The Pakistan Development Review
30 : 2 (Summer 1991) pp. 189 – 206

Aid-tying and the Real Value of Foreign Assistance: The Case of the Sudan

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This paper assesses the excess cost which results from aid-tying in some development projects in the Sudan. Tying can be of two types, either by source or by end-use. In the former case, restrictions are placed on where the recipients can spend the assistance. In the latter case, assistance is limited to specific items or projects. Thus, aid can be deemed to be doubly tied. In addition, there are other unquantifiable costs of tying. For example, the project to which the assistance will be tied might not suit the recipient's development programme, or the technology used may be inappropriate. Eight foreign-aided projects, which were tied by source as well as by end-use, were analysed to estimate the excess cost which results from the tying of aid. The overall weighted average of tying these projects appears to be 74 percent higher than the international market. In addition, the analysis shows that the terms of borrowing for these projects were hard; consequently, the grant element was low. Thus, if one takes into account the estimated excess cost of the tied foreign credits, which was greater than the commercial cost of borrowing at which these credits could have been sought in the absence of aid, the real value of these credits, the paper shows by using a shadow grant element approach, was negative.

1. INTRODUCTION

Aid-tying will reduce the real value of a capital inflow if the recipient country has to pay for the goods and services bought with the loan higher prices than those prevailing in alternative markets. Tying can either be by source (i.e., restrictions on where the recipients can spend the assistance) or by end-use (through the specification of commodities and/or projects). Spending restrictions which normally tie the assistance to purchases from the donor country are known as "procurement" restrictions or tying. On the other hand, use restrictions are usually imposed to cover the foreign exchange costs of a specific project. The combination of use and spending restrictions amounts to "double-tying", i.e., the use of a foreign capital inflow will be restricted to particular projects as well as to the donor's goods and services. Hence, the excess cost of tied goods will not only generate additional income to the donor country due to overpricing, but it will also save the donor the cost of an export subsidy. For if the tying had not been imposed, the donor country may have had to pay an export subsidy in order to remain competitive.

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Author's Note: This paper is based on my Ph.D. thesis completed at the University of Kent at Canterbury. I am very grateful to Professor Richard Disney for his invaluable comments, and to an anonymous referee for his/her helpful suggestions; but they should be absolved of any responsibility for the final product.

In addition to the inability of the recipient country to buy in the cheapest market, there are also some other unquantifiable costs of tying. For instance, when there is double-tying, the project to which the assistance will be tied might not suit the recipient's development programme, the technology might be inappropriate, the donor may unnecessarily raise the import content of the project, and so on. As such, aid-tying not only imposes different direct (and indirect) costs on the recipient country but it also acts as a constraint on the recipient's freedom to allocate resources in the best possible way, and hence causes a welfare loss.

The purpose of this paper is twofold: to estimate the direct excess costs of tied credits received by the Sudan, and to assess the effect of aid-tying on the value of these credits. This is done by developing a "shadow grant element" approach. A sample of some projects and commodities, which were tied simultaneously (i.e., double-tying) throughout the period 1969-1977, is examined. The selection of the sample is primarily dictated by the availability of data. The sample incorporates projects which relate to textiles (including spinning and weaving of sacks and hessian cloth) well drilling, printing and bookbinding, road building, and telecommunications.

Section 2 of this paper explores the cost of tying to recipient countries and Section 3 introduces the methodology by which the direct excess cost of aid-tying for the Sudan is calculated. While Section 4 discusses the empirical results, Section 5 examines the effect of aid-tying on the value of the credits. The final section offers some concluding remarks.

2. THE COST OF TYING TO RECIPIENT COUNTRIES

The costs of aid-tying can be broadly classified as "direct" and "indirect". Since the indirect costs are not necessarily quantifiable, it would be practical to concentrate on the direct costs when the issue of aid-tying is empirically examined.[1]

The direct costs of tying can be defined as the excess price actually paid by the recipient country over the lowest price which the country could have paid had the aid not been tied.

In the case of project-aid, the costs of tying can be avoided partly or minimized by adopting a worldwide tender policy. In practice, several projects will normally be allocated to certain tied sources simply because these sources will probably finance such projects. This is why, in many cases, the recipient countries will not be able to follow a proper tendering procedure. Sometimes a certain project

[1]The indirect costs include, for instance, the relatively higher prices that the recipient normally pays for spare parts and the long delays in delivering them, inadequate follow up of projects and, most importantly, the development costs (i.e., the effect of tying on the recipient's development plans as well as the choice of appropriate technology). For a comprehensive discussion on this subject, see, e.g., Singer (1965) and Bhagwati (1967).

might be allocated from the very beginning to a particular foreign firm which will automatically get the orders. On other occasions, aid will be allocated to a specific project according to a feasibility study which has been prepared by a firm from the donor country in collaboration with some firms and/or the government in the recipient country, in which case tendering will be regarded as irrelevant. Under these circumstances, ul Haq (1967) suggested that the recipient country should try both to invite worldwide tenders and to threaten to shift the project(s) to alternative sources if the aid source proved to be unduly expensive.

In practice, however, aid is often tied by specific projects as well as by commodity specifications (i.e., double-tying), in which case the substitution possibilities for the recipient country are greatly reduced or even eliminated.

3. ESTIMATES OF THE DIRECT EXCESS COSTS OF AID-TYING FOR THE SUDAN

The direct excess costs of aid-tying for the Sudan are calculated by determining the mark-up (say ε) of overpriced tied goods relative to the prices of alternative sources of supply. The mark-up is calculated by taking the difference in price between the lowest quotations of the tying source and the lowest quotations for the same good (or a similar one) as offered by other sources of supply; and the result is divided by the latter.

In order to calculate ε, the following steps were followed:

(a) Taking the data on its face value, the original quotations of machinery and equipment for the different tied contracts, which pertain to the projects under consideration, have been converted into Sudanese currency, using the prevailing exchange rate when these contracts were signed;[2] and

(b) In order to compare the quotations of tied machinery and equipment with alternative quotations from competitive sources of supply, more than fifty British firms (as well as some agents of foreign firms in Britain) which produce the same machines were requested to provide price quotations. These quotations (obtained from current alternative sources of supply) were then deflated to their real values that correspond to those at the date of signing the tied contracts. In order to do that, the difficult problem of choosing a proper deflator arose. However, since most of the alternative quotations of machinery and equipment were collected from British sources, the use of a British cost of plant index as a deflator seemed reasonable.

[2]The exchange rates were obtained from the IMF, *International Financial Statistics*.

Accordingly, the alternative quotations, which were currently obtained from non-tying sources, were deflated to their real values when the tied contracts were signed by using the U.K. Industrial Output Price Index (UKIOPI), which is reported in Table 1. Then the deflated quotations were also converted into their Sudanese equivalent according to the prevailing exchange rate, which corresponds to the date of signing the contract. By following this sequence, the effect of the series of devaluations of the Sudanese pound which started from 1978 will be avoided.

However, the estimates of the direct costs of tying for the Sudan using the UKIOPI as a deflator tend to be very high, resulting in an overall weighted average of 125 percent, as can be seen from Table 2. In order to check the performance of the UKIOPI, we wrote back to the British companies which supplied the alternative quotations, asking them for information on the price increases in their equipment over the deflated periods (i.e., the periods which pertain to the various tied contracts). Although these companies were not expected to reveal the true price increase of their equipment because this is a very sensitive issue, nonetheless, from the replies received, it seems that the price increase reflected by the UKIOPI is quite reasonable. For example, according to the information obtained from the British firms involved, the price increase in fibre processing plants during the (deflated) period 1975–1982 was 110 percent, while the UKIOPI shows a price increase of 137 percent over the same period. As for textile machinery (in particular weaving), prices have increased by 150 percent during the period 1974–1982 in comparison to the 190 percent increase reflected by the UKIOPI. Furthermore, the price increase in road equipment seems to be 70 percent during the period 1977–1981; and according to the UKIOPI, the increase was 57 percent over the same period. On balance, however, the UKIOPI should approximate the price increase over the deflated periods; and hence the measured high excess costs of tying cannot be attributed to an over deflation as a result of using the UKIOPI as a deflator.

Furthermore, the measured high excess costs of tying cannot be attributed to the effect of exchange rates because this possibility has been accounted for during the process of deflation, according to the procedure described in step (b). Finally, by asking the competitive alternative sources of supply from the very beginning for f.o.b. export prices, against which the tied quotations were compared, the effect of transport costs is effectively eliminated.

However, despite all these measures, to safeguard against the possibility of overestimating the excess cost of tying, it may still be argued that the method of obtaining quotations for similar machinery and equipment from non-committed firms might be questionable because these firms may tend to have other motives than just providing accurate information (such as to be considered for future contracts); and this is perhaps why they have provided very low quotations. Therefore, we assumed that these competitive firms have just attached a nominal margin of profit,

Table 1

The U.K. Industrial Output Price Index (UKIOPI), 1969–1982

Year	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
UKIOPI 1975 = 100	50.5	54.1	59.0	62.1	66.7	81.8	100.0	117.3	140.5	153.3	172.0	200.0	221.3	237.2

Source: Various issues of the IMF, *International Financial Statistics*.

Table 2

The Excess Costs of Tying the Purchase of Machinery of Some Selected Projects in the Sudan, 1969–1977

S. No.	Name of Project	Year	Lowest Quotations from Tied Source (Country)	Lowest Quotations from Alternative Sources of Supply (Country)	Excess Costs of Tying $\left[\frac{(1) - (2)}{(2)}\right]\%$ Using UKIOPI
1.	Well Drilling	1969	Yugoslavia	Great Britain	117.4
2.	Printing Press	1973	West Germany	Great Britain	96.8
3.	Shendi (Gadow) Textile Factory	1974	Italy	Great Britain, Japan and USA	123.0
4.	The Six Weaving Factories	1974	Belgium	Great Britain, Japan and USA	165.7
5.	Abu Naama's Fibre Processing Back-up Project	1975	Italy	Great Britain	56.1
6.	Tonj's Fibre Processing Back-up Project	1975	Italy	Great Britain	125.1
7.	The 22 Automatic Telephone Exchanges	1975	Japan	USA	75.8
8.	Road Building Equipment	1977	USA	Great Britain	248.3
	Overall Weighted Average				125

Source: Own estimates based on data compiled from the Sudanese Ministry of Finance and National Economy as well as various British, American, and Japanese firms.

i.e., they have given a voluntary price discount in order to attract, for instance, more contracts in future. A sensitivity analysis was then carried out for the profit margin that should have been considered by these firms. A profit margin which ranges between 10 to 30 percent was added to the quotations received from the competitive firms, assuming that this range represents the discount zone within which a buyer (or a recipient) can bargain to obtain a price discount as usually happens in any commercial deal of this nature. As such, the actual alternative quotations that should have been offered by these firms will be restored and the firms' intention of having other motives than just providing accurate information will be neutralized.

4. THE EMPIRICAL RESULTS

As it has been clear throughout the previous discussion, it is very difficult to arrive at an overall precise estimate of the amount of money that the Sudan could have saved from the obtained international assistance by buying from the international market had the assistance not been tied. Due to the lack of adequate information on all the credits as well as the problems involved in comparing different equipment, having different specifications and capacities, the estimates of the direct costs of tying are usually regarded as approximations.

Table 3 summarizes the estimates of the mark-up or the cost difference implied by tying the assistance to the purchases of donors' overpriced goods; while the basic detailed information has been reported in Appendix Table 1. Both tables are based on 8 tied projects which were also tied by source (i.e., double-tying), except the case of the printing press which was tied by source only, as the machinery and equipment for this project were drawn against a bilateral general commodity loan contracted with West Germany. The total cost of these projects amounts to L. S. 30 million but the specific items of equipment that have been included in the estimates of the direct costs of tying were worth about L. S. 11 million.

The comparison of price quotations is largely confined to the items of equipment with similar specifications, capacity, and quality. In some cases, the comparison is based on price quotations for a complete project, and in others it is based on the unit cost of each selected machinery item.

The overall weighted average price for these projects tends to be approximately 74 percent higher than the international prices (assuming the maximum 30 percent price discount was given by the competitive firms).[3] This figure might have been

[3]The cost of the tied projects was also made more expensive by including in the contracts price escalation clauses, additional commissions which are payable on top of the rate of interest attached to the credits, and contingency items which do not necessarily relate to the projects under consideration. On the other hand, the tying sources not only tend to control the domestic Sudanese market by stipulating the prices of domestic materials required for the projects, but they also try to safeguard against any fluctuations in their currency in order to keep the value of the credits intact [see, e.g., Yassin (1982)].

Table 3

Alternative Estimates of the Excess Costs of Tying the Purchase of Machinery of Some Selected Projects in the Sudan, 1969 – 1977

Name of Project	Year	Lowest Quotations from Tied Source (Country)	Lowest Quotations from Alternative Sources of Supply (Country)	Percent of Excess Costs of Tying when the Alternative Sources of Supply Increase their Profit Margin by 10%	20%	30%
Well Drilling	1969	Yugoslavia	Great Britain	87.6	85.4	67.2
Printing Press	1973	West Germany	Great Britain	78.9	64	51.4
Shendi (Gadow) Textile Factory	1974	Italy	Great Britain, Japan and USA	102.7	85.8	71.5
The Six Weaving Factories	1974	Belgium	Great Britain, Japan and USA	141.5	121.4	104.09
Abu Naama's Fibre Processing Back-up Project	1975	Italy	Great Britain	41.9	29	19.1
Tonj's Fibre Processing Back-up Project	1975	Italy	Great Britain	104.7	87.6	73.2
The 22 Automatic Telephone Exchanges	1975	Japan	USA	59.9	46.5	35.3
Road Building Equipment	1977	USA	Great Britain	216.7	190.3	168
Overall Weighted Average				105.5	88.8	73.8

Source: Own estimates based on data from the same source as Table 2.

exacerbated by the 1970s worldwide inflation (due to the increase in oil prices) since 75 percent of the tied projects were contracted during the 1973–1977 period. However, it can also be noticed from Table 3 that, within the tying sources, donors like the USA and Belgium seem to be harder in their tying practices.

5. THE EFFECT OF TYING ON THE VALUE OF CREDITS

In addition to the high mark-up that the donors have imposed on the Sudan by tying the credits, the terms of borrowing on which these credits were offered were also very hard (i.e., non-concessionary), and hence the associated grant element was very low.

It has been widely accepted that when loans are made on concessionary terms, they contain an aid component or a grant element which can be estimated in cash terms and regarded as a benefit to recipient countries. The grant element is, therefore, defined as the difference between the nominal value of the loan and the present value of all future repayments (amortization and interest) discounted by a proper discount rate. The factors which determine the value of the grant element are mainly three: the rate of interest attached to the loan which is the major one; the grace period which lies between the date of disbursement until the repayments start (usually during this period only the interest is paid); and the maturity period by the end of which the repayments obligations terminate.

Given the terms of borrowing and assuming a constant stream of debt servicing payments (according to which the debtor will surrender a fixed annual payment of the principal and interest when the grace period elapses), the grant element as a percent of the face value of the loan (A) can be determined as:

$$A = \left(\frac{F - PV}{F}\right)100 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

where F is the face value of the loan and PV is the present value of future debt servicing payments on a loan.[4]

[4]The present value of future repayments on the loan (PV) can be calculated by applying this formula:

$$PV = rF\left[\frac{1-(1+i)^{-G}}{i} + \frac{(1+r)^{N-G+1}}{(1+r)^{N}} \times \left(\frac{(1+i)^{-G}}{i} - \frac{(1+r)^{N-G+1}}{(1+r)^{N}}\right) + \frac{1}{i}\right]$$

where r is the annual rate of interest attached to the loan, F is the face value of the loan, i is the discount rate, G is the grace period and N is the maturity period. For an elaborate discussion on the formulae by which PV can be calculated, see, e.g., Yassin (1989).

As can be seen from Table 4, the average rate of interest attached to the tied credits for the Sudan, the length of maturity and the grace period were 7.3 percent, 6.5 and 1.5 years, respectively. Consequently, the estimated overall averages of the grant element were 6.7 percent and 12.4 percent at the discount rates of 8 percent and 10 percent, respectively. The 8 percent discount rate is assumed to represent the world market rate of interest being proxied by the average annual rate of the UK money markets and the Euro Dollar market during the period 1969–1977.[5] This rate acts as the rate of interest at which the Sudan might have had to borrow in the absence of aid [Yassin (1983)]; whilst the 10 percent is the standard discount rate of the Development Assistance Committee (DAC) of the Organization of Economic Cooperation and Development (OECD).

Although it has been argued that when the excess cost of aid-tying is very high and the terms of borrowing are very hard, the value of the credits could be negative [Thirlwall (1978), p. 307], yet no analytical framework has yet been developed to examine this hypothesis. Indeed, the effect of aid-tying on the value of the assistance can be appropriately assessed by determining the "shadow" value of the grant element. From Equation (1), the grant element as a percent of the face value of the loan (A) can be determined by calculating first the present value of all future repayments on the loan (PV) using a proper discount rate. PV should, then, be deducted from the nominal value of the loan (F) and the net result should be divided by F. Similarly, in order to work out the shadow value of the grant element, the present value of all future repayments on the nominal value of the loan (or PV) should be determined first because the repayments should cover fully the nominal value of the loan whether the loan is tied or not. But a tied loan would actually be worth less than its face value because of the effect of the excess cost of tying. Thus, the nominal value of the loan should be "deflated" to its real value by the proportionate excess cost of tying. Since in this analysis the excess cost of tying is defined as the mark-up on the price of tied goods (ε), F would be deflated by $1 + \varepsilon$ (or π) where π is 1 + % mark-up on the price of tied goods. Then, from this real value of the loan (or F/π), the already discounted future repayments (or PV) should be deducted, rather than being deducted from the nominal value of the loan (or F). In symbols, the shadow grant element as a percent of the real value of the loan (A^*) can, therefore, be expressed as:

$$A^* = \left(\frac{F^* - PV}{F^*}\right) 100 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

where F* is the real value of the loan or F/π and $\pi = 1 + \varepsilon$.

According to Equation (2), if the present value of future repayments on the

[5]The interest rates were compiled from the IMF, *International Financial Statistics*.

Table 4

Terms of Borrowing, Values of Grant Elements, and Excess Costs of Aid-tying: A Sample of Selected Sudanese Projects, 1969 – 1977

S. No.	Nature of Tied Project	Value of the the Tied Loan L.S. Million	Year	The Tying Source	Terms of Borrowing: Rate of Interest (%)	Terms of Borrowing: Maturity Period (Years)	Terms of Borrowing: Grace Period (Years)	The Grant Element at a Discount Rate Based on: 8%	The Grant Element at a Discount Rate Based on: 10%	The Excess Cost of Aid-tying Using UKIOPI %
1.	Well Drilling	4.3	1969	Yugoslavia	3	7	1	16.2	21.5	117.4
2.	Abu Naama's Kenaf Fibre Production Plant	1.1	1972	Italy	7	8	4	14.5	21.6	**
3.	Tonj's Kenaf Fibre Production Plant	2.8	1973	Italy	7	8	2.5	10.8	17.6	**
4.	Printing Press*	0.6	1973	West Germany	–	–	–	–	–	96.8
5.	Shendi (Gadow) Textile Factory	7.6	1974	Italy	8	8	1	4.2	10.8	123
6.	The Six Weaving Factories*	5.0	1974	Belgium	–	–	–	–	–	165.7
7.	Abu Naama's Fibre Processing Back-up Project	4.1	1975	Italy	8.5	5	1	1.8	6.7	56.1
8.	Tonj's Fibre Processing Back-up Project	5.9	1975	Italy	8.5	5	2	4.6	9.5	125.1
9.	The 22 Automatic Telephone Exchanges	1.7	1975	Japan	8	5	.5	1.7	6.3	75.8
10.	Road Building Equipment	0.7	1977	USA	8	6	1.5	4.8	10.2	248.4
	Overall Weighted Average				7.3	6.5	1.5	6.7	12.4	125

Source: Own estimates based on data from the same source as Table 2.

Notes: *The terms of borrowing for these contracts are not available.

**They are not included in the estimates because quotations from alternative sources of supply are not available.

nominal value of the loan exceeds the real value of the loan, after allowing for the effect of overpricing due to the practices of aid-tying, then the real worth of the assistance would be negative. The implications of this approach are analogous to the case of the grant element.

It is clear from the examples provided in Table 5, by applying Equation (2), that the real worth of the tied credits may become negative because, effectively, aid-tying makes the recipient country repay more than the actual value of the aid received. Given the low values of the grant element of the tied credits (due to the hard terms on which these credits were given) and the high excess cost of tying, the values of the shadow grant element were found to be negative, i.e., when the grant element is very low (or PV is very high) and the excess cost of tying is very high (or F^* is very low), the shadow grant element is likely to be negative.

Regarding the analysis as a whole, it should be mentioned, in addition to the discussion contained in Section 3, that the cost difference approach used in estimating the direct excess costs of aid-tying concentrates only on the actual cost incurred by the recipient country. It does not take into consideration whether the recipient might have been able to reduce the costs of tying (for instance, by following a better procurement policy) even within the context of tying. Furthermore, it is not clear from the obtained data whether the Sudan had invited international bids or not. Hence the effectiveness of this policy in minimizing the excess costs of tying cannot be assessed.

6. CONCLUDING REMARKS

In this paper the direct costs of tying the purchases of machinery and equipment of some Sudanese projects to the donor's source have been quantified, using a cost difference approach. The analysis has covered 8 tied projects (during the 1969–1977 period) which were also tied by source (i.e., double-tying). The estimated overall weighted average of the excess cost of tying these projects appears to be around 74 percent higher than the international market. This figure might have been aggravated by the 1970s worldwide inflation (as a result of the increase in oil prices), since most of these tied projects were contracted during the 1973–1977 period.

The analysis also shows that the terms of borrowing on which the credits for financing these projects were offered were hard; and hence the associated grant element was low. Given the estimated excess cost of the tied Sudanese credits, which was higher than the commercial cost (or terms) of borrowing at which these credits could have been sought in the absence of aid, it has been shown, by using a shadow grant element approach, that the real value of these credits was negative.

Ideally, aid should be untied since tying reduces the efficiency of loans in providing economic assistance. However, if the practices of aid-tying by donors cannot be avoided on grounds of the balance of payments protection, then the recipi-

Table 5

Examples of the Effect of Aid-tying on the Value of the Assistance

(1)		(2)	(3)	(4)	(5)	(6)		(7)	
S. No.	Nature of the Tied Project	The Tying Source	Year	Face Value of the Tied Loan (F)	Real Value of the Tied Loan (F/π): $\pi = 74\%$	Present Value of Future Repayments on the Nominal Value of the Loan (PV); Discounted by		Shadow Grant Element $\left[A^* = \left(\frac{(5) - (6)}{(5)}\right)\% \right]$; at a Discount Rate Based on	
				In L. S. Million		8%	10%	8%	10%
1.	Well Drilling	Yugoslavia	1969	4.3	2.47	3.60	3.37	Negative	Negative
2.	Shendi (Gadow) Textile Factory	Italy	1974	7.6	4.37	7.31	6.77	Negative	Negative
3.	Abu Naama's Fibre Processing Back-up Project	Italy	1975	4.1	2.36	4.02	3.82	Negative	Negative
4.	Tonj's Fibre Processing Back-up Project	Italy	1975	5.9	3.39	5.62	5.34	Negative	Negative
5.	The 22 Automatice Telephone Exchanges	Japan	1975	1.7	0.98	1.67	1.59	Negative	Negative
6.	Road Building Equipment	USA	1977	0.7	0.40	0.66	0.62	Negative	Negative

Source: Own estimates based on Table 3.

ent countries should try vigorously to minimize the excess costs of tying by adopting proper procurement policies, designing efficient programming of imports, inviting worldwide tenders, and utilizing the competitive substitution possibilities whenever they exist.

On the part of donors, the disadvantages of aid-tying to recipients can be mitigated if the donors can extend bilateral arrangements among themselves in order to allow the assistance from one donor to a developing country to be exchanged with another flow originating from another donor country; and hence the tying levels will be maintained just the same while the competitive opportunities for the recipients will be increased. Similarly, multilateral purchasing arrangements can be devised in order to enable recipient countries to buy in the cheapest markets within a group of countries which can be chosen, such that the gains and losses from "untying" the assistance would cancel out.

Appendix Table 1

The Higher Prices Paid for Machinery Items under Tied Credits: A Sample of Selected Sudanese Projects, 1969 – 1977

Nature of the Project; Source of Credit; Year of the Contract and Some Selected Machinery Items	Lowest Quotations of Tied Source	Lowest Quotations of Alternative Sources of Supply Deflated by the UKIOPI	Percentage of Excess Cost of Aid-tying $\left[\frac{(1)-(2)}{(2)}\right]\%$
	FOB; in Sudanese Pounds (L. S.)		
	(1)	(2)	(3)
Well Drilling; Yugoslavia (1969):			
Reciprocating Deep Well Piston Pump Complete with Accessories	2586.000	1217.67	112.4
Sucker Rods 3/4 Inch A.P.I.	30.724	4.730	549.6
Hoist Complete with 200 Ft. Wire Rope 1/2 Inch	437.000	201.750	116.6
Rising Main 4 Inch I.D.P.I. (per Foot)	1.500	.750	100
Printing Press; West Germany (1973):			
Total Cost of Machinery for the Press	190617.720	96850.832	96.8
Shendi (Gadow) Textile Factory; Italy (1974):			
Cotton Production Card, Mod C40	16864.466	5056.579	233.5
Drawframe for Cotton Mod S20	6723.778	3371.053	99.5
Cotton Ring Spinning Frame Mod RC/701 (per Spindle)	39.700	15.150	162.0

Continued –

Appendix Table 1 – (*Continued*)

Nature of the Project; Source of Credit; Year of the Contract and Some Selected Machinery Items	Lowest Quotations of Tied Source	Lowest Quotations of Alternative Sources of Supply Deflated by the UKIOPI	Percentage of Excess Cost of Aid-tying $\left[\frac{(1)-(2)}{(2)}\right]\%$
	FOB; in Sudanese Pounds (L. S.)		
	(1)	(2)	(3)
Hopper for Waste Mod B11/1	5717.370	2696.842	112.0
Hopper Feeder Mod B72/1	7128.430	3792.432	87.9
Automatic Single Shuttle Weaving Loom Mod T5C IXI	3569.787	1404.605 (UK)	154.1
	3569.787	1077.000 (Japan)	231.5
	3569.787	1800.000 (USA)	98.3
Open Width Continuous Washing and Bleaching Range	163327.070	78657.894	107.6
Chainless Mercerising Range– Type IMS 30	176222.660	56184.210	213.7
Giant Jiggers with Cover – Type F03	36508.915	19663.659	85.7
Hot Air Stenter Frame for Drying	66996.100	50565.789	32.5
Open Width Continuous Washing Range after Printing Mod RHONE	111083.020	67421.052	64.8
Inspecting Measuring Rolling up Machine – Type VI/A	13569.787	4213.816	222.0
Pneumatic Calendar 5 Cylinder – Type CP5	28555.509	22473.684	27.1
The Six Weaving Factories; Belgium (1974):			
Automatic Single Shuttle Weaving Loom	2249.590	1404.605 (UK)	60.2
	2249.590	1077.000 (Japan)	108.9
	2249.590	1800.000 (USA)	25.0

Continued –

Appendix Table 1 – (*Continued*)

Inspecting Measuring Rolling up Machine	13397.130	4213.816	217.9
High Speed Winding Machine	200.970	112.368	78.8
Abu Naama's Fibre Processing Back-up Project; Italy (1975):			
The Total Cost of Machinery	4055362.100	2598566.000	56.1
Tonj's Fibre Processing Back-up Project; Italy (1975):			
The Total Cost of Machinery	5850397.000	2598566.000	125.1
The 22 Automatic Telephone Exchanges; Japan (1975):			
The Average Cost per Line	110.679	62.944 (USA)	75.8
Road Building Equipment; USA (1977):			
Seaman Model MA Trailer-mounted (Single Axle) Maintenance Bituminous Distributor – 600 Gallon Capacity. Spray Bar Nozzle Spaced on 4 Inch Centres. Bar Length 6 Ft., Hand Spray Attachment 1 Inch x 15 Ft.	5759.158	3172.005	81.6
Seaman Senior Bituminous Distributors. Mounted on Heavy Duty Chassis. Tank to Hold 2000 Gallons. Rear Mounted Engine Drive. Dual Fuel Tanks	20252.402	5117.117	295.7
Overall Weighted Average			125

Source: Own estimates based on data from the same source as Table 2.

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