2 °/oo	5.35	15 028	1.30	6.65	0.07
Urea	1000	1.1	15 028	1.30	2.4	2.4

A: Direct estimate of gains in engineering services (first figure in corresponding line).

B: Ministry of Industry estimate (second figure in corresponding line).

Annex XXII

Petrochemical plant

Indirect employment balance-sheet by social and occupational category and by sector

(in work years)

Sector	Indirect jobs for the weight of the sector	Engineers and management	Technicians	Skilled workers	Unskilled workers
Engineering services	0.064	0.005	0.007	0.032	0.020
Civil engineering	0.198	0.014	0.022	0.098	0.064
Installation	0.481	0.034	0.053	0.238	0.155
Marine transport	0.004	ε	ε	0.002	0.002
Furnaces and thermal equipment	0.713	0.048	0.088	0.331	0.242
Boiler-making	0.732	0.050	0.090	0.343	0.249
Turbines and compressors	0.325	0.022	0.010	0.152	0.111
Fittings	0.268	0.018	0.033	0.126	0.091
Chemical industry machinery	0.227	0.015	0.028	0.106	0.077
Rotating plant	0.213	0.014	0.026	0.104	0.069
Chemicals	0.013	0.001	0.001	0.006	0.005
Total	3.24	0.221	0.388	1.541	1.085
Urea	1.3	0.078	0.146	0.646	0.43

Annex XXIII

Steel Plant

Direct employment balance-sheet (jobs 1973 and structure 1973)

	Jobs	Engineers and management	Technicians	Skilled workers (a)	Unskilled workers
Engineering services	0.925 2.170	0.350 0.82	0.315 0.74	0.235 0.55	0.025 0.06
Marine transport	0.412	0.056	0.037	0.181	0.139
Handling, public works and steelworks equipment 1/	1.724	0.118	0.137	0.917	0.552
Furnaces 1/	0.143	0.010	0.011	0.076	0.046
Boiler-making 1/	0.744	0.051	0.059	0.396	0.238
Electrical equipment	1.465	0.211	0.172	0.672	0.410
TOTAL	5.413/6.66	0.796/1.266	0.731/1.156	2.477/2.792	1.41/1.445
Rod	2.55	0.140	0.377	1.232	0.8
BALANCE	+2.863/4.11	0.656	0.354	1.245	0.61

1/ Employment structure of the foundry, heavy boiler-making, mechanical motors and pumps sector.

Annex XXIV

Steelworks and rolling mill

Over-all employment balance-sheet by sector (work years)

	Weight	Direct jobs for F 1 million turnover	Indirect jobs for sector activity	Indirect jobs for F 1 million	Total jobs for F 1 million	Jobs for the weigh of the sector
Engineering services (160/65)	365.5°/oo	251/5.9(a)	38,492	0.47	2.98/6.37	1.1/2.3
Marine transport (141/62)	69.2°/oo	5.96	90,661	1.43	7.39	0.51
Handling, public works and steelworks equipment (0 94 A/32)	247 °/oo	6.98	378,001	4.69	11.67	2.88
Furnaces (0 94 A/32)	123.5°/oo	6.08	"	4.69	10.77	1.33
Boiler-making (0 94 A/32)	69.6°/oo	10.7	"	4.69	15.39	1.07
Electrical equipment (0 95 1/34)	122.2°/oo	11.99	114,454	3.40	15.39	1.88
Steel rod (0 72/24)	000 °/oo	1.7	33,095	1.19	2.89	2.89

A: Direct estimate of direct jobs gained in engineering services.

B: Ministry of Industry estimate.

Annex XXV

Steelworks and rolling mill

Indirect employment balance-sheet by social and occupational category and by sector

(work years)

Sector	Indirect jobs for the weight of the sector	Engineers and management	Technicians	Skilled workers	Unskilled workers
Engineering services	0.173	0.012	0.019	0.086	0.056
Marine transport	0.099	0.007	0.012	0.048	0.032
Electrical equipment	0.415	0.028	0.051	0.202	0.134
Handling, public works and steelworks equipment	1.158	0.079	0.142	0.543	0.393
Furnaces	0.579	0.039	0.071	0.272	0.197
Boiler-making	0.326	0.022	0.04	0.153	0.111
Total	2.75	0.187	0.335	1.304	0.923
Steel rod	1.19	0.068	0.129	0.563	0.431

Annex XXVI

Household appliances factory

Direct employment balance-sheet (work years)

	Total direct jobs	Engineers and management	Technicians	Skilled workers	Unskilled workers
Engineering services	(A 0.651 (B 1.53	0.245 0.577	0.221 0.52	0.167 0.392	0.018 0.041
Insurance	0.056	0.003	0.011	0.026	0.016
Rail transport	1	0.12	0.12	0.57	0.19
Machine tools and presses	6.345	0.317	0.641	3.807	1.580
Thermal furnaces	0.239	0.016	0.019	0.127	0.076
Total	(A 8.291 (B 9.17	0.701 1.033	1.012 1.311	4.697 4.922	1.88 1.903
Household appliances	6.49	0.097	0.201	1.253	4.939

A: Direct estimate of direct jobs gained in engineering services.

B: Ministry of Industry estimate.

Annex XXVII

Household appliances factory

Over-all employment balance-sheet by sector (work years)

Sector	Weight	Direct jobs for 1 million	Indirect jobs for the activity of the sector	Indirect jobs for 1 million	Total jobs for 1 million	Jobs for the weight of the sector
Engineering services (160/65)	259.4°/°°	2.51/5.9 a/	38,492	0.47	2.98/6.37	0.77/1.65
Insurance (160/65)	9.5°/°°	5.9	"	0.47	6.37	0.06
Rail transport (140/62) b/	48.3°/°°	20.7	90,661	1.43	22.13	1.07
Machine tools (0 94 A/32)	604.3°/°°	10.5	378,001	4.69	15.19	9.18
Thermal furnaces (0 94 A/32)	39.25°/°°	6.08	"	4.69	10.77	0.42
Presses (0 94 A/32)	39.25°/°°	10.5	"	4.69	15.19	0.60
Household appliances (0 94 C/33) c/	1000 °/°°	6.49	87,178	4.70	11.19	11.19

a/ Direct and Ministry of Industry estimates.
b/ Merged with 141 and 143.
c/ Merged with 0 94 B.

Annex XXVIII

Household appliances factory

Indirect employment balance-sheet by social and occupational category and by sector

(work years)

Sector	Indirect jobs for the weight of the sector	Engineers and management	Technicians	Skilled workers	Unskilled workers
Engineering services	0.122	0.009	0.014	0.06	0.039
Insurance	0.005	ε	0.001	0.002	0.002
Marine transport	0.069	0.005	0.008	0.034	0.022
Machine tools and presses	3.018	0.205	0.371	1.415	1.026
Furnaces	0.184	0.013	0.023	0.086	0.063
Total	3.40	0.233	0.417	1.597	1.152
Household appliances	4.70	0.362	0.625	2.11	1.603

Annex XXIX

Starch-based sugar plant

Direct employment balance-sheet (work years)

	Total direct jobs	Engineers and management	Technicians	Skilled workers	Unskilled workers
Enginsering services (A	0.994	0.375	0.338	0.254	0.027
(B	2.336	0.891	0.794	0.598	0.063
Marine transport	0.018	0.002	0.002	0.008	0.006
Boiler-making[1]	0.669	0.0459	0.053	0.356	0.214
Fittings[2]	0.75	0.051	0.06	0.399	0.24
Chemical industry machinery	2.50	0.175	0.3	1.538	0.488
Electrical equipment	1	0.144	0.118	0.458	0.28
Total (A	5.931	0.793	0.871	3.013	1.255
(B	7.278	1.299	1.327	3.357	1.291
Sugar plant products	1.04	0.10	0.22	0.60	0.12

A: Direct estimate of direct jobs gained in engineering services.

B: Ministry of Industry estimate.

1/ The employment structure used here is that of the "foundry, heavy boiler-making, mechanical motors and pumps" sector.

2/ Employment structure of "pumps and hydraulic transmissions".

Annex XX

Starch-based sugar plant

Over-all employment balance-sheet by sector (work years)

Sector	Weight	Direct jobs for 1 million	Indirect jobs for the activity of the sector	Indirect jobs for 1 million	Total jobs for 1 million	Jobs for the weight of the sector
Engineering services (160/65)	396 °/oo	2.51/5.9 a/	38,482	0.47	2.98/6.37	1.18/2.52
Marine transport (141/62) b/	31 °/oo	5.96	90,661	1.43	7.39	0.23
Boiler-making (0 84 A/32)	62.5 °/oo	10.7	378,001	4.69	15.39	0.96
Fittings (0 84 A/32)	80 °/oo	9.37	"	4.69	14.06	1.12
Chemical industry machinery (0 84 A/32)	347.5 °/oo	7.19	"	4.69	11.88	4.13
Electrical equipment (0 85 A/34)	83 °/oo	11.99	114,454	3.40	15.39	1.28
Sugar plant products c/	OCO °/oo	A' 1.04 B' 1.04	33,156 9,298	6.12 0.94	7.16 1.98	7.16 1.98

a/ The first figure was estimated directly, the second is from Ministry of Industry estimates.

b/ Merged, for jobs, with 140 and 143,

c/ Calculated from the indirect employment of the three subsectors (annex VI) by weighting with the following coefficients:
sugar and sorbitol 63.3%; fats 10%; animal feeds 26.7%.

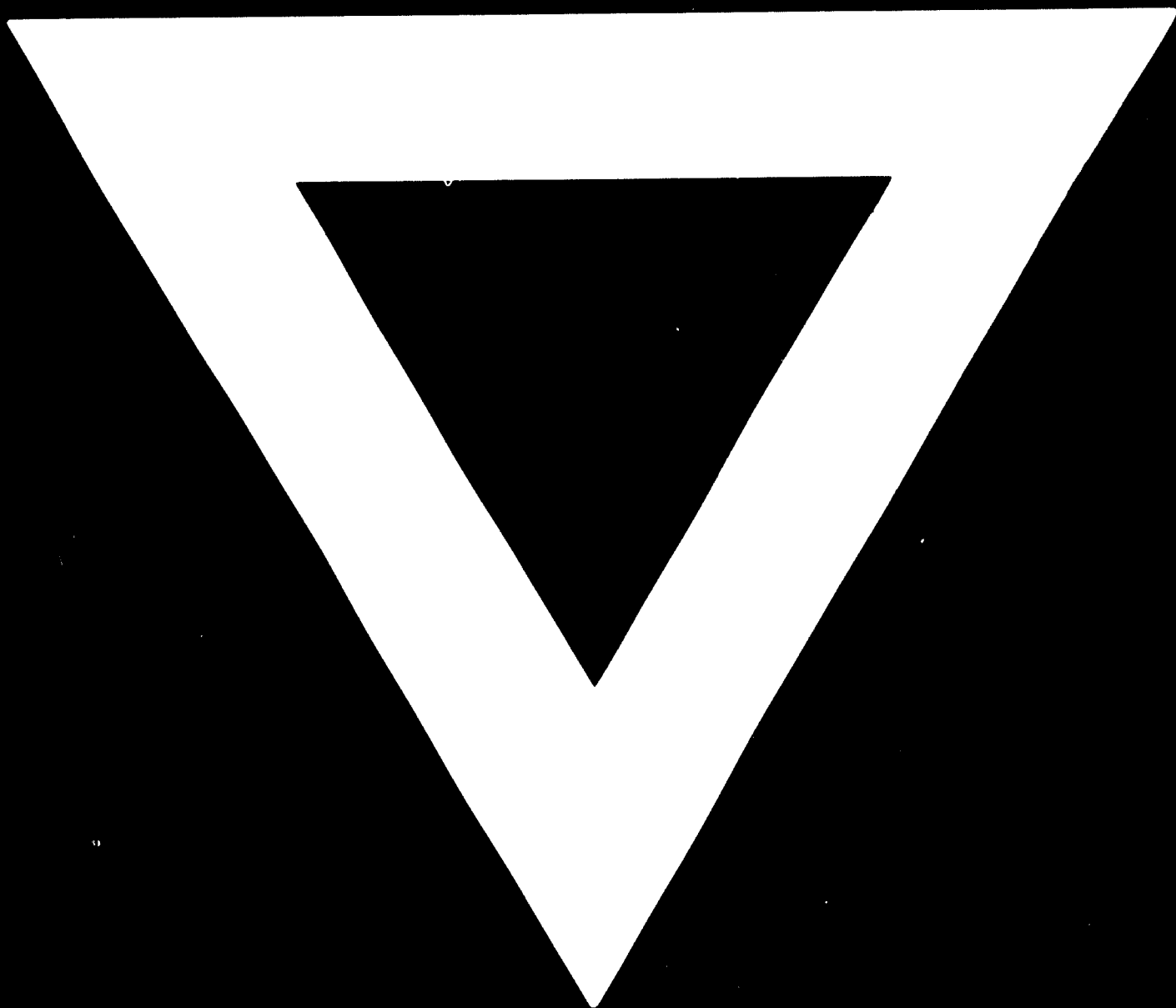A': Buy-back of four tied products,
B': Buy-back of animal feeds only,

Annex XXXI

Starch-based sugar plant

Indirect employment balance-sheet by social and occupational category and by sector

(work years)

Sector		Indirect jobs for the weight of the sector	Engineers and management	Technicians	Skilled workers	Unskilled workers
Engineering services		0.186	0.013	0.021	0.092	0.06
Marine transport		0.044	0.003	0.005	0.021	0.014
Electrical equipment		0.282	0.019	0.034	0.137	0.091
Boiler-making		0.293	0.020	0.036	0.137	0.100
Fittings		0.375	0.026	0.046	0.176	0.128
Chemical industry machinery		1.630	0.111	0.2	0.764	0.554
Total		2.81	0.192	0.342	1.327	0.947
Sugar plant products	A"	6.12	0.177	0.312	2.944	2.687
	B"	0.94	0.027	0.048	0.452	0.413

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