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Losing Control

A study of mergers and acquisitions in the British aerospace supply chain

Norman Smith & Joseph Wright

June 2015
Civitas: Institute for the Study of Civil Society

Norman Smith holds degrees from Oxford University (MA), the City University (M Phil) and Aberdeen University (PhD). He has participated in management development programmes at Harvard and CEDEP. He is a Fellow of the Energy Institute and of the Society of Business Economists. His career began in engineering manufacture where he first became involved with the offshore oil and gas industry. After a spell in merchant banking, he was seconded to the Department of Energy where he became Director General of the Offshore Supplies Office (OSO), the government agency which supported British suppliers to the North Sea oil and gas industry. On his return to the private sector, he co-founded and managed an energy consulting company and served as director of eight private companies in the oil and gas industry, becoming chairman of three. After retirement, he researched and authored an extensive study of the British supply chain supporting exploration and production activities in the North Sea: *The Sea of Lost Opportunity: North Sea Oil and Gas, British Industry and the Offshore Supplies Office* (2011).

Joseph Wright is the research fellow for Civitas' Wealth of Nations project. He studied Theology and Religious Studies at the University of Bristol (BA). His other reports include *Credit Unions: A Solution to Poor Bank Lending?*

CIVITAS
55 Tufton Street, London SW1P 3QL
T: 020 7799 6677
E: info@civitas.org.uk

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Executive summary

Aerospace is championed by the government as a key element of the British economy with a high added value. It employs more than 100,000 people directly in Britain, has a turnover of £25 billion, contributes £9.4 billion to GDP and with an estimated 17 per cent global market share is second only to the USA in its field. It generates an export surplus and operates within an industry generally believed to have a bright future. This is how the industry is presented by the government and the Aerospace Growth Partnership.[1] Other sources mentioned later in this report confirm the importance of the industry but place it in a lower position in the international hierarchy and with a less robust outlook.

While the general decline of British industry has been widely documented, it is often presumed that aerospace (a term which in this report covers civil and defence elements) has remained largely immune. Our observations, based on the analysis of an archive of sales and related literature from a company's technical library suggest otherwise. We took a look at what has happened to one part of the aerospace supply chain during this period, specifically in regard to survival and ownership in the period 1990-2014. The study is by no means a detailed examination of the entire industry and its findings should be regarded as only indicative.

Our analysis found there had been an apparent 25 per cent decline in the number of companies present in the supply chain. Of the 155 companies still present in 2014, just a third (47) seemed to have avoided takeover or related activity between 1990 to 2014, reflecting a high level of merger and acquisition (M&A) activity for the period. 174 deals were identified, an average of 7.3 per annum, peaking at 17 in 1999 and 2000, and declining since 2007. Almost half of the companies examined in depth (101/207) were subject to this form of corporate action and many received more than one approach, the highest being five. Of the 101 companies where a change of ownership was recorded, just over half (53) finished in foreign hands (48 in British). It is clear that some managements must have devoted a great deal of their time to these transactions, for which large fees and commission would also have been paid to bankers, brokers, accountants and solicitors.

When combined with the shrinkage of the supply chain and the number of companies already foreign-owned in 1990, there was an increase of foreign controlled companies from 14 per cent (29 out of 207) to 41 per cent (64 out of 155).

A significant proportion of the deals were associated with a small number of repeat acquirers – in particular the companies Cobham (5), Thales (4), GE (3), GKN (2) and Siemens (2). The median size of acquisitions made by the group was about £150 million turnover. By comparison, the median turnover of the 77 British owned companies unaffected by takeover activity was around £4 million. Moreover, all of the firms in the first group were judged to have valuable intangible assets (such as proprietary technology/know-how or an attractive market position) as against only 22 per cent of those untouched by takeover activity. This strongly suggests that large companies have 'cherry-picked' the most attractive targets in the supply chain, contributing, along with the financial crisis, to a marked slackening in M&A activity since 2007. It seems that the dominant motivation for takeovers has increasingly become control of proprietary intangible assets, particularly technology and know-how.

Unfortunately one of the results of the shrinkage in the supply chain and rise of foreign ownership has been to leave the surviving British owned companies heavily skewed towards small and medium-sized enterprises (SMEs). As a generalisation it is probably true to say that few of these will ever reach the minimum economic scale to grow into significant members of the international aerospace industry. However, unlike most science based industries there remains a significant number of large British controlled companies capable of competing in the global market place.

Not all transactions were 'trade', the presence of private equity funds was clear, particularly where management buy-outs (MBOs) and management buy-ins (MBIs), usually of smaller businesses, were concerned. A few larger businesses joined public markets, principally the London Stock Exchange, while others passed into the hands of large pension or sovereign wealth funds. The long-term implications of this last development are difficult to discern.

This internationalisation of the aerospace supply chain, as well as that of many other sectors of the economy, through foreign takeovers will have been welcomed by recent British governments as an indication of the attractiveness of the UK to businesses. The real reason is more likely to be the ease by which foreign multi-nationals can strengthen their technology/know-how portfolios and/or acquire difficult to obtain market entry positions by taking advantage of the UK's almost unique openness towards foreign ownership. The UK has the advantage (particularly for US firms which were found to be the biggest acquirer of British companies) of using the English language and being home to a large, long established and innovative aerospace industry, with a measure of government R&D support.

Only three UK companies (BAE Systems, NATS and Rolls Royce) are protected from foreign takeover by the presence of a government 'golden share' on their share register. By contrast, virtually all other developed countries retain more power to block foreign takeovers not deemed to be in the national interest over large sections of their economies. The UK position is so anomalous that it has to be regarded as either ideologically based or protected by powerful vested interests.

Foreign owners can bring benefits to the UK, above all if they undertake greenfield developments. But these are increasingly uncommon and usually associated with public subsidy. There are many disadvantages as well as advantages in the foreign acquisition of existing domestic businesses and whether or not a gain will be felt by the UK economy will vary from case to case. Gains usually occur when the new parent sees its UK subsidiary as an important part of its global operation and continues to invest, carry out R&D and upgrade the skills of the work force after the acquisition. At the other extreme, a business may be closed and its activities transferred abroad, which certainly happened in some cases in this study.

It is important for the UK aerospace supply chain to remain innovative. To entrust this to mainly foreign-owned companies is a risk, since their optimum strategies are unlikely to give much weight to British concerns. Something needs to be done, therefore, to safeguard the British ownership of the remaining locally owned firms. One way to achieve this, particularly for small companies, would be to make the process more expensive for the foreign buyer by following the Israeli example of levying a large tax charge on the buyer when domestic technology/know-how falls under foreign control, at least for businesses which have had public funding for R&D or product development. For larger companies a turnover related requirement to obtain government consent would be more appropriate.

The hope of some British politicians is to achieve economic rebalancing through the creation of a 'mittelstand', or privately owned specialist manufacturers along German lines. Based on the findings of this study, it will not come about unless the foreign cherry picking of British companies and technologies is moderated (and the decades-long difficulty in raising development capital is resolved). Even if these criteria are met, an industry like aerospace where most of the surviving British-owned firms are SMEs is an unpromising place to start.

Introduction

Ideally, a study of a supply chain should deal with the entire supply chain of a final end-product manufacturer, taking into account its own suppliers. Such an opportunity has not been presented to us. However, the chance has arisen to analyse the history of the supply chain of an important supplier to aerospace manufactures. The business concerned, the H. R. Smith Group of companies, is principally a supplier of aircraft antennae and search and rescue locator systems. It has made available an archive relating to its own suppliers and it is on this that our report is based. A description of the material and the means by which it was analysed can be found in the Appendix.

A notable feature of British 'deindustrialisation' has been the hollowing out of supply chains, which sometimes extends to British 'manufacturers' becoming little more than assemblers of foreign-made components. Such companies are usually foreign-owned and have often been recipients of substantial public subsidies. Notable examples are to be found in what the UK government regards as one of its most successful manufacturing sectors – motor vehicles, where despite strengthening output, only about a third of the components in a British-built car are domestically sourced (compared to more than 90 per cent in the mid-1970s);[2] for French and German cars the number is closer to 60 per cent.[3] No comparable up to date figure is available for the aerospace industry.

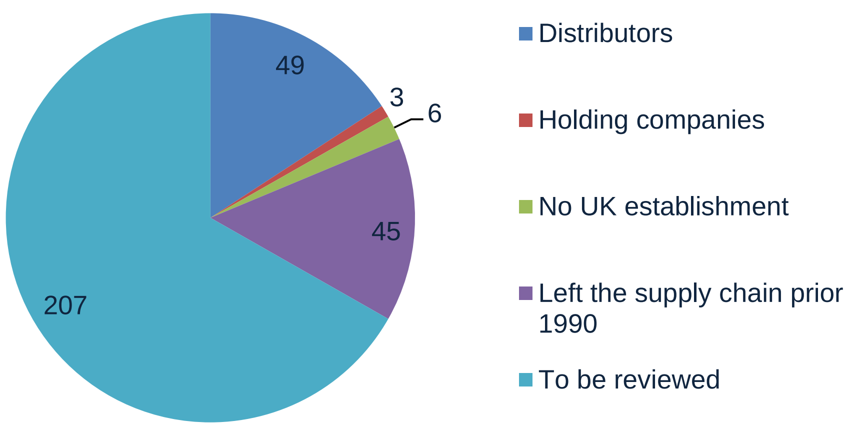
This trend has a number of serious adverse effects on the British economy. For a start, it diverts employment opportunities and the scope for increasing skills, as well as personal and corporate tax revenues, away from the UK towards foreign countries, usually, though not always, our neighbours in the EU or the USA. Again, by limiting the UK value added in the final 'British' product, the trend makes it extremely difficult for the growth of UK manufactured exports to close the trade gap – perhaps the most serious and intractable long-term problem facing the country – when the inevitable by-product is a substantial growth in imports. It also restricts the ability of domestic companies low in the supply chain to innovate as their contact with the end-product is restricted and may be via a foreign supplier unwilling to disrupt the status quo.

While the government is well aware of these issues and has sponsored a number of reports, it has so far failed to develop effective policy remedies. Part of the reason for this may lie in the relative absence of analyses of the mechanics of domestic supply chain shrinkage. Thus any opportunity to undertake such an analysis should be regarded as a matter of importance, particularly in this sector as the government rates aerospace very highly among British manufacturing sectors. This is not surprising as according to the Aerospace Growth Partnership, it employs more than 100,000 people directly in Britain, has a turnover of £25 billion, contributes £9.4 billion to GDP and with an estimated 17 per cent global market share is second only to the USA in its field.[4] It generates an all too rare export surplus for Britain and operates within an industry generally believed to have a bright future. Its employees enjoy above average salaries and it is R&D intensive by British standards. There is, however, a less encouraging view which places Britain at a lower point in the international hierarchy. A report by the lubricant's manufacturer Castrol places the UK world market position as fourth and having worse growth prospects than several of its competitors.[5]

Archive analysis

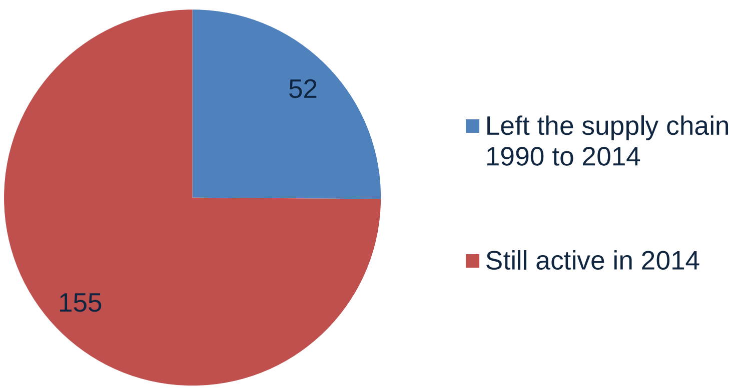
The archive was found to contain information on 310 companies supplying the aerospace sector, perhaps less than ten per cent of all companies in this market place, although we cannot be certain of how representative this sample is today.[6] Of these, 49 were distributors; these were not considered further on the basis that it was their principals that represented the supply chain membership. There were also three holding companies, which were also not considered further on the basis it was their trading subsidiaries which comprised part of the supply chain. A further 45 companies appeared to have left the supply chain prior to 1990 (before our period of review), while six companies appeared never to have had a UK establishment. After elimination of these 103 companies, 207 remained to be reviewed further. This distribution is illustrated in Chart 1 below.

Chart 1: Archive content



Of the companies subject to further review, it was found that 52 seem to have left the supply chain between 1990 and 2014 (see Chart 2). It should be noted that 190 of the 207 companies were manufacturers. Two were heat treatment providers, 13 could be described as support services companies, and two were unclear.

Chart 2: Survivors vs loses 1990 to 2014



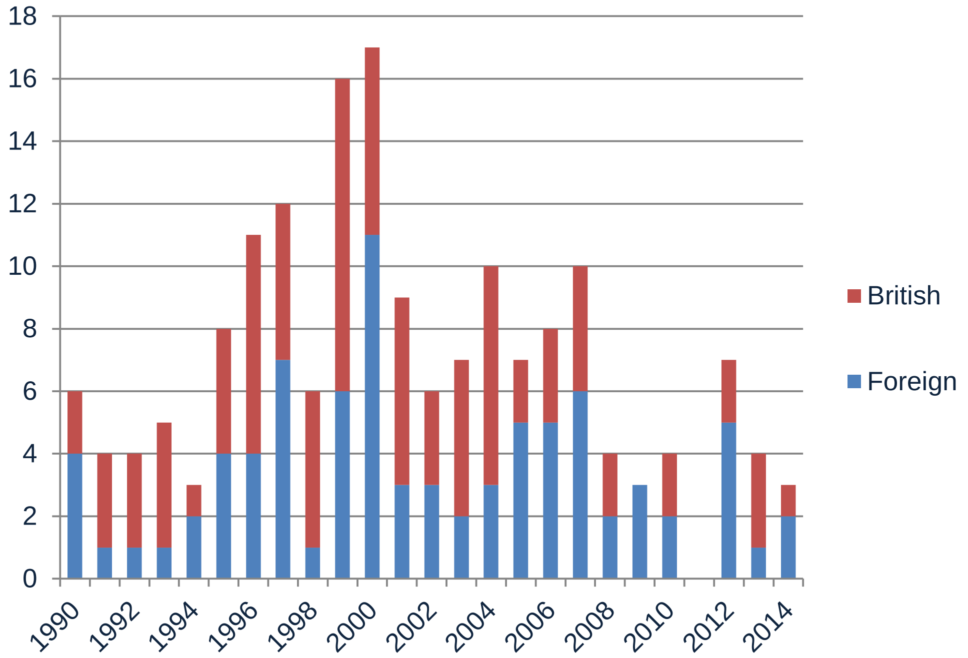
It would appear that on average about two companies departed the supply chain every year since 1990. The extent to which these losses were compensated for by new companies entering the supply chain, or existing ones expanding their product range, is unknown as these may not necessarily be apparent in the archives. The reasons for leaving the domestic supply chain were various but included commercial failure, removal of activities abroad and deciding to focus on other business areas.

A striking finding was the extent to which the supply chain had been affected by takeover activity in the period, particularly in respect of the companies which were British-controlled in 1990. No less than 174 deals were recorded when reviewing the 207 companies in the British supply chain between 1990 and 2014. In some cases a company was subjected to multiple changes of ownership, the highest number identified (affecting Slingsby Engineering) was five, with four companies subject to four such corporate transactions, 14 companies subjected to three, 30 subject to two and 51 subject to one deal. There were 29 companies which were foreign-owned throughout the period that have not been included in the takeover statistics. Less than half (77 out of 178) of the originally British-owned companies were seemingly unaffected by takeover activity, although it is likely that many may have been approached without a deal materialising.

Quite apart from the question of the frequent loss of British control, there must have been a great cost in terms of management time and in cash to pay fees for solicitors, accountants and bankers arising from these transactions, particularly for the 49 companies involved in multiple transactions.

Deals were not evenly spread throughout the period, with 1999 and 2000 representing peaks – similar to trends in general M&A activity internationally. The following chart represents the number of deals per year, with British and foreign deals distinguished separately. It is notable that there has been less takeover activity post-2007.

Chart 3: Number of takeovers by year, 1990 to 2014



Of the 101 companies subject to at least one takeover, 48 finished in British hands and 53 in foreign. American companies took final control of 28 firms, French of five, Swedish of four, Germans and Dutch of three, Canadians, Finnish and Japanese of two, and Emirati, Irish, Italian and Chinese of one (see chart below).

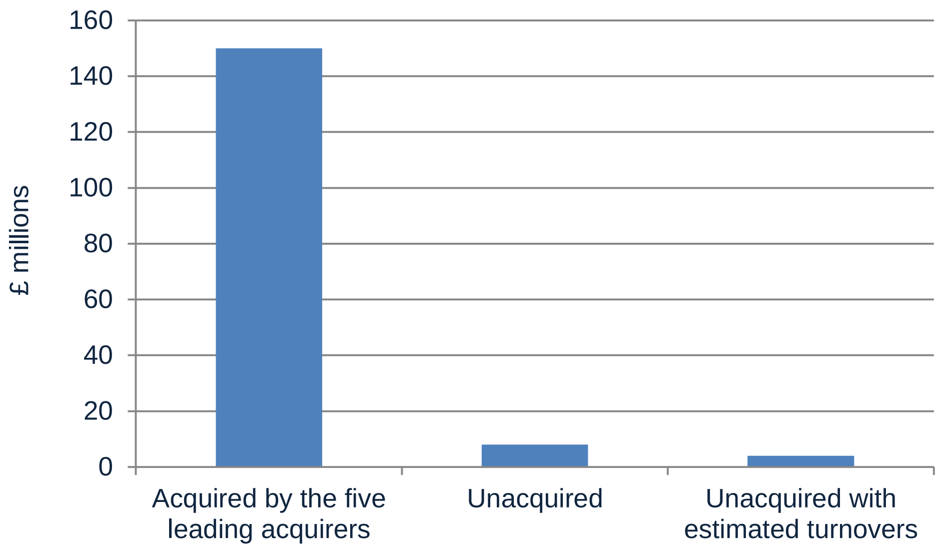
Common reasons for making an acquisition are to take control of proprietary technology/know-how, established brands or significant market share positions. When the traded companies were considered in these terms, it was found that 65 per cent of them were judged to be in possession of one or more of these characteristics. This applied almost equally to foreign and British acquisitions.

In summary, the supply chain contracted by a quarter in the period reviewed and the proportion of foreign-owned firms rose from 14 per cent (29 out of 207) to 41 per cent (64 out of 155 still active companies). While most transactions were trade deals between companies there were a number of MBOs (where a company's management acquire some or all of the company from the current owners) and similar-type transactions. Private equity was identified as being involved with 17 per cent of the initially British companies traded. This may be an underestimate. Financiers were not always easy to identify in the case of MBOs. Pension and sovereign wealth funds were also among the foreign acquirers.

It is notable that a high proportion of acquisitions (occasionally sold on) were made by a relatively small number of repeat acquirers, in particular the companies Cobham (five), GE (three) and Thales (three). In the case of Thales there appears to have been a deliberate policy of seeking a dominant position in the UK optronics industry and a general 'bulking up' of its UK operation, whilst GE and Cobham seem to have had a policy of making niche acquisitions in a number of business areas in which they were well established. GKN and Siemens were also found to have each been involved in the changes of ownership of two different companies.

In an attempt to allow for the differing dates of acquisitions, an effort was made to normalise company turnovers at their 2013 levels. In many cases this was easy because the subject company had retained its identity and had recently filed accounts, but in others it had not and it was necessary to make estimates (see Methodology). For the five acquirers named above, it was found that the turnovers of companies acquired ranged from well over £1 billion to less than £10 million. The median figure was around £150 million (see Chart 5). In all cases it was concluded that the acquired company was in possession of valuable intangible assets such as brand reputation, technology or market position.

Chart 5: Median turnover of companies

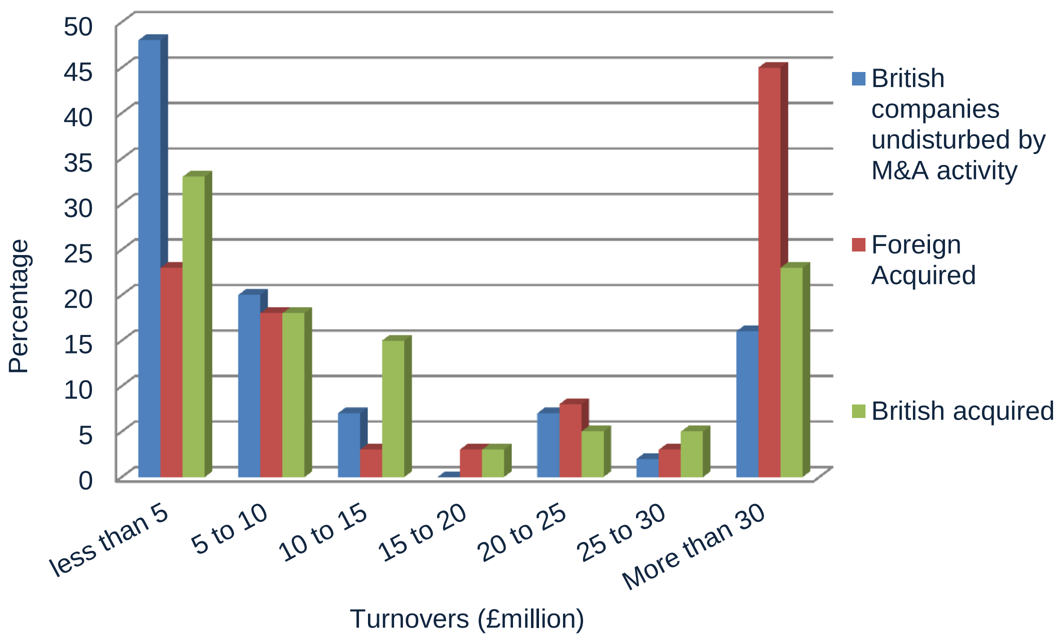


By comparison, the median 2013 turnover estimate for the British owned companies unaffected by takeover activity and having a turnover figure in their Companies House data from which an estimate of turnover standardisation for 2013 could be derived (including some that actually gave a 2013 figure) was approximately £8 million. Making more tenuous estimates for the 21 companies for which no turnover was available suggests the overall median turnover was in the order of £4 million. Only 17 of these 77 companies were judged to have intangible assets, such as niche technologies, similar to companies acquired by the principle predators. A further 30 of these 77 companies left the supply chain during the period studied, leaving 47 companies that were not subject to a takeover still active in the supply chain.

That the great majority of the 47 surviving British-owned undisturbed companies would be considered to be SMEs is clear from Chart 6. Using the EU definition of an SME,[7] it can be said that no less than 57 per cent (25 from 44) of the companies would be classified as 'small' (less than 10 million euro turnover), of which ten would be rated as 'micro' enterprises (less than two million euro turnover). Of the remaining 19 companies, only seven would be considered too large for the EU's SME category.

Turning to the 43 surviving companies acquired by foreign owners, it will be seen from Chart 6 that comparatively few fall into the small company groupings and no less than 45 per cent would be considered substantial businesses according to the EU's criteria, having a turnover greater than 50 million euro.

Chart 6: Size distribution in percentages of surviving companies by acquisition status



For the companies subject to acquisition by British firms (44 of which were still active in 2014) the great majority would be considered as small or very small. Only 20 per cent of these would be considered by the EU criteria not to be SMEs. In fact, more than a third would be considered as 'small' (less than ten million euro turnover).

Note: The total number of companies represented in Chart 6 is 124 out of the 155 survivors, including 40 foreign acquired active companies, 40 British acquired companies and 44 undisturbed British companies. We could not obtain turnovers for three foreign acquired companies, four British acquired and three undisturbed companies; the remaining 21 are active companies which have always been foreign-owned and were not included (eight of the originally stated 29 foreign-owned companies have ceased activity in Britain since 1990).

Conclusions and implications

The nature of the archival material for this study is not ideal. Its manipulation and analysis posed practical difficulties. Consequently, its results should be treated as *indicative* rather than definitive. However, it should be noted that no evidence of a similar study was encountered, so that the results do have a scarcity value.

The study suggests that over the last 24 years the UK's aerospace supply chain has contracted – by 25 per cent – and changed significantly in nature. It should be noted that this contraction may be misleading as it is perfectly possible for new companies to enter the market without being added to the archive. It is also possible that there will have been cases where a company disappears but its products remain in the supply chain. However, the contraction recorded here certainly reflects a lack of longevity among some companies.

Of the 155 companies surviving in 2014, only 91 were British controlled and over the period the proportion of foreign-owned companies in the supply chain rose from 14 per cent at the beginning of the period to 41 per cent at the end, the result of an increase from 29 to 64 companies. Since foreign-owned companies in our company sample are typically larger than British-owned firms, in terms of turnover the foreign-owned component is probably greater than 41 per cent. Whilst it is likely that some of these companies will have prospered under their foreign owners with better access to capital and other resources, the fact remains that for more than a third of the supply chain survivors, the final decisions in respect of such matters as research and product development will henceforth be made abroad.

It seems that the main motives for foreign companies to acquire British supply chain members lie in the growing importance of intellectual property (IP) and presence in what are perceived as growth markets. With largely global free trade and the migration of all but very specialised manufactured items towards East Asia and Eastern Europe, manufacturing facilities in long-established markets like the UK may in themselves have little appeal to foreign acquirers, the apparent exception being where a product is closely associated with a specific geographic location.

Even in these cases the amount of manufacture as opposed to assembly is likely to be small. Thus few aerospace supply chain acquisitions in recent years would have not been primarily to gain control of brand reputation, technology/know-how or market position. The beauty of such motivation from the acquirer's point of view is that it is much easier to relocate intangible assets than tangible assets. This helps to explain why the study encountered cases, post-acquisition, where UK facilities had been closed and the product sourced from outside the UK.

British companies were also acquisitive in the period. Of the 101 companies subject to at least one takeover, 48 finished in British hands and 53 in foreign. A high level of corporate deal-making (mainly acquisitions) was a feature of the period and many companies were involved in more than one, with Slingsby Engineering holding the record with five.

When examining the time period of the 174 deals recorded it was found that activity peaked in 1999 and 2000 when the number of transactions reached 17, probably reflecting an attempt by companies to adjust to globalisation. Takeover activity declined after 2007, as might be expected with the depressed state of the world economy following the financial crisis and the paucity of interesting target companies. Broadly similar patterns were found to exist in takeover activity in other industries and countries. It should also be noted that the number of deals identified almost certainly underestimates the amount of cost and time involved because in many cases prospective deals would have been aborted before knowledge of them reached the public domain.

Whatever the ultimate outcome of a takeover bid, it is quite clear that there would have been a very high cash cost in terms of fees and commissions to bankers, brokers, accountants and solicitors, for which many alternative, and probably often better, uses could have been found by the target companies. An even bigger cost to the businesses, especially those involved in multiple transactions, would have been the diversion of management time away from its primary responsibilities and quite probably an inability to formulate and adhere to a proper strategic development for the companies. According to John Hann, writing in Civitas' *Ideas for Economic Growth*, 'Hostile Takeovers in the UK and Short-termism', where the approaches were hostile this would make a contribution to the UK's 'short-termism' problem.[8] There is perhaps some circumstantial evidence in support of this from the fact that two of Britain's most successful engineering companies – Dyson and J. C. Bamford – have so far remained in private ownership and free to pursue long-term strategic plans without interference.

It seems evident that the larger the acquirer the more likely it is that an acquisition target will be of significant size and in possession of valuable intangible assets ─ a process often known as ‘cherry picking’. This process has proceeded so far in the case of the aerospace supply chain that the remaining independent companies are mainly SMEs, not many of which have strong intangible asset positions. Such companies are likely to suffer from the systemic lack of access to long term capital which is such a feature of the British industrial scene. They are also unlikely to be regarded as desirable partners in private-public R&D or product development initiatives. Thus the possibility of the UK replacing the companies taken into foreign ownership through the development of its existing stock of survivors seems remote. Nevertheless, it is possible that some of these small companies occupy product niches of considerable potential value.

It is worth emphasising the magnitude of this issue. Using the EU definition of an SME, it can be said that no less than 25 out of 44 (57 per cent) of the undisturbed British-owned companies would be classified as ‘small’ (less than 10 million euro turnover), of which ten would be rated as ‘micro’ enterprises (less than two million euro turnover). Of the remaining 19 companies, only seven (or 16 per cent) would be considered too large for the EU’s SME category. By contrast, 13 of the 40 (33 per cent) still active foreign-acquired companies operating in the UK would be classified as SMEs, only three of which are micro enterprises. Perhaps unsurprisingly in the case of businesses acquired by foreign parents, no less than 18 (45 per cent) can be considered as too large for the SME classification. This compares with only 8 (20 per cent) for companies with British buyers and 7 (16 per cent) for British companies unaffected by takeover activity.

There remain, of course, a small number of large British companies in this area such as BAE Systems, Cobham, GKN Aerospace, Meggit and Rolls-Royce, which did not feature in our supply chain sample other than as buyers. Such companies have been making acquisitions abroad (mainly in the USA), underlining the international nature of their business and to some extent offsetting what has been happening in their domestic market. Indeed, a distinguishing feature of the British aerospace industry is that it still contains independent British owned companies large enough to participate in or even lead industry consolidation. With perhaps the exception of pharmaceuticals, it is difficult to think of another science-based British industry in the same position.

By no means were all transactions deals between companies. At least 10 per cent of identified transactions involved some form of private equity. There were also 13 management buy-outs (7 per cent of all deals), three of which were recorded as backed by private equity, but also suggesting greater private equity involvement than the research uncovered.

A very recent development in corporate takeovers has been for large foreign pension and sovereign wealth funds to acquire full ownership of companies, including some in the aerospace supply chain. Given that such institutions normally lack industrial management resources and that their acquisitions are likely to have lost any former position in public financial markets, it remains to be seen what type of business model develops, particularly if or when an ‘exit’ is sought. A few cases of financial institutions having to recognise that a forced sale to a trade buyer is their only option are likely to raise serious questions over the appropriateness of their investment decisions, particularly their inflexibility.

It is possible that these institutions are behaving like those private equity funds which take control of the company with the knowledge that it can be relatively quickly unloaded upon the public market. However, private equity funds are unashamedly short term in their investment horizon and risk-tolerant, whereas pension and sovereign wealth funds are considered to be very long term risk-intolerant investors. Their recent actions may prove to be an aberration. If not, given the scale of their resources, the implications could be large.

A further 4 per cent of transactions related to companies moving to public markets – most commonly the London Stock Exchange. Given the small size and apparent lack of valuable intangible assets of most of the remaining independent supply chain members, it seems unlikely that there will be many more of them joining public markets in the foreseeable future.

In theory, it is the already significantly sized businesses with valuable intangible assets that should provide the new public market recruits. In practice, this will not happen much because most such companies in this sector have already been acquired. Unless they are particularly fortunate in their acquirer, even these may fail to achieve their full potential. Nevertheless, companies of this type properly financed and managed have the capability to drive economic expansion and employment growth to a far greater extent than either large companies (now often shedding labour) or small ones (very many of which frequently lack both the will and the wherewithal to grow and often struggle even to survive).

No attempt was made to establish the circumstances under which 52 companies left the supply chain between 1990 and 2014. Commercial failure played its part, but was by no means the only factor. Failure to keep up with technical change and resultant product obsolescence was a related issue. There were cases where a decision was made to withdraw from the aerospace market and concentrate activity on some other business area. Perhaps the oddest case was of a company which decided to ‘emigrate’ and re-establish itself in Australia.

Does foreign ownership matter?

One of the most striking findings of the archive analysis was a sharp increase in the proportion of foreign-owned companies in the UK aerospace supply chain. Much the same has happened in other sectors of the economy. This prompts the question as to whether foreign ownership of such high degrees is to be welcomed. The position of successive UK governments has been that it is – whether as a greenfield investment (increasingly uncommon in developed countries) or by the takeover of an existing business – as an indispensable part of a free market. Inward investors are seen as bringing in capital, improving productivity and revitalising management. However, even here there is a contrary body of opinion, to which the government partially defers by holding 'golden shares' (which can vote down any unwelcomed approach) in respect of three companies deemed vital to national security – BAE Systems, Rolls Royce and NATS Holdings (formerly National Air Traffic Services). Further, for the first two of these companies foreign shareholders acting in concert cannot own more than 15 per cent of the company's shares. Public interest considerations, such as competition, might also prevent a foreign as well as a domestic takeover or merger.

The UK government would cite the fact that the ability of British companies to make overseas acquisitions would be at risk if the UK made it difficult for foreigners to make acquisitions here. This could be of particular concern to the larger British owned members of the aerospace industry as they have been active acquirers abroad, particularly in the USA. Unfortunately, there are also a range of practical, negative impacts, which those favouring a permissive attitude towards foreign takeovers ‒ their views based on economic theory only – commonly overlook.

Unlike the UK, most governments of developed countries retain powers to review and, if deemed necessary, block foreign takeovers of their domestic companies (see Section 5 for examples), either on an economy-wide basis or for selected sectors. Since such policies are widespread among EU members, it is evident that membership of the bloc is no bar to them, although the Commission does try to limit their use in the interest of the single market.

In sectors such as aerospace, powerful motivations for acquiring other companies, whether domestic or overseas, are to extend the buyer's range of proprietary technology and market access or to suppress potential competition. The rise of the

Airbus family, necessarily mainly at the expense of Boeing, has probably given a strong market incentive for US companies to use the acquisition of a UK company already within the Airbus programme as a means of benefiting from it. The UK, as reputed home to the world's second or third largest aerospace industry, a reputation for innovation, a range of common-user assets and a degree of government support for R&D, has been second only to the USA as a source of aerospace acquisition targets.

Over the last 20 or so years, our ability to maintain the value of the pound sterling and to help finance our trade deficit has depended in part upon receipts from the sale of high-technology firms and basic industries like our electricity and water utilities to foreign owners, with the aerospace supply chain very much part of this process.

The implications of foreign acquisitions in the UK aerospace supply chain are very different from those relating to infrastructure/utilities where the buyer acquires primarily large-scale fixed assets tied to the local market. Here, if circumstances so dictate, it would be relatively easy to reverse the effects of foreign takeovers by legislation, which is not the case where intellectual property has been re-domiciled outside the UK. Once gone, it is unlikely to return. The UK government seems to recognise this point by offering tax advantages to companies exploiting patents from a UK base — its so-called patent box. A number of other countries have similar schemes.

The most damaging effect is when a foreign acquisition results in the closure of a UK facility and production is shifted overseas. This deals multiple blows to the UK – loss of jobs, loss of intellectual property (IP) and deterioration in the balance of trade. Though there are cases of this occurring in aerospace as well as every other UK economic sector, a particularly recent and visible example was the fate of the Longbridge motor plant in 2005/06. Though the mechanics were complex, the result of administration followed by Chinese acquisition was the loss of over 6,000 jobs and the transfer of the plant and equipment to China. Moreover, once a firm becomes foreign-owned, its returns cease to be part of the Gross National Product (GNP) but remain in the Gross Domestic Product (GDP), thereby flattering the presentation of national income statistics (usually presented in GDP terms).

Nevertheless, post-acquisition, strategic decisions relating to international investment, marketing, research, development and design will henceforth almost always be made in the country of control, usually also that of ownership. Occasionally, a foreign-controlled parent will make a subsidiary the regional or global headquarters of some part(s) of the group's business, enabling it still to make some strategic decisions. A recent example from the pharmaceutical industry is GlaxoSmithKline's decision to make Singapore its regional headquarters for Asia.

A network of affiliates can be used by a parent company to engage in international tax planning, which will almost certainly lower their overall tax bill. A recent example is high-leveraged Boots' decision to move its tax domicile to Switzerland which has resulted in its corporate tax payments falling from between £150 million and £120 million to less than £20 million.[9] Stand-alone companies present in only a single country have little opportunity to pursue such strategies and it is such practices which have fostered public animosity toward multinationals.

Proponents of untrammelled foreign-ownership will also point to the inherent advantages of a free market in corporate control in creating parties with much to lose from international tension. However, only the most extreme of them would deny that it can also sometimes bring disadvantages extending beyond the ownership of assets and income streams though still falling short of threats to national security.

When an industrial sector becomes largely foreign-owned, difficulties can arise in trading with third countries. For instance, a foreign parent and its subsidiaries may be required by its government to cease trading with a particular country. When its own government takes a different position, the subsidiaries can find themselves in difficulties. Problems of confidentiality and conflicts of interest can arise when both domestic and foreign-owned companies are involved in partly government funded R&D contracts.

There is also a risk that after a takeover, the acquirer will interfere with its new subsidiary's supply chain by requiring it to adopt corporation-wide purchasing policies which may undermine the business of another supply chain company. Though the reverse might also be true, it is less likely given the power relationships.

Another important question, which has become apparent in the case of British electricity generation, is where will the available resources of an international group be deployed if they are insufficient to meet all demands? Intra-group capital allocation is one of the main problems faced by geographically diverse companies. The UK government initially assumed that the British subsidiaries of German power companies RWE and E.ON would be providers of much of the capital needed for the UK's proposed nuclear power programme. Initially, the Germans agreed but then came the Fukushima accident in Japan and the German government demanded a rapid end to nuclear power in Germany and acceleration in the pace of switching to renewable fuels. The German business environment for the two companies deteriorated sharply along with their profits and cash flows. They were faced with the choice of supporting energy policy aims at home or in Britain. Needless to say, they decided to back their 'home team', leaving the UK government with a serious problem. Short of finding the funds itself or abandoning the ambition, the only way the UK had of resolving the issue was to offer terms to other investors more generous than comparable investment opportunities available elsewhere, almost certainly increasing the cost of electricity in the UK. The effects for a particular subsidiary in circumstance of capital rationing can range from generous capital allocation to no capital allocation.

With industries based upon the exploitation of a non-renewable natural resource, the eventual decline of local activity is more likely to lead to the ultimate withdrawal of a foreign rather than of a domestic owner, which will normally maintain its corporate functions and can seek additional overseas business without fear of intra-group conflict. The scarcity of locally controlled companies may be to Aberdeen's disadvantage if the current pressure on the oil and gas sector continues.

Even the almost universally welcomed foreign direct investment in new facilities can pose problems for the host country. An example is the case of 'Silicon Glen', a term used to describe the concentration of largely US-owned electronic component manufacturers which (with much official encouragement) grew up in central Scotland between the mid-1970s and the end of the twentieth century. By then, it had become one of Scotland's major employment centres. In 2000, it fell victim to the collapse of the 'high technology boom' and the rise of globalisation. In a year, the workforce halved as companies relocated or closed their operations, causing hardship and uncertainty in the areas affected and illustrating the dangers of becoming a ‘branch plant economy’:[10] there is often little to anchor foreign companies to their host nation when there is a corporate crisis. A more positive story can, of course, be told of other inward investments, such as the automobile manufacturing sector - at least so far. Whether or not it continues to prosper or declines will depend primarily on decisions made in Japan, India, Germany and the USA – not the UK.

The lack of enthusiasm for foreign takeovers of existing businesses, particularly where these are deemed to be of strategic importance, should not be seen as purely nationalistic in character. It can lead to real problems – hence the desire of most national governments to have some influence over it. While France apparently includes some consumer goods as ‘strategic’, most countries take a more relaxed stance, confining controls to those relatively small elements of the economy concerned with activities that affect national security. In the majority of cases, these include defence and energy supply where most countries would probably seek to ensure that foreign ownership did not come to predominate.

It is also sometimes claimed that globalisation has rendered the very notion of companies having a nationality as redundant. It is pointed out that some companies have directors and even CEOs and chairmen of different nationalities from that of a company’s domicile. This is occasionally true, particularly in the case of the UK, but the proportion of world economic activity which falls under this regime is small; there are few foreign directors on the boards of most American and Chinese companies. Another token of globalisation can be found in the international character of share registers. Again this is true, but only for a limited range of stock markets and companies, and most economic activity takes place outside public markets. Within them, foreign ownership of shares mostly takes the form of portfolio investment; portfolio investors only rarely become involved in company management issues, preferring to alter the size of their shareholding as a cleaner way to express their opinions.

Even where the share register is dominated by foreign owners, management control of most companies remains in their countries of origin and the majority of managers will be their nationals. The national culture will colour decision-making processes and will have a bias, even if unconscious, towards maintaining the home base at the expense of foreign operations when the company is under stress. Only in a few exceptional cases will the interests of far-flung foreign subsidiaries rise above this bias.

It must be concluded that foreign ownership does matter, but in different ways in different circumstances, sometimes having a favourable effect and other times a negative one. Foreign acquisition of domestic companies is not the one-way bet that recent British governments seem to have assumed. As long as it is easier to acquire companies in the UK than in other developed countries, the UK is likely to attract disproportionate attention from overseas corporations, to which they are already attracted by the use of the English language, the legal system, the science and technology base and a track-record of technical innovation.

In general this might not matter much for most of the economy. However, it does matter in sectors related to national security, such as at the very least defence (including aerospace) and energy supply, where it can be argued that existing controls should be extended and others introduced, moving the UK from an extreme position to a more centrist one when compared to its peer group. This seems unlikely to fall foul of the European Commission.

This reform would not address another important consideration – a proper return on promising innovations in any industry which has had some support from the public sector (either directly or indirectly, such as through the universities). When embedded in appropriate companies, such innovations can sometimes support rapid growth. At the moment, there must be a suspicion that savvy multinationals monitor the UK scene with a view to strengthening their technological position by acquiring such firms at an early stage, which can deny the UK economy of the full benefits of the rapid growth period and thus lessen the UK's return. The introduction of something along the lines of Israel's policy of requiring a payment to the state when national control of part publicly funded innovation (and possibly other intangible assets) is lost through a sale to foreign interests (see pages 32 & 33) would discourage the foreign acquirer by raising the cost of the deal. If the deal still went ahead, the UK would benefit from a compensation payment.

Finally, there is an emotional element in foreign takeovers extending beyond the fears of the employees. The disappearance of huge 'household name' companies familiar to many members of the population from their childhood carries with it an element of national deconstruction and loss of pride in industrial achievement.

How others do it compared with us

The UK is extremely 'permissive' where foreign takeovers are concerned, even in a field such as aerospace where the supply chain is closely bound up with that of the defence industry and thus national security – a criterion for which EU member states are able to intervene lawfully.

In order to show how unusual is the UK's position in this area, we set out briefly below the means by which other leading developed countries can seek to ensure that foreign takeovers of their companies are in the national interest. Some countries interpret these powers as applying to industry in general, but it is more common to employ them only in the case of strategic industries seen as crucial to national security – such as defence, energy and natural resources.

Australia and the US, countries with similar economic predispositions to Britain, take the former position, having a process to examine foreign acquisitions across most sectors. Australia's Foreign Investment Review Board (FIRB) scrutinises acquisitions of domestic businesses valued above $252 million (AUD); this extends as far as takeovers of offshore companies with Australian subsidiaries or gross assets above $252 million. The Australian Treasury has wide-ranging powers to intervene in a deal at its discretion, including on the grounds of 'community concerns'.

A generally similar approach is taken by the United States Committee on Foreign Investment (CFIUS). Established in 1975, it serves as an inter-agency review board chaired by the Treasury Secretary on the 'national security implications' of foreign investments. The power to block M&As itself remains with the President. The Committee or the President can initiate an investigation into any deal involving a foreign company, but in most cases they are voluntarily notified. The Committee then has 30 days to reach an initial decision.

CFIUS has 12 broad criteria for intervention, underpinned by the notion of 'national security implications', including 'critical infrastructure' and 'critical technologies'.[11] A case involving the former in 2006 brought the Committee's work out of relative obscurity when six strategically important American ports were purchased by Dubai Ports World (DP World). It led to a tightening of CFIUS's criteria for reviewing transactions and to DP World selling the ports to an American buyer.[12]

In Canada, the Investment Canada Act (ICA) requires that investments be of 'net benefit' to Canada. Investments are assessed by the relevant ministers.[13] The same goes for the Balance of Payments Division at the Bank of Japan where foreign investment into any of the following sectors can trigger a review: defence, space development, nuclear power, energy, petroleum, communication, broadcast, railway, transport and leather, among others. There is also a specific cap placed on the number of foreign held shares in the largest companies in the financial, communications and transport sectors. This varies between one-fifth for the financial services giant, Japan Exchange Group, to up to a third for companies like Japan Airlines and All Nippon Airways in the civil aeronautical sector.[14]

Recent British governments have argued that introducing powers to review foreign acquisitions of companies for reasons other than competition infringement would deter genuine inward investment into Britain. The countries mentioned above have all maintained good trading reputations and high levels of foreign investment by exercising these powers with moderation. CIFUS investigated 538 transactions between 2008 and 2012, 87 per cent of which were approved.[15] In Canada, fewer than 10 per cent of foreign acquisitions on average are subject to review by the ICA; the Canadian government has only blocked investments on three occasions.[16] It could be said that fear of affecting FDI has its own moderating influence on the actions of these regulatory bodies. Nevertheless, while these countries have upheld their right to intervene in 'bad' deals, and have when required, none, particularly the US or Canada, are perceived as unattractive places to invest. Instead they maintain a moderating influence on foreign acquisitions which the UK lacks.

European Union law is an important consideration for Britain's position on takeovers as mergers over a certain threshold automatically fall under the jurisdiction of the Commission. However, there are exceptions; member states can review transactions where they can demonstrate 'legitimate interests' are at stake.[17] The legitimacy of an interest is assessed by the Commission on a case-by-case basis, but the provision allows the UK considerable more room for manoeuvre than it currently exercises, especially when compared to other members.

Germany has provisions to oversee acquisitions in the postal, banking, insurance, aviation, telecommunications and broadcasting industries. All require notification of investments above certain thresholds, and specific permission from the relevant authority in the case of the latter. For non-EU acquirers of German companies, Germany's Foreign Trade Act and Foreign Trade Ordinance Act gives its Federal Ministry of Economics the right to review and prohibit/impose conditions on the acquisition.[18] The right is triggered if a company outside of the European Union or the European Free Trade Association acquires more than 25 per cent of shares in a domestic company.

Further barriers to foreign takeovers exist from the fact that federal state governments can (and do) own shares in companies important to their state. Lower Saxony maintains a blocking minority in Volkswagen, one of Germany's most successful companies, which was used in 2008 to stop a takeover attempt by Porsche – a company which Volkswagen now owns. Regional banks also help to ensure that local companies have a ready source of funding without surrendering some degree of control; localism is a force to be reckoned with in Germany.

Italy, as well as adopting golden shares and state shareholdings, maintains the principle of reciprocity whereby a foreign company cannot acquire an Italian company unless the same could happen were the roles reversed.

France has negotiated a considerable degree of autonomy on the issue in recent years, most notably during the Danone controversy in 2005 when it was alleged that PepsiCo planned to acquire the French food giant. As a response, French law was amended to allow the government to block takeovers of companies in 'strategic sectors'. In 2013 the law was extended, following the US engineering giant GE's attempted takeover of Alstom, one of France's oldest and best-known companies. The new decree required that approval be sought *before* a foreign bid for a company in the energy, water, transport, telecoms and health sectors. Arnaud Montebourg, then France's Economy and Industry Minister, described the move as 'an essential rearmament of public power'.[19]

France has also introduced new laws to bolster companies' ability to fend off bids on their own. The Florange law, passed in April of last year, extends double voting rights to all shareholders with shares in a French company held for more than two years. The law means the right is now automatic unless the company opts out. The intention behind 'loyalty shares' is to create a longer-term relationship between companies and investors, part of which involves limiting the ability of opportunist investors to force a takeover without regard for the target company's interests.[20]

A similar regime exists in the USA where differential voting rights for shares have allowed entrepreneurs and founding family members in particular to maintain control of public companies such as Google, Ford, Groupon, LinkedIn and Facebook. Moreover the USA permits the use of 'poison pills' against hostile acquisitions, contributing to a general bias against hostile takeovers whether by foreign or domestic companies. These can take a number of forms but the most common is to allow existing shareholders the right to acquire additional shares if an unwelcome takeover bid arises.

The EU's proposed Shareholder Rights Directive may include reforms enabling the use of 'loyalty shares' across member states, through either enabling higher dividend payments or additional voting rights as rewards. Recently this topic has come under scrutiny in the UK. The British government-commissioned Kay Review of UK equity markets in 2012 took the position that enhanced voter rights for longer-term shareholders were not an option worth pursuing. The Review claimed there were too many 'practical difficulties' in legislating on the matter, and they 'would be unlikely to achieve the intended effect.'[21] The issue has not left the UK public agenda, however. In its 2015 election manifesto, the Labour party proposed to restrict the voting rights in a takeover to those already holding shares once a bid has been launched.[22]

Dual class shares aside, it is clear that within the confines of the EU there is room for member states to manoeuvre on scrutiny of foreign acquisitions. Indeed, until 2002 (before the introduction of the European Takeovers Directive) UK takeovers were subject to a broad 'public interest' test. Changes to legislation removed the decision-making powers of ministers by narrowing the criteria for assessment of takeovers to competition, in keeping with the spirit of the EU directive, but exceeding the practices of Britain's EU partners. The exceptions to this rule, under the Enterprise Act 2002, are cases involving 'issues of national security, media quality, plurality and standards and financial stability'.[23] In the case of national security, this is exercised mostly through the holding of golden shares in three companies and also limiting 'in concert' foreign ownership to 15 per cent in two of them.

As mentioned above, member states have some ability to define what constitutes a legitimate interest for mergers and acquisitions. In the case of the UK, the Secretary of State for Business, Innovation and Skills can extend the list of interests under the Enterprise Act. This was the case in 2008 when the Labour government added ‘financial stability’ to the legislation in order to allow a merger between Lloyds TSB and HBOS ─ a merger the then Office of Fair Trade (now the Competition and Markets Authority) was duty-bound to block on the grounds it would endanger competition.[24]

Lord Heseltine in his report for the Coalition government in 2012, *No Stone Unturned,* recommended the government show greater willingness to use this Act, arguing that every major developed economy ensures it has powers to stop mergers in select sectors which are potentially harmful to their national interests. He also called on the government to be more assertive in extracting commitments from foreign acquirers to maintaining British industry and create powers to make such commitments binding where necessary. His proposals were rejected on the grounds they would damage the UK’s reputation as an open market, despite Britain’s competitors for foreign investment being far less timid in this respect.

His position was more recently echoed by the former Business Secretary, Vince Cable, following public concerns over a bid by US pharmaceutical giant Pfizer for British-based AstraZeneca in 2014. Along with minor changes to the Takeover Code to enforce commitments made during a bid, he argued also, unsuccessfully, for a ‘last resort power’ to stop harmful M&As where guarantees were not forthcoming.[25]

Nevertheless, having rejected the idea of using current primary legislation more assertively, there is another method, used by Israel, which may allay fears of damaging Britain’s reputation. Probably because of its small size, Israel usually receives little attention in discussions of foreign acquisitions and mergers. However, in recent years its young companies, particularly in the IT sector, have become popular acquisition targets for leading US companies in the same field.

The country generally favours foreign inward investment and imposes little restriction on foreign-owned businesses. There are a few exceptions, particularly applying in fields relating to national security where outside ownership is not allowed. Investments in regulated industries such as banking, insurance and telecommunications also require prior government approval.

However, Israel does have one seemingly unique tool which attracted attention when in 2013 Google purchased a very young digital mapping company called

Waze for a reported $966 million. Waze had received $1 million in government funding from Israel's Office of the Chief Scientist under Israel's so-called R&D Law. On Waze's sale, this triggered a payment of $3 million to the Office, a figure which was dwarfed by an alleged payment of $230 million to the Israeli Tax Authority in recognition of the fact that Waze's intellectual property was to be re-domiciled outside of Israel. The payment, it is believed, arose to compensate Israel for loss of control of the technology while it was still immature. It is not entirely clear from information in the public domain whether the charge was assessed under the R&D law or some other article of the Israeli tax code. Details of the tax calculations and confirmation of the payment amounts were not available at the time of writing.

There have been reports that the Israeli Tax Authority (ITA) is seeking to apply a similar approach to other foreign acquisitions of IP-rich Israeli companies planning to take IP out of Israel. Mindy Herzfeld of taxanalysts.com described the Waze deal as possibly 'part of a proactive effort by the ITA to let multinationals know that they should expect to be heavily taxed when acquiring Israeli companies.'[26]

R&D and the resultant IP should be one of Britain's greatest competitive strengths. Thirty years ago we spent a greater proportion of our GDP on research than most of our competitors, now we spend below the EU average[27] and rate 159th out of 174 countries in the international league table, following a downward trend in business investment for the last 15 years.[28] While Germany, Japan, France and the US all outspend Britain on R&D,[29] they also seem far less willing to see the results sold to foreign companies. Foreign corporations have come to control 39 per cent of UK patents, compared to an EU member state average of 13.7 per cent, 11.8 per cent of US patents and 3.7 per cent of Japanese patents.[30] At the moment this is more likely to reflect the level of foreign corporate ownership than the effects of the patent box. Reform along the Israeli lines would recognise the importance of keeping ownership of intellectual property in the country and help to recapture some of the flare for innovation we seem to be losing.

Final remarks

When the analysis of the supply chain archive on which this report is based was first proposed, there were no preconceptions as to what it might reveal. In fact, it showed that although the British aerospace industry over the last quarter of a century had contracted in scale and come increasingly under foreign control – in line with the general experience of British manufacturing ─ it remained substantially different in character from other sectors. It holds a strong position in world markets and generates a healthy trade surplus.

It is largely a hi-tech, high-productivity business recognised by the government as having good growth prospects. However, there is a risk that the government's optimistic outlook may not be realised. Despite a rapid rise in foreign ownership resulting from a period of hyper-activity in the M&A scene, it is unusual in British science-based manufacturing in that aerospace retains a number of large locally controlled companies still capable of engaging in industry-wide consolidation, thereby helping to shape the future of the global industry.

Without re-opening the whole question of local versus foreign ownership, the unusually favourable features of this business support the argument in favour of protecting the few remaining large British-owned companies from foreign takeovers, through a provision to obtain government consent for deals in this industry over a certain size – perhaps £150 million turnover p.a., which was the typical size of companies taken over by the five most acquisitive companies recorded.

This would not address the problem of foreign companies seeking to acquire valuable technological niches held by small companies, and often developed with some degree of public sector support, before they had matured after a period of rapid growth. Here there is a case for adopting something along the lines of the Israeli tax on the value of the intangibles which are removed from national control through a foreign takeover.

The UK government already offers tax advantages to companies exploiting patents from a UK base ─ its so-called patent box. It would not be a great leap, politically, therefore to deter companies which sought to do the opposite. This would have the additional bonus of removing the decision to intervene in a merger from the

Secretary of State for Business alone, as would extensions to current legislation. Establishing a process with transparent costs for removing British R&D capacity would depoliticise the process.

Rebuilding British industry is a colossal task in itself; but to do so whilst leaving companies exposed to the same practices that sped its initial decline is more than a little unwise. As long as it remains easier to acquire companies in the UK than in other developed countries, the UK is likely to attract disproportionate attention from overseas corporations. It is difficult to avoid the conclusion that British governments' *laissez faire* attitude towards foreign acquisitions is either the result of a doctrinal preoccupation or reflects pressure from vested interests.

Appendix: methodology

The archive took the form of vendor brochures, sales literature and sometimes covering correspondence, which had been aggregated to form a technical library. It was stored in boxes and the only classification was alphabetic. In addition to company material, other documents such as trade association and government literature were also present. These were regarded as irrelevant to the study and discarded. The same approach was taken in respect to material relating to end-products such as aircraft or submarines. No attempt was made to distinguish between companies that were totally or primarily engaged in supplying the aerospace industry from those to which other markets were more important.

Most papers carried no indication of their age and there was no means of determining the period over which the archive had been collected, but clearly some of it was very old. The earliest date discovered went back as far as 1969, though the majority of the material appeared to date from 1980 to 2000. There was a small amount from the early 21st century. A small number of government agencies trading at some point were included in the archive, which were treated in the same manner as companies. It can be seen from this description that the nature of the archive would place considerable constraints on what could be achieved by attempting to analyse it.

It was necessary to examine every paper individually to determine whether the company concerned required further consideration. It was found that a number of the companies appeared to be distributors of third party products. Taking the view that it was their principals that represented the supply chain, such companies were not considered further. Ultimate holding companies have also been eliminated as it is their trading subsidiaries which form part of the supply chain.

An attempt was made to eliminate companies that appear to have left the supply chain prior to 1990, the start of the review period. This could be done in only a crude manner, the main criteria being the absence of website or email addresses on the literature, the results of a web search (which often produced nothing) and what could be deduced from the Companies House digitised data base. Unfortunately, full digitisation only extends from about 1995 and although earlier information is available on many companies, it can be relatively expensive and slow to obtain. The digitised database itself has been subjected to ‘purges’ to get rid of the records of defunct companies, although it is not clear how systematic this has been. Given the nature of the material and the screens employed, it is quite possible that some of the excluded companies (perhaps with a different name), or at least part of their product ranges, continue to be present in the market.

The surviving companies were analysed in an attempt to assess the supply chain losses over the period 1990 to 2014 (or the closest date for which information was available). Companies frequently changed their names, though sometimes only to a minor extent, which may help to explain why it was not always possible to match a company name to a registration number. Where the original company as evidenced by the documents could not be shown still to exist, but a seemingly related company with substantially the same name and business did, the company was considered to have survived. A number of cases were found where a company had disappeared (often following a takeover) but its name survived following its sale to an unrelated company in a different business area; such survivor companies were assumed not to still form part of the supply chain.

There were also companies that maintained their independent identity but switched their activity away from the aerospace supply chain, requiring them to be regarded as losses to it. Additionally there were cases where a company could have disappeared, but some of its product(s) continued to be offered by another business. In some cases companies were found to be still in existence but dormant, with no practical way of knowing what had happened to their products; these companies were considered as losses to the supply chain. There also appeared to be a few ‘Lazarus companies’ where the company referred to on the original literature had failed but subsequently re-emerged as a new registration trading in the same area. These were considered to be survivors. As a final check the companies apparently still in existence in 2014 were cross-checked against Companies House information and it was found there were a number of cases where, although we had not identified any specific reason why the company could have gone out of existence, it evidently had, or at least become dormant.

Takeovers were frequent, often by foreign companies, and some firms changed hands on more than one occasion. Provided the new owner maintained the UK operation, it was considered that the original company was a survivor. Where the UK operation was closed and domestic production replaced by imports, the original company was considered lost to the supply chain. With particular reference to where takeovers occurred, the target companies were (subjectively) rated on whether they appeared to have valuable technology/know-how, a strong market position or a well-known brand.

The terms 'acquisition' and 'deal' are used inter-changeably to signify a transaction resulting in a change of control and thus include MBOs or MBIs. Care was needed to avoid double counting. For instance, where control changed in stages (e.g. acquisition of a minority stake followed by a full takeover) only a single deal was recorded. Sometimes, there were sequential deals related to IPOs or two distinct companies with the same vendor and buyer at the same time. In all cases, only one deal was recorded.

Unwelcome complications arose from the disappearance in the period of many major British industrial groups (e.g. BTR, GEC, ICI, Lucas Industries, the TI Group, Vickers Group etc.), which had considerable ramifications on the aerospace supply chain. Where it was possible to track the fate of a particular subsidiary, it was treated in the same manner as other companies, but where this was not possible without an unjustifiable increase in the work load and complexity, the fall of these 'giants' was recorded only once.

We judged it necessary to make some sort of analysis to distinguish between ownership groups in the surviving company information. This was extremely difficult because we felt it necessary to address the issue that, where acquisitions had occurred, they had been spread over a 24 year period. Fortunately a high proportion of the companies remained in existence and it was possible to use Companies House or other public domain information, but where this was not possible the last turnover recorded was adjusted to take into account inflation over the period prior to 2013. Where no turnover was filed, the average level of the last two years debtors was used to provide a guide to a likely approximate turnover.

When comparing company turnovers to the European Union's criteria for Small and Medium Size Enterprises, given as less than two million euro for 'Micro', less than ten million euro for 'Small', and less than 50 million euro for 'Medium', turnovers in sterling were converted to euros using the exchange rate on the 30 April 2015.

It was not always easy to be totally sure of the fate of a business without a disproportionate and unjustifiable degree of extra work. In such cases where there was enough information to allow it, a judgement was made as to the fate of the company and to whether or not it remained in the supply chain. Telephone or email enquiries to difficult companies, where they could be identified, did not often yield useful results. In the light of these circumstances, the results of the study should be treated with caution and considered as indicative and not definitive.

For Section 5, normal research methods were supplemented by direct contact with representatives of individual countries. Israel was a difficult case because there was little information in the public domain about the 'takeover tax' or the manner in which in which it was applied. This appeared to be the result of a deliberate policy by the Israeli Tax Authority.

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