

The GE-Honeywell Merger in the EU

August 2008

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^{*} Vives was retained by the European Commission to advice on some specific economic aspects of the merger and he is grateful to the Abertis Chair of Regulation, Competition and Public Policy at IESE Business School for support. The views expressed in the paper are only those of the authors.

1. Introduction

The European Commission (EC) declared in July 2001 the merger between General Electric (GE) and Honeywell “incompatible with the common market” according to the Merger Regulation established in the Council Regulation (EEC) No. 4064/89. Article 2(3) of such regulation states that “a concentration which creates or strengthens a dominant position as a result of which effective competition would be significantly impeded in the common market or in a substantial part of it shall be declared incompatible with the common market”.¹

The EC based formally its decision to block the merger on two pillars:

- The strengthening of the GE dominant position in the markets for large commercial aircraft engines and for large regional aircraft engines, and the creation a dominant position on the markets for corporate jet engines.
- The creation of a dominant position in the market for avionics and non-avionics aerospace components, where Honeywell enjoyed a leading position, and in the market for small marine gas turbines.

The main channels by which the merger was going to create and strengthen dominant positions consisted in horizontal overlaps and vertical and conglomerate integration. The combined market share of the merging parties, the influence and leverage of the financial arms of GE, GECAS and GE Capital, and the ability and incentive to bundle products are behind the conclusions of the EC. The end result would be monopolisation of some markets (like engines for large regional jet aircraft), vertical foreclosure in engine starters, and foreclosure and eventual exit of rivals of the merger entity.

The decision was appealed by GE and Honeywell to the Court of First Instance (CFI), which in December 2005 (with the merger long “dead”) decided to uphold it.² The CFI,

¹ The Regulation was later replaced by the Council Regulation (EC) No. 193/2004, where the meaning of the Article mentioned here was preserved via a slightly different wording of Article 2(3): “A concentration which would significantly impede effective competition [...], in particular as a result of the creation or strengthening of dominant position, shall be declared incompatible with the common market”. The spirit of this change consists in allowing for the consideration of anti-competitive effects even when the merger does not result in dominance in the strict meaning of the term.

² *General Electric v. Commission*. Honeywell’s application was dismissed by the CFI “mainly on technical grounds related to the scope of the action” (CFI, Press Release No. 109/05).

however, only supported the parts of the reasoning behind the decision related to horizontal overlap between the merging parties. Other parts were instead found to be “vitiating by manifest errors”; this was the case for vertical effects and, most notably, for conglomerate effects.

The decision of the EC spurred a lively debate in economic and policy circles, not least because the merger had previously passed the scrutiny of the US Department of Justice (DOJ), only subject to the divestiture of the military helicopter engine business and other minor requirements.

Section 2 describes the markets involved in the merger, and Sections 3 to 5 present the lines of arguments by the EC, along with the CFI responses, on the alleged dominance of GE and horizontal overlaps with Honeywell, vertical effects, and conglomerate effects. Section 6 presents the US position. In Section 7 we assess the pillars of the decision. Section 8 concludes.

2. The markets involved

The EC considered two main markets (jet engines and aircraft components and systems) and an auxiliary market for engine controls as input in the production of engines. The market for power systems was also analysed.

2.1. Jet engines

The EC stressed that “engines compete in order to be certified on a given platform”, first, and then they also compete “when airlines buying the aircraft platform select one of the available certified engines or when airlines decide on the acquisition of aircraft with different engines (whether or not the aircraft offers an engine choice)” (par. 9). In the market for jet engines, three distinct sectors were defined: *large commercial aircraft* (more than 100 seats, range greater than 2,000 nautical miles, cost over USD 35 million), *regional jet aircraft* (30 to 90+ seats, less than 2,000 nautical miles range, cost up to USD 30 million) and *corporate jet aircraft* (designed for corporate activities, cost varying between USD 3 to 35 million).

Large commercial aircraft. GE, Rolls Royce (“RR” from now on) and Pratt & Whitney (“P&W”) were the three main independent suppliers of engines for large commercial aircraft, which were divided in the EC’s scheme in wide-bodies and narrow-bodies according to seats and distances typically covered. Both types are manufactured by Boeing and Airbus. The engine suppliers also operate via joint ventures, the most notable being CFMI (50-50 between GE and French SNECMA) and International Aero-Engines (“IAE”), controlled by P&W and RR.

Regional jet aircraft. Regional jets were produced by Embraer, Fairchild Doner, Bombardier and BAe Systems. The EC distinguished between small regional jets (30 to 50 passengers) and large regional jets (70 to 90+), arguing that substitutability was not feasible among the two categories. For small regional jets, GE (alone and through CFMI), P&W and RR were active in the market, while engines for the “large” regional jets were only supplied by GE and Honeywell, the two parties in the attempted merger.

The engines for large commercial aircraft and for regional aircraft may be sold to airframe manufacturers or directly to the airlines.³ In the latter case the airframe manufacturers leave the choice of engine (among a certified list) to the airlines. Those may have preferences on engines because of commonality effects related to the standardisation of an airline’s fleet or part of it, leading to economies of scale (for example, in maintenance of engines).

Corporate jet aircraft, manufactured by Bombardier, Cessna, Dassault and Raytheon, was subdivided in heavy, medium and light. GE, Honeywell, RR and P&W were present in the market and, following the EC’s assessment, a horizontal overlap between GE and Honeywell arose in the medium segment. The engines for corporate jets are typically chosen by the airframe manufacturers.

Maintenance, repair and overhaul (MRO) activities, part of the “after-markets”, are important due to the intense wear of jet engines. Services and spare parts are provided by engine manufacturers, besides independent shops and airlines’ maintenance departments, and are a source of large streams of revenues.

³ Engines can also be sold to leasing companies. We will refer to this possibility later.

2.2. Aerospace Components: Avionics and Non-Avionics

Honeywell manufactured a range of aviation products, besides engines, over which it enjoyed a leading position which allegedly would be converted into outright dominance were the merger to go ahead.

Avionics products relate to equipment used to control navigation and communication of the aircraft as well as flying controls. For large commercial aircraft, customers were aircraft manufacturers and airlines. For regional and corporate aircraft, manufacturers were the only customers and typically bought avionics as part of an integrated cockpit. Standard avionics products, which are not part of integrated systems, are “Buyer-Furnished-Equipment” (“BFE”), i.e. can be chosen by airlines.

Non-avionics products include a variety of systems such as auxiliary power units, environmental control systems, electric power, wheel, brakes and others. With the exception of highly consumable parts such as wheels and brakes, non-avionics products are “Supplier-Furnished-Equipment” (“SFE”) selected by the airframe manufacturers.

The EC maintained that Honeywell was a leading supplier of avionics, enjoying a market share around 50%-60%, while its main competitors were Rockwell Collins (20%-30%), Thales (10%-20%) and Smiths Industries (0%-10%), and also in non-avionics, rivalled by United Technologies Corporation (UTC), through its subsidiary Hamilton Sundstrand, and to a lesser extent by BF Goodrich, SNECMA and Liebherr (no market shares indicated in this case).

2.3. Engine controls

Engine controls are necessary inputs for the production of engines. Honeywell was active in this market, in particular as a producer of engine starters, where it enjoyed a 50% market share, while its main competitor, Hamilton Sundstrand, had more than 40% according to the EC (and sold to the associated company P&W).

2.4. Power systems

The market for small marine gas turbines, defined to include turbines up to 10 MW, was composed by P&W Canada, RR/Allison, Honeywell and GE. Lumpy and cyclical demand rendered the estimation of market shares difficult. However, the EC established that for turbines below 5 MW, where the bulk of the demand is concentrated,

Honeywell and GE had market shares around 70-80% and 10-20%, respectively. These shares moved to 40-50% and 25-30%, respectively, when considering the whole 0.5-10 MW range. GE and Honeywell argued against the existence of a horizontal overlap with technical substitutability issues and the lack of geographical overlap in the market activities of the two firms in this sector.

3. GE dominance and horizontal overlap with Honeywell

In the market for *engines of large commercial aircrafts*, the definition of market shares was based on the installed base and orders backlog for aircraft still in production, and excluded those which are no longer manufactured as no orders could be placed.

Taking account of joint ventures (CFMI, between GE and French SNECMA, was allocated 100% to GE; and IAE, between P&W and RR, was allocated equally between them) the resulting market shares of the installed base of aircraft still in production were:

- GE/CFMI: 52.5%
- P&W/IAE: 26.5%
- RR/IAE: 21%

Looking forward, the order book of aircraft still in production reinforced the position of GE/CFMI:

- GE/CFMI: 65%
- P&W/IAE: 16%
- RR/IAE: 19%

Objections by the parties focused on the failure to take into account the revenues still accruing from engines used in out-of-production aircraft and the overall dynamics of the market over the previous decades. The EC argued that market shares affect competitive conditions for future orders via incumbency effects, due to lower costs for airlines from fleet and engine commonality. Since airlines could only buy aircraft still in production, and revenues (especially from aftermarket services) mainly accrued from engines for aircraft still in production, the objections were dismissed. Furthermore, the EC noted

that “on 10 of the last 12 platforms for which airframe manufacturers offered exclusive positions, GE managed to place its products” (par. 164). The EC highlighted the case of the whole range of Boeing 777 aircraft, sold as a package including aircraft and engines, against normal practice by which airlines buy them separately (par. 167).

In the market for *engines of large regional jet aircraft*, the merged entity would enjoy 100% control of the jet engine supply of platforms not yet in service (Honeywell’s 10% would be added to GE’s 90%) and 90%-100% of the overall engine installed base on the existing platforms, so that any form of price competition would be prevented, and the incumbency advantage would be enhanced. The only engines by Honeywell in this market were those used to power Avro jets.

In the market for *corporate jet aircraft engines*, the horizontal overlap would lead to a dominant position, with 50%-60% market share overall and 80%-90% in the medium segment (building on GE’s 10%-20%). Bundling and vertical integration effects would reinforce foreclosure of competitors.

In *power systems* the EC argued that there existed significant horizontal overlap among the parties, resulting in a market share between 65% and 90% of the market for small marine gas turbines, against the parties’ contention that they focus on turbines of different dimensions and therefore do not compete with each other. The dominant position of the merged entity would also be reinforced by high development costs acting as barriers to entry.

Maintenance, repair and overhaul (MRO). MRO activities are an important source of revenues for engine manufacturers. The EC underlined that both the “spare parts” and the MRO service markets had seen the GE’s foothold becoming stronger in the past years vis-à-vis competitors. Commonality effects were claimed to reinforce GE’s position.

Conclusions on GE’s dominance and horizontal overlaps

The EC concluded that GE enjoyed a position of dominance, on the basis of high current and prospective market shares, in the market for engines *for large commercial*

aircraft, which – as shown in the following sections – would be extended to Honeywell products.

Horizontal overlaps existed for engines of *large regional jet aircraft*, *engines of corporate jet aircraft* and *power systems*. In those markets, positions of dominance would be created or strengthened by the merger.

The CFI found in its 2005 decision that the EC analysis of horizontal overlaps – unlike the other parts of the EC analysis - was not vitiated by manifest error of assessment, and hence constituted the basis for upholding the decision to block the merger.

4. Vertical effects

The EC identified potential vertical foreclosure dangers with the leasing company of GE, *GE Capital Aviation Services* (“GECAS”), and with Honeywell’s engine starters.

4.1. GECAS

GECAS bought planes in order to lease them to airlines, often engaging in “speculative” purchases that were not linked to any requests by its customers. Besides the obviously different type of risk involved in leasing instead of buying, the value added by this activity consisted in providing airlines with readily available aircraft, something which is not usually possible when buying directly from manufacturers,. GECAS’ contribution to GE’s sales consisted in its “GE-only” policy, by which almost all the aircraft it purchased was powered by GE or CFMI engines. As a consequence, when manufacturers select engines as part of their aircraft on sole source platforms (i.e. when the choice is not given to the airlines), they would prefer, *ceteris paribus*, to buy GE or CFMI engines, as one of the potential buyers of their aircraft displays this strong “preference”. The EC argued that GE’s policy of buying only aircraft with GE engines allowed it to “seed” smaller airlines by creating and enhancing fleet commonality effects. GECAS’ 10% market share, in a highly fragmented market, would suffice to foster its role as “launch customer”, tilting the market towards GE and, after the merger, Honeywell’s products.

The CFI upheld the view that GECAS did foster GE's dominance, but also found that there was no sufficient evidence that the merged entity would have an incentive to extend those "GE-only" practices to Honeywell's SFE and BFE products, as there existed a huge difference in prices between engines for large commercial aircraft and large regional aircraft, on one hand, and each of the avionics and non-avionics products, on the other. Imposing the condition to have Honeywell's components may not be profitable if it jeopardises profits on engines. Furthermore, the assertion that such practices would necessarily result in dominance was deemed questionable since there was a distinct market for each of the avionics and non-avionics products, and the EC's arguments lacked a thorough analysis of the effects on those different markets.

4.2. Honeywell's engine starters

Honeywell was a "key supplier of engine controls to engine manufacturers" and "the leading, if not the only, independent supplier of engine starters". The fear was that the merged entity "would have an incentive to delay or disrupt the supply of Honeywell engine starters to competing engine manufacturers [...] . Likewise, the merged entity could increase the prices of engine starters or their spares, thereby increasing rival engine manufacturers' costs and reducing even further their ability to compete against the merged entity" (par. 420). The EC's arguments seem to point to RR as the main loser. P&W was manufacturing engine starters mainly for its own use, and another supplier, Hamilton-Sundstrand, belongs to the same group as P&W. The EC argued that those suppliers, as well as Honeywell, would not find it profitable to sell engine starters to RR in light of profit considerations regarding the whole group they belonged or would belong after the merger. Other independent suppliers (Urengo, Microturbo, Parker and Sumitomo) would not be a feasible alternative.

The parties' proposal to divest Honeywell's engine starters were rejected by the EC mainly on technical grounds, related to the failure to include air starter valves in the divestiture.

The CFI did recognise that GE-Honeywell could disrupt the supply of engine starters to competitors and that the sacrifice of profits in starters may be amply compensated by even a tiny percentage increase in the market share for large commercial aircraft at the expense of P&W and RR. However, the CFI stated that the EC committed a manifest

error of assessment as it failed to take into account the deterrent effect of Article 82 of the Treaty: the disruption of supply of engine starters of the merged entity would be a clear abuse of dominant position.

5. Conglomerate effects

The EC identified two main potentially anticompetitive conglomerate effects relating to the financial arm of GE, GE Capital, and to the practice of bundling.

5.1 GE Capital

GE's financial strength through GE Capital and the overall GE stance as the world's largest company in terms of market capitalisation "clearly represent a significant competitive advantage over P&W and RR" (par. 32), in particular in terms of GE's ability to engage in risky R&D projects and absorb potential failure. Furthermore GE could also afford aggressive pricing strategies with heavy discounts on the catalogue prices for engines. Those discounts were seen as resulting in the "weakening of engine competitors and ultimately in foreclosing them from current and future platforms and airline competitions" (par. 112), and not in lower costs for customers, as the latter have to spend more in later phases on maintenance and spare parts manufactured by the original supplier, so that the "total average cost of an engine has actually increased between 10% and 30% in real terms" (par. 113). Furthermore, GE's strength was also employed to provide significant financial support to airframe manufacturers to obtain engine exclusivity, and to airlines in order to gear their purchasing behaviour towards GE engines and to vertically integrate in repair shops in the after-markets (e.g. servicing, repair, replacement parts).

The CFI provided arguments that substantially mirror those related to GECAS: GE Capital did probably affect GE's ability to reach dominance, but this would not imply that dominance in Honeywell's components would arise from the merger.

5.2. Bundling

Most controversially, the EC argued that the combination of GE and Honeywell across a range of products would reinforce existing dominance and create further dominant positions by foreclosing rivals. The main concern was the ability of the merged

company to bundle, for example engines and avionics, to the disadvantage of specialist producers in either field and ultimately to the disadvantage of consumers.

The EC claimed that “the merged entity will be able to offer a package of products that has never been put together on the market prior to the merger and that cannot be challenged by any other competitor on its own” (par. 350), so that the new entity may promote the selection of Honeywell’s BFE and SFE-option products by selling them as part of a broader package comprising engines and GE’s ancillary services such as maintenance, leasing, finance, training, and so forth.

“Packaged offers” could take several forms: mixed bundling, where complementary products are sold in a package priced at a discount with respect to the sum of the prices of individual components, or pure bundling, where components cannot be purchased separately. The latter can take the form of technical bundling, so that components are rendered incompatible with the complementary ones provided by competitors.

Bundling would reduce the profits of competitors up to causing their eventual exit from the market.⁴ The EC decision did not present a detailed reasoning about *how* bundling may lead, in the markets concerned, to foreclosure of competition: “the various economic analyses have been subject to theoretical controversy, in particular as far as the economic model of mixed bundling, prepared by one of the third parties⁵, is concerned”, but “the Commission does not consider the reliance on one or the other model necessary for the conclusion that the packaged deals that the merged entity will be in a position to offer will foreclose competitors from the engines and avionics/non-avionics markets” (par. 352). The EC argued that, even if one were to accept that the overall demand for aircraft equipment is relatively inelastic, the demand for the products of individual firms would still be elastic enough so that bundling with discount would “lead to a re-allocation and therefore to a shift of market shares in favour of the merged entity” (par. 376).

⁴ “The ability of the merged entity to cross-subsidise its various complementary activities and to engage in profitable forms of packaged sales will have an adverse effect on the profitability of competing producers of avionics and non-avionics products, as a result of market share erosion. This is likely to lead to market exit of existing competitors and market foreclosure [...]” (par 398).

⁵ The Commission is referring here to the model presented by Frontier Economics and Professor Choi on behalf of RR that we are going to discuss later.

In the *aerospace component (avionics and non-avionics)* market the EC identified Honeywell as the unique competitor in a position to offer a “complete range of avionics equipment”, enjoying a competitive advantage both for SFE and for BFE products. Packaged deals including components and engines, that competitors would be unable to match,⁶ would result in a change from Honeywell’s leading position to downright dominance and effective foreclosure of competitors’ presence in the market.

In the market for *engines for large commercial aircraft*, GE’s dominant and Honeywell’s leading positions in their respective markets would allow to engage in packaged offers of complementary products such as engines, avionics and non-avionics products and related services. As a consequence, the merger would strengthen GE’s existing dominance and also contribute to dominance in the other segments, the engines for large regional jet aircraft and for corporate jet aircraft.

The relevance of *countervailing power of customers* was downplayed by the EC on the grounds that customers would not refuse lower prices resulting from packaged deals. On the possibility that the two large airframe manufacturers, Boeing and Airbus, would aim at preserving competition, the EC stressed that none of them would be willing to place itself at a disadvantage by selecting a more expensive combination of products than the packaged deals offered by the strongest competitor on the other side of the market.

The undertakings submitted by the parties included a “no-bundling” behavioural commitment. The EC replied stating a preference for ex-ante structural to ex-post behavioural solutions, where the latter would involve “endless litigation” in the phase of controlling for effective compliance.

The EC’s bundling analysis resulted in some of the greatest controversy, both amongst economists and with the antitrust authority across the Atlantic. The CFI stated that the EC had not provided convincing arguments showing that the merged entity would have engaged in bundling former GE’s engines with former Honeywell’s avionics and non-avionics products.

⁶ The possibility of teaming arrangements by rivals was not seen as a credible alternative by the EC.

The CFI maintained that only “in the sector for large commercial aircraft, for which the Commission has defined distinct markets both for jet engines and for each avionics product, that the Commission’s case on bundling could conceivably be sustained” (par. 404)⁷. Moreover, the fact that the final customer in that segment would not always be the same imposed additional restraint to the potential scope of bundling. Namely, bundling would be possible, “in case of airframe manufacturers, only between GE engines and Honeywell SFE-standard products on sole-source platforms and, in case of airlines, only between GE engines and Honeywell BFE/SFE option products on multi-source platforms”. The timeline of purchasing, whereby engines tended to be selected earlier than avionics and non-avionics, would not per se preclude bundling practices, but would impose extra commercial effort to enforce bundling offers as opposed to pricing individual components.

In the CFI’s view, the EC failed to recognise the potential harmful effect on profits of *pure* bundling practices, whereby purchasers would be compelled to buy the whole package. For instance, a buyer with only a marginal preference for GE engines may be put off by the request to buy also Honeywell products; the costs of losing some demand for engines could well offset the benefit of fostering demand for avionics and non-avionics. Also, the EC should have taken into account the deterrent effect of Article 82. Therefore, the EC had not established that the merged entity would engage in *pure* bundling.

The likelihood of *mixed* bundling practices, on the other hand, was reinforced, in the EC’s view, by the existence of previous practices by Honeywell. Such evidence was deemed “of little relevance” by the CFI, on the grounds that engine prices were markedly higher than avionics and non-avionics products and hence the commercial dynamics of all encompassing bundling by the merged entity would be substantially different.

⁷ In the market for engines for corporate jet aircraft, GE presence was quite limited and hence the bundling possibilities mainly involved Honeywell’s engines and components and were not significantly affected by the merger (par. 402). Market definition and related technical issues exclude the remaining possibilities.

The supporting economic analysis was deemed insufficient by the CFI. After pointing out that the EC neither adopted nor rejected the model defined by Professor Choi,⁸ which had previously been used in the EC's Statement of Objections, the CFI states that "no evidence or analysis is put forward which is such that it might establish that there was a real likelihood of such an incentive [for mixed bundling] existing after the merger" (par. 449). The bulk of the limited EC analysis consisted in rejecting the parties' contention that the demand for their products was relatively inelastic, on the ground that there would still be, in any case, elasticity in terms of demand for individual products: offering discounted bundles would result in higher market shares. Elasticity would reinforce the "Cournot effect", whereby a firm that sells a wide range of complementary products derives advantages from offering discounts which, although reducing profit margins on a discounted item, results in selling a larger quantity of all the products in the range. The CFI maintained that a proper evaluation of Cournot effects should rely on detailed empirical analysis regarding the size of price cuts, the consequent shifts in sales and the variation in profit margins of the participants. The lack of such analysis undermined the EC's conclusions and incentives to bundle cannot be seen as "direct and automatic consequence of the economic theory of Cournot effect" (par. 456).

The CFI also maintained that the EC had provided insufficient evidence and the reasoning to support the view that the merged entity would use discounted bundles as a strategic device to maximise long-term profits via exclusion of rivals. For example, GE's joint venture partner, SNECMA, would have little interest in participating in a discount scheme for CFMI engines in order to boost sales of GE-Honeywell's avionics. Finally, the EC had once again failed to recognise the deterrent effect of Article 82 on anti-competitive practices.

6. The US view

In the US Department of Justice (DOJ) view, the only antitrust issue related to horizontal overlap in the U.S. helicopter engines, and repair and overhaul services for certain Honeywell engines. As a consequence, divestiture remedies (agreed by the parties) only affected those areas and the merger was approved. The thrust of the US

⁸ This is discussed in section 6 below.

analysis of the merger is strikingly different from the European one.⁹ Competition in the market for jet engines for large commercial aircraft is seen to be fierce and results in deeply discounted engine prices. GE's position might be seen as "leading" but "nowhere near dominance" (Platt Majoras, 2001) given that P&W and RR were enjoying growing revenues and profits and investing heavily in the development of next generation engines, and also in light of the latest 2001 contract awards. Even assuming the assignment of all CFMI sales to GE, the consideration of the special case of GE's sole-source contract for the Boeing 737 should drive towards a more balanced assessment of market positions; namely, excluding those sales, GE's share would be 44%, instead of 65%, in the share of outstanding orders for engines for large commercial aircraft. With regard to engines for large regional aircraft, the US contemplated thrust and aircraft characteristics that made GE and Honeywell's engines part of different markets. The EC referred to seats and this made Honeywell's engines used by Avro part of the same market as GE's engines.

The harshest criticism on the US side lies in the criticism of the "range effects" theory, i.e. the possibility that the merged entity would engage in mixed bundling and offer discounted packages including Honeywell's products. Platt Majoras observes that "entrenchment", an alleged anti-competitive consequence of conglomerate mergers via higher efficiency and stronger financial position of already dominant firms, was eliminated as a basis for challenging non-horizontal mergers in 1982 with the DOJ new Merger Guidelines and the Federal Trade Commission Statement on Horizontal Mergers. It was recognised that "efficiency and aggressive competition benefit consumers, even if rivals that fail to offer an equally "good deal" suffer loss of sales or market share". In this case, the Cournot effect from bundling complementary products enhances consumer welfare: as the merged firm internalises the negative externality on demands for complements caused by high prices, the new prices decrease, moving closer to marginal costs and hence increasing allocative efficiency.¹⁰ GE's ability to provide cheaper finance results in a source of efficiency as any other valuable asset, and if cheaper capital leads to more investment and discounted prices, this eventually benefits consumers. The impact of GECAS on GE's success is downplayed by the DOJ

⁹ See the remarks of the Deputy Assistant Attorney General of the Antitrust Division Deborah Platt Majoras (2001).

¹⁰ See Kolasky (2001).

on the basis of the small GECAS purchasing share, of a lower relevance of commonality for airlines, and of the empirical analysis of the factors behind GE's contracts as sole suppliers for airframe manufacturers. As in GE's case, Honeywell's competitors are seen also as much stronger than in the EC's representation, and the possibility of teaming arrangements is deemed viable.

Platt Majoras (2001) stresses the general policy pursued by US authorities which mainly consist in fostering competition as a means to efficiency and not as an end in itself, so that conglomerate mergers are not to be blocked, as a general rule, insofar as they enhance efficiency even if they place less efficient firms at risk of exiting the market. The trade-off, in terms of consumer welfare, between the positive effect of short-term efficiency brought about by the market and the possible long-term negative effect of enhancing market power of the merged entity, if some competitors are forced out of the market, is intrinsically hard to assess. It involves many steps, including the quantification of the efficiency, of the time it takes for exit of rivals to happen and of the likelihood that the latter will not be able to develop counter-strategies, the assessment of the future price increase stemming from market power, and of the possibility of new entrants in the market.

Overall, the US authorities conclude that while horizontal and vertical mergers should raise the attention of regulators, as they may eliminate competitors and suppliers or customers, respectively, and therefore reduce or distort competition and undermine market efficiency, "antitrust should rarely, if ever, interfere with any conglomerate merger", as this type is found to have the potential to generate efficiency via infusion of capital, diversification of risk, meshing of R&D, improving management and fostering entrepreneurship.

7. The pillars of the EC decision: an economic assessment

We have set out the three different views of the EC, CFI and US DOJ. What light can careful economic analysis cast on who was right on what? As we have seen, the case of the EC is founded on the dominance of GE in the market for large commercial aircraft, reinforced with vertical and conglomerate effects with their financial arms GE Capital and GECAS, which, via bundling, would extend to Honeywell's avionics and non-

avionics products. Added reasons to block the merger are a vertical foreclosure argument related to engine starters and horizontal overlaps between GE and Honeywell in the large regional jet engines market. We deal with these issues in turn.

7.1. Horizontal issues

Was GE dominant even without Honeywell?

The pre-merger dominance of GE stands at the basis of arguments related to the strengthening and extension effects of the merger. The EC analysis of the market for large commercial aircraft engines raises the issue of market share as an indicator of market power. The term “bidding market” has been used by critics of the EC decision to suggest that current shares say little about future success in markets characterised by periodic very large contracts. Each contract should be won on a technical and commercial basis, that is, on the quality of the product and on price competition, so capable and efficient competitors should be able to gain contracts irrespectively of what market share has arisen from previous experience. The “bidding market” description of the engines market is shared, among others, by the DOJ, Patterson and Shapiro¹¹ (2001) and Grant and Neven (2005). Patterson and Shapiro underline that credible competitors in the market continuously bid for contracts and that the EC acknowledges in its decision that GE won contracts via “heavy discounting practices”. Engaging in heavy discounting was seen by the EC as evidence of dominance based on superior financial strength but it was viewed as evidence of competitive pressure by the US DOJ.¹²

Second, even if one agrees with the EC and the CFI that market shares are a relevant indicator of market power, the very definition of shares is contentious. The EC calculation for GE’s market share is done using only the installed base and orders for currently manufactured aircraft, and it adds the engines produced by CFMI, its joint venture with French SNECMA. The latter is a big proportion of GE’s share, and a driver of the reversal of previous market leadership by P&W comes from CFMI’s contract as sole supplier for Boeing 737, the most successful airplane in history. The rationale for looking at installed base stems from switching costs and learning effects

¹¹ Carl Shapiro acted as an economic expert for GE-Honeywell in their presentation to the EU Merger Task Force, along with Barry Nalebuff, Patrick Rey, Shihua Lu and Gerg Vistnes.

¹² Grant and Neven (2005) point out that evidence suggests that “the nature of competition is such that emphasis is on future competitions, not on ones that have already been decided”, so that in its market share-based approach, the EC “would appear to have ignored the dynamics of the market”.

associated to engines, that provide inertia in the orders of airlines. The exclusion of engines for out-of-production planes is justified because there is nothing to compete for. With regard to the share of CFMI, the EC's rationale was to assign the share solely to the firms acting as independent suppliers as the other firms could not act as a competitive constraint to GE.¹³

Nalebuff (2003) argues that assigning to GE the whole CFMI quota, removing engines on planes out of production and other relevant choices should be justified according to the goal of market share assessment. If the revenue stream is the object of interest, then engines on the whole installed base, instead of only engines on planes in production, should be considered; this would reduce GE's share to 41%. Furthermore, GE should be assigned only half of CFMI's share (because this is what GE gets in terms of revenues), which reduces GE's market share to 36%. Combining both corrections, GE's share would be only 28%. When market power is the main issue, Nalebuff's conclusions become more radical. Most of CFMI's share comes from the exclusivity contract for Boeing 737, whose terms were prenegotiated between the parties (Boeing and the GE/SNECMA) so that CFMI does not have the ability to control engine prices on orders from airlines. Excluding its exclusive contract sales GE's share drops to 10% or 20% depending on whether out-of-production planes are considered.¹⁴ Similar results are obtained when the objective is to understand the potential for bundling. As engines offered to Boeing by CFMI are offered at a predetermined deal, the only way to propose a discounted bundle would be via future discounts on Honeywell's components subject to having bought the CFMI powered plane. This would make sense only as long as it determines an increase in plane sales. An obvious issue arises in relation to the small price of Honeywell's components with respect to the cost of the engine and plane: there is little scope for the "tail to wag the dog".

Indeed, the market share calculations of the EC do not seem to succeed in proving the inclination of the merged entity to use bundling strategies and eventually foreclose the

¹³ Kolasky (2001) points out that SNECMA competes with Honeywell in the market for landing gears, so that the EC should explain why the French firm would not object to the policy extension of dominance in favour of Honeywell products.

¹⁴ Kolasky (2001) states that excluding the contract with Boeing 737, even if we assign 100% of remaining sales by CFMI to GE we get a more balanced market share picture: GE 44%, P&W 23%, RR 27%.

competitors of Honeywell. With regards to their relevance for the assessment of extant market power and horizontal effects, the main issues relates to the very nature of market interactions. The infrequency of bidding contests and their big impact on the evolution of market shares suggests the importance of understanding what has driven GE's success in recent bids, most notably on CFMI's contract with Boeing, and whether those same conditions are likely to continue into the future or, rather, whether it is likely that current or future competitors will enjoy a level playing field. Ultimately, the question revolves around incumbency effects which the EC links to commonality.

We do consider that the EC was right in not taking at face value the claims that in a "bidding market" existing shares do not indicate market power. The reason is that the assumptions needed for the claim to be true are very stringent and boil down to the adequacy of the Bertrand model with homogeneous product (and constant known marginal cost with no capacity constraints) as a description of the market.¹⁵

However, the relevance of commonality was probably overstated by the EC, as aggressive bidding was the main factor of GE's success in the market for engines. In any case a more detailed empirical study on the bidding dynamics and the market share inertia due to commonality should have been undertaken.

All in all, we conclude that the case for GE's dominance in the market for large commercial aircraft engines was not sufficiently grounded on empirical analysis.

Horizontal overlaps with Honeywell

At the time of the EC decision the horizontal overlap issue attracted relatively little attention as it was perceived that relatively limited divestiture could settle those concerns. For example, Kolasky (2001) and Platt Majoras (2001) pointed out the remarkable *lack* of overlap among GE and Honeywell, two big players in the aerospace industry. The CFI, however, stressed the growing importance of the large regional aircraft sector while arguing that the merger would strengthen GE' dominant position in the market for engines in that sector, and that the feasibility of proceeding with the merger with divestiture remedies would be questionable (e.g. it would be difficult to

¹⁵ See Chapter 5 in Vives (1999) for the assumptions and analysis of the Bertrand model and Klemperer (2007) for a more explicit analysis of competition issues in bidding markets.

find a credible buyer for the business). In the large regional aircraft engine market, the merger would have created a 100% market share, by adding to GE's 90% the remainder of the market as defined by the EC.

Although it makes sense to consider the switch from a very large market share to 100% as a strengthening of dominance, this 'monopoly' is highly sensitive to market definition. While the definition of the EC is based on seats and cost consideration, the DOJ relied on engine power. Furthermore, Kolasky (2006) remarks that the hypothetical monopoly test was not employed to see whether one could see the engines in question as part of the same market.

Be that as it may, the parties did offer the divestiture of the relevant Honeywell's engines as a remedy for antitrust concerns in the sector of the engines for large regional aircraft. It remains unclear whether the practical issues related to finding a buyer or to the uncertain environment that Avro producers would have faced really meant that the remedy was not feasible. However, it seems hard to believe that the prohibition of such a wide-ranging merger should hinge on an apparently modest difficulty with implementing this divestiture.

6.2. Vertical foreclosure

Engine starters and engines

The fear was that the merged GE-Honeywell would disrupt the supply of starters to engine producers like RR. However, for a vertical merger to lead to foreclosure of rivals several conditions need to be fulfilled. The vertically integrated firm must have the ability and the incentive to raise rivals' costs in a significant way and the consequence must be that prices downstream increase. If one neglects the possible penalties for breach of existing commitments, whenever there is the *ability* to raise rivals' costs (and this is the case with imperfect competition upstream and with the upstream division of the vertically integrated firm being a relevant supplier) there tends to be the *incentive* to do so. This is so because sales to rivals increase their production and hurt the vertically integrated firm. Given that the revenues on starters are relatively low, such a foreclosure strategy may indeed be profitable.¹⁶ Furthermore, whenever pre-merger the upstream

¹⁶ However, rivals' costs need not increase in equilibrium. In particular, other upstream producers may replace the vertically integrated firm. Here the merging parties and the EC disagree. The EC does not

division sets price above cost, the downstream division of the vertically integrated firm sustains lower costs (because of the elimination of the double margin), sells more, while rivals sell less and have a reduced derived demand for the input. The impact on the downstream final prices of engines is ambiguous. They may go down because the direct effect of the elimination of the double margin often dominates the potential indirect effect of raising rivals' costs. The possibility of entry (for example, of RR producing its own starters) should also be considered.

Given these uncertainties, we think that the standard to show vertical foreclosure up to blocking the merger was not satisfied by the EC analysis. In this sense we do find the CFI view, based on the deterrent effect of Article 82, quite reasonable.

The role of GECAS

The most immediate objection involving GECAS' role consists in its limited market share. The EC sets it at around 10%, others (see e.g. Nalebuff, 2003) at 5% to 7% according to different criteria, so that even the position as market leader (with respect to another leasing company, ILFC) may be questioned. The relevance of GECAS behaviour even when its share is relatively small is at the core of the Archimedean or pivotal leveraging theory proposed by Reynolds and Ordober (2002)¹⁷. Their main point is that if a group of customers prefers a given characteristic of a good and all the others are indifferent, then the profit-maximising firm is going to include it (if not too costly). In this case, the reasoning would especially apply to aircraft manufacturers selecting GE engines for sole-source platform and, if the merger had been allowed, Honeywell's products for SFE equipment. For the Archimedean theory to work, a number of assumptions are needed. First, a firm (GE or GE-Honeywell) must be present both as supplier of components to intermediate manufacturers of aircraft (Airbus, Boeing, Bombardier) and as a buyer (GECAS) who leases the product to final consumers (airlines). Those final users can also buy directly the planes. The intermediate manufacturers make exclusive choices with respect to which system (aerospace components) will be incorporated into their products. End users and intermediate

see any viable alternative supplier of starters to RR to replace Honeywell (Hamilton Sundstrand because it belongs to the same group as P&W, Microturbo because it is in the same group as SNECMA, and others for different reasons).

¹⁷ The authors worked on behalf of UTC, a competitor of GE in several markets: the P&W division manufactures jet engines and the Hamilton Sundstrand division produces aircraft systems.

manufacturers are indifferent about the choice made by the manufacturer. Finally, product price exceeds incremental cost both for producers of the intermediate products and for system suppliers.

Suppose also that prior to the merger, the downstream purchaser GECAS had no internal preference, either with respect to the systems or with respect to the intermediate product. Then, after the merger, the downstream purchaser GECAS implements the policy of purchasing only those intermediate products (aircraft) in which the components of the upstream systems affiliate are embedded. Knowing that, the intermediate producers choose to embed those systems (Honeywell's components) in order to be able to supply to GECAS. This situation can be seen as an equilibrium if rival suppliers do not react. Reynolds and Ordovery argue that the history of the impact of GECAS towards GE's dominance in the engines markets strongly suggests the inability of competitors to counteract the strategy that the merged entity would carry out. Furthermore, they maintain that the empirical evidence contradicts the idea that GECAS' rivals shift away from GE's powered aircraft. Eventually, GE-Honeywell would be able to impose higher prices for their product even in the short run, while in the long run this effect would be stronger following the likely exit by existing Honeywell rivals.

The theoretical argument is supported with evidence based on the increase in market shares enjoyed by GE in the period in which GECAS started to purchase new planes, 1996-2000. Reynolds and Ordovery (2002) show that the share for competitive-engine large commercial aircraft ordered with GE engines by speculative leasing companies (including GECAS) rose from 40% to 60% approximately, while in the same period the corresponding share declined by 5% (from 50% to 45%, approximately) when considering demand from airlines. Nalebuff (2003) contradicts this evidence and shows that correct market share assignment in the competitive engine choice market result in a lower increase in the sales to leasing companies and in a slight *decrease* of GE (including CFMI) overall share, from 52.3% to 50.6%¹⁸. Two main effects are behind these results: GECAS rivals (most notably ILFC) did shift away from GE's powered aircraft; and leasing companies' demand simply replaces direct demand from airlines.

¹⁸ Among the flaws alleged to exist in Reynolds and Ordovery (2002) there are the inclusion of aircraft for which no choice is available and other technical issues.

Similarly, the US DOJ also disagrees with Reynolds and Ordovery's market share assignments (see Emch, 2003).¹⁹ Other critical remarks by Nalebuff concern the real role of GECAS: as its business consists in leasing to airlines, it is conceivable that GE would have enjoyed benefits from increments in demand for GE-powered aircraft directly from airlines or from other leasing companies.

The effect of GECAS in relation to the merger hinges on its supposed change in demand behaviour, applying a "GE-only" policy also to Honeywell components. For this strategy to be successful, the assumption on the pre-merger indifference between components should hold tight, so that expectations of the increase in the quantity demanded by GECAS is enough to tilt choices in favour of Honeywell despite the small magnitude of GECAS market share. But this assumption implies basically no product differentiation and does not seem to fit well with the market for aerospace components. Whether the Archimedean leverage theory can work in the presence of differentiated components is essentially an empirical question.

Overall, the uncertainty on whether GECAS had significantly affected the behaviour of manufacturers in favour of GE's engine becomes much stronger when we move towards the hypothesis that its role would have resulted in market foreclosure for Honeywell's competitors. The case for GECAS causing dominance in the avionics and non-avionics markets is weak. The position of the CFI accepting the potential contribution of GECAS to GE's dominance but denying the extension to Honeywell's markets looks therefore reasonable.

¹⁹ This was not the only instance of disagreement on factual analysis. While for large commercial aircraft the engines are typically not embedded and can be selected by airlines or leasing companies, large regional jets entail the choice of a sole engine supplier, i.e. they are selected by the aircraft manufacturers and not by airlines and leasing companies. This makes the comparison with SFE aerospace components more immediate. During the late 1990's, GE was selected by the three main manufacturers (Fairchild Dornier, Embraer and Bombardier) for their new jets over alternatives from P&W and Rolls Royce. Here the disagreement lies on the real availability of alternatives, as GE's engines for large regional jets were more developed at the time, but especially on the real role of GECAS as, according to Nalebuff (2003), the decision to engage in speculative purchasing of new planes happened *after* GE engines were selected for those jets.

6.3. Conglomerate effects: consolidating and extending dominance

The CFI accepted that the EC's argument for GE's pre-merger dominance was "not vitiated by manifest error". The CFI saw manifest errors in a later stage, where the EC maintained that GE's dominance would be extended into Honeywell's markets as a result of GE's financial strength and the practice of bundling.. Let us examine those issues in turn.

Financial leverage through GE Capital

The financial strength of GE was seen by the EC as part of GE's toolkit for dominance. No explicit deep pocket predation theory of harm was proposed. In the presence of imperfect capital markets there are several potential theories of effects on competition. For example, Bolton and Scharfstein (1990), in a model where financial contracts are observable, argue that a deep-pocket firm may have an incentive to undermine the performance of rivals causing their exit. The key issue here is whether GE's deep pocket, coupled with other conglomerate effects, could actually induce the exit of rivals in the engine or aerospace components markets.

Internal funds are crucial in the face of imperfect capital markets (in particular for high-risk R&D projects like engine development and other aerospace equipment). The financial muscle could be used to foster R&D in those segments facing more competition with the potential outcome of discouraging rivals' innovation activity.

The profitability of cross-subsidies is a debated issue in the academic literature. A conglomerate has to decide how to allocate its financial resources among its subsidiaries. Stein (1997) argues that "winner-picking", i.e. shifting resources towards the most profitable subsidiaries, tends to be preferred to cross-subsidisation. In other words, group affiliation may even reduce, *ceteris paribus*, the availability of funds to a firm facing tough competitive conditions, as opposed to others operating in conditions of dominance. However, Cestone and Fumagalli (2003) point out that cross-subsidisation may be a profit maximising strategy when it is used to sustain presence in the most competitive market, which would otherwise be abandoned. The channel by which large resources result in the entrenchment in the competitive market consists in ameliorating the "agency problem": a cash poor firm would have difficulties in raising funds to stay in a market where the profits to be pledged are limited. Furthermore,

Cestone and Fumagalli develop a product market model based on a “winner-takes-all” hypothesis, related to R&D competition, and find that, conditional on entering the market, group-affiliated firms tend to compete more aggressively than “stand-alone” ones, due to higher flexibility in the available resources. The R&D effort strategy tends to exhibit a relatively flat reaction function, so that high R&D effort by rivals has a limited effect in discouraging its own effort.²⁰ Overall, their analysis suggests that subsidiaries in a financially powerful group tend to be more resilient to rivals’ aggressive strategies and, in turn, are potentially tougher competitors. This may have a pro-competitive effect but may also result in the exclusion of rivals.

Whether this theoretical possibility could entail the exit of rivals of GE (like RR) or of Honeywell is another matter that requires very careful assessment based on empirical analysis.²¹ The EC seemed to be saying that the financial strength of GE gives the company an advantage in R&D and a deep pocket to make life difficult for rivals, and at the same time increase overall prices (by rising prices in the after-markets). However, if airlines are rational consumers, they should not be misled into buying engines that have a relatively low purchase price but high maintenance costs.

The financial capabilities of rivals such as P&W or RR and the countervailing power of buyers should also be carefully analysed. P&W is a division of the large UTC and both were active also in the military sector with the external (technological and financial) effects that this implies. The strength of both firms appears to be confirmed by the evolution of their stock. Indeed, the stock market reaction in the period when it seemed that the deal would be cleared by the EC shows the aerospace competitors of GE and Honeywell overperforming the market benchmark (this is the case for UTC and RR, as well as Rockwell and Smiths, for example). GE in fact was underperforming, which suggests that perhaps Honeywell’s shareholders were obtaining the better part of the deal). The market scepticism about the profitability of the deal for GE and the overperformance of competitors does not fit well with foreclosure prospects for rivals

²⁰ The “winner-takes-all” framework implies that R&D effort levels of the different competitors are strategic substitutes; i.e. a non-conglomerate invests less in R&D if the rival conglomerate has an incentive to invest more.

²¹ For example, empirical evidence cited by the Department of Justice (Kolasky, 2001) suggests that GE’s rivals did in fact succeed in securing the financing they need.

(although it would be consistent with the deal having anti-competitive horizontal effects).²² In relation to the power of buyers it seems sensible to think that large airlines, the second largest leasing company (ILFC), and aircraft manufacturers such as Boeing and Airbus all have substantial clout in the market and would be interested in keeping alive viable competitors to GE and Honeywell.

Bundling

As we have seen above, the EC did not deem necessary to rely on any specific economic model in order to show that the merged entity would be able to offer packages of products that competitors would be unable to challenge. It asserted that bundling would result in a shift in market shares in favour of the new entity and foreclosure of rivals (supported on some third party evidence). .

Let us explore first the model presented by Professor Choi on behalf of RR, which constituted the basis of bundling arguments in the Statement of Objections, but was not included in the EC's final decision. Choi (2001, see also 2007) built up a model of product differentiation based on a linear demand system specification for the complementary components produced by firms. Consumers, whose tastes are uniformly distributed, must buy one engine and one set of avionics/non avionics. Firms are assumed to be price setters. One further underlying assumption is that the same price (for a given product or for a bundle) is charged to all consumers. In this framework, Choi analyses the impact of the GE-Honeywell merger assuming that there are two engine suppliers (GE and RR) and two avionics/non avionics suppliers (Honeywell and a competitor). The merged entity is assumed to be able to engage in *mixed bundling* only, i.e. to offer a package of the two products at a discount from the sum of the two prices when the goods are bought separately. Pure bundling, whereby goods are not offered on a stand-alone basis, could reinforce foreclosure effects on future generations of aircraft products.

Choi simulates, with parameters argued to match the industry's configuration, the effects against an initial symmetric situation, where each consumer buys one engine and one aerospace component according to the "distance" from their ideal product (no price

²² See Grant and Neven (2005).

differences initially exist between the two engines, nor between the two components). Choi finds that mixed bundling by the merged entity results in higher prices for stand-alone components and a lower price of the bundled set by the new firm, which gains market share. The main route by which this happens with complementary goods can be explained as a “Cournot effect” (Cournot, 1838): before the merger, each firm does not take into account the positive externality of its sales on the demand for complementary goods. The merged firm, instead, internalises such effects and hence lowers prices. If mixed bundling is possible it can furthermore limit this positive effect to the demand for its own products. Stand-alone prices are set higher in order to undermine the demand for the rivals’ products. Competitors will respond by cutting prices but not to the point of countering completely the reduction in their market shares, as they do not benefit from the “internalisation” of complementarities. Their profits decrease, while the profits of the merged firm may increase (it expands market share and the decrease in prices may expand the total market).

The Cournot effect implies that the merger would enhance consumer welfare if goods were eventually offered by a monopolist. As instead there are competitors in the market, the effects of merger and bundling strategies becomes less straightforward. It remains true that if the merger and bundling occur, the price of the bundle will in general be lower than the sum of the prices when goods are sold on an individual basis. This stems from the externality effect. However, the strategic response by competitors will in general consist in decreasing their own prices, so that overall the bundling strategy may have a positive or negative effect on the profits of the merged entity, with respect to the sum of the pre-merger profits of the two entities.

In Choi’s analysis, bundling gives a competitive advantage to the merged entity: to use mixed bundling is optimal *given* the prices of competitors (but still profits may decrease with respect to the situation in which the merged entity commits not to bundle). For some parameter constellations the merger is not profitable (neither with nor without mixed bundling).²³ What we do know is that if mixed bundling happens then rivals’

²³ Nalebuff (2000) finds in a model with inelastic demand that the profits of a pure bundling strategy are negative as a consequence of the strategic response of competitors, although the latter suffer from a much more pronounced profit reduction. In his model, and by construction given the optimality of initial choices with symmetry and inelastic demand, bundling can only reduce welfare.

profits tend to decrease.²⁴ The impact on consumer's welfare is potentially ambiguous with heterogeneous consumer preferences since some consumers may gain and others lose (those that before the merger purchased a "mix-and-match" system); however, the impact becomes negative if the reduction in the profits of the rivals leads to their exit.

Nalebuff (2003) casts doubts on the results of Choi's simulations and on the overall validity of his approach. He argues that prices in aerospace are typically negotiated for jet engines and avionics, rather than being proposed in a list valid for all buyers. In those markets there is no unique price for a given product towards all clients. The latter, in fact, receive different conditions depending on the strategic impact for the producer of securing the contract (with an eye on the ensuing stream of profits), on the perceived bargaining power of the two parties in the negotiation (which also depends on the assumed valuation of the customer of the product involved and feasible alternatives) and on other relevant features. Nalebuff points out evidence that, in fact, prices charged to different customers for the same products (engines and aerospace components) vary considerably. With a simple modelling exercise based on two product types and cost symmetry among producers, he shows that when prices are negotiated and customer's valuations are known by firms, then bundling cannot be profitable. This means that firms can price discriminate perfectly and that there is localized Bertrand competition for every customer. In those circumstances the outcome is known to be very competitive.²⁵ In this case it does not pay to use bundling strategies (as bundling complementary products does not pay with perfect competition).²⁶ However, this model is extreme in assuming perfect knowledge of customers' valuations and is difficult to

²⁴ However, Nalebuff and Lu (2001) find that when asymmetry in importance exists among goods (e.g. due to the much higher cost of engines vis-à-vis avionics/non avionics), then the incentive to bundle and the impact on competitors tend to vanish.

²⁵ See Thisse and Vives (1988).

²⁶ The intuition is straightforward: if the producer bundles the two goods, and both are the most preferred by a customer, then he will be able to extract precisely the same margin he could get without bundling. In other words, the margin will correspond to the sum of the two margins if goods were sold on an individual basis. If neither good is the most preferred by the customer, then the goods are not sold whether they are bundled or not (as he would need to sell below cost). When only one of the two goods is preferred by the customer, then bundling may result in lower profits. Assume, for instance, that without bundling the producer would sell good A, as it is the most preferred by the customer, but not good B, as a competitor with the same cost structure (e.g. with constant marginal cost c) produces a good that the customer finds to have a greater value than B, and denote with x the difference in value. Then, in order to convince the customer to buy the bundle, the margin which could be achieved by selling only good A has to be reduced by the quantity x (as the competitor is willing to lower the price of his good down to c) in order to sell the bundle that includes good B.

square with an industry with large R&D expenses that have to be recovered with margins over costs. The single price model of Choi can be interpreted as the case where firms have no knowledge about customers while the perfect knowledge model of Nalebuff is the other extreme. The reality of the aerospace market is certainly in between, and only a careful empirical analysis could shed some light over this issue.

A further argument was raised about the practicality of bundling engines with avionics and non-avionics components on the basis that they are typically sold in different moments in time. Contractual arrangements may ameliorate the timing problems, but if prices are negotiated the offering of discounts for bundles may be trickier to achieve. According to Nalebuff (2003) there would be no basis on which to offer a discount on future components conditional on having bought an engine, or vice versa (i.e. on the engine conditional on buying components in the future). It is possible that if the interaction is repeated the merged entity may try to develop a reputation on offering better conditions for those who buy both the engines and the avionics and non-avionics components. A much more clear-cut issue relates to the main fact behind GE's position in the market for engines for large commercial jets: prices of the engines for the Boeing 737 are pre-negotiated with Boeing which renders unfeasible the implementation of a bundling strategy. If the "bundle" were proposed the price of aerospace components could easily be inferred simply by subtracting the previously established engine price.

The results of Choi and Nalebuff's models suggest an impact of mixed bundling on the profits of GE-Honeywell rivals which ranges from moderate to significant. The indicators also point to a pro-competitive effect of the merger in terms of lowering prices. It is a robust fact that for given prices of competitors GE and Honeywell would have an incentive to use mixed bundling. However, mixed bundling may or may not be profitable from the point of view of a merged GE- Honeywell in equilibrium.²⁷

²⁷ Bundling may be used also as a price discrimination device (see, e.g., McAfee et al., 1989). This happens when consumers also derive utility from buying one good individually, For example, in comparison to selling two products under monopoly conditions, bundling can enhance profits but often favour consumers too. In the aircraft industry consumers buy systems (jets, avionics and non-avionics) and therefore the price discrimination aspect of bundling is not so relevant (and it did not play any role in the case).

A hotly debated issue was whether the potential decrease in profits of a rival to a merged GE and Honeywell would induce exit in order to save fixed avoidable operation costs. This could happen as an outcome of “innocent” bundling by GE and Honeywell, that is, in a situation in which the merged entity does not try strategically to force exit of rivals. However, the exit scenarios remain speculative because of the sensitivity of the profit impact of bundling to the variations of the model. Furthermore, the rivals of GE-Honeywell could try to fight back the reduced bundle price of the merged entity by coordinating bundled offers, reducing costs, improving service or product quality.

It is even harder to support a theory that the merged entity would engage in *strategic* bundling to induce exit and enjoy subsequent price increases. A predation story needs to justify why the merged firm would sacrifice current profits. A decrease in short-run profits would represent the cost of predation and then the pattern of recoupment should be established (at least as a cross-check to the theory of harm). The EC hinted at predatory behaviour²⁸ but made no effort to sustain a coherent predation story, and argued instead that it was sufficient to rely on the short-term profitability of bundling.

If pure bundling, when the goods involved cannot be bought individually, were to become feasible for the merged entity relatively soon, a foreclosure case could be made on the basis of the Whinston (1990) model, provided that the merged firms can credibly commit to the bundling strategy and there is a sunk cost of entry.²⁹ This is a modern version of the leverage theory of a firm with substantial market power in one market extending it to another independent market. Chicago School arguments (see, e.g., Posner, 1976) have largely succeeded in the rebuttal of the traditional story according to which a firm would be able to leverage its market power by tying its monopolised product “A” to another product “B” it supplies in a *competitive* market (with constant returns to scale).³⁰ The firm finds it profitable to compete aggressively against any new entrant in one of the markets, as losing sales for one good implies losing them on the other as well: its willingness to lower prices as a competitive response is therefore

²⁸ See Giotakos et al. 2001.

²⁹ The possibility of technical bundling by GE and Honeywell was mentioned in the EC decision but not adequately established according to the CFI.

³⁰ The argument is that monopoly profits can only be reaped once, that is, in order to sell B at a price above the competitive level it would have to forego a part of its monopoly rents on good A.

augmented by the bundling strategy. Commitment is paramount in this strategy as the firm would, ex post, optimally react by unbundling products so as to maintain maximum rents in one of the markets. When complementary goods are involved, however, it does not pay to tie and foreclose except in the special cases where there is an unrelated use of component B (this could be a replacement parts market) or there is an inferior competitively supplied component alternative to A. These special circumstances were not examined in the GE-Honeywell case (for example, taking A as the engine market and B as the avionics and non-avionics components market).

Commitment to bundling can also make a difference when R&D incentives are considered. Tying can be profitable even without inducing exit because it increases the tying firm's R&D incentives in the tied good market (since it can spread out the cost of R&D over a larger number of units) meanwhile the R&D incentives of the rival firm diminish. If this R&D effect dominates the decrease in profitability due to the increased price competition, tying is beneficial (Choi, 2004). Furthermore, in complementary markets tying makes successful entry prospects more uncertain and discourages investment by entrants because they have to succeed in both markets (Choi and Stefanidis, 2001). In the case of the merger of GE and Honeywell it could have been argued that tying closed system engines and avionics would force competitors to be successful simultaneously in both and this would reduce their incentives to innovate. The outcome would have been that GE-Honeywell would overinvest and the competitors underinvest in innovation (and this would be bad for welfare when there is a low probability of success since then there would be too little diversification).

The US approach to bundling was very different. The DOJ was not willing to consider the potential harm done in the long term by the merger given that the estimated effect on prices would be to reduce them in the short term. In contrast, the EC started (particularly in the Statement of Objections) with the idea that the ability and the incentive to bundle by the merged entity would lead naturally to foreclosure of rivals but then, as we have seen, the bundling model was dismissed in the final decision.

Concerns in terms of increased difficulty by existing competitors to stay in the market and by new ones to enter could potentially arise as a result of the possibility of bundling products, provided bundling were a feasible strategy. The question is whether the EC

had a coherent theory of harm and whether it was tested to the requisite standard. For this it is necessary to show: (i) that there is a robust incentive to bundle for the merged entity, and that either the bundling practice is established in the industry or the merger will make it possible; (ii) that bundling will decrease profits of rivals for a substantial period so as to induce exit; and (iii) that the exit of rivals will end up damaging consumers. Given that the merger would most likely produce a short run competitive impact the expected discounted potential medium and long run harm should be weighted against this short run benefit.

The EC analysis did not measure up to this standard. Indeed, it is difficult to disagree with the CFI on the fact that the EC did not prove that bundling would emerge, nor that eventually it would have led rivals to exit the market and that a position of dominance would be strengthened. A fortiori, it is far from clear that overall long-term consumer welfare would diminish, when the positive effect of more aggressive competition and internalisation of pricing effects among complements are balanced against the negative effect of the potential (and yet unproved) exit of rivals.

Among the remedies proposed by the parties, there was the commitment not to bundle GE products with Honeywell products. This was found to be insufficient as it would be intrinsically a remedy to be policed *ex post*, and the “lack of formality” of bundling makes the monitoring difficult and costly. However, the remedy seems far more attractive than the outright prohibition of the merger, given the uncertainties arising from the analysis of bundling and the deterrent effect of Article 82 against abuse of dominance.

7. Conclusions

This is a very complex merger case which involves horizontal, vertical and conglomerate issues in an array of markets. The EC’s initial challenge to the merger, as set out in the Statement of Objections, presented a theory of foreclosure based on bundling of GE and Honeywell products. The early analysis, originating in a model commissioned by Rolls Royce, was quietly dropped and the EC moved to a more encompassing dynamic foreclosure and possible predation story based on the alleged

dominance of GE strengthened by their financial arm and bundling capacity. The end result was that the merger was blocked.

The CFI upheld the EC's decision on the basis of horizontal overlap issues, which had attracted relatively little attention before the appeal. This is somewhat surprising since it seems that the existing overlap could have been resolved by relatively minor divestiture remedies, as had been the case in the decision by the US DOJ. The CFI dismissed the conglomerate effects arguments, bundling in particular, because of "manifest errors of assessment". With regard to the analysis of vertical integration between engine starters and engines, the EC failed according to the CFI to take account of the deterrent effect of Article 82.

Does the outcome of the case mean that bundling arguments should be disregarded for merger analysis in the future? This would be too hasty a conclusion. Bundling may, in general, raise antitrust concerns in terms of the possibility to reinforce market power. Furthermore, the competition authority should try to look at the long-term consequences of mergers and not only the short-run ones. This presents a challenge because long-term effects have to be discounted for time and probability of occurrence. In the words of Platt Majoras (2001) US authorities are "humble about our ability to make those judgements, which necessarily involves predictions far out in the future" and have "more confidence in the self-correcting nature of markets". The US approach moves one step further than the CFI correction of the decision of the EC, putting the emphasis on potential short-run effects of the merger. This seems to indicate that a major difference between the US and EU approaches is that in the EU authorities are willing to venture into looking at the long-term consequences of a merger while in the US more long-term possibilities are discounted more heavily.

Competition authorities should present a concrete economic theory of harm, check it for internal consistency with economic models, and contrast it with the empirical evidence available, history of the industry and, if possible, documentation on the strategies of the firms. The analysis should be carried out taking into account the potential efficiencies of the practice, e.g. bundling, from the beginning. In the GE-Honeywell case this could have been a predatory or dynamic foreclosure theory. The EC had a legitimate case to look at such a possibility but the bar on the standard of proof to block a merger on such

grounds is indeed very high and, on this occasion, the EC's arguments fell short of the mark. In this case, the potentially anticompetitive impact of bundling, as well as financial leverage, could have been dealt with ex post, on the basis of Article 82.

The GE-Honeywell case, together with other cases in which the CFI has amended the decisions of the EC, have contributed to push for the enhancement of the economic analysis capabilities of DG Competition at the EC (with the creation of the position of Chief Competition Economist responsible for a team) and to its internal restructuring to further the independent scrutiny of merger investigations. In terms of the transatlantic debate perhaps the most enduring legacy of the GE-Honeywell case will be in making apparent the tension in regard to merger analysis between the more "practical" short-term US approach versus the more "ambitious" long-term view of EU authorities. A basic underlying issue is whether merger policy should deal with conditions that make exclusionary/predatory behaviour more likely and what is the standard which this analysis must be subjected to. The challenge for economic analysis is to provide operational tools to assess the trade-offs involved.

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