ESTABLISHED 1939

A list of Working Papers on the last pages

Revised version published in *Patterns of a Network Economy*, B. Johansson et al. (eds.), Springer-Verlag, 1994.

No. 381, 1993

REGIONAL INTEGRATION AS A VEHICLE TO MICROECONOMIC DISINTEGRATION: SOME MACROECONOMIC IMPLICATIONS OF FIRMS' REORGANIZATION

by

Pontus Braunerhjelm

THE RESEARCH INSTITUTE OF INDUSTRIAL ECONOMICS

POSTAL ADDRESS
Box 5501
SE-114 85 Stockholm
Sweden

OFFICE ADDRESS
Industrihuset
Storgatan 19

TELEPHONE
+46 8 783 84 01
TELEFAX
+46 8 661 79 69

E-MAIL
info@iui.se
INTERNET
http://www.iui.se/iui

POSTGIRO
19 15 92-5
BANKGIRO
446-9995

REGIONAL INTEGRATION AS A VEHICLE TO MICROECONOMIC DISINTEGRATION; SOME MACROECONOMIC IMPLICATIONS OF FIRMS' REORGANIZATION

by

Pontus Braunerhjelm, April 1993
The Industrial Institute for Social and Economic Research[1]

Abstract

A regional integration process that intensifies competition between firms affects the organization of production. In the adjustment to the intensified competition, firms concentrate on core activities, while more peripheral production is either sold out or organized in independent, profit accounting, units. Hence, integration at the macrolevel induce disintegration on the microeconomic level. Furthermore, the increased exposure to international disturbances forces firms to place priority on flexibility. Depending on the demand characteristics encountered by firms, the adjustment will either enhance machine (dynamic) or volume (static) flexibility, whith different macro economic implications. The macro economic effects shows up at the industrial level, affecting the patterns of production and trade, as well as different countries ability to cope with exogenous shocks, i.e. flexibility on the macro economic level.

Keywords; core activity, flexibility, decentralization, internationalization

---

[1]Financial support is gratefuly acknowledged from the Nordic Economic Research Counsel.

1. Introduction

This paper discusses the impact of "EC 1992" on the organization of production in manufacturing firms and the derived macroeconomic consequences for a small open economy. Flexibility is the key concept in this paper. On the micro-level it is argued that the intensified competition due to the European integration forces firms to adopt more flexible production technologies. The type of micro-level flexibility - i.e., whether it can be characterized as being dynamic or static - determines the scope for flexibility on the macro-level.

Turning to the macro-level, allowance for factors of production to move between countries - conversely to the neo-classical trade model - is an essential part in understanding the adjustment process to policy shocks. To which extent reallocation of factors will eventually take place is determined by differences in factor endowments, national policies, international commitments, firm characteristics etc. Such reallocations have a bearing on the distribution of production and welfare, and hence also on trade, between regions and countries.

Consequently, the analysis must incorporate the effect of (expected) deviations in economic policies between regions or nations - or/and other relevant differences - from a firm perspective in order to understand factor flows. It should be noted that such differences are important not only for outsiders to the integration process, but also for insiders, since conditions for firms differs between regions within the integrated area. However, it is particularly relevant for outsiders since integration always contains an element, or potential threat of, discriminatory policies towards outsiders.[2] Statistics reveals that the 1992

---

[2] Figure 1 reveals that company net acquisitions, defined as the acquisitions abroad by a nation's firms minus the foreign acquisitions in that nation are strongly concentrated to non-member countries.

proposal has markedly affected the rate of mergers and acquisitions as well as the flows of direct investment (Smith-Walter,1990).

The analysis will be based on traditional trade concepts, with special attention paid to the firm as a vehicle of transfers of factors of production. How the firm's position and role is determined in a net-work context and the associated effects of factor flows are also considered briefly. Normative conclusions derived from a social welfare function - such as whether policies should be geared towards retaining or attracting firms - is not the purpose of this paper.[3] Rather to describe how exogenous policy may induce firms to shift production between regions, and the related macroeconomic implications.

The paper is organized as follows. Section 2 presents the micro-economic theorethical framework. In section 3 this is linked to the macro-economic effects on specialization and the ability of countries to cope with shocks on the macro level. Thereafter a conceivable model of the structure of the Swedish economy is discussed and the adjustments arising from an - as perceived by Swedish firms - exogenous institutional change as the EC 1992. The last part summarizes the main findings of the paper.

2. Production flexibility and networks: Some micro aspects

The term flexibility is quite new in economics. It was probably introduced by Stigler in 1939 who defined it as the slope of the short-run average cost curve, where costs in turn depended on the produced volume (Carlsson 1989a). A flat curve was interpreted as high flexibility (Figure 2). This definition is generally knowned in economics as **volume flexibility**. This kind of flexibility is restricted to the amount produced and no variability in product

---

[3]More precisely, effects of industrial policies or strategic trade policies on imperfect markets are not considered here.

characteristica is possible, which renders volume flexibility a quite static feature.

Stigler's original definition of flexibility has since then been modified and reinterpreted in several ways. In Taymas (1989) different types of flexibilities are unified in a hierarchial structure, relating the traditional volume flexibility to the engeeniring concept of **machine flexibility.**[4] The term machine flexibility refers to flexibility in products, processes and operation at plant level. Hence, it relates to flexibility in production technology in general. Further, it grants flexibility a more dynamic character since in addition to volume alteration, product attributes can be varied. Taymas also shows how volume flexibility can be derived from machine flexibility. For our purpose, it is machine flexibility which is of particular interest.

The implications of flexibility as defined above is best understood by confronting it with the classical models of organizing production. The Fordistic assembly technique, and the Tayloristic hierarchic organizing system, both designed to enhance the efficiency of traditional mass production, lose validity if machine flexibility turns out to be a key function in production. This also means that there is a trade-off between static efficiency and flexible production technologies (Mills 1986). In other words, the choice of production technology is made by taking into account the structure of the demand fluctuations. If demand frequently changes with regard to its level, then volume flexibility - or static efficiency - is preferred. On the other hand, if demand is volatile with respect to different varieties within the same product-group, then systems emphasizing machine flexibility are favoured, even if they imply higher average costs in production compared to the traditional system of volume flexibility.

---

[4] For a more detailed description, see Taymas 1989.

In retrospect it is obvious that among industrialized countries there is considerable demand for varieties of the same product. During the 70s many of the traditionally organized industries were severly hit by the recession. As demand changed and competition increased from "new" countries, not only were these industries sluggish in adjusting with regard to product characteristic, but they were also hit by high fixed costs due to large and inflexible plants. Indeed, as shown by Diwer (1989), flexible production technologies are more conducive in smaller plants.[5]

Hence, production of high quality differentiated products seems to be best accomplished in smaller units, enabling more efficient supervising, monitoring and "customization". World wide the average plant size has also diminished during the last decade (Braunerhjelm 1993, Carlsson 1989b). At the same time firms have grown. This illustrates that the importance of economies of scale has been transferred from the traditional production line - or plant level - to the creation of firm specific assets derived from R&D, marketing, organization and management, finance etc. Moreover, the decline of plant size coincides with closer relations between firms (networks), quite dissimilar to the traditional subcontractor-purchaser links. Hence, two parallell paths of development evolve; decentralization and externalization.

Technological progress has paved the way for cost reducing modes such as just-in-time (JIT) delivery systems etc, thereby fostering a closer relationsship between firms. Such a close-knit relation between users and producers leads to strong interdependence and

---

[5]The concept of "flexible manufacturing systems (FMS)" often appears when new production modes are discussed. It is defined as "several automated machine tools of the universal or special type and/or flexible manufacturing cells and, if necessary, further manual or automated workstations. These are interlinked by an automatic workpiece flow system in a way which enables the simultanous machining of different workpieces which pass through the system along different routes" (Warnecke-Vettin, 1982).

favors the establishment of networks. These networks may be national or international - or a mixture - and they blur the traditional notion of the unit of production, i e the firm. From a theoretical point of view, the existence of transactions costs justifies the existence of networks (Coase 1937, Williamson 1975, 1985). The higher asset specificity and the more uncertainty, together with infrequent transactions, the larger is the need to internalize transactions, where network organization is one possible strategy.

One of the advantages with a net-work organization is to reinforce the signalling effects of prices compared to alternatives such as structures of vertical integration. Still, the competitive role of price is often overshadowed by the emphasis on quality aspects in networks. The diffusion of quality enhancing technology and the associated possibilities to exploit externalities are some of the alleged superiorities of network organizations, especially for high-tech firms. Thus, firms have increased their cooperation in fields traditionally strictly kept to the individual firm. One evident example is R&D where firms now often share the basic expenditures whereas the pure product-related R&D is undertaken by the individual firm (two examples in the Swedish economy are the Volvo-Renault agreement and the attempted "outsourcing" of R&D on subcontractors). Such relations are not only developed between firms but - although to a lesser extent - also between firms and institutions as universities and different governmental bodies.

Simultanously, in other parts of the economy firms still derive their competitive edge from massproduction. In particular, scale economies at the plant level are crucial in the basic industry (forestry, ores etc). Within these industries the demand for customized intermediate products carrying certain product characteristica is neglible. Here, conventional subcontracting relations and vertical integration structures of production are much more common.

If the economy is structured in the way described above, exchanges of commodities take place in three different dimensions; trade among the entities belonging to a network, trade between the network and the market and "traditional" transactions at the market between firms. The more standardized goods will be traded at the markets whereas the transactions of customized, quality demanding products take place within the network (Ylä-Antilla, 1990).

To summarize the micro effects, firms facing relatively frequent fluctuation in demand with regard to production characteristics favour smaller plants and tighter networks, emphasizing dynamic flexibility. This seems to be parallelled by the development of larger firms and a higher degree of internationalization, in order to reap the benefits of economies of scale (or/and scope) in predominantly non-tangible activities of the firm. Internationalization renders market knowledge and increase the possibility of technological spill-over effects that can be internalized by the firms. In other industries, demand mainly varies with respect to the level of output. Firms in these sectors place priority on the traditional, static (volume) flexibility. In the following section we will link this development to macroeconomic performance.

3. Macroeconomic implications of microeconomic flexibility

Adjustments are continously taking place on the firm level. The economic, technological and social environment of the firm sets the pace for the adjustment pressure. How these environmental factors interact is, however, far from evident. It seems indisputable that social change has implications for technological progress. One example is the change of rules of commercial policies between nations. EC 1992 is such an institutional change that could - for instance by attracting foreign capital and facilitating intra-regional factor movements - augment competition and thereby spur technological progress (Geroski 1988). Whether such technological

advances are dispersed throughout the whole economy or restricted to certain sectors is, however, not self-evident, which influences the locational decisions by firms.

If reorganization of production within firms, including the adoption of new production technology, implies higher imports of components, more decentralized and scattered production etc, such changes will influence the dependence on the outside world. This has ambigous macroeconomic effects. On the one hand, nations become more sensitive to outside shocks the more intergrated with the rest of the world they are. If networks turn more international and if firms shift from "multisourcing" to "single sourcing" strategies in their delivery systems, dependence on the world market is likely to increase. On the other hand, the larger the part of a nation's firms that employs flexible production technologies due to stiffer competition, the higher aggregate national flexibility. Hence, production can adjust comparatively smoothly to macroeconomic shocks. Consequently, these two forces work in opposite directions; foreign shocks are transmitted directly whereas enhanced industrial flexibility increases the ability for a country to cope with such shocks.

3.1 How do the strategies of firms impinge on the structure and vulnerability of the Swedish economy?

The overwhelming part of Swedish manufacturing employment, exports, value-added etc is generated by the 30 largest firms. From a macro perspective, Swedish manufacturing industry can be decomposed into two sub-industries, engineering and basic industries. The machinery, or engineering, industry (which we denote M) is dominated by comparatively few, but large, multinational firms. Examples are SKF, Atlas Copco and Electrolux. These firms have a long tradition of internationally dispersed production. Predominantly they compete with some firm-specific asset in highly competitive markets. Marketing, R&D, managerial and organizational

know-how are the cornerstones of their competitive edge. Economies of scale are derived at the **firm** level as several plants take advantage of such intangible assets. Hence, there is no need to concentrate production to one plant or to one country. Especially since production technologies must entail a high degree of flexibility in order to enable swift changes in response to alterations in demand, even at the level of national markets.

Basic industry (called X), on the other hand, contains forestry, ore and other raw material (or process) intensive production.[6] It produces a relatively homogenous good and production is organized to exploit volume (static) flexibility. Economies of scale are derived at the **plant** level, i e in the actual production process. Technology is characterized by large, process- and capital intensive plants. Compared to the engineering sector, less resources are spent on intangibles, especially R&D. Production is generally confined to a particular country since it is tied to some natural resource, whereas firms in the engineering sector may take up production anywhere. Thus, at this level of aggregation the two sectors can also be referred to as the internationally mobile (engineering industry) and the immobile (basic industry). Sweden's dependence on the respective sector is illustrated in Figure 3. The basic sector is particularly important as a generator of foreign exchange.

Consequently, the basic structure of the manufacturing sector could be captured in a traditional two sector trade model (Jones 1965). In such models the possible combinations of production is generally illustrated through a production possibility curve (Figure 4). Flexibility within the economy - i.e. how easily production is switched between the two sectors (engineering and basic industry

---

[6] The two sectors could just as well be divided into an assemblying part (engineering, chemicals etc) and a processintensive sector (forestry, ore, part of chemical and food industry).

goods) - can be chracterized by the shape of the production possibility curve, which in turn depends on the implemented technology.[7] The lower flexibility, the more exposed is a nation to external (or internal) shocks. Conesquently, the duration of an adjustment process due to exogenous shocks, will vary with the country's organization of its production.

The role of flexibility (or elasticities) in demand and supply are, on the macrolevel, perhaps more explicitly elicited in a partial equilibrium context. As Figure 5 shows, the more inelastic demand and supply are, the harder adjustment is imposed on the domestic economy to cope with shocks that disturb the foreign supply of goods. The more of flexible production technology adopted in the manufacturing sector (i.e. the larger the engineering industry), the more elastic is supply. If supply and demand are relatively price elastic, a shortfall could be fairly easy be compensated for through movements along the respective curves (Figure 5). Such adjustment is achieved quite instantly. On the other hand, inelastic supply requires that the curves shifts to alleviate the shortfall which takes time and increases vulnerability.

Consider now the role of the international firm in such a setting. The overall objective of the EC 1992 program is to increase competition between firms by abolishing different protectionistic barriers. Companies formerly protected behind national borders must act in order to prepare for changing market conditions. If competition spurs innovations and technological progress, firms competing in the "high-tech" engineering sector (M) must implement production technologies that allows them to adapt quickly to changing conditions. Further, to become "best performers", they have to concentrate on their core activities (Eliasson-Lundberg,

---

[7] The production possibility curve is superior in illustrating flexibility compared to the integrated equilibrium technique used in the Helpman-Krugman (1985) framework.

1989). More peripheral production are either sold out or organized in independent profit accounting entities, i.e. disintegration is embarked upon. Consequently, a competition enhancing integration process at the macro-level encourages disintegration at the microlevel in the sector producing the "high-tech" good. A change in organization towards machine flexibility change the curvature as shown in Figure 4. Hence, macro-economic flexibility increase.

In particular, assume that each firm employs skilled and unskilled labor in addition to machinery and capital of a more physically fixed nature (raw materials, real estate etc). To simplify we assume that skilled labor and machinery is employed in fixed proportions and likewize for unskilled labor and fixed capital. Furter, we assume that skilled labor and machinery can move between different countries whereas unskilled labor and fixed capital may not due to language obstacles etc. In addition, the basic industry predominantly employs the immobile factor (called V) while the engineering sector is intensive in its use of the mobile factor (called h).

Obviously, if conditions change between the outside world and the domestic economy, the adjustment of the engineering sector will be accomplished comparatively more easy. Likewize, if globalization strategies for one or another reason is regarded as important for the companies, this will predominantly affect the engineering sector and could thereby influence the industrial structure of the economy.

External shocks - such as the EC 1992 - and internal exogenous shocks influence the decisions of firms with regard to their location. Looking at the overall production structure of the economy, and assuming that exports takes place within both sectors - although the engineering sector is assumed to be the net importer whereas the basic sector is the net exporter - one possible outcome is shown in Figure 6. An outflow of production factors (or firms),

affecting especially the M-sector, shifts the production possibility curve down- and inwards. Such outflows could take place for several reasons. For a country participating in an integration process, closeness to technological centers (Silicon Valley effects, spillovers etc) may induce location in certain areas. Or, the desire to compensate lost market shares on the earlier protected home market, could start an internationalization process. For outsiders we could imagine a situation where the engineering goods sector is discriminated - or expects discrimination - by the integrated area for political, or other, reasons. Or in general, a situation where divergencies in economic policies favours the production of the engineering good in the integrated area. To be drastic, assume that the exports of firms in the engineering sector of an outsider country are stopped (or that firms beleive this will happen). Terms of trade remains constant since the impact of the small open economy is neglible in relation to the large, integrated area. However, factors of production may move. It is intuitively appealing that producers of the engineering good in the small open economy with a large export share will move to the integrated area.

Hence, factor flows - as described above - imply that the small open economy will become more specialized and, hence, more dependent on imports from the integrated area. In addition, in this case, it will also become more inflexible (Figure 6). In the integrated area the opposite development occurs. This hypothetical situation is of course an exaggeration, however, we can easily conceive other situations of less severe exclusion from a market (local requirement rules, anti-dumping etc) that also could set off a transfer of factors of production through direct investment.

An extension of the model is to incorporate networking firms. Assume as before that the manufacturing sector consists of a engineering and a basic industry. A slightly different definition of the production factors is necessary. Skilled labor (called S)

produces the production technology (f) while unskilled labor and machinery combines into a factor L, needed in the production of the intermediate product h.[8] V is composed in the same way as above. Thus, firms in both industries employ the fixed factor (V) and S, whereas intermediate products are purchased from network firms. In the production of the engineering good (M) the intermediate product is used intensively while the basic sector (X) mainly employs the fixed factor.

Thus, we have a four factor, four good and two country model (the small open economy and the rest of the world),

$$M = f(h,V)$$
$$X = f(h,V)$$
$$f = g(S)$$
$$h = l(L)$$

and for each firm

$$m = g(S)(l(L), V)$$
$$x = g(S)(l(L), V)$$

where M and X are tradable whereas h and f are non-traded.[9] Factors of production are fully mobile between sectors within each nation. However, only S and L is mobile between nations. S can be thought of as a level of knowledge although differentiated between

---

[8] This is along the lines of Helpman-Krugman (1985, chapter 12) where it is postulated that some factor in the production process assumes firm-specific features as soon as it is employed by the respective firm.

[9] Assume that the small firms producing h lack all knowledge of foreign markets which limits their export possibilities. There are fixed costs in exports, hence, larger firms have economies of scale advantages in exports. Similarly, f is a firm specific asset which, due to problems of appropriability, is not exported or transferred through arm's length contracts.

individuals, imposing firm specific characteristics to each firm which renders a monopolistic market structure. Such knowledge is easily moved across regions and nations. Knowledge for the individual firm is derived from the overall level of knowledge in a country or region (Eliasson 1991b). Thus, by locating in knowledge intensive areas, firms could increase their own knowledge base.[10] Since an increase in S has a positive effect on the marginal productivity of the factors h and V, an emigration of S will stimulate producers of h to relocate and a bandwagon effect will occur (see appendix).

To summarize, the larger the engineering sector is - characterized by dynamic machine flexibility - the larger is a nation's capacity to cope with macroeconomic shocks. A small engineering sector generates inelastic supply on the macro-level, even though supply may exhibit high flexibility in each sector on the micro-level. However, a large flexible sector also implies that firms will move if they are exposed to some sort of exogenous shock that alters the prerequisites for production between different regions. Firms' decisions are affected by a multifold of factors, including political factors (Braunerhjelm 1990, 1991, Mundell 1957, see Figure 7). As production move abroad, the only way to acheive the same consumption level is to rely more heavily on imports. In other words, dependence on the international market increases and so does national vulnerability. Flexibility on the macro-level will also be reduced. If the small open economy takes part in the integration, it will de facto be part of the region and the risks of being discriminated are eliminated which influence expectations of firms and their risk hedging behaviour.

---

[10] If firms beleive that their particular knowledge in producing M is enhanced by moving the production to another region, for example because other firms are concentrated in that region (Silicon Valley effects), they will move to preserve their competitiveness. Or they will move part of their human capital, i.e. individuals, to that area.

Final remarks

An integration process that enhances competition - which is one of the primary objectives of the "EC 1992" - forces firms formerly protected on national markets, to reorganize in order to stay competitive or become best performers. If firms fail to respond to the new market situation, they have to exit. For a small open economy with close ties to the EC, there is no shelter behind national borders. The need to adjust might even be more pronounced for outsiders since the risk of being exposed to discrimination cannot be completely eliminated.

The stiffer competition implies that firms must concentrate on core activities while more peripheral production are dismissed. This induces a disintegration process, encouraging the establishment of smaller, flexible **plants** and network arrangements. Production is decentralized into independent profit accounting, or/and strategic business, units. Further, to preserve, or augment, their competitive strength, **firms** must fully exploit scale economies, particularly in the production of intangibles, and embark upon internationalization. As quality, defined in several dimensions, becomes more important, networks based on confidence and competence will be established.

The move towards smaller plants, geared by high machine flexibility, decreases the exposure to macroeconomic shocks for a country. The adjustment potential depends on the possibility of swift adjustment, transferring factors and organizing production according to to the new terms and conditions. What matters for flexibility on the macroeconomic level is how production is organized on the micro-economic level and the size of the respective sectors. High volume (static) flexibility on the micro-level will never be compatible with high flexibility on the macro-level. Necessary conditions for macro-economic flexibility are a relatively large engineering sector organized in a dynamically

flexible way.

From a policy view, this also implies that if governments fail to launch distinct signals with regard to their economic policies, in particular in an integration or international context, expectations could be influenced in such way that both domestic and foreign investment are discouraged. The massive outflow of investment from Sweden to EC during the late 80s coincided with a period of extreme uncertainty regarding Sweden's future EC-policy.[11] At the same time foreign investment within Sweden has remained at a very modest level. Since it is particularly the large, inflexible process-intensive firms in the basic industry that stays, the economy become more vulnerable to external shocks.

Hence, low macroeconomic vulnerability is attained through the complexity and diversity of production. This means that incentives must be appropriately designed to encourage firms to produce and invest within a nation. As integration is undertaken by a small open economy's main trading partners, full membership is probably necessary to keep or restore competitiveness. This argument can of course be generalized to other differences in economic policies.

---

[11]There are of course numerous reasons why a firm choose to invest abroad rather than within the domestic economy, which is shown in Figure 7. However, the uncertainty concerning the relations towards EC was one of the factors favouring investment abroad (Braunerhjelm 1990b).

Literature

Braunerhjelm, P, 1990a, Effekter på den svenska industristrukturen av EG 1992, Ekonomisk Debatt, No 8, pp 713-720

Braunerhjelm, P, 1990, Regional Integration, the International Firm and the Allocation of International Production, 1990c, WP No 14-91, Institute of International Economics and Management, Copenhagen

Braunerhjelm, P, 1990b, Svenska industriföretag inför EG 1992, IUI, Stockholm

Braunerhjelm, P, 1991, Svenska underleverantörer och småföretag i det nya Europa, Forskningsrapport nr 38, IUI, Stockholm

Braunerhjelm, P, 1993, Globalization and the Future Role of Small and Medium-Sized Enterprises, in Oxelheim, L, (ed.), The Global Race for Foreign Direct Investments, Springer Verlag, forthcoming

Carlsson, B, 1989a, Flexibility and the Theory of the Firm, International Journal of Industrial Organization, Vol 7, pp 179-203

Carlsson, B, 1989b, The Evolution of Manufacturing Technology and Its Impact on Industrial Structure: An International Study, Small Business Economics, Vol 1, pp 21-37

Cecchini, P, 1988, Europas inre marknad, SNS, Stockholm

Coase, R, 1937, The Nature of the Firm, Economica, Vol 4, pp 13-16

Dahmén, E, 1989, "Development Blocks" in Industrial Economics, in B. Carlssons (ed.) Industrial Dynamics, Technological, Organizational, and Structural Changes in Industries and Firms, Kluwer Academic Press

Diwan, R, 1989, Small Business and Economics of Flexible Manufacturing, Small Business Economics, Vol 1, pp 101-110

Eliasson, G, 1991, Deregulation, Innovative Entry, and Structural Diversity as a Source of Stable and Rapid Growth, Journal of Evolutionary Economics, No 1, pp 49-53

Eliasson, G, 1991b, The Firm as a Competent Team, Journal of Economic Behaviour and Organization, Vol 13, pp 273-89

Eliasson, G, Lundberg, L, 1989, The Creation of the EC Internal Market and Its Effect on the Competitiveness of Producers in Other Industrial Economies, in H.Siebert, J.Mohr, (eds.), The Completion of the Internal Market Symposium 1989 or IUI Booklet No 263, IUI,

Stockholm

Eliasson, G, Fölster, S, Lindberg, T, Pousette, T, Taymas, E, 1991, The Knowledge Based Information Economy, IUI, Stockholm

Geroski, P, 1988, Competition and Innovation, in Research on the Cost of Non-Europe, Vol 2, EC Commission

Helpman, A, Krugman, P, 1985, Increasing Returns, Imperfect Competition and International Trade, MIT Press, Cambridge

Jones, R, 1965, A Simple General Equilibrium Model, Journal of Political Economy, Vol 73, pp 557-572

Lundberg, L, 1989, Svenskt näringsliv och den europeiska integrationen, bilaga 3, LU-90

Mills, D, 1986, Flexibility and Firm Diversity with Demand Fluctuations, International Journal of Industrial Organization, Vol 4, pp 302-315

Mundell, R, 1957, International Trade and Factor Mobility, American Economic Review, Vol 47, pp 321-25

Ohlsson, L, 1989, Industrin inför EGs 90-tal. En strategisk effektanalys, Sveriges Industriförbund, Stockholm

Smith, R, Walter,I, 1990, The European Market for Corporate Control Structure, Transaction Flow, and Regulation, mimeo, Conference Paper Marstrand, May

Swedenborg, B, Johansson-Grahn, G, Kinnwall, M, 1988, Den svenska industrins utlandsinvesteringar 1960-86, IUI, Stockholm

Taymas, E, 1989, Types of Flexibility in a Single-Machine Production System, International Journal of Production Research, Vol 27, pp 1891-1899

The Economics of 1992, European Economy, Nr 35, March 1988

Warnecke, H, Vettin, G, 1982, Technical Investment Planning of Flexible Manufacturing Systems - The Application of Practice Oriented Methods, Journal of Manufacturing Sytems, Vol 1, pp 89-98

Williamson, O, 1975, Markets and Hierarchies. Analysis and Antitrust Implications, Free Press, New York

Williamson, O, 1985, The Economic Institutions of Capitalism, Free Press, New York

Ylä-Antilla, P, Lovio,R, 1990, Flexible Production, Industrial

Networks and Company Structure - Some Scandinavian Evidence, ETLA WP, No 338

Appendix

The production functions in the respective sector are

$$M = A(l(L), V) = g(S)(l(L), V)$$
$$X = A(l(L), V) = g(S)(l(L), V)$$

assumed to be homogenous of degree one in L and V, concave (for given A) and increasing in all arguments.[12] M and X are tradable while h and f are non-tradable. However, skilled labor (S), as well as the production factor L used in the production of intermediate goods, can move between nations. The level of infirm skillness is influnced by the overall amount of S within an economy through spillovers and off market interactions. Therefore, the marginal productivity of S in producing M increases in areas abundant in S. Hence, this increases the reward to S and influence the location of S. Thus,

$$(dm/dS)^* > (dm/dS) \qquad \text{if} \qquad S^* > S$$

where starred variables represent the foreign region (or country).

The shift in the production function for the firms due to improved or extended knowledge also influence the reward to other factors of production. Assume that technology is captured by a standard Cobb-Douglas function (for a given knowledge level).Then the reward to L, or the price of h, is affected in the following way,

$$m^* = A^* L^a V^{1-a}$$

and the marginal product of L is derived as

$$dm^*/dL = (a/L)(A^* L^a V^{1-a}) = (a/L)(m^*)$$

---

[12] Let small x and m denote firms in the respective sector.

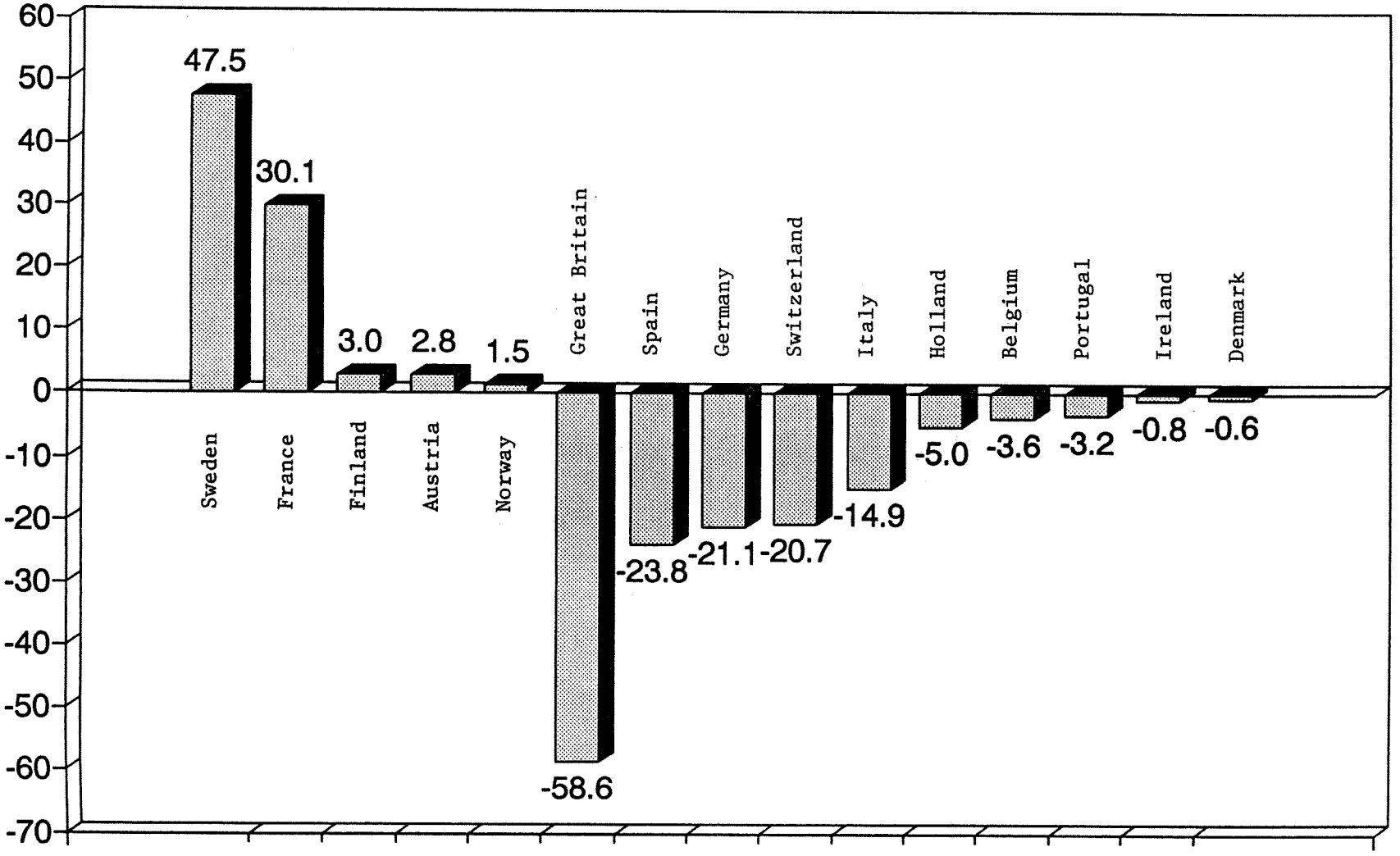
where

$m^* > m$ since $A^* > A$ if $S^* > S$

and consequently the marginal productivity of L is larger in the starred (foreign) country then in the domestic economy. At given prices the reward to the L factor is then also larger. This induces a bandwagon effect where L also locate to the foreign contry (region). Alternatively it could be argued that part of the skillness in M production (call that fraction s) is transferred (spillovers) to subcontractors producing h which increase the price relative to domestically produced h (this could also be interpreted as a quality difference). As S and L flows out of the outsider country, the production possibility curve shifts downwards. The shift will continue until factor rewards are equalized or regions (nations) becomes completely specialized.

Figure 1

Net investment, company acquisitions in Europe, 1990 billion SEK



Source: Translink, European Deal Review, April 1990

Figure 2 Example of average cost curves

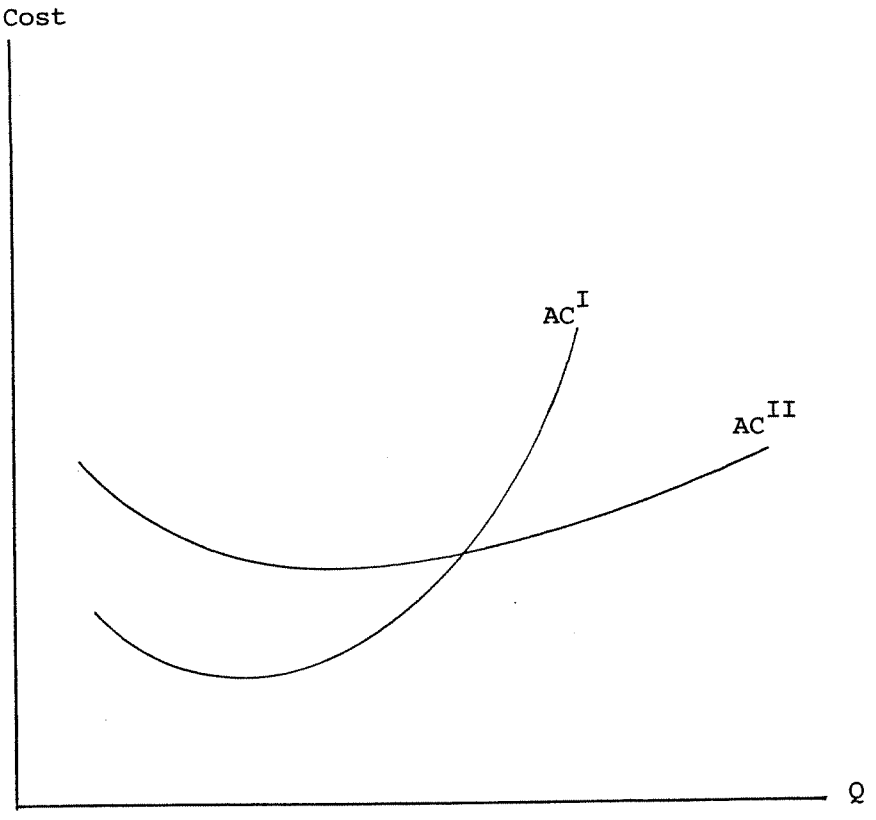
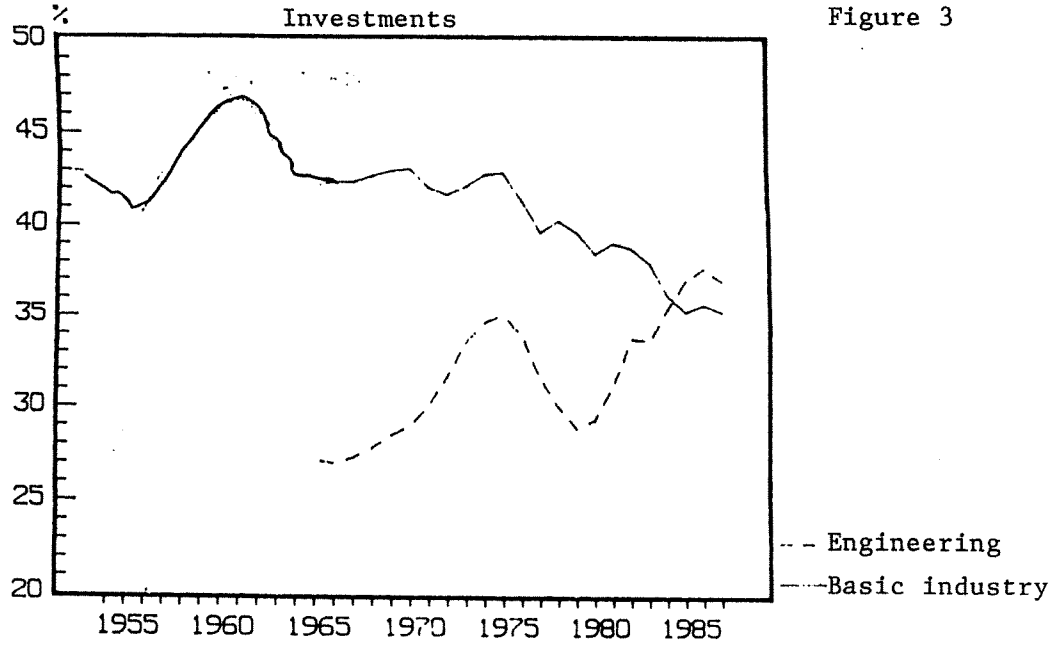
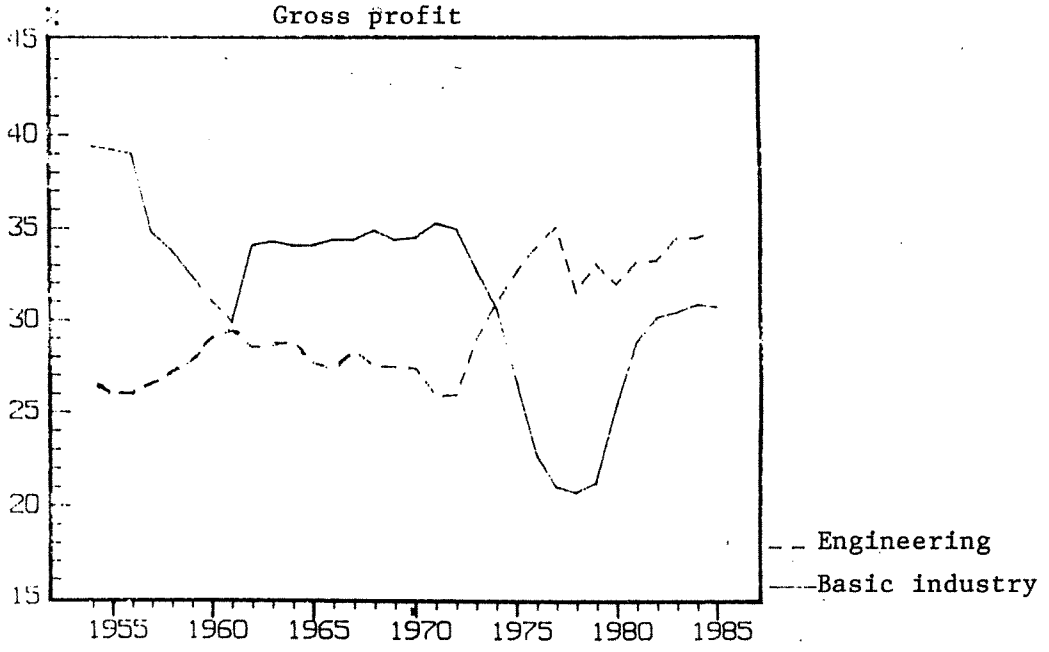
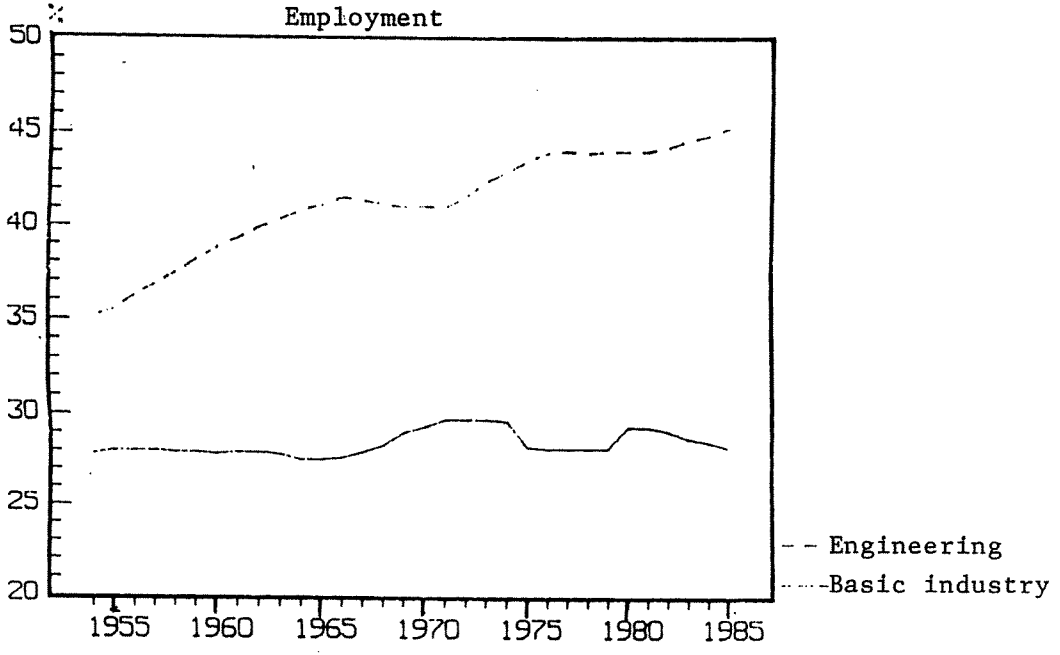


Figure 3


Investments
%
50
45
40
35
30
25
20
1955
1960
1965
1970
1975
1980
1985
Engineering
Basic industry


Gross profit
%
45
40
35
30
25
20
15
1955
1960
1965
1970
1975
1980
1985
Engineering
Basic industry


Employment
%
50
45
40
35
30
25
20
1955
1960
1965
1970
1975
1980
1985
Engineering
Basic industry

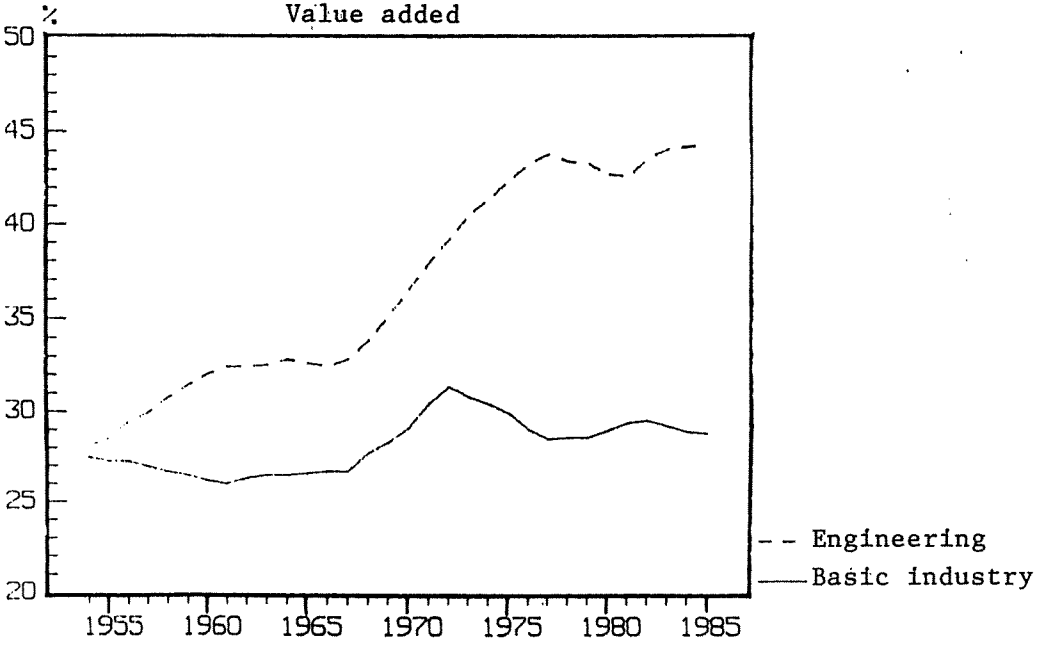
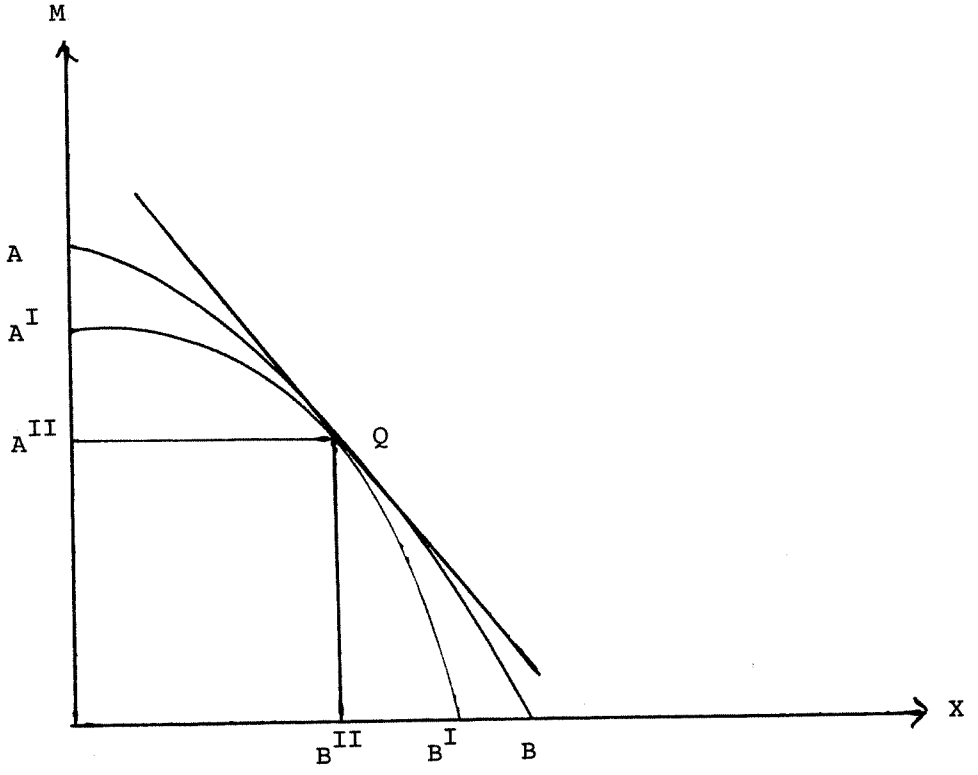

Value added
%
50
45
40
35
30
25
20
1955
1960
1965
1970
1975
1980
1985
Engineering
Basic industry

Figure 4 Flexibility in a general equilibrium setting

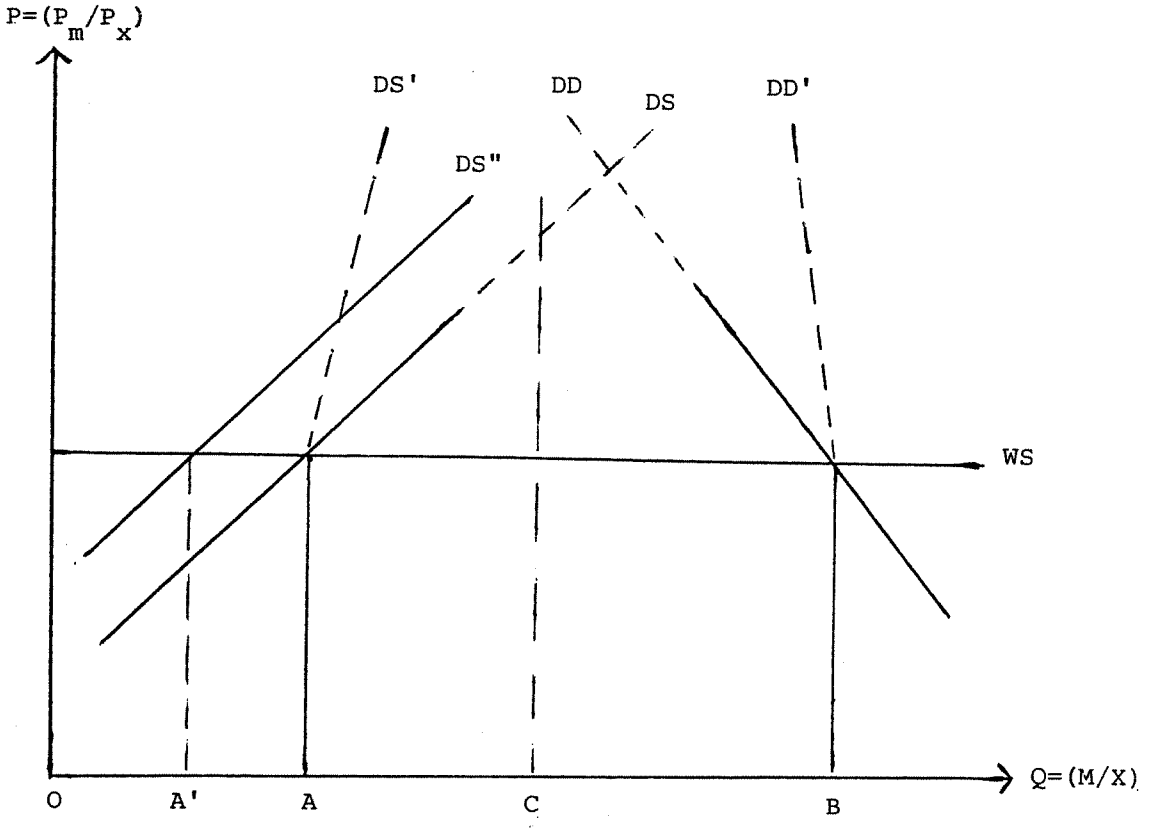


The different curvatures represent different degrees of flexibility. A'' - B'' is completely inflexible and production will take place at Q whatever price-ratio.

The curves can also be interpreted as the adjustment possibilities in the short-run (A'' - B'') and in the long-run (A-B).

The curvature of the production possibility curve is affected by changes in the endowment of factors.

Figure 5 A partial equilibrium representation of national vulnerability

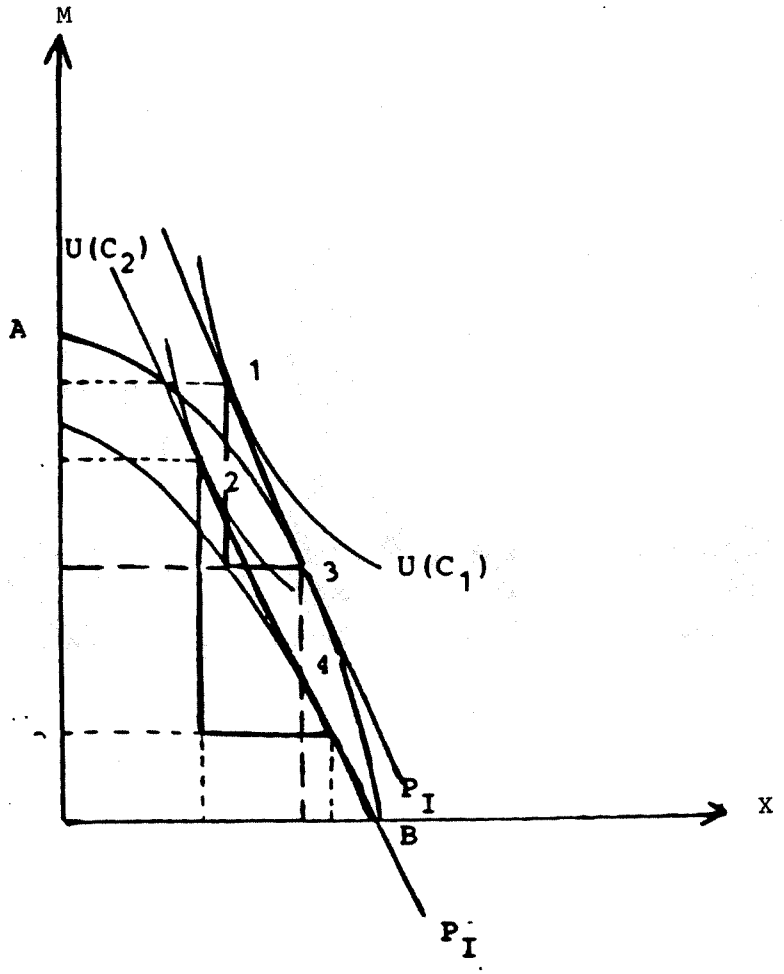


DS = domestic supply
DS' = inelastic domestic supply
DS'' = decrease in factors of production
WS = world supply
DD = domestic demand
DD' = inelastic domestic demand
C = estimated minimum level of consumption of Q

Initial import = B-A
Initial consumption = O-B
Import after factor shift = B-A'
Initial domestic production = O-A
Domestic production after factor shift = O-A'

The more elastic domestic supply (DS), the easier it is to attain the minimum level C of consumption of M if a nation is isolated from world market supply (WS). Inelastic curves requires shifts of the supply curve. DS'' represents an outflow of factors.

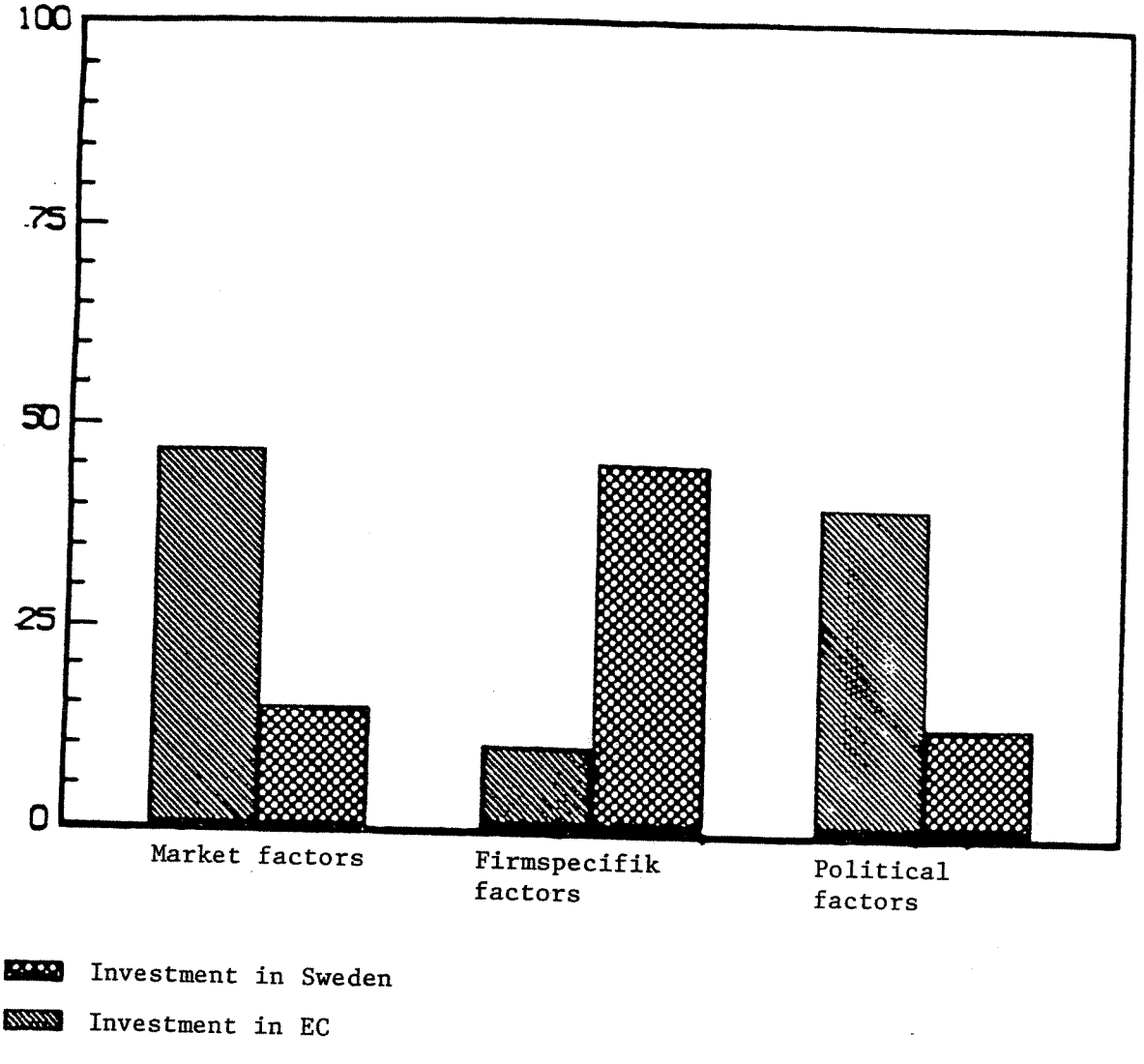
Figure 6 Factor flows and specialization in production



U = welfare level
P_I = terms of trade

1 = consumption ratio before the integration (C_1)
2 = consumption ratio after the integration (C_2)
3 = production ratio before the integration (Q_1)
4 = production ratio after the integration (Q_2)

Figure 7 Factors influencing the regional distribution of investments and production



The colums indicates how many firms in a recent survey (for details, see Braunerhjelm 1990b) that estimate the importance of the respective factors in this investment decisions. The striped column implies that investments within EC are advocated while the dotted column favour investments in Sweden.