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Program on Comparative Economic Development

Optimal Export Demand-Oriented Economic Policies in Poland

Jan Svejnar*
and
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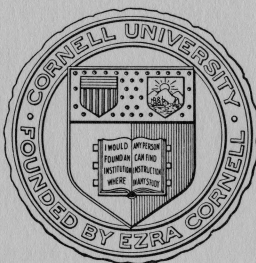
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1. Introduction

Since January 1971, when Edward Gierek replaced Wladyslaw Gomulka as the First Secretary of the Polish United Workers' Party and embarked on the ambitious import-led growth program, the economic situation in Poland has naturally been the focus of attention of officials in the Soviet bloc. More remarkably, the Polish policies have been followed by policy makers in both the less developed (Third World) and the developed (Western) countries. The less developed countries (LDCs) saw in the Polish approach an intriguing large-scale attempt to increase growth by importing advanced technology and augmenting investment significantly beyond levels sustainable by internal resources. The idea that technology imports could enable the recipient country to secure a greater share of the world export market was of course shared by Poland's main LDC competitors, many of whom pursued similar technology-importing strategies.¹ The developed countries regarded Poland in the early 1970s as an attractive export market for their machinery and other technologically advanced products as well as a reasonable outlet for sizable loans. As the economic crisis set in and Poland's debt service/export ratio started approaching unity in the late 1970s, the LDCs followed closely Poland's attempts to improve its trade balance and reschedule its sizable foreign debt. The developed countries in turn began coordinating their activities vis a vis Poland both in renegotiating the hard-currency loans and in imposing economic sanctions in response to the introduction of the marshall law in 1981.

While analysts still debate the exact causes of the Polish crisis, there is a consensus that the severe economic difficulties experienced by Poland since 1978 are the result of inappropriate economic policies pursued both by Gomulka, during the 1950s and 1960s, and by his successors during the 1970s and 1980s.² In particular, while Gomulka's concern with poor export and productivity performance led to the formulation of a new export-oriented economic strategy

(the "selective growth strategy") in 1968, bureaucratic rigidities and opposition effectively prevented its elaboration and implementation.³ Gierek's introduction of the "new development strategy" in the early 1970s aimed at improving productivity by importing advanced technology and relying on the (expected) resulting surge in exports to stop the rapid accumulation of foreign debt. The general agreement is that the implementation of this strategy failed in large part because (a) decisions on export specialization were retained by the central authorities (especially the Ministry of Foreign Trade), (b) these decisions were made on the basis of insufficient information about export markets and the relative merits of selectively promoting specific Polish industries, and (c) the system was unable to establish relatively few priority sectors (products) and channel resources to them.⁴ The inability to select and assist priority sectors plagued Gierek's (1976-79) "economic manoeuvre" as well as the (1979-82) crisis period and the slow recovery of 1983-85.⁵

Paradoxically enough, Nugent and Yotopoulos' (1982) study of 42 countries indicates that growth in the centrally planned economies depends crucially on the promotion of priority sectors.

The policy pursued by the Polish government in the last two decades has thus lacked sectoral focus and during the Gierek regime it was strictly supply-side oriented — attempting to shift the output supply curve down by producing cheaper and higher-quality products with Western technology. The inability of the Polish decision-makers to select appropriate priority sectors and gear government policies towards them distinguishes Poland's industrial policy from that of its main LDC competitors (e.g. South Korea, Taiwan and Brazil) which engaged in substantial technology importations and succeeded in penetrating Western markets.⁶ The exclusive preoccupation with and the failure of the supply-side oriented policies have been documented in many studies.⁷ However,

little attention has been paid to the demand side, although there are clear indications that (a) Poland failed to realize significant export gains by ignoring demand factors and (b) other countries have gained export markets by adopting judicious export demand-oriented policies. In particular, the Polish centralized approach to information gathering and marketing of exports has been very cumbersome and export promotion measures (aimed at increasing foreign demand for existing products) were markedly inferior to those of other countries (e.g. South Korea or Hungary).⁸

In view of these historical shortcomings and the centralized (technocratic) nature of the ongoing Polish economic reform, it is of interest to explore what would have been and what would now be the optimal demand-side policy for the Polish economy. In particular, if resources were to be expended on increasing the demand for Polish products abroad (e.g. by better marketing or selective export subsidies), which industries ought to have received and ought now to receive priority?

In attempting to answer this question, our approach is to use the most reliable data on the technological (productive) structure of the Polish economy at three distinct points in the last twenty years and identify the optimal demand-side policies within these technological frameworks. Specifically, we use the 1969, 1977 and 1982 official Polish input-output (I-O) tables to identify the optimal demand policies (a) immediately before the "new-development strategy", which relied so heavily on large scale investments and imports of western technology, (b) immediately after the major importations took place and the brakes of the "economic manoeuvre" were imposed in 1976, and (c) at the trough of the recession in 1982, respectively.⁹

The methodology that we use is general in that the priorities which it identifies apply to domestically generated as well as export driven demand.

From the standpoint of economic policy, the results are thus compatible with both inward and outward oriented strategies. However, since demand constraints are observable mostly on the export markets, our calculations are carried out primarily with this orientation in mind.

Section 2 of the paper describes the general equilibrium methodology underlying our macro-economic investigation. Section 3 presents the main results and Section 4 draws the conclusions.

2. Methodology

The focus of our study is the calculation of five intersectoral linkages which relate an increase in any given sector's final (e.g. export) demand to the resulting increase in total product, employment (wage bill), income, capital requirement, and import requirement of the economy. The conventional emphasis on growth suggests that the total product criterion be used as the principal measure. However, since Gierrek's "new development strategy" placed great emphasis on income (wage) growth and all the subsequent policies have aimed at reducing the capital and import requirements of the economy, the four other linkages provide important policy indicators as well.

We first calculate linkages based on a one zloty increase in the final demand of each sector. This approach is of course ideal for determining an optimal policy based on domestic demand, whereby the government strives to allocate its expenditure among sectors so as to maximize output growth or an objective function based on several of the aforementioned indicators. The approach is also very useful for policies which maximize the government's objective function by allocating resources so as to stimulate export demand in selected sectors. However, it is quite possible that a given effort (expenditure) to stimulate exports will have a larger absolute effect (in

zlotys) in a high export sector (e.g. coal) than in a sector that is less export oriented (e.g. wood and paper). To allow for this possibility, we also calculate the five linkage effects on the basis of a one percent increase in exports of each sector. The two sets of calculations place reasonable bounds on the actual effects and permit us to draw conclusions about what should be the target sectors for export demand policies based on the above five criteria.

Since the Polish economic strategy has been marked by political inability to select target sectors and since there is high likelihood that this tendency will continue in the near future, we also calculate the impact of a uniform (one percent) increase in all sectors' export demand on output, employment, capital requirement, and import requirement of each sector in the Polish economy. Such an increase in exports could for instance occur because of a proportional external shift in demand or "balanced" (unfocused) export promotion policy. Such a scenario may indeed be quite realistic,¹⁰ and it is therefore useful to understand which sectors would experience the greatest increase in demand for their products and which ones would require the largest inflows of capital and imports. However, since these calculations constitute a digression from our main topic, we discuss only the principal results and relegate the underlying tables to an appendix.

In technical terms, we assume that the production processes can be approximated by production functions which at a given point in time display constant technical coefficients and constant returns to scale. Let

X_i = the annual volume of total output of industry i ,

x_{ij} = the amount of industry i 's product absorbed annually as an intermediate input by industry j ,

Y_i = the amount of product i used to satisfy final demand,

$$a_{ij} = x_{ij}/X_j \quad i = 1, \dots, n, \quad j=1, \dots, n.$$

It follows that

$$\sum_{j=1}^n x_{ij} + Y_i = X_i \quad i=1, \dots, n. \quad (1)$$

Letting X be the vector $X = (X_1, \dots, X_n)$, Y be the vector $Y = (Y_1, \dots, Y_n)$, A be the inter-industry coefficients matrix of a_{ij} 's, and I be the identity matrix, the system in (1) may be rewritten as

$$X - AX = Y \quad (2)$$

or

$$(I-A)X = Y, \quad (3)$$

where $(I-A)$ is the Leontief matrix. Define $R = (I-A)^{-1}$ as the inverted Leontief matrix with elements of the j th column of R being the output requirements in each sector i for unit of final demand for the j th commodity. We can then describe the relationship between the vector of total inputs (X) and the vector of total final demands (Y) by the equation

$$X = R \cdot Y. \quad (4)$$

Moreover, it follows that

$$\Delta X = R \cdot \Delta Y, \quad (5)$$

where ΔX represents the change in total output corresponding to the change ΔY in final demand.

A. The Interindustry Linkage Effects

The interindustry linkage analysis has been used successfully to identify optimal demand strategies in many LDCs, including Poland's main competitors [see e.g. Yotopoulos and Nugent (1976) and Bulmer-Thomas (1982)].¹¹ In our investigation we calculate the total interindustry linkage (TL_j), the inter-industry employment linkage (EL_j) the interindustry income generation linkage (YL_j), the capital requirement linkage (KL_j), and the import requirement linkage (ML_j). The total interindustry linkage effect of a one zloty increase in the

final demand (e.g. exports) for the product of any given industry on the total output of this and every other industry can be obtained from the R matrix as follows:

$$TL_j = \sum_i r_{ij} = \sum_i (1-a_{ij})^{-1}, \quad (6)$$

where $r_{ij} = (1-a_{ij})^{-1}$ is the ij 'th element of the inverted Leontief matrix.

The interindustry employment linkage is the total effect of a one unit increase in the j th element of the final demand vector (Y_j) on the use of labor expressed in value terms (i.e. the wage bill). For the j th sector the expression ℓ_j is defined as the coefficient or the value of labor input per unit of output. That is, $\ell_j = L_j/X_j$, where L_j is the j th sector's labor utilization in value terms and X_j is the corresponding total production for the j th sector. The employment linkage effect is obtained by summing over the row elements of the product of the labor coefficient and the elements of the inverted Leontief matrix:

$$EL_j = \sum_i \ell_i r_{ij} = \sum_i \ell_i (1-a_{ij})^{-1}. \quad (7)$$

The employment linkage EL_j thus expresses the importance of different sectors' final demand on employment (wage bill) generation.

The total and employment interindustry linkages ignore the level of income, basically assuming that labor income is independent of the structure of production and effectively exogenous. To relax this assumption, we also calculate the interindustry income generation linkage YL_j which is based on the assumption that the interindustry structure of production determines employment and that wage payments endogenously determine household income.

The income generation linkage captures the direct effects of household expenditure as well as the indirect effects of this expenditure on each sector's demand for intermediate products and labor and on household income. It must be noted that the construction of the income generation linkage assumes that earnings from capital and rents are minor components of household income. In a centrally planned, socialist economy such as Poland's, this assumption is of course much more valid than it would be in the framework of a capitalist country.

In computing the income generation linkage, the $(n \times n)$ matrix A is augmented by one row and one column vector to form a new matrix D which is of the dimension $(n+1) \times (n+1)$. The row vector by which A is augmented is the vector of labor income coefficients l_j obtained from the value added quadrant of the I-0 table, while the extra column is the vector of the household sector's marginal (equal to the average) propensities to consume which is obtained by dividing every entry in the household consumption column of the final demand quadrant by total household income. The transformation amounts to making the household demand endogenous while leaving each of government, investment and export demand, exogenous. The income generation linkage YL_j is given by the last $(n+1)$ 'th row of the inverted matrix $(I - D)$, i.e. $(I-D)^{-1}$.

The capital and import requirement linkages are calculated analogously to the employment (wage bill) linkage. Letting K_j and M_j be the j 'th sector's value of fixed capital and of imports, respectively, the two linkages are given by:

$$KL_j = \sum_i k_i r_{ij} \quad (8)$$

$$ML_j = \sum_i m_i r_{ij} \quad , \quad (9)$$

where $k_i = K_i/X_i$ and $m_i = M_i/X_i$.

The calculation of the linkages in terms of a one percent increase in exports of a given sector is identical except that the final demand stimulus is the number of zlotys corresponding to a one percent increase in exports of the given sector.

B. Industry-specific Effects of a One Percent Change in Total Exports

The effect of a one percent increase in exports of all industries on each sector's output, employment, imports, and fixed capital is calculated as follows:

$$\Delta X = R \cdot \Delta \tilde{Y} \quad (10)$$

$$\Delta L = \sum_{i=1}^n \ell_i^* \left(\sum_{j=1}^n r_{ij} \Delta \tilde{Y}_j \right) \quad (11)$$

$$\Delta M = \sum_{i=1}^n m_i \left(\sum_{j=1}^n r_{ij} \Delta \tilde{Y}_j \right), \quad (12)$$

$$\Delta K = \sum_{i=1}^n k_i \left(\sum_{j=1}^n r_{ij} \Delta \tilde{Y}_j \right), \quad (13)$$

where $\Delta \tilde{Y}$ is the vector of a one percent change in the export column and $\ell_i^* = L_i^*/X_i$, with L_i^* being the number of workers in sector i .

3. Results

A. Interindustry Linkages

The calculated linkage effects based on a one zloty increase in final demand are given for 1969, 1977 and 1982 in Tables 1,2 and 3, respectively. Table 1 is based on a 15 sector I-0 table, while Tables 2 and 3 are based on 39 and 32 sector I-0 tables respectively. The 1977 and 1982 I-0 tables are identically designed except that sectors 32-39 in the 1977 table are collapsed into one sector (material and social services) in 1982. In all calculations the employment linkage (EL_j) and income generation linkage (YL_j) have identical

rankings. This means that although the linkage effects based on endogenous income determination are quantitatively different from those obtained when income is treated as exogenous, the ranking of industries is not affected by this extension. This result is important because it leads to uniform policy conclusions based on these two performance indicators.

As the rankings in Table 1 indicate, apart from "other" products (1) and "other" industrial production (3), the 1969 total interindustry linkage (TL_j) is the highest in metallurgy (2), food industry (4), agriculture (5), light industry (6), construction (7), electromachinery (8), wood and paper (9), and chemicals (10). The income generation and employment linkages indicate that the highest linkage effect occurs, apart from "other" products (1) and "other" industries (5), in the services (2), agriculture (3), construction (4), metallurgy (6), transportation (7), forestry (8), wood and paper (9), food industry (10), and light industries (11). Considering these three sets of linkages together therefore indicates that in 1969 the primary targets of industrial policy based on demand induced growth and welfare improvement were metallurgy, agriculture, food industry, construction, light industry, wood and paper, and electromachinery. Metallurgy was the most intensive import user, however, and its capital requirement linkage was also relatively high (5). Electromachinery had the second highest import requirement linkage and agriculture ranked relatively high with respect to both capital (3) and import (6) linkages. Taking these latter linkages into account brings up more the relatively uniform (though not extreme) attractiveness of the light industry.

Table 2 presents results from the period immediately following the great import thrust. As mentioned earlier, these results are also based on a much finer disaggregation of the individual sectors. As this table indicates, the ranking of individual industries in the decreasing order of the total

interindustry linkage (TL_j) is food production [meat (1), livestock (2), and other food (7)], "other" industries (3), tourism (4), leather (5), metallurgy [non-ferrous metallurgy (6), ferrous metallurgy (11)], apparel (10), construction [construction for production and services (8), general construction (12), and construction materials (16)], agricultural (9) and material (15) services, transport equipment (13), wood production (14), and electrotechnical and electronic products (17). The employment and income generation linkages on the other hand point to the importance of various services, followed by construction, coal production, tourism, trade, material and agricultural services, and glass and ceramics.

Except for tourism, construction, and material and agricultural services, there hence appears to be a divergence in the set of priorities between the total interindustry linkage on the one hand and the employment and income generation linkages on the other hand in 1977. However, by 1977 the policy interest in increasing wages (incomes) was waning and the total interindustry linkage can therefore be safely seen as the principal performance indicator. Comparing its industry ranking over time indicates that the same industrial sectors retained their relative position. Thus metallurgy, food, agriculture, light industries and construction remained important, although by using the 1977 disaggregated table one can hypothesize that it is meat and livestock production that determines the importance of agriculture and non-ferrous metals that of metallurgy. In terms of light industry, leather and apparel production seem to be the most important elements as indicated by the 1977 calculations.

By the late 1970s the policy interest in reducing the rate of growth of capital formation and especially cutting imports became pronounced. The information on capital and import requirement linkages therefore becomes important in examining the 1977 results. Combining the information on TL_j ,

KL_j and ML_j indicates that the ten most attractive sectors were probably leather, meat, apparel, livestock, other food, wood, tourism, non-ferrous metallurgy, transport equipment, and electrotechnical and electronic products.

Table 3 contains the results for 1982 and thus gives an indication of the relative sectoral priorities in recent years and probably also at present. Moreover, the fact that disaggregation of the 1977 and 1982 I-0 tables is very similar permits a reliable intertemporal comparison during the 1977-82 period. In terms of the total interindustry linkage (TL_j), meat production (1) retains its primacy, followed by non-ferrous (2) and ferrous (3) metallurgy, livestock (4), agricultural services (5), transport equipment (6), other food (7), other industries (8), material and social services (9), leather production (10), construction for production and services (11), general construction (12), transport and communications (13), electrical and steam energy (14), wood (15), machines and equipment (16), paper (17), construction materials (18), apparel (19), and electrotechnical and electronic products (20).

The important point to note is that 1982 was the deepest point in the 1978-82 recession and that the overwhelming desire for growth probably makes TL_j the single most important indicator in the 1980s. However, the magnitudes of the total interindustry linkages are quite similar for a large number of industries, ranging from 2.42 for agricultural services (5) to 2.03 for electrotechnical and electronic products (20). The selection of priority sectors thus needs to be guided by some of the other indicators. In view of the debt crisis, ML_j is the prime candidate. Supplementing the TL_j results with those of ML_j and to a lesser extent KL_j and YL_j suggests that the priority sectors are likely to be meat, ferrous and non-ferrous metallurgy, other food, wood, general construction, construction for production and services, leather, apparel, coal, construction materials, and livestock production.

Percentage Effects

Tables 4,5 and 6 give the various linkage effects based on a one percent increase in exports of any given sector in 1969, 1977 and 1982, respectively. As Table 4 indicates, in 1969 electromachinery, food, metallurgy, light industry, and agriculture were among the sectors that had important total interindustry linkages in percentage terms. This means that these sectors ranked high in the effect of both a one zloty and one percent increase in exports on the output of the Polish economy. However, fuel and energy, chemicals, and transportation, while unimportant in terms of a one zloty effect, become important when the effect of a one percent increase in exports on output is considered. The EL_j , YL_j , KL_j and ML_j linkages provide similar rankings and demonstrate that those industries that would tend to raise output and income the most would also tend to use more capital and imported inputs (the light industry being a notable exception). Of course, for any given industry the relationship among the five linkages is the same in Tables 1 and 4, and we therefore need not delve into this relationship again. The importance of Tables 4-6 lies in identifying changes in sectoral priorities when a percentage change in export is used. From the standpoint of economic policy it is reassuring to find that in 1969 a large number of industries ranked similarly in terms of the one zloty and one percent export change effect.

The calculations of the linkage effect of a one percent increase in exports for 1977 are reported in Table 5. They indicate that the total interindustry linkage rankings of individual industries are, in decreasing order, transport equipment (1), coal (2), transport and communications (3), electrotechnical and electronic products (4), machines and equipment (5), chemicals (6), other food (7), meat (8), nonferrous metals (9), ferrous metals (10), metal products (11),

apparel (12), and textiles (13). These results point to the importance of the more traditional sectors such as coal and chemicals which were not consistently identified by the earlier calculations.

The other linkage calculations in Table 5 convey analogous information as their counterparts in Table 2. They indicate that increased exports of transport equipment and electrotechnical and electronic products could be realized with relatively modest capital requirements while coal, transport communications and food exports are not highly import intensive.

The results for 1982, reported in Table 6, are similar to those for 1977. Increased exports of machines and equipment (1), transport and communications products (2) and electrotechnical and electronic products (3) pushed these industries into the forefront in terms of the total (percentage) interindustry linkage but the same key industries remain in the top group: machines and equipment (1), transport and communication (2), electrotechnical and electronic products (3), transport equipment (4), chemicals (5), metal products (6), coal (7), metallurgy (8-9), other food (10), meat (11), apparel (12), textiles (13), and specialized construction (14).

B. Effects of a Change in Total Exports

The calculated effects on industry-specific indicators of a one percent increase in exports of all industries are reported for the years 1969, 1977 and 1982 in Tables A1-A3 of the appendix.

In 1969 the most important output effects were registered in electro-machinery (1), metallurgy (2), agriculture (3), fuel and energy (4), food industry (5), light industry (6), and chemicals (7). In 1977 the same industries were ranked high although perhaps in a slightly different order. Again the industries with the highest output effect were transport equipment

(1), chemicals (2), transport and communications (3), machines and equipment (4), metallurgy (5 and 8), coal (6) and fuel (9) production, electrotechnical and electronic products (7), textiles (10), metal products (11), plants (12), and other food (13). The same industries were in the top group in 1982, with transport equipment declining in importance and machines and equipment rising.

The largest import effect in 1969 was displayed by the electromachinery industry, followed by metallurgy, chemicals, fuel and energy, agriculture, and food industry. The same industries, together with transportation and services, also registered the highest total capital requirement corresponding to a one percent increase in exports.

The results for 1977 show that the most import-intensive industries were again machines and equipment, metallurgy, chemicals, fuel production, transport equipment, electrotechnical and electronic products, and metal products. The capital requirement was again ranked similarly, but the coal industry is also important in this regard.

The results for 1982 are essentially identical to those of 1977, thus pointing to similarities both over time and across import and capital requirements.

4. Summary and Conclusions

The aim of our investigation has been to identify key Polish sectors (industries) from the standpoint of an optimal export demand-oriented economic policy based on the absolute and percentage interindustry linkage effects.

In the late 1960s when Gomulka unsuccessfully attempted to implement the "selective growth strategy" and in the early 1970's when Gierek introduced the "new development strategy", the principal sectors that ought to have been given priority on the basis of our analysis were metallurgy, electromachinery, food,

agriculture, and light industry. These sectors were important for output growth and, with the exception of electromachinery, they also ranked relatively favorably in their income generation potential. Moreover, they were identified as the most important sectors by both the absolute and percentage linkage criteria. Yet, only one of these key sectors experienced significantly above average growth in exports in the 1970s and early 1980s. The share of metallurgy in total exports slipped from 8 percent in 1970 to 6.5 percent in the mid 1970s and it climbed above 7 percent only in the 1980s. The share of food dropped from 11.6 percent in 1970 to 8.7 percent in 1975 and 5.5 percent in 1981, while that of agriculture fell from 5.3 percent in 1970 to mere 1.7 percent in 1981. Light industry's share was virtually stagnant at 8-9 percent. Only machinery as a whole registered a significant increase from 31.8 percent in 1970 to 55.2 percent in 1981. Electromachinery, being a subset of this category, was thus the only one of the key sectors that registered above average export gains and therefore had significant positive linkage effects on the Polish economy.

Fuel & energy and chemicals were two sectors that were found to be unimportant in terms of the absolute linkage effect but fairly important in terms of the percentage (export increase) linkage effect. Yet, this impact on the economy was also unimpressive as the export share of chemicals remained around 8-9 percent, while that of fuel and energy declined from 21 percent in 1970 to 18 percent in the mid 1970s and to a mere 8 percent in 1981.¹²

Fallenbuchl's (1983) examination of the allocation of Poland's imports of Western technology between 1972 and 1977 reveals the following sectoral ranking: engineering (1), chemicals (2), metallurgy (3), light industry (4), food and tobacco (5), fuel and energy (6), construction (7), wood and paper (8), minerals (9), agriculture (10), and printing (11). The orientation of this unsuccessful supply-side policy reveals priorities that only partially overlap with our

demand-side rankings. In particular, it demonstrates the very low priority accorded to agriculture and the relatively low emphasis on food and light industry during Gierek's new development strategy. Moreover, the high import requirement linkage exhibited by the two sectors with the highest technology import allocations (engineering and chemicals) underscores the riskiness inherent in promoting sectors with high import content and relatively low total interindustry linkage effects.

The more disaggregated results available for 1977 indicate that meat, other food, transport equipment, metallurgy, electrotechnical and electronic products, and apparel are the key sectors identified by both the absolute and percentage (export increase) linkage analysis. The absolute linkage analysis also identifies tourism and leather production as important sectors while the percentage (export increase) linkages are naturally strong in high-export sectors such as coal production, transport and communications, machines and equipment, and to a lesser extent also chemicals. The 1977 results are broadly consistent with the 1969 findings and they suggest that meat production is the important subsector in the food industry, transport equipment in electromachinery, non-ferrous metals in metallurgy, and leather and apparel in the light industry. Moreover, the increasing severity of foreign exchange shortages in the late 1970s suggests that industries with relatively low import requirement linkages (coal, apparel, food, and livestock) would have been especially appropriate targets for an export demand-oriented strategy in the last decade. The fact that exports of coal, food and processed agricultural products plummeted in the early 1980s attests to the lack of a coherent export-oriented strategy in recent years.

The results for 1982 are similar to those for 1977, with metallurgy and transport equipment becoming relatively more important in terms of the total

interindustry linkage. Moreover, the high rate of export growth of machines and equipment, transport and communications products and electrotechnical and electronic products made these industries relatively more important in terms of the total (percentage) interindustry linkage.

The high likelihood that the ongoing Polish economic reform will continue to be marked by diffused priorities has led us to calculate the effects of a one percent simultaneous increase in exports of all industries on output, employment, imports and capital of individual industries. The calculations indicate that "balanced export growth" of this type would lead to the highest growth in output and resource use in the very sectors identified by the linkage analysis and in fuel production.

Overall, our analysis suggests that the Polish economy would have benefitted significantly from a demand-oriented export promotion strategy based on a relatively small number of high linkage sectors and that the priority sectors have not changed substantially over time. The single most important policy shortcoming identified in our study is the neglect of agriculture.

Footnotes

1. See Poznanski (1984, 1985 and 1986).
2. See Nuti (1982), Brada and Montias (1984, 1985) and Fallenbuchl (1986).
3. See ibid.
4. See ibid.
5. The fact that the growth rate of output of material goods and "productive services" fell to 3% in 1985 after registering a 6% and 5.6% growth in 1983 and 1984, respectively, suggests that the problems underlying the 1979-82 downturn may not be fully under control [see Vanous (1986)].
6. See Poznanski (1984, 1985 and 1986).
7. See e.g. Gomulka (1978), Fallenbuchl (1983, 1986), Brada and Montias (1984, 1985), Whitesell (1985), Kemme (1985), and Terrell (1986).
8. See Crane (1986) and Poznanski (1984, 1986) for details.
9. The 1982 I-0 table was the last table officially available at the time of this investigation.
10. Note that the external shift in demand may be negative, with the resulting effects being negative as well.
11. In fact, the discussion in this section follows the exposition of Yotopoulos and Nugent (1976).
12. See Kazmer (1986).

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Table 1

Total Interindustry, Employment, Income Generation, Capital Requirement, and
Import Requirement Linkages and Their Rankings in 1969

Industry	Total Interindustry Linkage (TL _j)		Employment Linkage (EL _j)		Income Generation Linkage (YL _j)		Capital Requirement Linkage (KL _j)		Import Requirement Linkage (ML _j)	
1. Fuel & Energy	1.747	(12)	0.480	(13)	1.116	(13)	2.902	(4)	0.161	(10)
2. Metallurgy	2.915	(2)	0.583	(6)	1.355	(6)	2.723	(5)	0.489	(1)
3. Electromachinery	2.103	(8)	0.463	(14)	1.076	(14)	1.376	(14)	0.333	(2)
4. Chemicals	2.006	(10)	0.397	(15)	0.923	(15)	1.776	(10)	0.283	(4)
5. Minerals	1.880	(11)	0.488	(12)	1.134	(12)	2.396	(6)	0.151	(11)
6. Wood & Paper	2.082	(9)	0.528	(9)	1.228	(9)	1.663	(12)	0.169	(8)
7. Light Ind.	2.261	(6)	0.505	(11)	1.175	(11)	1.307	(15)	0.145	(12)
8. Food Ind.	2.616	(4)	0.524	(10)	1.218	(10)	2.272	(7)	0.165	(9)
9. Other Ind's.	2.695	(3)	0.607	(5)	1.410	(5)	2.100	(8)	0.234	(5)
10. Construction	2.163	(7)	0.654	(4)	1.520	(4)	1.687	(11)	0.127	(13)
11. Agriculture	2.309	(5)	0.657	(3)	1.528	(3)	3.133	(3)	0.193	(6)
12. Forestry	1.527	(15)	0.539	(8)	1.253	(8)	1.836	(9)	0.181	(7)
13. Transportation	1.624	(13)	0.571	(7)	1.327	(7)	4.399	(2)	0.091	(14)
14. Services	1.605	(14)	0.728	(2)	1.693	(2)	1.580	(13)	0.047	(15)
15. Other Products and Mat. Services	3.346	(1)	1.466	(1)	3.407	(1)	6.580	(1)	0.289	(3)

Note: The calculations are based on the 1969 official Polish input-output table. Values in parentheses are the rankings. Linkages are expressed in 1969 zlotys.

Table 2

Total Interindustry, Employment, Income Generation, Capital Requirement, and Import
Requirement Linkages and Their Rankings in 1977

Industry	Total Interindustry Linkage (TL _j)		Employment Linkage (EL _j)		Income Generation Linkage (YL _j)		Capital Requirement Linkage (KL _j)		Import Requirement Linkage (ML _j)	
1. Coal	1.871	(29)	0.617	(7)	1.027	(7)	1.931	(16)	0.141	(27)
2. Fuel	1.667	(35)	0.114	(39)	0.190	(39)	0.967	(38)	0.523	(2)
3. Electrical & Steam Energy	2.043	(20)	0.431	(20)	0.717	(20)	4.093	(3)	0.120	(29)
4. Ferrous Metals	2.358	(11)	0.300	(31)	0.499	(31)	1.662	(21)	0.546	(1)
5. Non-ferrous Metals	2.634	(6)	0.291	(32)	0.484	(32)	1.645	(22)	0.396	(5)
6. Metal Products	2.078	(19)	0.350	(26)	0.582	(26)	1.293	(32)	0.336	(8)
7. Machines & Equipment	1.917	(24)	0.325	(28)	0.542	(28)	1.158	(34)	0.484	(4)
8. Fine Mechanics	1.684	(34)	0.301	(30)	0.501	(30)	0.751	(39)	0.505	(3)
9. Transport Equipment	2.228	(13)	0.377	(25)	0.628	(25)	1.372	(29)	0.382	(6)
10. Electrotechnical & Electronic Products	2.097	(17)	0.337	(27)	0.560	(27)	1.084	(35)	0.283	(10) ₂₃
11. Chemicals	1.921	(23)	0.247	(37)	0.411	(37)	1.346	(31)	0.368	(7)
12. Construction Mats.	2.102	(16)	0.455	(15)	0.758	(15)	2.021	(14)	0.225	(15)
13. Glass & Ceramics	1.880	(27)	0.446	(16)	0.743	(16)	1.487	(25)	0.210	(16)
14. Wood	2.186	(14)	0.418	(22)	0.695	(22)	1.428	(26)	0.167	(25)
15. Paper	1.906	(26)	0.288	(34)	0.479	(34)	1.531	(24)	0.268	(11)
16. Textiles	1.968	(21)	0.290	(33)	0.483	(33)	1.061	(36)	0.206	(18)
17. Apparel	2.455	(10)	0.434	(18)	0.723	(18)	1.037	(37)	0.166	(26)
18. Leather	2.640	(5)	0.434	(19)	0.723	(19)	1.376	(28)	0.207	(17)
19. Meat	4.258	(1)	0.421	(21)	0.700	(21)	2.980	(7)	0.322	(9)
20. Other Food	2.543	(7)	0.267	(35)	0.445	(35)	1.742	(18)	0.199	(21)
21. Other Ind's	2.755	(3)	0.305	(29)	0.508	(29)	1.674	(20)	0.257	(12)
22. General Construction	2.284	(12)	0.519	(10)	0.864	(10)	1.643	(23)	0.178	(23)
23. Construction for Production & Services	2.541	(8)	0.640	(5)	1.065	(5)	1.991	(15)	0.226	(14)
24. Specialized Constr.	1.938	(22)	0.402	(23)	0.668	(23)	1.250	(33)	0.139	(28)
25. Other Construction	1.568	(38)	0.503	(12)	0.837	(12)	1.356	(30)	0.098	(33)

Table 2 (continued)

Industry	Total Interindustry Linkage (TL _j)		Employment Linkage (EL _j)		Income Generation Linkage (YL _j)		Capital Requirement Linkage (KL _j)		Import Requirement Linkage (ML _j)	
26. Plants	1.585	(37)	0.130	(38)	0.216	(38)	1.699	(19)	0.190	(22)
27. Livestock	2.859	(2)	0.248	(36)	0.413	(36)	2.430	(12)	0.205	(19)
28. Agric. Services	2.513	(9)	0.475	(14)	0.790	(14)	2.590	(11)	0.251	(13)
29. Forestry	1.761	(32)	0.438	(17)	0.729	(17)	1.928	(17)	0.098	(32)
30. Transport & Communication	1.846	(30)	0.485	(13)	0.807	(13)	2.943	(9)	0.203	(20)
31. Trade	1.700	(33)	0.560	(9)	0.931	(9)	1.401	(27)	0.078	(36)
32. Material Services	2.143	(15)	0.510	(11)	0.849	(11)	3.216	(6)	0.167	(24)
33. Housing	1.874	(28)	0.400	(24)	0.665	(24)	29.190	(1)	0.074	(38)
34. Education	1.816	(31)	0.749	(3)	1.246	(3)	2.660	(10)	0.078	(35)
35. Arts & Culture	2.091	(18)	0.871	(2)	1.450	(2)	3.477	(5)	0.096	(34)
36. Health	1.909	(25)	0.716	(4)	1.192	(4)	2.313	(13)	0.103	(31)
37. Recreation & Tourism	2.662	(4)	0.587	(8)	0.978	(8)	3.904	(4)	0.116	(30)
38. Other Nonmaterial Services	1.655	(36)	0.622	(6)	1.034	(6)	4.491	(2)	0.076	(37)
39. Science, Technology & State Services	1.000	(39)	0.875	(1)	1.456	(1)	2.946	(8)	0	(39)

Note: The calculations are based on the 1977 official Polish input-output table. Values in parentheses are the rankings. Linkages are expressed in 1977 zlotys.

Table 3

Total Interindustry, Employment, Income Generation, Capital Requirement, and Import
Requirement Linkages and Their Rankings in 1982

Industry	Total Interindustry Linkage (TL _j)	Employment Linkage (EL _j)	Income Generation Linkage (YL _j)	Capital Requirement Linkage (KL _j)	Import Requirement Linkage (ML _j)
1. Coal	1.943 (22)	0.506 (5)	1.051 (5)	1.169 (9)	0.101 (27)
2. Fuel	1.897 (26)	0.120 (32)	0.250 (32)	0.512 (30)	0.446 (1)
3. Electrical & Steam Energy	2.119 (14)	0.320 (21)	0.665 (21)	1.957 (1)	0.084 (30)
4. Ferrous Metals	2.783 (3)	0.413 (12)	0.857 (12)	1.491 (4)	0.379 (2)
5. Non-ferrous Metals	3.182 (2)	0.273 (25)	0.566 (25)	1.387 (5)	0.375 (3)
6. Metal Products	1.935 (23)	0.256 (28)	0.532 (28)	0.786 (22)	0.213 (10)
7. Machines and Equipment	2.077 (16)	0.415 (10)	0.863 (10)	0.930 (16)	0.251 (6)
8. Fine Mechanics	1.844 (27)	0.306 (23)	0.636 (23)	0.619 (28)	0.219 (9)
9. Transport Equipment	2.358 (6)	0.335 (19)	0.695 (19)	1.036 (13)	0.305 (5)
10. Electrotechnical & Electronic Products	2.033 (20)	0.248 (29)	0.514 (29)	0.726 (25)	0.231 (7)
11. Chemicals	2.022 (21)	0.270 (26)	0.562 (26)	0.828 (18)	0.322 (4)
12. Construction Mats.	2.062 (18)	0.310 (22)	0.644 (22)	1.141 (10)	0.150 (17)
13. Glass & Ceramics	1.911 (25)	0.498 (6)	1.035 (6)	0.824 (19)	0.143 (18)
14. Wood	2.082 (15)	0.474 (7)	0.985 (7)	0.764 (24)	0.112 (24)
15. Paper	2.066 (17)	0.242 (31)	0.503 (31)	1.057 (12)	0.210 (11)
16. Textiles	1.925 (24)	0.274 (24)	0.570 (24)	0.710 (27)	0.159 (14)
17. Apparel	2.048 (19)	0.359 (16)	0.747 (16)	0.474 (31)	0.106 (26)
18. Leather	2.243 (10)	0.385 (15)	0.800 (15)	0.594 (29)	0.158 (15)
19. Meat	3.561 (1)	0.746 (2)	1.551 (2)	1.316 (6)	0.178 (13)
20. Other Food	2.323 (7)	0.338 (18)	0.702 (18)	0.809 (21)	0.132 (19)
21. Other Ind's	2.294 (8)	0.352 (17)	0.731 (17)	0.782 (23)	0.154 (16)
22. General Construction	2.140 (12)	0.392 (14)	0.814 (14)	0.813 (20)	0.109 (25)
23. Construction for Production and Services	2.176 (11)	0.404 (13)	0.839 (13)	0.866 (17)	0.114 (23)
24. Specialized Construction	1.840 (28)	0.246 (30)	0.512 (30)	0.717 (26)	0.086 (29)
25. Other Construction	1.713 (30)	0.509 (4)	1.057 (4)	1.062 (11)	0.087 (28)
26. Plants	1.603 (31)	0.468 (8)	0.971 (8)	0.985 (14)	0.127 (20)
27. Livestock	2.590 (4)	0.794 (1)	1.650 (1)	1.268 (7)	0.125 (21)
28. Agricultural Services	2.419 (5)	0.629 (3)	1.308 (3)	1.222 (8)	0.182 (12)
29. Forestry	1.747 (29)	0.325 (20)	0.674 (20)	0.946 (15)	0.069 (31)

Table 3 (continued)

Industry	Total Interindustry Linkage (TL _j)		Employment Linkage (EL _j)		Income Generation Linkage (YL _j)		Capital Requirement Linkage (KL _j)		Import Requirement Linkage (ML _j)	
30. Transport & Communication	2.124	(13)	0.412	(11)	0.857	(11)	1.784	(2)	0.227	(8)
31. Trade	1.453	(32)	0.265	(27)	0.550	(27)	0.467	(32)	0.041	(32)
32. Material & Social Services	2.273	(9)	0.427	(9)	0.888	(9)	1.590	(3)	0.123	(22)

Note: The calculations are based on the 1982 official Polish input-output table. Values in parentheses are the rankings.
Linkages are expressed in 1982 zlotys.

Table 4
Total Interindustry, Employment, Income Generation, Capital Requirement, and
Import Requirement Linkage Effects of a 1 Percent Increase in Exports of a Given Industry in 1969

1% Increase in Exports of Industry	Total Inter- Industry Linkage Effect (% PL _j)	Employment Linkage Effect (% EL _j)	Income Generation Linkage Effect (% YL _j)	Capital Requirement Linkage Effect (% KL _j)	Import Requirement Linkage Effect (% ML _j)
1. Fuel & Energy	270.58 (5)	74.37 (4)	172.89 (4)	449.56 (3)	24.98 (5)
2. Metallurgy	338.91 (3)	67.79 (5)	157.58 (5)	316.58 (5)	56.86 (2)
3. Electromachinery	996.68 (1)	219.38 (1)	509.98 (1)	652.08 (1)	157.92 (1)
4. Chemicals	215.95 (6)	42.73 (8)	99.32 (8)	191.23 (8)	30.50 (4)
5. Minerals	32.22 (12)	8.36 (12)	19.44 (12)	41.07 (11)	2.58 (11)
6. Wood & Paper	78.52 (9)	19.93 (10)	46.33 (10)	62.74 (10)	6.39 (9)
7. Light Industry	337.70 (4)	75.45 (3)	175.38 (3)	195.12 (7)	21.67 (6)
8. Food Industry	587.52 (2)	115.88 (2)	269.37 (2)	502.40 (2)	36.41 (3)
9. Other Industries	42.63 (11)	9.60 (11)	22.31 (11)	33.23 (12)	3.70 (10)
10. Construction	5.84 (15)	1.77 (15)	4.10 (15)	4.55 (15)	0.34 (15)
11. Agriculture	180.35 (7)	51.33 (7)	119.33 (7)	244.70 (6)	15.05 (7)
12. Forestry	7.31 (14)	2.58 (14)	6.00 (14)	8.79 (14)	0.87 (13)
13. Transportation	163.97 (8)	57.64 (6)	134.00 (6)	444.18 (4)	9.17 (8)
14. Services	69.01 (10)	31.31 (9)	72.77 (9)	67.91 (9)	2.00 (12)
15. Other Products & Mat. Services	9.47 (13)	4.15 (13)	9.64 (13)	18.62 (13)	0.82 (14)

Note: The calculations are based on the 1969 official Polish input-output table. Values in parentheses are the rankings. Linkage effects are expressed in 1969 zlotys.

Table 5

Total Interindustry, Employment, Income Generation, Capital Requirement, and Import
Requirement Linkage Effects of a 1 Percent Increase in Exports of a Given Industry in 1977

1% Increase in Exports of Industry	Total Interindustry Linkage Effect (% PL) ↓	Employment Linkage Effect (% EL) ↓	Income Generation Linkage Effect (% YL) ↓	Capital Requirement Linkage Effect (% KL) ↓	Import Requirement Linkage Effect (% ML) ↓
1. Coal	1160.2 (2)	382.9 (1)	637.1 (1)	1197.3 (2)	87.3 (6)
2. Fuel	259.7 (15)	17.8 (19)	29.6 (19)	150.7 (15)	81.5 (8)
3. Electrical & Steam Energy	16.3 (28)	3.4 (28)	5.7 (28)	32.6 (27)	1.0 (30)
4. Ferrous Metals	376.3 (10)	47.9 (13)	79.7 (13)	265.3 (9)	87.1 (7)
5. Non-ferrous Metals	398.9 (9)	44.1 (15)	73.4 (15)	249.2 (10)	59.9 (10)
6. Metal Products	361.6 (11)	60.8 (10)	101.2 (10)	225.0 (11)	58.5 (11)
7. Machines & Equipment	829.4 (5)	140.8 (4)	234.3 (4)	501.1 (5)	209.6 (2)
8. Fine Mechanics	244.9 (16)	43.8 (16)	72.9 (16)	109.2 (20)	73.5 (9)
9. Transport Equipment	1470.0 (1)	248.8 (2)	414.1 (2)	905.4 (3)	252.3 (1)
10. Electrotechnical & Electronic Products	874.1 (4)	140.4 (5)	233.6 (5)	451.7 (6)	117.9 (4)
11. Chemicals	738.1 (6)	95.0 (6)	158.0 (6)	517.1 (4)	141.2 (3)
12. Construction Materials	47.7 (24)	10.3 (24)	17.2 (24)	45.8 (22)	5.1 (23)
13. Glass & Ceramics	48.3 (23)	11.5 (23)	19.1 (23)	38.2 (25)	5.4 (22)
14. Wood	232.6 (18)	44.4 (14)	74.0 (14)	151.9 (14)	17.7 (18)
15. Paper	8.8 (30)	1.3 (30)	2.2 (30)	7.1 (30)	1.2 (28)
16. Textiles	348.1 (13)	51.3 (11)	85.3 (11)	187.6 (13)	36.5 (14)
17. Apparel	351.5 (12)	62.2 (9)	103.4 (9)	148.5 (16)	23.7 (16)
18. Leather	237.0 (17)	39.0 (17)	64.9 (17)	123.5 (19)	18.6 (17)
19. Meat	502.9 (8)	49.7 (12)	82.7 (12)	351.9 (8)	38.1 (13)
20. Other Food	625.2 (7)	65.8 (8)	109.4 (8)	428.4 (7)	48.9 (12)
21. Other Industries	45.4 (26)	5.0 (27)	8.4 (27)	27.6 (28)	4.2 (25)
22. General Construction	81.5 (21)	18.5 (18)	30.8 (18)	58.6 (21)	6.4 (21)
23. Construction for Production and Services	272.2 (14)	68.5 (7)	114.1 (7)	213.2 (12)	24.2 (15)
24. Specialized Construction	65.2 (22)	13.5 (22)	22.5 (22)	42.0 (24)	4.7 (24)
25. Other Construction	2.0 (31)	0.6 (31)	1.1 (31)	1.7 (31)	0.1 (31)

Table 5 (continued)

1% Increase in Exports of Industry	Total Interindustry Linkage Effect (% PL) j	Employment Linkage Effect (% EL) j	Income Generation Linkage Effect (% YL) j	Capital Requirement Linkage Effect (% KL) j	Import Requirement Linkage Effect (% ML) j
26. Plants	116.6 (20)	9.5 (26)	15.9 (26)	123.0 (18)	14.0 (19)
27. Livestock	168.9 (19)	14.6 (21)	24.4 (21)	143.5 (17)	12.1 (20)
28. Agricultural Services	0.0	0.0	0.0	0.0	0.0
29. Forestry	40.0 (27)	10.0 (25)	16.6 (25)	43.8 (23)	2.2 (26)
30. Transport & Communication	898.4 (3)	236.1 (3)	392.9 (3)	1432.1 (1)	98.7 (5)
31. Trade	46.3 (25)	15.3 (20)	25.4 (20)	38.2 (26)	2.1 (27)
32. Material Services	12.3 (29)	2.9 (29)	4.9 (29)	18.5 (29)	1.0 (29)
33. Housing	0.0	0.0	0.0	0	0
34. Education	0.0	0.0	0.0	0	0
35. Arts & Culture	0.0	0.0	0.0	0	0
36. Health	0.0	0.0	0.0	0	0
37. Recreation & Tourism	0.0	0.0	0.0	0	0
38. Other Non-material Services	0.0	0.0	0.0	0	0
39. Science, Technology & State Services	0.0	0.0	0.0	0	0

Note: The calculations are based on the 1977 official Polish input-output table. Values in parentheses are the rankings. Linkage effects are expressed in 1977 zlotys.

Table 6

Total Interindustry, Employment, Income Generation, Capital Requirement, and Import Requirement
Linkage Effects of a 1 Percent Increase in Exports of a Given Industry in 1982

1% Increase in Exports of Industry	Total Interindustry Linkage Effect (% PL) ↓	Employment Linkage Effect (% EL) ↓	Income Generation Linkage Effect (% YL) ↓	Capital Requirement Linkage Effect (% KL) ↓	Import Requirement Linkage Effect (% ML) ↓
1. Coal	1214.9 (7)	316.4 (3)	657.3 (3)	730.8 (4)	62.9 (10)
2. Fuel	405.5 (18)	25.7 (22)	53.5 (22)	109.4 (20)	95.2 (9)
3. Electric & Steam Energy	147.1 (23)	22.2 (24)	46.2 (24)	135.9 (19)	5.9 (25)
4. Ferrous Metals	1046.8 (9)	155.2 (10)	322.5 (10)	560.7 (8)	142.6 (7)
5. Non-ferrous Metals	1208.2 (8)	103.5 (14)	215.0 (14)	526.8 (9)	142.4 (8)
6. Metal Products	1444.3 (6)	191.3 (7)	397.4 (7)	586.7 (7)	159.3 (6)
7. Machines & Equipment	3262.7 (1)	652.4 (1)	1355.4 (1)	1460.8 (2)	393.8 (1)
8. Fine Mechanics	430.0 (16)	71.4 (18)	148.4 (18)	144.4 (18)	51.0 (12)
9. Transport Equipment	1787.1 (4)	253.7 (4)	527.1 (4)	785.0 (3)	231.4 (4)
10. Electrotechnical & Electronic Products	1807.4 (3)	220.1 (5)	457.2 (5)	645.5 (6)	205.1 (5)
11. Chemicals	1585.9 (5)	212.2 (6)	440.8 (6)	649.7 (5)	252.6 (3)
12. Construction Materials	67.6 (28)	10.2 (28)	21.1 (28)	37.4 (26)	4.9 (26)
13. Glass & Ceramics	94.7 (25)	24.7 (23)	51.3 (23)	40.8 (24)	7.1 (23)
14. Wood	402.3 (19)	91.6 (15)	190.3 (15)	147.5 (17)	21.6 (19)
15. Paper	30.4 (29)	3.6 (30)	7.4 (30)	15.6 (30)	3.1 (27)
16. Textiles	580.7 (13)	82.8 (16)	171.9 (16)	214.3 (14)	47.9 (13)
17. Apparel	645.0 (12)	113.2 (12)	235.2 (12)	149.3 (16)	33.5 (15)
18. Leather	389.0 (20)	66.8 (19)	138.7 (19)	103.0 (21)	27.4 (18)
19. Meat	801.5 (11)	168.0 (8)	349.0 (8)	296.3 (11)	40.1 (14)
20. Other Food	1101.6 (10)	160.2 (9)	332.7 (9)	383.8 (10)	62.5 (11)
21. Other Industries	88.6 (26)	13.6 (26)	28.2 (26)	30.2 (28)	6.0 (24)
22. General Construction	210.1 (21)	38.5 (21)	80.0 (21)	79.8 (23)	10.7 (22)
23. Construction for Production & Services	566.3 (15)	105.0 (13)	218.2 (13)	225.4 (12)	29.7 (16)
24. Specialized Construction	573.0 (14)	76.7 (17)	159.3 (17)	223.1 (13)	26.7 (17)
25. Other Construction	8.9 (31)	2.6 (31)	5.5 (31)	5.5 (31)	0.5 (31)

Table 6 (continued)

1% Increase in Exports of Industry	Total Interindustry Linkage Effect (% PL) j	Employment Linkage Effect (% EL) j	Income Generation Linkage Effect (% YL) j	Capital Requirement Linkage Effect (% KL) j	Import Requirement Linkage Effect (% ML) j
26. Plants	161.6 (22)	47.2 (20)	98.0 (20)	99.3 (22)	12.8 (21)
27. Livestock	413.1 (17)	126.7 (11)	263.1 (11)	202.1 (15)	19.9 (20)
28. Agricultural Services	0.0 (32)	0.0 (32)	0.0 (32)	0.0 (32)	0.0 (32)
29. Forestry	72.6 (26)	13.5 (27)	28.0 (27)	39.3 (25)	2.9 (28)
30. Transport & Communication	2669.8 (2)	518.4 (2)	1077.0 (2)	2242.7 (1)	285.8 (2)
31. Trade	97.2 (24)	17.7 (25)	36.8 (25)	31.3 (27)	2.8 (29)
32. Material & Social Services	30.4 (30)	5.7 (29)	11.9 (29)	21.3 (29)	1.6 (30)

Note: The calculations are based on the 1982 official Polish input-output table. Values in parentheses are the rankings.
The linkage effects are expressed in 1982 zlotys.

Table A1

Industry-specific Effects of a 1 Percent Increase in Exports of all Industries on Output,
Employment, Imports and Capital of each Industry in 1969

Industry	<u>Output</u>		<u>Employment</u>		<u>Imports</u>		<u>Fixed Capital</u>	
	(Million zloty)	(Rank)	(Thousand Workers)	(Rank)	(Million zloty)	(Rank)	(Million zloty)	(Rank)
1. Fuel and Energy	359.9	(4)	1,255	(5)	32.1	(4)	678.8	(2)
2. Metallurgy	486.7	(2)	960	(6)	95.6	(2)	454.8	(5)
3. Electromachinery	734.2	(1)	2,726	(2)	123.6	(1)	486.8	(4)
4. Chemicals	251.0	(7)	598	(8)	42.1	(3)	218.6	(6)
5. Minerals	56.6	(11)	348	(12)	3.5	(12)	80.3	(10)
6. Wood & Paper	91.6	(10)	455	(11)	5.7	(8)	68.2	(12)
7. Light Industry	278.7	(6)	1,374	(4)	12.2	(7)	139.9	(9)
8. Food Industry	305.7	(5)	533	(10)	12.9	(6)	161.5	(8)
9. Other Industries	44.2	(12)	206	(15)	4.3	(10)	28.9	(14)
10. Construction	26.6	(13)	214	(14)	0.0		13.2	(15)
11. Agriculture	370.4	(3)	6,267	(1)	29.1	(5)	532.3	(3)
12. Forestry	25.5	(14)	331	(13)	3.5	(11)	29.7	(13)
13. Transportation	187.0	(8)	1,890	(3)	4.5	(9)	691.7	(1)
14. Services	93.3	(9)	898	(7)	0.0		192.5	(7)
15. Other Products & Material Services	16.5	(15)	577	(9)	0.2	(13)	75.2	(11)

Note: The calculations are based on the 1969 official Polish input-output table. Values are expressed in 1969 zlotys.

Table A2
Industry-specific Effects of a 1 Percent Increase in Exports of all Industries
on Output, Employment, Imports, and Capital of Each Industry in 1977

Industry	<u>Output</u>		<u>Employment</u>		<u>Imports</u>		<u>Fixed Capital</u>	
	(Million zloty)	(Rank)	(Thousand Workers)	(Rank)	(Million zloty)	(Rank)	(Million zloty)	(Rank)
1. Coal	759.0	(6)	2,103	(3)	10.0	(17)	827.5	(2)
2. Fuel	532.9	(9)	150	(30)	181.4	(4)	254.1	(11)
3. Electrical & Steam Energy	146.0	(19)	237	(25)	0.9	(27)	429.5	(8)
4. Ferrous Metals	760.8	(5)	681	(11)	201.5	(2)	445.2	(6)
5. Non-ferrous Metals	638.4	(8)	462	(15)	94.7	(6)	330.2	(10)
6. Metal Products	438.4	(11)	1,003	(8)	64.0	(9)	192.9	(14)
7. Machines & Equipment	788.3	(4)	1,234	(6)	247.3	(1)	363.1	(9)
8. Fine Mechanics	186.9	(16)	347	(22)	72.8	(8)	46.0	(25)
9. Transport Equipment	946.9	(1)	1,629	(5)	155.4	(5)	434.3	(7)
10. Electrotechnical & Electronic Products	647.1	(7)	1,089	(7)	77.5	(7)	208.5	(13)
11. Chemicals	891.1	(2)	921	(9)	192.8	(3)	530.3	(3)
12. Construction Materials	136.5	(22)	398	(18)	10.1	(16)	126.2	(18)
13. Glass & Ceramics	55.9	(29)	322	(23)	4.6	(21)	37.7	(27)
14. Wood	210.6	(15)	544	(14)	9.7	(18)	82.9	(19)
15. Paper	71.7	(28)	126	(32)	11.2	(15)	49.1	(24)
16. Textiles	459.5	(10)	905	(10)	39.8	(12)	183.6	(15)
17. Apparel	173.1	(17)	568	(13)	3.5	(23)	19.4	(32)
18. Leather	134.0	(23)	401	(17)	6.4	(20)	31.4	(29)
19. Meat	161.6	(18)	164	(28)	12.7	(14)	35.3	(28)
20. Other food	365.9	(13)	352	(21)	20.9	(13)	133.2	(17)
21. Other Industries	129.6	(24)	217	(26)	9.0	(19)	28.5	(30)
22. General Construction	46.8	(30)	173	(27)	0.5	(28)	13.7	(35)
23. Construction for Production and Services	144.5	(20)	431	(16)	1.8	(24)	44.3	(26)
24. Specialized Construction	92.1	(25)	256	(24)	0.04	(30)	24.9	(31)
25. Other Construction	23.4	(32)	97	(33)	0.02	(31)	17.2	(34)
26. Plants	422.2	(12)	2,359	(2)	47.8	(11)	493.0	(4)
27. Livestock	315.9	(14)	1,870	(4)	3.9	(22)	234.4	(12)
28. Agricultural Services	13.6	(35)	66	(34)	0.0		18.5	(33)
29. Forestry	73.9	(27)	360	(20)	1.7	(25)	75.4	(22)

Table A2 (continued)

Industry	<u>Output</u>		<u>Employment</u>		<u>Imports</u>		<u>Fixed Capital</u>	
	(Million zloty)	(Rank)	(Thousand Workers)	(Rank)	(Million zloty)	(Rank)	(Million zloty)	(Rank)
30. Transport & Communication	829.7	(3)	3,429	(1)	51.1	(10)	1,698.2	(1)
31. Trade	137.9	(21)	597	(12)	0.4	(29)	54.6	(23)
32. Material Services	76.8	(26)	397	(19)	1.4	(26)	156.6	(16)
33. Housing	16.0	(34)	37	(35)	0.0		447.3	(5)
34. Education	1.3	(37)	14	(37)	0.0		2.3	(37)
35. Arts & Culture	0.7	(39)	5	(39)	0.0		1.3	(39)
36. Health	1.3	(38)	15	(36)	0.0		1.6	(38)
37. Recreation & Tourism	2.2	(36)	9	(38)	0.0		3.4	(36)
38. Other Non-material Services	21.2	(33)	147	(31)	0.0		77.0	(21)
39. Science, Technology and State Services	26.9	(31)	157	(29)	0.0		79.2	(20)

Note: The calculations are based on the 1977 official Polish input-output table. Values are expressed in 1977 zlotys.

Table A3
Industry-specific Effects of a 1 Percent Increase in Exports of all Industries
on Output, Employment, Imports and Capital of Each Industry in 1982

Industry	<u>Output</u>		<u>Employment</u>		<u>Imports</u>		<u>Fixed Capital</u>	
	(Million zloty)	(Rank)	(Thousand Workers)	(Rank)	(Million zloty)	(Rank)	(Million zloty)	(Rank)
1. Coal	1162.6	(10)	1311.7	(5)	10.5	(19)	770.0	(6)
2. Fuel	1435.3	(5)	115.2	(29)	422.8	(1)	338.3	(14)
3. Electric & Steam Energy	552.3	(15)	257.9	(22)	4.6	(22)	748.7	(7)
4. Ferrous Metals	1678.9	(4)	650.9	(13)	258.8	(4)	1260.8	(3)
5. Non-ferrous Metals	1412.6	(6)	364.1	(18)	173.4	(6)	723.5	(8)
6. Metal Products	1282.9	(8)	1182.7	(6)	132.0	(9)	632.3	(10)
7. Machines & Equipment	2228.9	(1)	1946.7	(2)	283.4	(3)	1581.1	(2)
8. Fine Mechanics	292.1	(22)	384.7	(17)	38.2	(12)	173.7	(19)
9. Transport Equipment	1248.2	(9)	1128.2	(8)	183.7	(5)	918.5	(4)
10. Electrotechnical & Electronic Products	1345.7	(7)	1149.7	(7)	156.5	(7)	704.1	(9)
11. Chemicals	1826.5	(3)	831.9	(10)	340.9	(2)	906.8	(5)
12. Construction Materials	330.8	(21)	322.1	(20)	15.1	(14)	229.9	(16)
13. Glass & Ceramics	114.9	(30)	153.9	(28)	4.6	(24)	64.5	(28)
14. Wood	401.2	(18)	410.4	(16)	13.4	(17)	157.3	(22)
15. Paper	123.2	(29)	68.6	(32)	14.5	(15)	72.1	(26)
16. Textiles	814.5	(11)	850.9	(9)	58.5	(10)	406.0	(13)
17. Apparel	394.6	(19)	671.7	(12)	8.2	(21)	100.4	(24)
18. Leather	242.3	(25)	311.5	(21)	14.5	(16)	73.1	(25)
19. Meat	286.7	(23)	72.9	(31)	13.2	(18)	44.4	(31)
20. Other Food	682.4	(12)	228.0	(23)	30.4	(13)	214.9	(18)
21. Other Industries	199.6	(26)	174.9	(27)	9.7	(20)	53.7	(29)
22. General Construction	152.9	(27)	216.7	(24)	0.8	(27)	49.4	(30)
23. Construction for Production & Services	382.4	(20)	571.0	(14)	0.1	(29)	162.7	(21)
24. Specialized Construction	440.9	(17)	323.9	(19)	0.0		167.5	(20)

Table A3 (continued)

Industry	<u>Output</u>		<u>Employment</u>		<u>Imports</u>		<u>Fixed Capital</u>	
	(Million zloty)	(Rank)	(Thousand Workers)	(Rank)	(Million zloty)	(Rank)	(Million zloty)	(Rank)
25. Other Construction	66.2	(31)	188.9	(26)	0.0		65.2	(27)
26. Plants	662.3	(13)	1497.8	(3)	44.0	(11)	449.9	(11)
27. Livestock	536.5	(16)	1402.6	(4)	4.6	(23)	218.7	(17)
28. Agricultural Services	27.2	(32)	76.7	(30)	0.0		39.4	(32)
29. Forestry	151.2	(28)	199.6	(25)	1.2	(26)	103.2	(23)
30. Transport & Communication	2034.7	(2)	3887.5	(1)	149.7	(8)	2731.0	(1)
31. Trade	554.7	(14)	831.2	(11)	0.2	(28)	448.7	(12)
32. Material & Social Services	279.0	(24)	478.9	(15)	2.1	(25)	295.9	(15)

Note: The calculations are based on the 1982 official Polish input-output table. Values are expressed in 1982 zlotys.