

**GLOBALISATION AND ITS IMPACT ON COMPETITIVENESS: THE
CASE OF THE BRITISH AND GERMAN PHARMACEUTICAL
INDUSTRY**

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Abstract

This paper assesses the degree of financial and economic globalisation of British and German pharmaceutical companies during 1990 and 2001 and explores the changing balance between globalisation and national embeddedness. It tries to explain both the much lower degree of globalisation of German as compared to British companies in 1990, as well as their catching up at the beginning of the 21st century. The paper suggests that the lesser degree of globalisation of German firms during most of the 1990s partly explains their slide in competitiveness during this period. The conclusion examines prospects for the future of firms in both economies. The paper draws on detailed industry data, as well as case studies of the major firms in the two national industries.

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I. Introduction

It is widely held that globalisation creates multiple attachments for multinational companies (MNCs) to foreign as well as domestic national institutional environments, which weakens domestic embeddedness and implantation into national policy networks. At the same time, it is realised that the extent of such disembedding depends on the degree of cohesion of the national business system and the differential way in which that system fosters the development of factors of production. In this respect a contrast between deeply embedded German firms, reliant on domestic provision of factors of production, and more isolated and autonomous British firms has been presented in the literature (Whitley 1999; Lane 1998 and 2000; Schmidt 2002). These different degrees of institutional embeddedness/autonomy have at least in part influenced the globalisation strategies that companies in these two economies have adopted. Whereas British firms internationalised relatively early (from the late 1970s onwards), German firms did so more hesitantly and much later (from the late 1980s onwards). But this picture of uneven progress by German companies on the road to becoming globally oriented firms has begun to change since the mid-1990s.

These circumstances raise the following questions:

1. Where were the two sets of national firms located on the continuum between highly globalised and locally embedded firms in 1990, and what factors can explain their different placement?
2. How has this been changing during the last decade? How has the dramatic increase in outward FDI by large firms in both countries (UNCTAD 2001, tables III.1 and III.5) affected the balance between national embeddedness and disembedding?
3. Do German firms adopt a different path to globalisation as compared with UK firms, or do they simply follow the British pattern with a considerable time delay?
4. What are the connections between globalisation and competitiveness? Has the different speed of globalisation of each national set of firms affected the degree of competitiveness of specific industries in each country?

To answer these questions, we are undertaking a comparative review of the largest firms in the pharmaceutical/biotechnology industry of each country at

the two points in time. The focus on the pharmaceutical industry is motivated by two of its features. First, it is regarded as one of the most highly globalised industries. Firms in this industry need large markets to recoup high R&D costs. Access to new knowledge, which is more developed in some countries than in others, is an additional driver of globalisation. Further, more or less stringent regulatory approval is required for each of the countries outside the EU where firms aim to market their products. Hence the pharmaceutical industry may serve as a limiting case in answering some of the above questions. It will show whether the recent acceleration of FDI has virtually eliminated the impact of firms' national origin, or whether, in such a highly globalised industry, a degree of national embeddedness remains important, even for the traditionally more detached UK firms.

The second reason for choosing this industry has been that a German-British comparison poses an intriguing puzzle. A highly successful British industry with high R&D spending, in an otherwise unsuccessful manufacturing sector with R&D spending below the European average (Matraves 1997), may be contrasted with a German industry with an illustrious past (Keck 1993: 126) which is part of a more successful manufacturing sector that is losing competitiveness. More particularly, the German pharmaceutical industry has been losing out vis-à-vis its British rival in Europe since the early 1990s, both in terms of market share and innovativeness. The question addressed in this paper therefore is whether loss of competitiveness in the German industry is connected with the lesser degree of globalisation of its firms and, vice versa, whether British success can be ascribed at least in part to earlier internationalisation. Such an analysis also puts into perspective often exaggerated claims about British pharmaceuticals as 'a beacon of excellence' (e.g. Vitols 2001) and permits a more sober assessment of both the current and future contribution of this industry to the well-being of the British economy.

The paper utilises case studies of all the major companies in the two industries in 2001 ranked by turnover, thus making it possible to generalise to the whole industry. (We include all firms incorporated in or with operational headquarters in Britain and Germany during most of the decade or so covered, that produce prescription drugs or develop platform technologies and have a turnover of at least £300 million). The list of companies studied for this paper is given in table 2. By extending our investigation beyond merely the two or three giants in each national industry to include other firms of significant size, we are able to present a more comprehensive and balanced picture than is often provided. The case studies of firms in 2001 draw on data from company web sites and various company financial data bases, as well as on reports by industry associations and

financial analysts, and some other secondary sources. These data are compared with information for the same companies in 1990, which draws on similar sources but achieves a less complete data set.

We adopt a dual definition of globalisation that considers both its financial and its economic dimension: 1. insertion into and exposure to international financial markets; and 2. company operations and activity in all major world markets for pharmaceutical products. A company's degree of financial globalisation is assessed by looking at the ownership structure of firms, their mode of growth and their exposure to pressures from both domestic and foreign institutional investors. To gauge economic globalisation, the following three indicators have been adopted: the proportion of foreign employment as a proxy for the extent of foreign operations; the number of countries in which the firm has sites as a proxy for global dispersion; and the proportion of sales achieved in the US, Japan and the rest of the world (RoW) as a proxy for global reach.

II. The Two Industries Compared

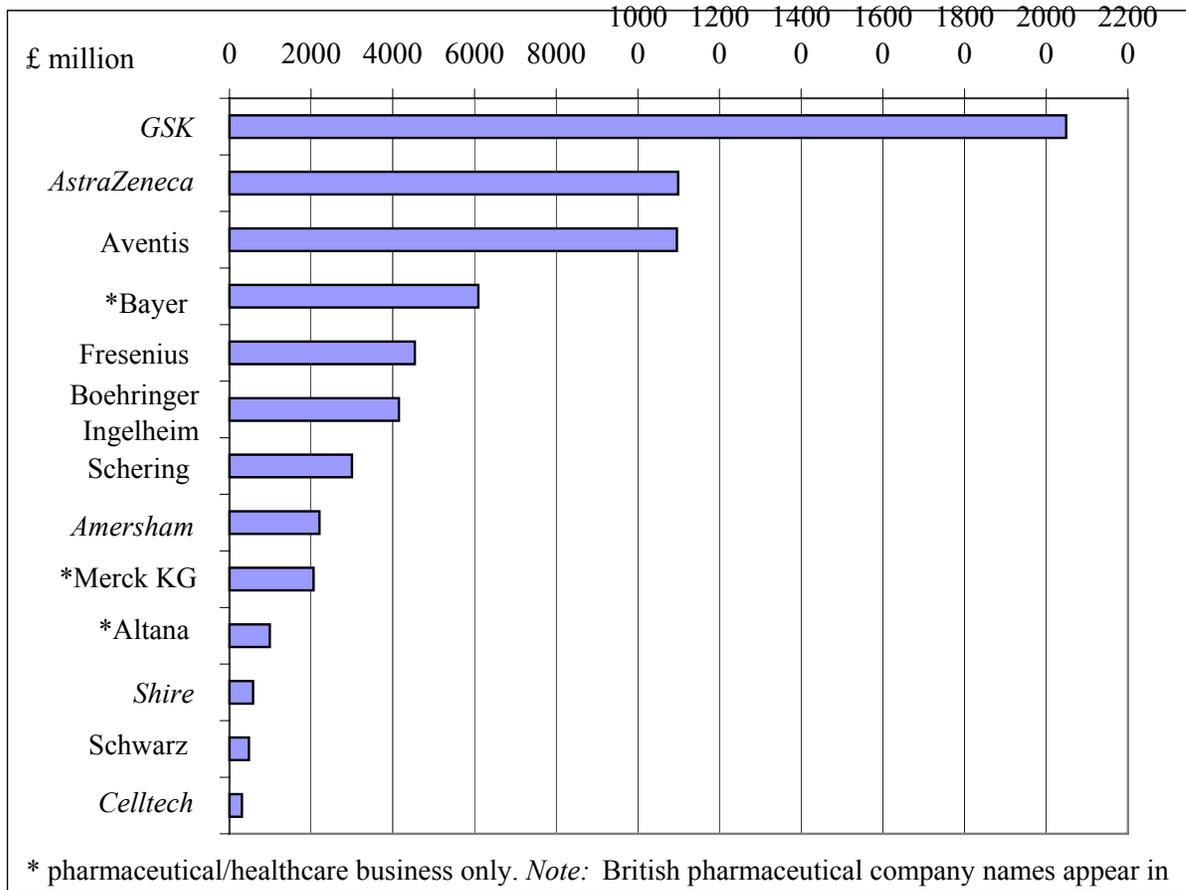
The German and British pharmaceutical industries have very different histories. In Germany, the large chemical–pharmaceutical firms have their origins in the 19th century (Keck 1993: 126), were very early adopters of a science-based approach to production and, due to a bank-based financial system, have had an almost uninterrupted existence since then. (Pharmaceuticals, however, were a relatively small part of the product portfolio of the three giants until the early 1990s (Becker 2001: 92)). In contrast, their British counterparts date back mostly to the 1920s and 1930s or, if biotechnology firms, the 1980s and 1990s. Historically, they entered much later into large-scale industrial R&D and have had discontinuous development during recent decades, reflecting their greater orientation to the stock market. The two industries appear to be of similar size, measured in value of production, although the market value of sales was significantly higher in Germany in 2001 (EFPIA 2002: 14).

At the current time, a first striking difference between the two sets of firms is the divergent degree of capital concentration and the ownership structure of all but the giant firms in the industry. Different financial systems and divergences in the patterns of ownership and control have led to different modes of firm growth and extent of size polarization (Figure 1). The large British firms have a very high concentration of capital and only two giants – GSK and AstraZeneca – now dominate the industry. In 2000, GSK ranked first and AstraZeneca fourth in terms of world market share in pharmaceuticals (Becker 2001: 108). Since other firms are comparatively small, the British pharmaceutical industry has a

highly polarized structure. The German industry has a lower degree of capital concentration and an absence of the size polarization that characterises the British industry. A German market concentration rate for the top ten of 38.35 per cent in 1999 contrasts with a UK rate of 49.13 per cent (Gambardella et al 2000:25, table 8). (The divestment, in 2000, by BASF of its pharmaceutical subsidiary will have reduced the German rate of concentration further and widened the difference between the two countries' industries). Although the German chemical-pharmaceutical giants are also very large they have grown more organically over a very long period. The German industry also contains a number of large, often family-owned, firms that have sufficient size to be or to become independent global players. All German companies have remained loyal to one locality over their long history – another contrast with UK firms, whose mergers have led to the closure or downgrading in importance of some sites.

Firms in both countries previously had a mixed product portfolio consisting, in different combinations, of chemicals of various kinds, lower-tech health products/foods, and patented and generic pharmaceuticals. Traditionally their degree of diversification has been high. British firms (e.g. Glaxo in the 1980s and ICI in 1993) began to de-diversify significantly earlier than German ones. Divergences in forms of corporate governance and in the ensuing degree of pressure from investors have led in the British case to a stronger and earlier concentration on the high-margined prescription pharmaceutical segment (Froud et al 1998).

Figure 1: *Annual sales of German and British pharmaceutical firms, 2001*



Another significant difference in the national institutional framework lies in the role of the state in shaping the competitive environment of firms in this industry. The British state has since the late 1950s provided strong incentives for inward investment by foreign pharmaceutical firms, oriented particularly to those that are prepared to locate parts of their R&D function in Britain (Thomas 1994; Gambardella et al 2000). It has thus created a more challenging competitive environment, eliminating the smaller and weaker firms and forcing the survivors to become more attuned to international competitive standards (ibid). No other British manufacturing industry benefited from similar policies to encourage international competitiveness (cf. the detrimental effect on the competitiveness of the UK computer industry of the government's 'Buy British' requirement for the public services' IT needs (Owen, 1994)). The policy worked well in the pharmaceutical industry because it was administered via the Pharmaceuticals Price Regulation Scheme (PPRS), negotiated between the Department of Health and ABPI, the industry association. The PPRS regulates the cost of medicines supplied to the National Health Service, the UK's tax-funded medical system, by allowing companies to set their own prices but

capping the rate of profit they make on sales to the NHS. Calculation of profits considers investments undertaken, including those in R&D. Higher allowable profit margins are the reward for investment in UK-based R&D. The German state also allows companies freedom in drug pricing at launch, but it introduced a reference pricing system in 1989 that covers two-thirds of the pharmaceutical market and fixes reimbursement levels at the average price of cheaper drugs in the same therapeutic class (Jacobzone, 2000). In recent years it has also introduced regulations and incentives that steer doctors and pharmacists towards cheaper generic drugs. Such a pricing system not only keeps down profit levels but, significantly, provides no incentive for a high level of domestically based investment in R&D. There is additionally a 16 per cent VAT charge on prescription drugs, whereas drugs in Britain are VAT-free. British-based firms are seen to benefit from the differential pricing system, the indirect subsidy it provides for R&D, and the tax policy (Froud et al 1998; VfA 2001), and the stability and consistency of the PPRS over the last 40 years has also been an advantage (Owen, 1994).

The degree of international competitiveness of the two industries has differed over time. German firms have usually been world leaders in exports and have had an excellent record in R&D and product innovation. But their performance has declined during the 1990s, and British firms began to outperform their German competitors in crucial respects. British firms' share of the world market has increased between 1989 and 1999, whereas that of German firms has declined in the same period but still remains larger (Gambardella et al 2000:31). The large British firms invest more in R&D (in 2000, 32.5 per cent more, according to the EFPIA (2002: 18)). Between 1995 and 1999, their share of the top 50 new chemical entities was double that of German companies (Gambardella et al 2000: 33), and in 2001 they had a significantly higher share of the world's top 75 prescription drugs – 20.3 per cent versus 2.7 per cent (ABPI 2002: 3). Their advantage in the field of innovation is reflected in a significantly larger number of so-called blockbuster drugs in their product portfolios. The competitive slide of the German pharmaceutical industry is evident in the fate of Bayer – now its largest firm. Bayer, ranked 12th among the world's leading manufacturers of pharmaceuticals in 1995, was no longer in the top 15 companies by 2001 (IMS Health data), in part due to leapfrogging by other firms merging with rivals.

Last, Britain has a number of biotechnology firms, which, although not yet financially very secure, are older, larger and said to be more involved in therapeutic drugs research than in the development of platform technologies that most German firms favour (Kettler and Casper, 2000). There is as yet no well-

established German counterpart for companies like Celltech, Cambridge Antibody and Vernalis.

III. Companies' Degree of Globalisation at the Beginning of the 1990s

Historically and up to the mid-1990s, German pharmaceutical firms were much less globalised than their British counterparts. Financial globalisation hardly existed, and insider control seemed well entrenched. Even some large firms were not yet listed on the stock market and those that were had few foreign investors in general and institutional investors in particular. (For details, see Lane 2003.) Insider control traditionally has included control also by labour representatives on companies' supervisory boards. Although labour has not opposed globalisation *tout court* its company representatives seek to prevent overseas activity if it involves substitution for domestic activity and employment, rather than their expansion. They also tend to oppose any divestment or relocation out of Germany or, at least, seek to gain compensation for any loss of employment. Hoechst discovered how costly such a reorganisation strategy can be, when, as a consequence of its merger with Rhone-Poulenc in 1999, it had to lay off a large number of highly-qualified employees for whom the works council negotiated generous compensation packages.

The economic globalisation of German firms was well under way by the early 1990s, but was much less advanced than for large British firms. Both global reach and global dispersion of operations were relatively low. German firms remained strongly Europe-oriented in terms of exports and in the location of their subsidiaries. Domestic employment mostly remained higher than foreign employment, and the internationalisation of R&D was comparatively low.

Both the financial and the economic globalisation of large British firms during the early 1990s were much more advanced. All reasonably sized firms were quoted on the stock market, and their highly dispersed share holdings left them vulnerable to takeover or control by outsiders. It is, however, much harder to provide statistical comparison with the picture in 2001. Few of the firms currently in the industry existed in 1990 in their present form. The two current giants were five separate firms in the early 1990s (Glaxo, Wellcome, and the Anglo-American company SmithKline Beecham, which together now comprise GSK; and Zeneca, the pharmaceuticals business spun out from ICI in 1993, together with Astra of Sweden making up AstraZeneca). Smaller firms (Amersham, Shire and Celltech) also existed in 1990 in a radically different form from today and had not yet reached a scale to be globally active. Shire

Pharmaceuticals – now Britain’s fourth largest drugs company – for example, was founded only in 1986 and has grown to its current size only via seven acquisitions in the six years up to 2001. In 1995 it employed only 80 people worldwide. Hence the comparison of sales and employment dispersion presented in Table 1 focuses on only the larger firms at that time – Glaxo, Wellcome, SmithKline Beecham and ICI. Glaxo, in 1990, was already strongly US-focused, had internationally dispersed R&D sites, and employed more people abroad than at home.

Table 1: *German and British pharmaceutical firms in 1990*

a) Turnover (%)

	BASF*	Bayer	Hoechst	Boehringer Ingelheim	Fresenius	Merck KG
Germany		34	23	25	51	27
Rest of Europe	67	25	35	31	23	40
All of Europe	67	59	58	56	74	67

	Glaxo+	ICI	SmithKline Beecham	Wellcome
UK	12	23	11	33
Rest of Europe	33	26	27	23
All of Europe	45	49	38	46

b) Employment (%)

	BASF*	Bayer	Hoechst	Boehringer Ingelheim	Fresenius	Merck KG
Germany	64	37	53	39	63	40
Rest of Europe	14	33	19	22	15	26
All of Europe	78	70	72	61	78	66

	Glaxo+	ICI	SmithKline Beecham	Wellcome
UK	39	41	19	37
Rest of Europe	n.a.	13	21	13
All of Europe	n.a.	54	40	50

* BASF sold its pharmaceutical operations in 2000-1.

+ Pharmaceuticals and foods division.

Source: For Germany, adapted from Becker 2001, p.153, 155, 156; for Britain, annual reports.

What were the reasons for this Anglo-German difference in the level of firm globalisation? How can the marked lag on the part of German firms be explained? The foremost explanation to date has pointed to their greater degree of local and regional embeddedness (cf. Lane 1998). A greater reliance on access to national tangible and intangible factors of production and on risk sharing in national innovation and inter-firm networks (both direct and mediated by associations) are important factors, as well as greater constraints experienced from labour. Additionally, the more limited use of the stock market by German

companies and resulting forms of corporate governance underlay both the lack of pressure and the opportunity to internationalise on a large scale. The resulting greater presence of firms with family majority ownership in particular has curtailed expansion beyond the point where the family would lose control. More generally, external growth through large-scale merger and acquisition to gain globally competitive size has been the exception (the Hoechst case), rather than the rule in the German pharmaceutical industry.¹ As indicated above, the British stock market-based system has had the opposite effect on UK firms' growth strategy.

Yet this explanation alone of the differing degree of British and German firms' globalisation in 1990 is too simple and cannot fully explain the national differences in firms' patterns of globalisation. It is too simple because, in this industry, close relations with the state and the system of health provision are vital in both countries. As shown earlier in this section, close firm-state relations exist to negotiate cost structures and drug approval systems. In addition firms may receive indirect support from the state for R&D, and they are reliant on the state's structuring of the national health system as well as being exposed to its competition policy.

The 'embeddedness' thesis also offers an insufficient explanation. Additional explanatory factors need to be considered to explain German firms' lag on the road to globalisation, as well as the early start of their British counterparts. One important reason has been historical. Whereas Britain's past possession of an empire and the use of pounds sterling as an international currency favoured British firms' early internationalisation, Germany's loss of two world wars drastically disrupted its firms' internationalisation endeavours. As part of reparations after WWI, German companies lost all their assets and patents in the US, UK and France (Corley 1999/2000; Keck 1993: 126). In the US, they even lost their trade names when subsidiaries of Merck and Schering became the eponymous US firms. This setback caused many German firms to prefer an export strategy towards internationalisation and to delay embarking on foreign direct investment until much later than comparable British companies. A final explanatory factor is that German firms have a larger home market and occupy a larger share of it than do British counterparts in their home market; hence they remain more reliant on it for sales (EFPIA 2001; EFPIA 2002).

IV. Acceleration of Globalisation in the German Industry

The picture of German firms as laggards on the road to globalisation began to change from the mid-1990s onwards, and accelerated globalisation is an

appropriate way to describe the process of change. While this applies to German firms in many industries, it has been particularly pronounced in the pharmaceutical sector. (See foreign investment statistics in UNCTAD 2001, tables III.1 and III.5).

The reasons for change are connected both with new opportunities and new constraints. Cost pressures from rising R&D expenditure translate into pressure to enlarge market opportunities. The large size of the US market, together with the clear leadership of US firms in the biotechnology segment and in innovation more generally, makes presence in this market obligatory for firms with global aspirations. The importance of obtaining regulatory approval from the FDA is an additional reason for establishing sites in the US. Hence German firms have had to move away from their Euro-centricity and strengthen their presence in the US, both in terms of manufacturing sites or R&D laboratories, and in terms of sales. Entry into the Japanese market and that of the rest of the world (RoW) has been much slower.

In light of these changes, have German firms caught up with British firms in their degree of globalisation, or are there still significant differences at the beginning of the 21st century? Are the responses of German firms to global pressures qualitatively different, or do they simply constitute a delayed response in comparison with the globalisation strategies of British companies?

To answer these questions, we first examine the two sets of national firms in terms of their degree of financial globalisation. It is no exaggeration to say that the large British firms owe their current dominant status worldwide to financial globalisation: they have depended on financial markets for their growth and globalisation strategy. The four largest – GSK, AstraZeneca, Shire and Amersham – have expanded through sizeable multiple acquisitions during the 1990s. This fact has shaped their mode of corporate governance. All firms, including the smaller ones (in terms of turnover and employees), are strongly reliant on how their shares are valued on the stock market. Their relatively dispersed ownership makes them vulnerable to the threat of takeover from other British or foreign companies, although GSK and Astra Zeneca now are perhaps too large to become targets.

In Germany, financial globalisation has progressed markedly since the late 1990s (O’Sullivan 2001; Hoepner 2001; Lane 2003), but it has not yet had nearly the same salience as it has for British companies. Stock market listing is not yet as important as it is for British pharmaceutical companies, and instances of external growth through acquisition, to attain global status, have been

infrequent. Financial globalisation has nevertheless been important for both restructuring and growth. Thus the transformation of Hoechst and its eventual merger with Rhone Poulenc of France to form Aventis depended entirely on stock market quotation and the opportunity it provided both to raise large amounts of capital and to swap shares. Also the restructuring of both Bayer and BASF into business divisions occurred in response to investor pressures. Several smaller companies and family- or foundation-owned firms, with the exception of Boehringer Ingelheim, have listed on the DAX or on foreign markets during the last few years, usually to support a strategy of external expansion. Most have now made acquisitions. Thus, Altana achieved listing on the DAX and the NYSE in 2002, and the company explicitly linked its NYSE listing with expansion plans in the US (Annual Report 2002). Schering, too, started to acquire US companies after listing on the NYSE in 2000. External growth has for the most part been fairly modest, with the exception of Fresenius. Its growth through acquisition in the US resulted in around a sevenfold increase in turnover and employment between 1990 and 1997 (Becker 2001: 235).

Yet exposure to the market for corporate control applies only to a few companies, particularly Bayer and, to a lesser extent, Hoechst/Aventis. Attention to foreign investors, in terms of investor relations and the formal aspects of observing shareholder value, looms large in both companies, and the restructuring first of Hoechst and then Aventis has been a classic case of following the dictates of investors (Becker 2001). All privately owned firms have taken care to preserve family/foundation majority control. Thus, in the cases of Merck KGaA, Fresenius, Schwarz and Altana, the family/foundation retains between 51 and 75 per cent of share capital, and family members are active in corporate governance.

The different degree and pattern of economic globalisation of British and German companies, shown in Table 2, reveal complexities that make comparison more difficult.

The data are difficult to interpret because both sets of firms show intra-country differences, depending on company history and size. It is nevertheless clear that German firms have in many ways caught up and are now similar to their British counterparts on several indicators of economic globalisation.

British firms, nevertheless, remain more globalised. This is particularly evident in a comparison of the two national giants – German Bayer and British GSK. Bayer is still a Europe-centred company, with a relatively low level of global

dispersion of its activities and employment, and it has retained a diversified business portfolio, with only one-third of sales derived from healthcare. Its board has remained solidly German, and Bayer's attachment to its century-long base in Leverkusen remains strong for all operations. GSK, in contrast, is highly globalised on all indicators in the table. It now has its operational HQ in the US, and its board membership reflects this strong US-centrism, yet the company remains registered in the UK, where it also has its primary stock market listing. The R&D function also is highly US-focused although the firm also remains one of the three largest investors in research in the UK, together with AstraZeneca and Pfizer (ABPI, 2003).

The comparative evaluation of the extent of globalisation is more difficult for the other two giants – Aventis (Hoechst) and AstraZeneca, both of which were formed from mergers with a European partner and hence have remained more Europe-centred organisations. Yet North America dominates the sales breakdown for AstraZeneca (55%), whereas Aventis has greater sales in the rest of the world (RoW). In both cases, the board of directors is bi-national (at least), giving representation to members from both merger partners. Aventis has loosened its ties with Germany, having placed its legal headquarters in France (albeit near the German border) and appointed a US-based executive as head of discovery research. The German market is now its third largest, behind the US and France. Nevertheless, reliance on the German research infrastructure and human resources still is significant; Frankfurt remains the main research site for several therapeutic categories; and new costly facilities are still being opened in Germany (e.g. a genomics research facility in Munich and a new insulin-producing plant). The company also has adopted a system of employee representation similar to the German system of co-determination. AstraZeneca is more Europe-centred than Aventis in terms of locations and employment, and less so in terms of sales. Its embeddedness in Britain appears less strong since its R&D headquarters is in Sweden, even though its legal headquarters is in London. Its accounts are denominated in US dollars, reflecting the importance of its US institutional shareholders.

When we then focus on the smaller firms the picture is more varied, depending on size and age. The starker internal differences in Britain than in Germany reflect the greater size polarisation.

Table 2: *Indicators of Globalisation: German and British Pharmaceutical Firms in 2001*

Company	Sales (£ mill.)	Non-European sales as % of total sales	Employment	Non-European employ't as % of total employ't	Spread of international activity			Overall degree of globalisation
					No. of sites in no. of countries	No. of R&D sites	Geographical spread of sales (%)	
<i>German</i> Aventis (Hoechst)	10,958	68	74,931	48	44 countries >120 sites; R&D/ mfg in 22 non-Eur countries	3 sites, 1 in US	N.America 39 Japan 6 RoW 19	High in all respects
Bayer*	6,096	60 ⁺	41,700	45 ⁺	sites in 100 countries	4 main sites	N.America 33 AsiaPac 16 RoW 11	Medium-high, sales still Europe-centric
Fresenius	4,538	69	60,667	60	sites in 100 countries, 16 main mfg sites w/wide		US 56 AsiaPac 11 RoW 17	High
Boehringer Ingelheim	4,150	69	27,980	46	sites in 42 countries	8 sites in 7 countries/3 regions	N.America 52 RoW 17	High in sales, lower in employ't
Schering	3,002	55	25,556	38	28 subsids. 14 in Europe	9 sites in Europe, US & Japan	US 23 Japan 14 RoW 18	Low
Merck KG*	2,060	57	34,294 ⁺	45 ⁺	192 sites in 55 countries ⁺	6 sites in 5 countries	N.America 31 AsiaPac 9 RoW 17	Low-Medium
Altana*	986	46	6,867	56 (outside Germany)	12 subsids in 12 countries	2 sites, 1 in US	N.America 26 RoW 20	Low
Schwarz Pharma	476	32	3,428	26	17 subsids in 14 countries	2 sites, 1 in US (development only)	US 30 Asia 2	Low
<i>British</i> Glaxo-SmithKline	20,489	74	107,899	57	107 sites in 70 countries	20 R&D sites, inc. 9 foreign	US 53 Japan 4 RoW 13	High
Astra-Zeneca	10,986	68	52,600	43	marketing in >100, mfg in 20 countries	9 sites, 7 abroad (major sites in 5)	Americas 58 RoW 10	High
Amersham	2,206	61	9,500	38	>50 countries, mfg sites in Europe, US, Asia	7 main sites in 4 countries	N.America 48 Japan 18 RoW 10	High in sales, lower in employment
Shire Pharmaceuticals	580	74 (US)	1,677	Approx 80	14 sites in 9 countries	2 (1 in US)	US 74 Internat'l (inc. UK) 26	Medium (US-focused)
Celltech	303	85	2,029	N.A.	10 main sites in 7 countries	2 in UK, 1 in US	US 73 RoW 12	Low

* Pharmaceutical/healthcare divisions only, except where indicated.

+ Entire company

Note: Euros converted to sterling at €1 = £0.62; US\$ at US\$1 = £0.67 (AstraZeneca produces its accounts only in US \$)

Sources: Company annual reports 2001 & 2002; company websites; company presentations

Fresenius has greatly increased its non-European sales and employment through a number of US acquisitions, but has retained its headquarters and R&D centre in Bad Homburg, Germany. Both Boehringer Ingelheim and Merck KGaA have also spread their sales activities widely. Boehringer Ingelheim operates important R&D sites in the US and in Japan, but retains its main research facility in its home base at Ingelheim, Germany, where it recently invested heavily in a new administrative building (Becker 2001: 157). Merck KGaA, despite setting up a new research site and marketing and distribution centres in the US and Japan, similarly maintains its core activities in Darmstadt where it originated as an apothecary in 1668. In contrast, both Schering and, more so, Schwarz have a comparatively low global dispersion. Schering does generate high sales outside both Europe and the US (the relatively modest US sales reflecting the resolution only in 1988 of Schering's legal problems with Schering-Plough over the use of the Schering name in the United States), whereas Schwarz remains firmly Europe-centred.

The British second-tier companies are very much younger and smaller than their German counterparts. Although its origins date back to the 1940s, Amersham in 1990 was still of small scale and very much UK-centred. A deliberate strategy of globalisation through acquisition led to mergers with two large European partners and many more smaller acquisitions. Although less strongly US-focused in either operations or sales, its headquarters for biosciences is nevertheless located there. Shire retains a particularly low attachment to Britain, by virtue of its growth through serial US acquisitions, with most of its employees in the US and strong corporate control exerted by US non-executive directors. Celltech, founded in 1975, but existing in its present form since 1990, makes more than half of its sales in the US thanks to mergers in 1999 and 2000 with two other British firms that had US operations. A laboratory in Seattle supplements its core research activities in the UK.

The same willingness of the British firms to engage actively in mergers to expand their size and scope is evident in their use of alliances with biotechnology firms and research institutions that give the large firms right of first refusal over the discoveries made by their small partners. Often these agreements are entered into to fill gaps in R&D pipelines, and for the larger firms they represent a means of tapping into the flexibility and creativity of smaller innovative organisations. Here again UK firms' behaviour has contrasted with that of the German firms, which traditionally have relied more heavily on in-house research, although the creative pull of American biotechnology firms has also begun to attract German interest.

Despite marked intra-country diversity between firms it is possible to make some generalisations. German firms have grown more similar to British ones in degree and route of economic globalisation, but they still differ in crucial respects. They tend to be better represented in non-US markets and activities, whereas British companies, with the exception of some of the smallest, remain predominantly US-focused. The R&D operations of German firms, although now more oriented towards developments in the US, have retained their main locus in Germany. They not only show a strong attachment to Germany for high-value functions but also to the towns in which they have been based for a century or more. Both supervisory and management boards, excepting the case of Aventis, remain almost solidly German. These features no longer apply to the larger UK firms.

The biggest difference between German and UK firms lies in the area of financial globalisation. Whereas German firms largely have grown organically to their current large size and are only beginning to use international capital markets for their globalisation strategy, most British companies owe their very existence as global players to participation in financial markets.

V. Globalisation and Performance

In section II it was shown that there exists a clear performance deficit by the German pharmaceutical/biotechnology industry in terms of innovation and market share, as compared with its British counterpart. What, if any, are the connections between German delayed financial and economic globalisation and the German industry's inferior performance? Why are British firms showing this uncharacteristically high performance?

The British industry's superior performance may be connected with earlier financial and economic globalisation, but firms in this industry also have enjoyed a number of advantages that flow from national embeddedness. They have benefited from a supportive pricing system instituted by the national state. This, together with a large captive client – the NHS – has ensured firms sufficient margins and security for some to choose to make high and long-term investments in R&D, thus remaining unaffected by the usual Anglo-American short-termism. Moreover, the design of state policy has rewarded research intensity. The capital market-based financial system has encouraged and facilitated both external growth and, in the last two decades, a greater concentration of business activity on high-margin ethical pharmaceuticals than is found in the German industry. Further, a developed capital market and the availability of venture capital (though to a much lesser extent than in the United

States) have favoured the relatively early creation of a biotechnology industry, encouraged also by more permissive state regulation of gene research than was the case in Germany. British firms have, of course, also benefited from a good domestic scientific base and an easier transfer of new knowledge from the academic world into medical application (Gambardella et al 2000), but this has not been a new development and hence it cannot explain the industry's spurt ahead from the late 1980s onwards.

However earlier globalisation – economic and financial – of both the domestic economy and of British firms, fostered by state policy, has been an additional important contributory factor in superior competitiveness. The state's early and successful encouragement of inward FDI has created a highly competitive domestic environment, constraining firms to grow and prosper or perish (Gambardella et al 2000). Outward FDI into the US from the late 1970s onwards has similarly been vital to the success of British companies. The giant US market, its excellent scientific base, its developed biotechnology industry, and its much faster growth throughout the 1990s than any other market in the world have had very positive consequences for the innovativeness and growth of British firms. Earlier financial globalisation has facilitated external growth through mega mergers and has enabled firms like GSK and Astra-Zeneca to penetrate and hold their own in the US market.

The German firms, despite an earlier history of success in terms of their share of the world market and a continuing good export performance, have lost some of their competitive edge. They did not enjoy the same opportunities and constraints during the 1980s and first half of the 1990s as did British firms. A long-term perspective on investment into human capital and technology has proved insufficient in this industry to preserve competitive advantage. Less rapid responses to market demands and, above all, a lesser capacity for radical innovation, due to labour market and organisational rigidities and insufficient venture capital, are cited as the main explanations in the literature (e.g. Soskice 1997; Casper et al 1999) for German firms' recent loss of leadership. While their analysis offers a very plausible explanation of lower German innovativeness in this industry as a whole, it cannot explain the *recent* German loss in competitiveness in pharmaceuticals. This paper additionally has highlighted the impact of different state policies towards the pharmaceutical and biotechnology industries, but above all has emphasised the effects of later financial and economic globalisation. In particular a less developed presence in the world's largest and consistently fastest-growing market and their remoteness from the US knowledge base have undoubtedly had a negative effect on the German industry.

VI. Conclusions and Future Prospects

This paper has reviewed the different patterns of globalisation of German and British firms in the pharmaceutical industry and has connected the lag on the road to globalisation up to the mid-1990s of German firms, as compared with British firms, with the recent loss of competitiveness of the German industry.

Our review of companies' international activities during the recent globalisation spurt in an already highly globalised industry has not supported the image of completely footloose transnational actors among either German or British companies. It is still possible to categorise companies by their national origin. Globalisation and national embeddedness, it has been shown, coexist in a complex mixture in both Britain and Germany. Reliance on state funding of health spending, on national regulatory policy in fields of health care and medicines and on indirect subsidy for R&D make for an industry which, although highly globalised, still depends strongly on the national state and on the health care and innovation systems it maintains. This applies not only to German companies, but is equally or even more true for British ones. (These same factors naturally also apply to foreign firms operating in the German and British markets.)

British pharmaceutical companies have benefited more from state policy than companies in other sectors of British industry (excepting the defence industry), and they have derived greater advantage from this relation than their German counterparts. The state's free market stance on inward FDI, coupled with a pricing policy, supportive of a high level of R&D expenditure, has served large British companies well. Historically it has given pharmaceutical companies in Britain the opportunity to earn a high rate of return, the lack of which has hampered the development of firms in other British manufacturing industries. The advent of NICE, the National Institute for Clinical Excellence, and the resulting blight on sales to the NHS of products that are under evaluation, coupled with a more highly regulated environment for clinical trials than is the norm across Europe, may in the medium to longer term reduce the attractiveness of Britain as an investment site. German companies also have enjoyed a supportive domestic environment, but state policy on a variety of dimensions seems to have been less beneficial for firms than is the case in Britain.

German companies have internationalised later and by the early 1990s had achieved more limited global dispersion and reach, while financial globalisation was not at all developed. Their much smaller presence in the important US market has been a particular factor. At the beginning of the 21st century, despite

much internal diversity, the degree of globalisation of German companies has become very similar to that of their British competitors. It could even be claimed that they have achieved a wider global dispersion and greater global reach than British companies, which have remained heavily focused on the US, although the alternative argument is that in so doing they are expending too many resources on less important and lower margin markets.

But even after their recent globalisation spurt and the making up for lost ground, German companies have remained more nationally and even locally embedded. This is particularly evident in their continuing attachment to long-established home bases in particular provincial towns and their greater retention of high-value functions in these bases. Also important is that family majority ownership of even very large companies endures and that, in all companies except for Aventis, internal control remains almost exclusively in German hands, as indicated by the composition of both management and supervisory boards. German multinational companies have become steadily more globally dispersed and more adept at combining national advantages for factor development with location advantages in foreign investment sites. Their increased reliance on US expertise in the area of R&D best illustrates this point.

Globalisation of German firms thus may be described as both following the British pattern with a delayed response and, at the same time, preserving its *sui generis* character in seeking to combine advanced globalisation with continuing national embeddedness. German companies may be said to be following a similar trajectory not only in degree of economic globalisation but also in locational choices and adaptation of organisational structures (more product-oriented, operationally independent but financially controlled business units (Becker 2001: 154)). The first response is very much shaped by the second. In Britain, in contrast, detachment from the home base has become more pronounced in recent years. It has been most evident in the case of GSK and Shire and slightly less so in the cases of AstraZeneca and Amersham.

The later and more hesitant globalisation of German companies, as compared with their British counterparts, it has been argued, has had a decisive impact on industrial performance in the pharmaceutical industry. During the last two decades, a high degree of global dispersion and reach have been necessary, though not sufficient, for the attainment of international competitiveness. Particularly, location of operations in the US has been vital for three reasons. It has facilitated better access to this large market and has enabled the accumulation of the necessary resources to achieve external growth and high investment in R&D. Experience of managing operations in the US also has

supported the learning by British firms of aggressive marketing techniques, considered crucial for this industry. But, above all, earlier exposure to the US science base and its many successful biotechnology firms has afforded invaluable opportunities for learning from the world leader in both pharmaceuticals and biotechnology, through both scientific co-operation and in-licensing of new drug discoveries.

The catching up of German pharmaceutical firms on the road to globalisation would suggest that performance also is likely to improve during the coming decade. Any forecast in this respect needs to extrapolate from current trends and distinguish between different types of firm in both industries. Under-performance has not been dramatic – the German industry is still the world’s largest exporter – and it has mainly affected the giants in the German industry. Its many solid large firms (Boehringer and Schering are counted among the world’s top 25 pharmaceutical companies) are far better equipped to succeed in terms of available resources for globalisation than the smaller and less secure British firms, like Shire and Celltech. Although GSK still possesses a promising drugs pipeline its post-merger troubles have disrupted the innovation process. Moreover, with its operational HQ already in the US and the relative unimportance of the British market, it is becoming increasingly detached from its British science base. AstraZeneca is predicted to lose market share with the expiry of the patent for its best-selling drug, Losec, in 2003. German second-rung pharmaceutical companies, such as Boehringer, Schering, Merck KG and Fresenius, have performed well in most years during the 1990s (Becker 2001: 139, 145-48) and should be able to secure the industry’s future. The case of Bayer is more problematic, as the firm considers whether its pharmaceutical operations have sufficient critical mass to continue, following the failure of one of its key drug prospects in 2002. Aventis now has a much reduced presence in and reliance on Germany, and it is debatable whether it should be counted as a German firm in the future.

Also the German state’s recent nurture of a domestic biotech industry resulted in an upsurge in new biotech firms. It has more than 500 small independent firms dedicated to biotechnology, compared with around 450 in Britain (Allansdottir et al 2002: 32-33). Their increasing turnover and employment in recent years (*Financial Times*, 25 September 2000), together with the steep increase between 1997 and 2000 in new patent registrations from Germany based on biotechnological research (VfA 2001: 34), hold some promise for the industry’s future (Casper et al 1999), despite the painful collapse of many young firms when the technology boom ended. Although Britain has more-advanced biotech companies, the semi-detachment of its large pharmaceutical companies

deprives them of opportunities for nurture within supportive domestic networks (Gambardella et al 2000: 83-84). Moreover, their supposedly high concentration on radically innovative drug discovery (Soskice 1997; Kettler and Casper 2000) looks less impressive when it is realised that none of these firms so far have reached a significant level of profitability and some, such as Amersham, have chosen to divest their drug discovery assets. Last, although British firms were quick to colonise the lucrative US market, German firms are perhaps better prepared for entry to the Asian and Latin American world.

Thus, to conclude, differences in the degree of both financial and economic globalisation will further diminish although German firms will be likely to continue to combine their internationalisation efforts with more pronounced domestic embeddedness in terms of access to knowledge and high-quality labour. Consequently, differences in innovation and competitive capacity also are likely to diminish, if not disappear. This will be partly, but not solely, as a consequence of German firms' stronger positive responses to opportunities to globalise, as well as to a greater propensity to seize them, due to increased pressures from a changed financial system and forms of corporate governance.

Notes

- ¹ BASF is unusual among German firms in deciding in 2000-1 to sell its pharmaceutical interests because they lacked critical mass, whereas several diversified British firms exited pharmaceuticals earlier in the 1990s for similar reasons.

Boehringer Mannheim is an example of exit by a well-known name in the German pharmaceutical industry: it was acquired by the Swiss company, Roche, in 1997.

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