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**HECKSCHER–OHLIN AND SCHUMPETER
INDUSTRIES: The Response by Swedish
Multinational Firms to the EC 1992 Program**

by

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This is a preliminary paper. Comments are welcome.

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Abstract

This paper addresses the impact of the EC 1992 program on the distribution of investments between foreign and domestic markets by firms in a small outsider country. The results shown indicate a major shift in the direction of Swedish foreign direct investment as from the time of the announcement of the EC 1992 program. A strong substitutability between domestic and foreign investment is found for investment in knowledge-intensive industries (Schumpeter industries) in the EC region. The results urge policymakers in outsider countries to mitigate the potential emergence of structural imbalances in the domestic country due to uncertainty about effects of the EC 1992 program.

**HECKSCHER–OHLIN AND SCHUMPETER INDUSTRIES:
THE RESPONSE BY SWEDISH MULTINATIONAL FIRMS
TO THE EC 1992 PROGRAM**

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1. Introduction

The massive inflow of foreign direct investment (FDI) into the European Community (EC) in the late 1980s and beginning of the 1990s, suggests that firms expect the beneficial effects of the internal market to accrue predominantly to insiders. Other factors tend to reinforce this pattern, for instance the trend towards more global strategies, the need to attain a competitive position before the completion of the internal market, and – at least in the case of Swedish firms – the domestic cost crisis during most of the 1980s. The fear of being excluded from a potential growth market seems however to be a major determinant of the inflows of investments from outsider firms – European as well as American and Japanese – into the Common Market (Braunerhjelm 1990, Karlsen 1990, Yamawiki 1990, Yannopoulos 1990, 1991, Ozawa 1991, Rugman–Verbeke 1991, US Trade Commission 1992).

The purpose of this paper is to shed light on the impact of the EC 1992 program on the distribution of Swedish FDI across industries and regions in the 1980s. Sweden may be of special interest as it is often claimed to have one of the most "multinational industries" in the world. Hence, to which extent did the approval of the White Book in 1985 and the Single Act in 1986 (formally accepted by the EC in 1987) influence the allocation of Swedish investment and its regional distribution between the US and the EC? In addition, have the responses to EC 1992 differed between industries and, if so, does the impact on domestic investment differ between industries? Furthermore, what

can be inferred from the observed pattern concerning future industrial production in Sweden?

In order to understand the implications for the Swedish economy of the dynamic events of the 1980s, these changes must be traced and analyzed. The data set covers the period 1981–1991 and is distributed on industries and countries. The analysis, although it concentrates on a descriptive presentation of the statistics, provides valuable insights with regard to firms' reaction to the EC 1992 program and the implications for future industrial production in Sweden.

The rest of the paper is organized as follows. In Section 2, the theoretical background on firms' engagement in FDI is briefly discussed. Thereafter, Section 3 presents the hypotheses, while Section 4 contains the definitions of the industries, the data set and the results. Finally, Section 5 summarizes the main conclusions.

2. The rationale of FDI from countries not covered by the EC 1992 program

International integration theory is normally confined to the partial effects of trade creation and trade diversion, where the former carries positive welfare implications in contrast to the negative effects associated with trade diversion. Recent contributions along this line of research, still in a partial framework, take into account the effects of trade suppression, trade costs reductions and game theoretic aspects. A distinct characteristics of these models are, however, the negligence of factor flows between regions as a response to changing institutional settings. Despite the rather extensive empirical evidence of the impact of institutional changes on factor flows, few attempts have been made to incorporate these into economic modelling (Dunning 1989). The "new" growth theory does incorporate some of these aspects (Romer 1986) and the concepts of "investment creation" and "investment diversion" have recently been introduced (Sweeney 1992).

The EC 1992 program constitutes an example of such institutional change that has influenced, and still influences, factor flows and investment patterns between outsiders and insiders (Buigues–Jacquemin 1989, Burgenmeier–Mucchielli 1991, Hirsch–Meshulach 1992). A related issue in this context is how FDI influence domestic investments. Although evidence is scattered, contemporary research seems to indicate that large FDI has a crowding out effect on domestic investment, at least for small economies (Belderbos 1992, Lipsey–Stevens 1992).

One reason to the arbitrary treatment of firms in an integration context, besides analytical and mathematical complexities, is the strong tradition of fixed factors in mainstream trade economics. More precisely, production factors are assumed perfectly mobile between sectors within an economy while they are treated as perfectly immobile between countries. This is quite inconsistent considering the dominating role of relatively "footloose" multinational firms in trade, international investments and in the diffusion of technological knowledge and know-how (Dunning 1992).

The theory of the firm claims that internationalization, either by setting up subsidiaries or by relying on exports, occur in order to protect a firm's proprietary assets from imitation and opportunistic behavior (Hymer 1960, Caves 1971, Buckley–Casson 1976, Williamson 1975, 1985). Due to market failures, firms cannot engage in arm's length contracts etc., without eroding their sources of competitiveness. Resource seeking, tariff-jumping, global strategies etc., have also been suggested as reasons for internationalization (Mundell 1957, Hirsch 1976, Grant 1991). Price differences between markets are particularly important in vertical integration models, but the overwhelming argument for internationalization rests on the firms' possibility to exploit their firm-specific assets or knowledge.

The driving forces of firms' internationalization have been summarized in the eclectic approach by Dunning (1977) into three main factors. These are ownership advantages (which equal firms proprietary assets), location

advantages (between countries), and internalization (lack of markets). The EC 1992 program is expected to primarily affect the locational advantage by reducing costs, improving the supportive systems for industries, subsidizing R&D etc., which hence create incentives for foreign firms to invest within EC.

A shift in locational advantage influences, however, different firms in different ways. Some firms base their competitiveness on the access to some country specific, relatively abundant and inexpensive, natural resource or knowledge. Other firms derive their competitive edge from firm-specific factors, created within the firm through R&D and other knowledge enhancing activities. A conspicuous feature of such firms is the participation in markets characterized by intensive technological competition where competitiveness requires continuous upgrading of know-how and skill (Eliasson 1991).

We will in our analysis of the effects of the EC 1992 program on the allocation of Swedish FDI emphasize this difference and separate firms into two major categories. Hence, firms based on country specific resources or knowledge will in the analysis be referred to as Heckscher–Ohlin firms, or, if aggregated, Heckscher–Ohlin industries. These firms relate to the traditional trade framework, where factors are immobile between nations. The other type of firms, where competitiveness builds on individual firm specific knowledge, are denoted Schumpeter firms, since the innovation process in products, processes and organizations is crucial. In an aggregated form these firms constitute a Schumpeter industry (Hirsch–Meshulach 1992).

Hence, the main difference between the two types of firms or industries refers to the sources of competitiveness, i.e. proprietary firm-specific assets or country-fixed resources. It can always be argued that the division undertaken here is artificial since the operations of most firms involve some Schumpeterian features. Attention will therefore be paid to the robustness of the results to different ways of treating borderline cases like paper and pulp firms with fairly large high-tech content and chemistry firms involving production of both basic chemistry and pharmaceuticals.

3. Hypotheses concerning outsiders' reaction to the EC 1992 program

Sweden has for a long time pursued a free trade oriented policy where the major part of her international exchange of goods and services has been geared towards Europe. US is the second most important market, although for some industries, notably the car-industry, it is of core importance. Institutional changes that influence production conditions between the nearby European market and the Swedish market, could be expected to influence the behavior of Swedish firms.

The Swedish manufacturing industry is dominated by relatively few, large multinational firms, with a long tradition of production abroad. However, as is obvious from the impressive foreign direct investment undertaken by Swedish firms in the 1980s, this did not refrain them from building up further capacity abroad. A suggestive explanation is that the firms have reacted to the EC 1992 proposal by concentrating investments into Europe, although other factors like uncertainty about environmental and energy policies, future access to the EC-market, etc., also influence this evolution (Braunerhjelm 1990).

To examine whether FDI have shifted between regions, to what extent this evolution has affected domestic investment and if the different industries – the Heckscher–Ohlin (H) and Schumpeter (S) industries – display different patterns, the following hypotheses will be tested:

H1. The accumulated flow of FDI in EC in 1984–1987 < the accumulated flow of FDI in EC in 1988–1991.

In 1987 the Single Act, the main instrument to achieve the objectives stated in the White Paper of 1985, was approved by the EC-countries. Since outsiders will doubtlessly experience locational disadvantages, e.g. one border must be crossed, we may therefore expect that Swedish firms reacted to the new market situation by increasing the volume of their investments within the

EC. Especially as the Swedish standpoint, regarding the future form of association with the EC, was quite unclear in the late 1980s.

H2. The accumulated flow of FDI in US in 1984–1987 > the accumulated flow of FDI in EC in 1984–1987.

The US is the other main recipient of Swedish FDI, and the growth of the US market in 1984–1987 was strong whereas Europe suffered from "eurosclerosis". Hence, we may expect that investments in the US were larger during this period, and that the differences have diminished as is expressed in H3. In order to reflect a potential shift in paradigm the data will be normalized by GDP of the respective target market.

H3. The EC/US ratio of stocks of FDI in 1984–1987 < the EC/US ratio of stocks of FDI in 1988–1991.

This is a relative measure of the increase in FDI in EC over the period.

H4. The accumulated flow of FDI in S-industries in 1988–1991 > the accumulated flow of FDI in H-industries in 1988–1991.

It is hypothesized that firms in the S-industries react more aptly by locating production into foreign markets. This hypothesis is based on the discussion on different sources of competitiveness above. Firstly, firms belonging to the S-industry can more easily take up production abroad since their competitiveness is not based on some country bounded advantage (as natural resources). Moreover, H-production is often associated with considerable economies of scale on the plant level, which makes it hard to change existing production structures. As investment costs in such plants are comparatively high and infrequent, it is expected that sudden jumps can be detected and that FDI are concentrated to less capital intensive activities in the value-added chain, as sales offices, service department and other complementary activities. That should show up in lower FDI costs than for the S-industry. Secondly, S-

firms compete on markets where upgrading of knowledge, closeness to markets etc. are crucial for success, while H-firms produce homogenous goods, more exposed to price competition. The data will be normalized by the number of employees in the S- and H-industries.

H5. The S-industry/H-industry ratio of accumulated flow of FDI in the EC in 1984–1987 < the S-industry/H-industry ratio of accumulated flow of FDI in the EC in 1988–1991.

For the same reasons as above, the firms in the S-industry are expected to have reacted more quickly to the EC 1992 program.

H6. The growth in FDI > the growth in DGI (domestic gross investment) in the period 1984–1991.

For a small open economy, dominated by quite few, large multinational firms, it is expected that FDI partly substitutes for DGI, especially in periods of institutional uncertainty, as is the case for outsiders of the EC 1992 program.

H7. The substitution effect of DGI for FDI is most pronounced in the S-industry in the period 1984–1991.

Since we expect that FDI has increased more in the S-industry, then if substitutability prevails between domestic and foreign investment, the shift between domestic and foreign investment should be particularly evident in the S-sector.

The altogether seven hypotheses will be tested with data on the industry level for FDI and DGI.

4. Definitions, data and results

For the analysis, the Swedish manufacturing sector has been aggregated into two industries, where the Schumpeter industry consists of ISIC 35 (chemicals)

and 38 (engineering), while the Heckscher–Ohlin industry comprises ISIC 32 (textiles), 33 (wood), 34 (paper and pulp), and 37 (metal processing). The aggregation is determined by the R&D intensities by industries, as exhibited in Table 1. A further refinement in the composition of these aggregates are hindered by the lack of data, particularly with regard to FDI. The two sub-industries ISIC 31 (food and beverage) and ISIC 36 (non-metallic mineral products) are excluded since these industries are, or have been, heavily protected.

The data on FDI – of which some are unpublished – have been provided by the Swedish Riksbank, while data on DGI and output deflators are submitted by The National Bureau of Statistics (SCB). Exchange rates are from the IMF-database.

Table 2 shows that the accumulated Swedish real stock of FDI in the EC has increased by approximately 350 per cent between the two periods (from an accumulated flow of 22 billion SEK for the period 1984–1987 to an accumulated flow of 101 billion SEK for 1988–1991). Looking at each separate year in Figure 1, it is obvious that FDI peaked in 1990, from where it fell quite dramatically in 1991. However, preliminary figures for 1992 provide an impression that the drop in 1991 was only a temporary one. Hence, the first hypothesis is clearly supported.

It is also evident from Table 3 and Figure 2 that Swedish FDI has shifted towards the EC after 1987. However, in the period 1984–1987, FDI in the US and the EC followed almost identical paths, both with respect to the rate of change and the invested amounts. After 1987 the growth of FDI in the EC is spectacular while FDI in the US remains more or less constant. Accordingly, hypothesis 2 is not supported while hypothesis 3 receives strong support (Table 4). The rejection of hypothesis 2 is to a large extent explained by the inclusion of 1987 in the first period, as the relocation of investment gained momentum in this year.

Tables 5 and 6 reveal the evolution of FDI in the respective industry. The stock of S-firms' investment is more than twice the size of the H-firms' investment. However, the FDI by the H-industry increases distinctly after 1987 while the investment of the S-industry – except for the peaks in 1986 and 1991 – is quite constant. The H-industry's FDI shifts upward dramatically in 1990, the only year FDI in the H-industry exceeds FDI by the S-industry. However, this shift can be pinned down to two major takeovers by Swedish firms in the forest industry. Moreover, the huge increase in 1990 was followed by a correspondingly dramatic fall in 1991. FDI in H-industries this year was less than 1 billion SEK in current prices, while it amounted to roughly 22 billion SEK in S-industries. For the other two years in the second period (1988 and 1989) the level of investment in S-industries was almost double the investment in H-industries. As is seen from Figure 3, the overall picture seems to suggest that the H-industry experienced a trendwise increase in FDI after 1987, while the S-industry shifted up their FDI the year before and then kept them at a constantly high level. The data support the fourth hypothesis, while the fifth hypothesis is rejected.

In terms of the FDI per employee the investment level is considerably higher in the S-industry although the H-industry exhibits a faster growth.¹ These figures have two components; the size of the domestic labor force and the extent of FDI in the respective industry. Thus, for constant (or growing) domestic employment an increase in FDI per employee indicates complementary overseas production. During 1984–1991 the number of employees has decreased in the domestic S-industry by approximately 6% while the domestic H-industry has increased employment by almost 28%. This suggests a complementary relationship in the latter industry since it has also had a higher growth in FDI per employee.

¹ 56 thousand SEK versus 10 thousand SEK per employee in the period 1984–1987 and 77 thousand SEK as compared to 61 thousand SEK in the period 1988–1991, for the respective industry in 1984 prices.

Considering the last two hypotheses of the relation between FDI and gross domestic production, the flow figures – decomposed into the two industries – are given in Table 6. With regard to the H-industry, investments abroad and at home follow a similar pattern. They increased trendwise between 1984–1989, peaked in 1990, and then fell significantly in 1991. As illustrated in Figure 4 (total Swedish FDI) and Figure 5 (Swedish FDI in the EC), no evidence that FDI substitutes for DGI (domestic gross investment) can be detected for the H-industry.

The S-industry shows a different pattern. Except for the years 1986 and 1990, the investment patterns move in different directions. This is most obvious in 1987 and 1991 and indicates a strong substitution between FDI and DGI, as is suggested by for instance Belderbos (1992) to be the case for small open economies dominated by a limited number of large multinational firms. However, a difference in the pattern of FDI in the S-industry appears with regard to host region. As is seen from Table 8, the correlation for the period 1981–1991 is significantly negative only in the case of the EC being the recipient region. More detailed and refined studies are, however, warranted to draw any firm conclusion in this matter although there are apparent differences between the sub-industries. Noteworthy is also that in 1991 FDI in the S-industry for the first time almost leveled with DGI, and that they exceeded by far the total – foreign and domestic – investments undertaken in the H-industry.

5. Concluding remarks

We have found a substantial shift in the investment pattern occurring at the time of the announcement of the EC 1992 program. The shift implied a dramatic increase in Swedish FDI into the EC, especially within the S-industry. An interview study shows that a major cause for this shift was uncertainty about a future Swedish EC membership and a fear of fortress Europe (Braunerhjelm 1990).

Except for some recent contributions, it has in the literature often been emphasized that FDI and DGI are complementary in small open economies dominated by a small number of large multinational firms, as emphasized in the case of Sweden by Swedenborg (1979). In this paper we have found little sign of complementarity when investment patterns are studied at industry levels and on different regions. Rather we have found strong substitutabilities between FDI and DGI in S-industries. However, these findings are only significant for the EC region, i.e., the core economic area for Swedish multinational firms, while the pattern is less pronounced when the whole world is considered. The results are robust as concern the aggregation. A move of the borderline case – ISIC 34 – into the Schumpeter industries would have made the findings even stronger. The use of firm data would probably further enhance the results.

In the long run, a diminished S-industry could have severe welfare consequences. If increasingly larger proportions of the R&D-intensive sector is located abroad, higher macro-economic vulnerability would be inserted on the Swedish economy due to the high dependence on more price-sensitive production. Further, an erosion of knowledge or skill today may be extremely hard to re-capture later, especially if clustering effects to reap the benefits of spill-overs will gain in importance. Hence, a shift today may have irreversible long-run effects.

Considering the size of the shift in investments and the substitutability found for knowledge-intensive industries, it is hence an issue of profound dignity for policy makers in outsider countries to deal with uncertainty about the EC 1992 program – and similar regional arrangements (LAFTA, NAFTA, etc.) – in order to avoid the emergence of structural imbalances in domestic industry.

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Table 1 **Research and development expenses in Swedish multinationals
1986 and 1990**
R&D expenses as percent of turnover

ISIC	1986	1990
31	0.7	0.2
32	0.1	1.0
34	0.7	1.3
35	6.7	8.1
37	0.2	0.8
38	4.5	5.3

Note: The figures are based on the IUI data base covering Swedish multinationals. R&D expenses in industries not mentioned in the table are negligible. The figure for ISIC 34 in 1990 is still preliminary.

Table 2 Swedish direct investment totally and in the EC 1984–91
New investment in million SEK, current prices and in 1984
prices

	Total		EC	
	Current prices	In 1984 prices	Current prices	In 1984 prices
1984	12890	12890	4 663	4 663
1985	15696	14724	3 274	3 071
1986	26520	23294	6 397	5 619
1987	28671	24030	10 379	8 699
1988	44275	34843	22 984	18 088
1989	62777	45787	31 809	23 200
1990	83194	55464	63 297	42 199
1991	48229	29883	28 750	17 814

Source: Based on data from OECD, *Main Economic indicator*, various issues and the Central Bank of Sweden

Table 3 Swedish foreign direct investment in the EC and the US
1984-91
 Net investment, million SEK

	Current prices		Accumulated	
	EC	USA	EC	USA
1984	4 663	2 242	4 663	2 242
1985	3 274	4 076	7 937	6 318
1986	6 397	11 203	14 334	17 521
1987	10 379	4 043	24 713	21 564
1988	22 984	2 215	47 697	23 779
1989	31 809	7 388	79 506	31 167
1990	63 297	3 249	142 803	34 416
1991	28 750	4 873	171 553	39 289

Source: Based on data from the Central Bank of Sweden

Table 4 **Relation of Swedish foreign direct investment in the EC and US, 1984-91**
 Current prices, million SEK, normalized

Normalized
 for difference
 in Market size

	EC-Sum	US-sum	EC/US	EC/US
1984-87	24 713	21 564	1,1460	1,1906
1988-91	146 840	17 725	8,2843	7,3538

Sources: Based on data from the Central Bank of Sweden, OECD and the Central Statistical Bureau of Sweden

Table 5 Swedish total foreign direct investment in S-industries and H-industries, 1981–91
Net investment, million SEK

	<i>Current prices</i>		<i>Real (1984 prices.)</i>		<i>Real (1984 prices.)</i>	
	<i>Flows</i>		<i>Flows</i>		<i>Accumulated</i>	
	<i>S-products</i>	<i>H-products</i>	<i>S-products</i>	<i>H-products</i>	<i>S-products</i>	<i>H-products</i>
1984	4 148	752	4 148	752	4 148	752
1985	3 970	457	3 724	429	7 872	1 181
1986	14 528	839	12 761	737	20 633	1 918
1987	10 534	1 546	8 829	1 296	29 462	3 213
1988	11 507	4 514	9 056	3 552	38 518	6 766
1989	11 962	6 185	8 725	4 511	47 242	11 277
1990	10 752	23 709	7 168	15 806	54 410	27 083
1991	21 234	454	13 157	281	67 567	27 365

88635 38456

SUM:	67 567	27 365
Labour 91	493 500	398 859
FDI/Employee	0.1369	0.0686

SUM: 84-87	29 462	3 213
Labour 87	522 800	309 600
FDI/Employee	0.0564	0.0104

SUM: 88-91	38 105	24 151
Labour 91	493 500	398 859
FDI/Employee	0.0772	0.0606

Sources: Based on data from the Central Bank of Sweden (FDI), OECD (implicit price index) and the Central Statistical Bureau of Sweden (employment)

Table 6 Swedish foreign direct investment in the EC in S-industries and H-industries
Net investment, million SEK

	<i>Current prices</i>		<i>Real (1984 prices.)</i>		<i>Real (1984 prices.)</i>	
	<i>Flows</i>		<i>Flows</i>		<i>Accumulated</i>	
	<i>S-products</i>	<i>H-products</i>	<i>S-products</i>	<i>H-products</i>	<i>S-products</i>	<i>H-products</i>
1984	2453	190	2 453	190	2 453	190
1985	1601	298	1 502	280	3 955	470
1986	3496	422	3 071	371	7 026	840
1987	4717	1400	3 953	1 173	10 979	2 014
1988	7380	4191	5 808	3 298	16 787	5 312
1989	6881	5775	5 019	4 212	21 806	9 524
1990	9910	22947	6 607	15 298	28 412	24 822
1991	20355	495	12 612	307	41 024	25 129

56 793 35 718

SUM:	41 024	25 129
Labour 91	493 500	398 859
FDI/Employee	0.0831	0.0630

SUM: 84-87	10 979	2 014
Labour 87	522 800	309 600
FDI/Employee	0.0210	0.0065

SUM: 88-91	30 045	23 115
Labour 91	493 500	398 859
FDI/Employee	0.0609	0.0580

Sources: See Table 4.

Table 7 Swedish domestic gross investment (DGI)
Million SEK

	<i>Current prices</i>		<i>Real (1984 prices.)</i>		<i>Real (1984 prices.)</i>	
	<i>Flows</i>		<i>Flows</i>		<i>Accumulated</i>	
	<i>S-products</i>	<i>H-products</i>	<i>S-products</i>	<i>H-products</i>	<i>S-products</i>	<i>H-products</i>
1984	12 034	8 608	12 034	8 608	12 034	8 608
1985	16 170	11 905	15 169	11 168	27 203	19 776
1986	18 113	11 141	15 910	9 786	43 113	29 562
1987	20 998	13 301	17 599	11 148	60 712	40 710
1988	20 910	16 032	16 456	12 617	77 167	53 326
1989	24 761	18 984	18 060	13 846	95 227	67 172
1990	25 643	18 355	17 096	12 237	112 323	79 410
1991	23 518	13 765	14 572	8 529	126 894	87 938

162 147 112 091

SUM:	126 894	87 938
Labour 91	493 500	398 859
FDI/Employee	0.2571	0.2205

SUM: 84-87	60 712	40 710
Labour 87	522 800	309 600
FDI/Employee	0.1161	0.1315

SUM: 88-91	66 183	47 229
Labour 91	493 500	398 859
FDI/Employee	0.1341	0.1184

Source: Based on data from the Central Statistical Bureau of Sweden.

Table 8 Correlation between annual changes in FDI and DGI, 1981–91

Type of investment	DGI-H	DGI-S
FDI-H (TOTAL)	-0.03 (0.94)	–
FDI-S (TOTAL)	–	-0.23 (0.56)

FDI-H (EC)	0.26 (0.51)	–
FDI-S (EC)	–	-0.70 (0.03)

Note: Prob > |R| under $H_0: \rho = 0$ (n = 9) are given in parentheses.

Figure 1 Swedish foreign direct investment (FDI) totally and in the EC
1984-91
Deflated by the GDP implicit price index (1984=100), annual
data

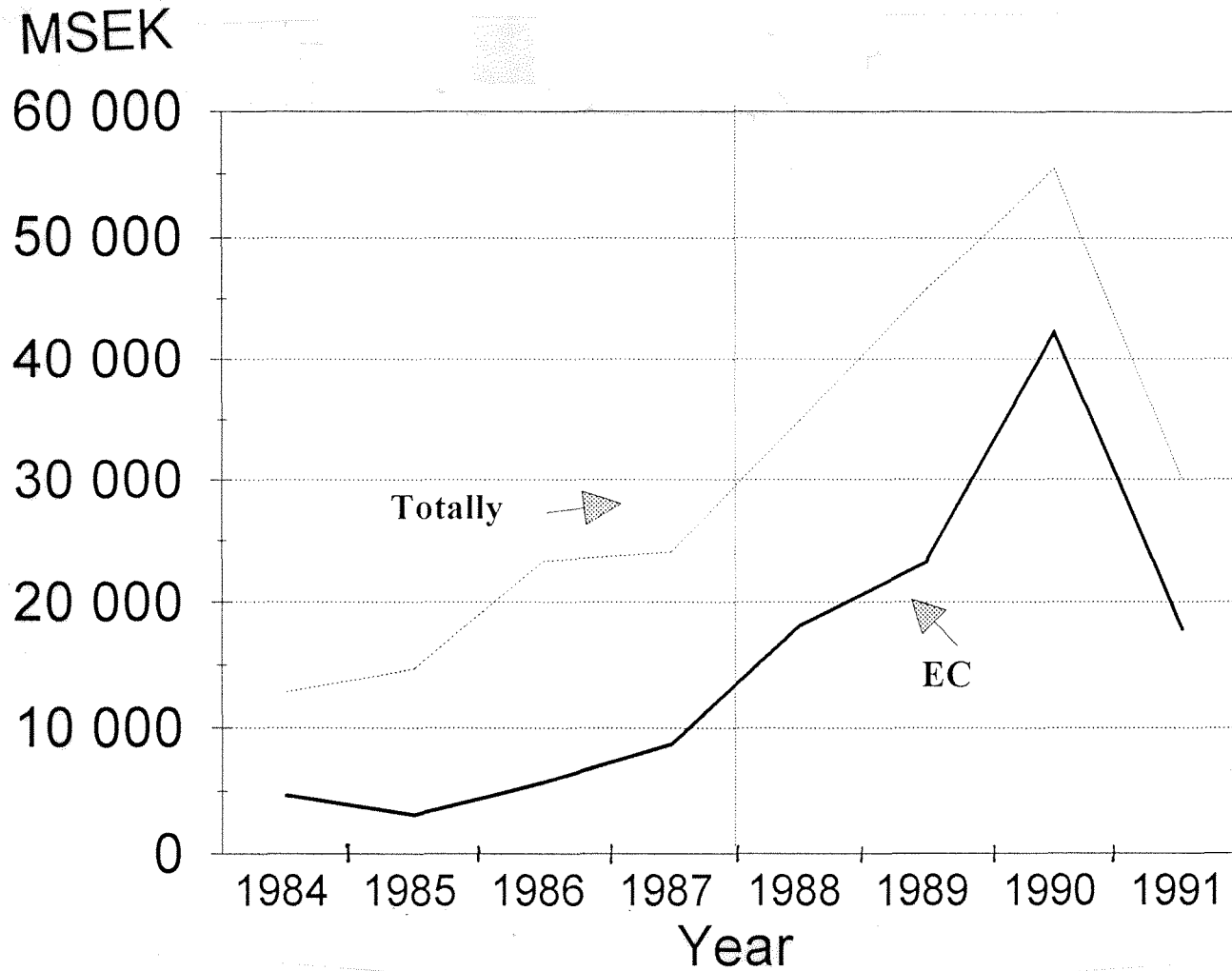


Figure 2 Accumulated Swedish foreign direct investment (FDI) in the EC and US 1984-91
Current prices, million SEK

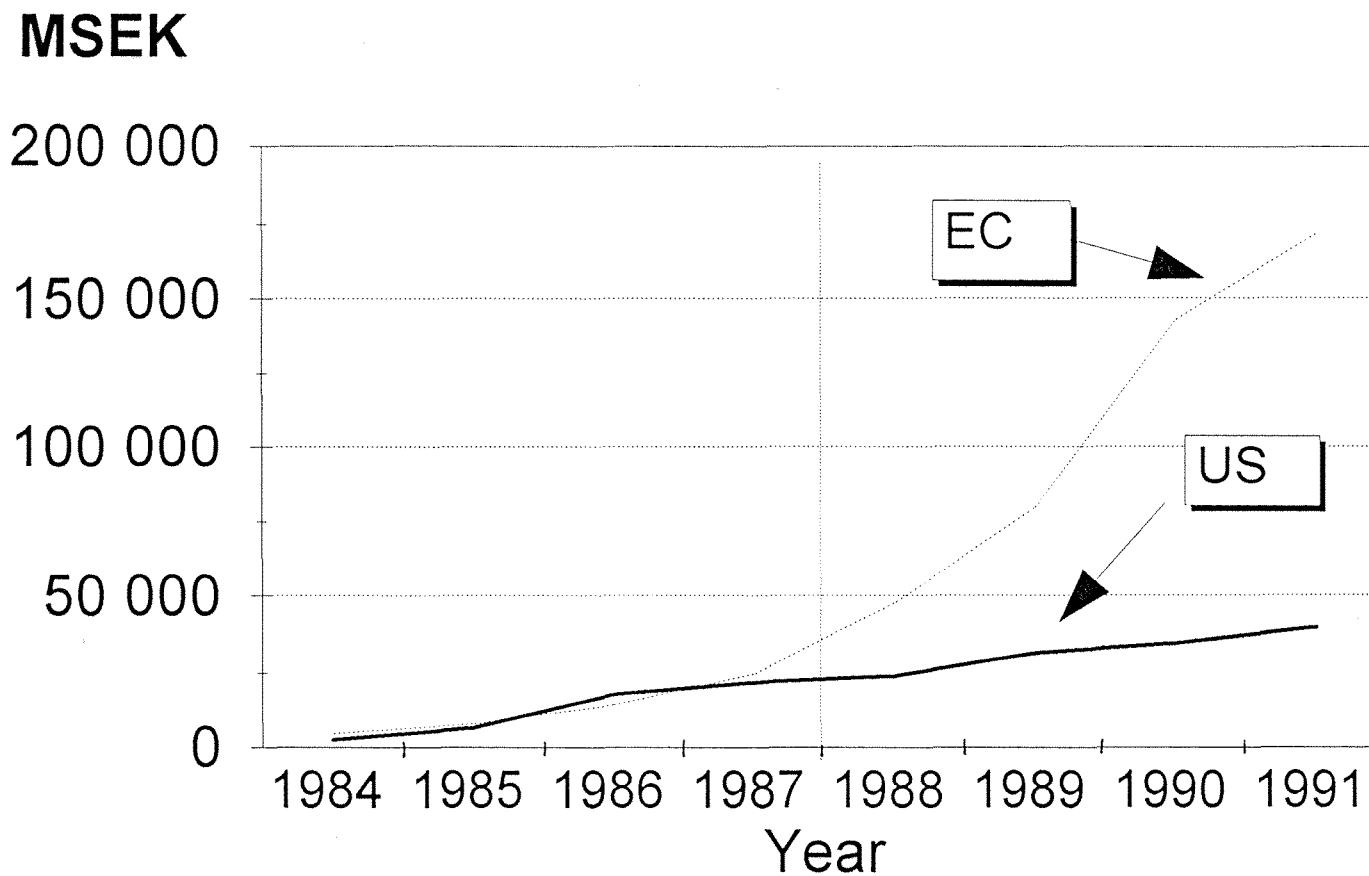


Figure 3 Accumulated total foreign direct investment (FDI) in S-
industries and H-industries
Deflated by the GDP implicit price index (1984=100), annual
data

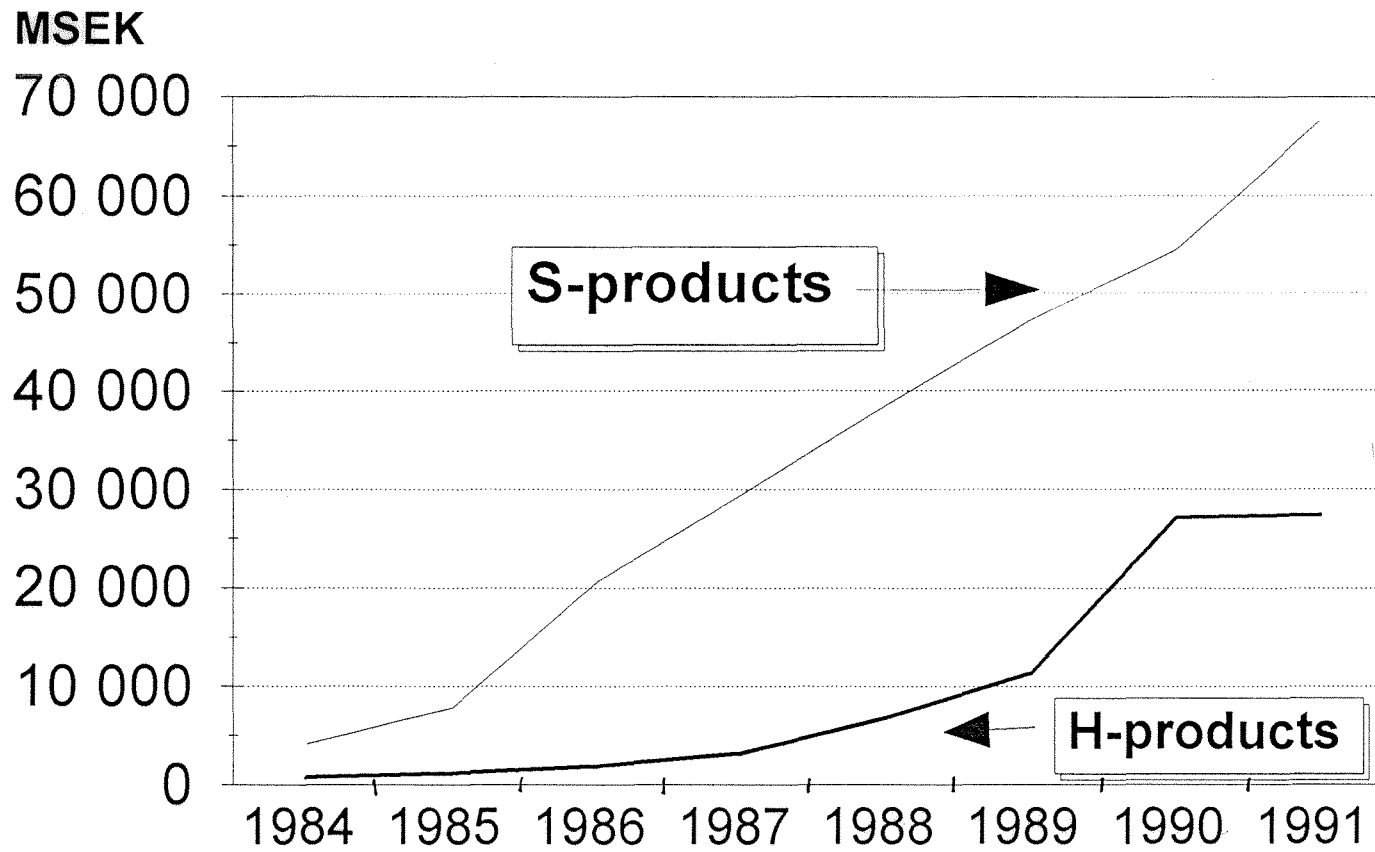


Figure 4 Swedish domestic gross investment (DGI) and FDI in S- and H-industries
Deflated by the GDP implicit price index (1984=100)

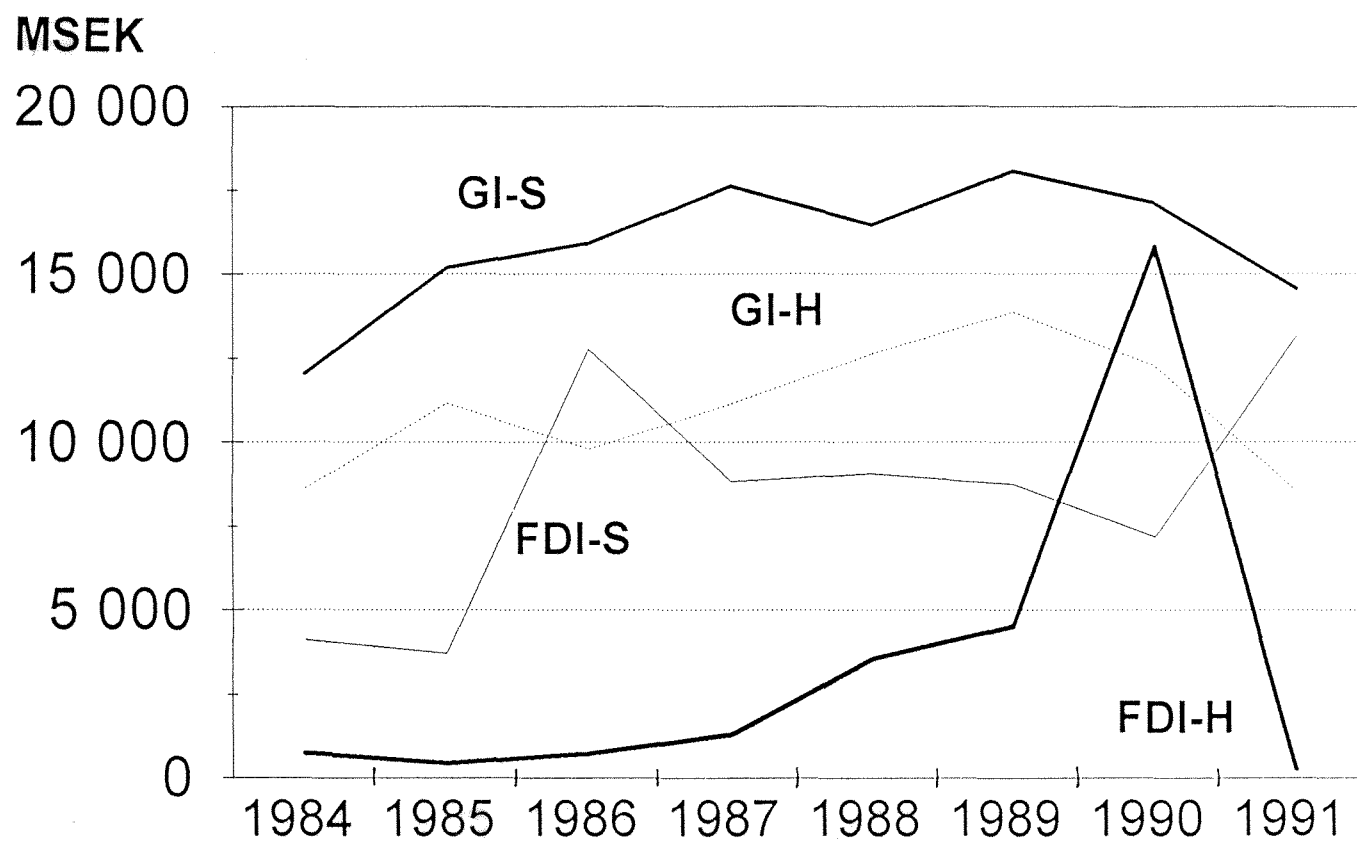


Figure 5 Swedish DGI and FDI (in EC) in S- and H-industries
Deflated by the GDP implicit price index (1984 = 100)

