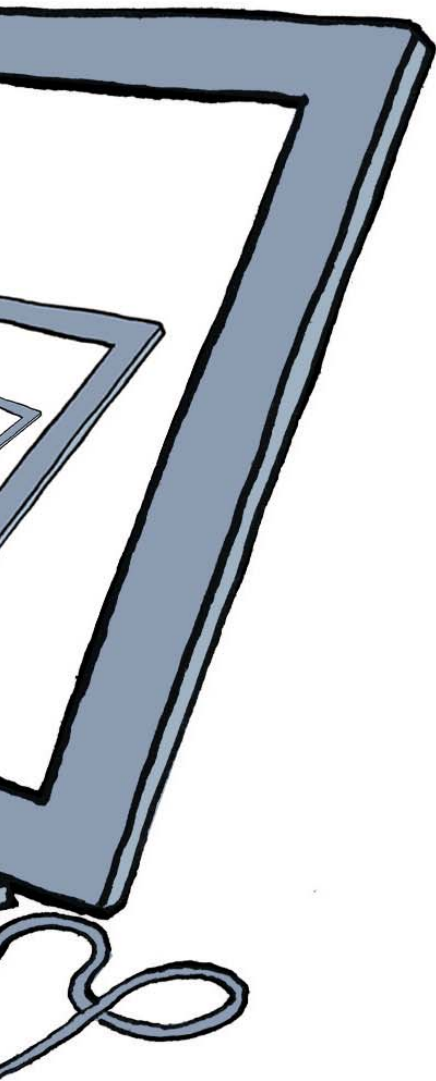


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The antitrust cases against Microsoft in the United States and Europe have been the most high profile implementation of competition law in the last 20 years. **Christos Genakos, Kai Uwe Kühn** and **John Van Reenen** look at the key economic issues, notably what they imply for the conduct of competition policy in high-tech industries dominated by rapid innovation.



The European Commission versus Microsoft: competition policy in high-tech industries



In the various Microsoft cases, antitrust authorities in the United States and the European Union (EU) took on one of the most valuable companies in the world and its CEO Bill Gates, the world's richest man. After five years of investigation, in March 2004, the European Commission held Microsoft guilty of abuse of its dominant market position under Article 82 of EU law and imposed the largest fine ever for such an antitrust violation in Europe: €497 million.

The Commission found that Microsoft had abused its monopoly of personal computer (PC) operating systems in two ways: 'deliberately restricting interoperability between Windows PCs and non-Microsoft work group servers, and by tying its Windows Media Player, a product where it faced competition, with its ubiquitous Windows operating system.' (Work group servers are computers that allow people to share files and printing, store and protect large amounts of data, access the internet, etc.)

The Commission also demanded major remedies, including compulsory licensing of intellectual property: 'within 120 days, to disclose complete and accurate interface documentation which would allow non-Microsoft work group servers to achieve full interoperability with Windows PCs and servers'; and 'within 90 days, to offer to PC manufacturers a version of its

Windows client PC operating system without Windows Media Player.'

This degree of intervention is highly unusual and has led to a continued conflict about the implementation of the remedies. The case also raises an important question about the conduct of competition policy in high-tech industries dominated by rapid innovation.

Market power

In the server case, which we focus on here, the Commission's basic argument was that Microsoft extended its market power from PC operating systems (of which Windows controls over 95% of the market) into a complementary market – that of the operating systems for work group servers. How did it do this?

For server operating systems to be effective, they must be able to communicate easily with the PC operating system – what is known as 'efficient interoperability'. Microsoft's control of the PC operating system meant that it could limit the efficient interoperability between Windows and rival companies' server operating systems by manipulating the interfaces responsible for connecting Windows with other software.

The Commission argued that Microsoft had both short-run ('static') and long-run ('dynamic') incentives to 'foreclose' rivals from the server operating systems market in this way. The dynamic reasons are

probably most important, as Microsoft was clearly concerned that a strong presence of rivals in server operating systems could threaten the profits it enjoyed from its Windows monopoly of the PC market in the future.

For example, customers could reduce their reliance on PCs by running applications like spreadsheets, database management and banking software mostly on servers, leading to a decline of Microsoft's longstanding monopoly. By extending the Windows platform dominance from PCs to servers, Microsoft could extinguish this future threat.

Various internal emails by Microsoft senior executives suggest that this strategy was not the overzealous imaginings of Eurocrats. For example, in 1997, Bill Gates wrote: 'What we're trying to do is use our server control to do new protocols and lock out Sun and Oracle specifically... the symmetry that we have between the client operating system and the server operating system is a huge advantage for us'.

This may have just been cheap talk, but as Figure 1 shows, Microsoft's share of the server operating systems market did rise dramatically during the late 1990s: from about 20% at the start of 1996 to

over 60% in 2001. By this point, Novell, the combined UNIX platforms (IBM, Sun, etc.) and Linux could muster only about 10% each in market shares. The Commission argued that at least some of Microsoft's swift rise to power was due to anti-competitive actions.

There has been much debate over whether Microsoft was dominant in the work group server market. But the key issue in a 'leveraging' case like this is whether Microsoft had power over PC operating systems. Given their 95%-plus market share, even Microsoft's lawyers did not try hard to contest this point.

Economic incentives to foreclose

So did Microsoft have an economic incentive to foreclose competition through leveraging? The key question is as follows: when firm A, the monopolist (Microsoft in PC operating systems), faces firm B in a complementary market (server operating systems), in what circumstances will firm A exclude firm B from the adjacent market? Microsoft's essential argument rested on the Chicago School view that a monopolist does not have incentives to monopolise a complementary market since all profits can be extracted at least as effectively by increasing the price of the monopoly product.

The Chicago argument – known as the 'one monopoly profit theory' – is that degrading interoperability would cost Microsoft lost revenues as consumers would

The Commission's remedy for foreclosure was to ask Microsoft to reveal information to enable server vendors to connect properly with Windows

not be willing to pay as much for a Windows operating system due to its lower performance with non-Microsoft servers. Instead of going to the expense of monopolising the new market through reducing rivals' quality, Microsoft could simply charge a higher price for its PC operating system and extract all the profits from the server market in this way. Consequently, the Chicago argument is that Microsoft must have benign reasons, such as its desire to end the excessive profits earned by other server vendors or the superior efficiency of Windows technology.

The modern economic theory of foreclosure suggests many reasons why this critique might break down. In Microsoft's case, it is useful to distinguish between dynamic and static incentives.

Dynamic incentives to foreclose

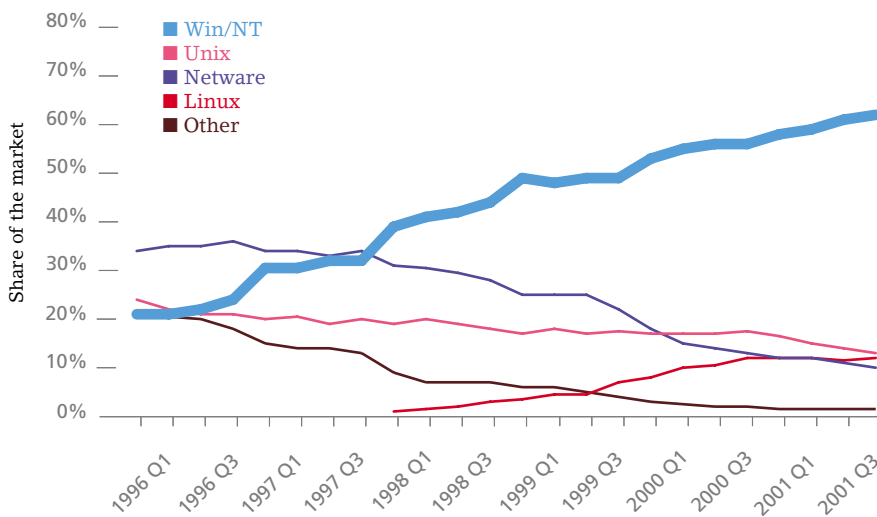
The lack of any long-run incentive to foreclose in the 'one monopoly profit theory' arises from the assumption that the monopolist has a permanent unchallenged position with no threat of future entry to the primary market. This is unlikely to hold for Microsoft's position in the PC operating systems market.

Although in the short run it was protected by strong barriers to entry, in the longer run, there were a variety of threats to Microsoft's juicy stream of profits. Consumers care about the software applications (spreadsheets, word processors, games, etc) that are written on a particular operating system. The main competitive advantage of Windows is the wide range of applications written on its platform (software developers write programs to work on the most popular platforms). But major platform threats emerged in the late 1990s associated with the growth of the internet.

One threat was that increasing numbers of applications could be delivered through servers. Server operating systems

By degrading the ability of rival server operating systems to work with Windows, Microsoft 'foreclosed' the market

Figure 1: The growth of Microsoft's share in the work group server market 1996-2001



There are many reasons for believing that the remedy could have a positive effect on industry-wide innovation



typically run on open standards, so software developers could use these standards rather than Windows. This meant that the server operating system could become a potential non-Microsoft platform, directly challenging the stronghold that Microsoft had created on PC operating systems. If applications only needed a slimmed down version of a PC operating system, customers would not need to buy expensive Windows upgrades.

Effectively, a platform based on a server operating system could have become a potential competitor for the Windows operating system. One way to prevent this danger was for Microsoft to monopolise the server market – even if this meant sacrificing profits in the short run.

The key idea in dynamic foreclosure theory is that an action that shifts short-run market share can have long-run benefits to the monopolist through depressing rivals' incentives to invest and innovate. In many cases, these arguments may be suspect as there is no obvious mechanism whereby this could take place. But in Microsoft's case, the mechanism is clear and well established due to the 'applications network effect'. Shifts in share towards Microsoft in the server market (current and expected) will mean that developers start switching away from

writing to non-Microsoft platforms. Customers will shift away from rivals because there are fewer applications and this will further reduce developer's incentives to write software. This applications network effect makes foreclosure arguments much more plausible than in other industries.

Static incentives to foreclose

The dynamic arguments for foreclosure work even though, in the short run, the monopolist may suffer some losses. But these arguments are even more compelling when there are short-run incentives to foreclose. One such incentive is the ability to price discriminate more effectively in the monopoly market (PC operating systems) by dominating the complementary market (server operating systems).

In Microsoft's case, imagine that there are two types of customers: large firms (which are less sensitive to the price of the PC operating system) and small firms (which are very sensitive to the price of the PC operating system). A monopolist would like to charge a high price to the large firms and a low price to the small firms. Microsoft finds this hard to do because the large firm can always pretend to be a small firm.

But imagine that large firms also place

a high valuation on a complementary product (servers), whereas small firms do not because the gains from sharing computing resources are much smaller. In this case, by monopolising the server market and charging a higher price for the PC and server operating systems bundle, Microsoft is able to extract more profits. Our research provides empirical evidence that these short-run incentives exist and that they have grown stronger over time.

Remedies

Software markets are fast moving and highly innovative: many new economy advocates have argued that European competition law is inadequate in such markets. In particular, Microsoft argued that the proposed remedies of forced disclosure of interoperability information would have a severely negative effect on innovation, as it would lead to the wholesale cloning of Microsoft's valuable intellectual property. Whatever the supposed short-run gains, they argued that the long-run costs in terms of lower innovation by Microsoft would swamp these purported benefits.

These are difficult areas as the Commission was under no legal obligation to consider the effects on innovation, despite their economic importance. Nevertheless, the Commission argued that: 'a detailed examination of the scope of the disclosure at stake leads to the conclusion that, on balance, the possible negative impact on Microsoft's incentives to innovate is outweighed by its positive impact on the level of innovation of the whole industry'.

To assess this claim, we must investigate the Commission's remedies and their likely impact on innovation incentives on Microsoft, on its rivals and therefore on the market as a whole. The Commission asked Microsoft to reveal information necessary to allow rivals to interoperate with the Windows platform. This amounts to a compulsory licensing remedy. The Commission conceded that Microsoft could charge a reasonable fee for such licenses, reflecting the intellectual property embedded in the information.

There is an important distinction between demanding information to enable *interoperability* compared with *imitation*. The Commission wants the former to enable other firms to connect to Windows in the same way telecom

regulators force fixed line incumbents to share their network with mobile phone operators, even if the incumbent also offers these services.

If the remedy allowed *imitation* – for example, a complete copy of the key security features of the PC operating system – there would be a stronger concern over innovation. Consequently, the remedy *did not* require release of Windows source code – Microsoft’s ‘crown jewels’.

Interestingly, Windows source code is not what the rival server vendors wanted. Instead, they were after a detailed technical description of the interfaces to enable them to design their own code to interoperate with Windows. Microsoft’s description of the remedy as allowing cloning is therefore inaccurate.

The impact on innovation incentives

What are the likely effects of the remedy on industry incentives to invest in research and development (R&D)? For Microsoft’s rivals, there are two effects:

- Having interoperability information increases the value and sales of their products. This will increase rivals’ returns

to R&D, as any innovation will be spread over a larger number of units sold. The remedy essentially reduces Microsoft’s tax on rival innovation and should increase incentives to innovate.

- Rivals no longer have to incur costs to overcome technical barriers to interoperability created by Microsoft’s disclosure policy. Overcoming such barriers is innovation of a sort, but it is duplicative and socially wasteful.

There are several potential effects of the remedy on Microsoft’s incentives to innovate:

- First, with better disclosure, rivals will be able to compete on a level playing field. To the extent that this reduces the expected market share and increases price competition from now higher quality rival products, the remedy may lead to some reduction in Microsoft’s incentive to invest. But unlike its rivals, Microsoft will still obtain substantial profits from general innovation in the PC operating systems market, where it will continue to enjoy a monopoly. There is therefore little reason to expect that Microsoft’s incentives to innovate on operating systems solutions would substantially fall.

- A further effect may also contribute strongly to increased innovation incentives. Through innovation, a firm can escape harsh competition with rivals and secure profits for a transitory period. This effect will tend to increase the investment incentives of all firms, including Microsoft. Economic research is somewhat ambiguous on the net impact of all of these effects, but on balance, it is believed that intensifying competition will usually lead to increased innovation.

- Finally, Microsoft may change the quality as well as the quantity of its R&D. There could be positive effects on quality because Microsoft will no longer have incentives to block innovations that raise quality but have high interoperability with non-Microsoft servers. There is some evidence that Microsoft has sacrificed its own innovative potential to protect the Windows desktop monopoly. This was known within Microsoft as the Windows ‘strategy tax’ – the need to close down research lines that, although leading to innovative products, could potentially weaken the lock-in of Windows.

In summary, there are likely to be positive effects on rivals’ innovation from the remedy and ambiguous effects on Microsoft’s incentives. While the eventual outcome is uncertain, it is far from clear that the remedy will reduce industry-wide innovation. On the contrary, there are many reasons to believe that it could have a positive effect on aggregate innovation.

Interoperability at what price?

Following the Commission’s decision, the most contentious issue has been the conditions under which the interoperability information should be licensed and what information was necessary to achieve full interoperability. The Commission left the exact conditions out of its initial decision because it involved intricate review of technical information, which was delegated to an independent monitoring trustee.

Microsoft’s initial suggestions were unacceptable to the industry, the Commission and the independent monitoring trustee appointed to oversee the remedy. Microsoft proposed that the interface information could only be

Competition policy can deter anti-competitive behaviour without the need for ever taking legal action



purchased as one bundle and specified a license fee for each rival software copy shipped in the order of magnitude of the Microsoft software itself. This would have clearly continued the exclusionary effect simply through high prices.

Many industry insiders doubted that any innovation of significance was embedded in the interfaces themselves. They argued that just changing the language of the interface would not be a substantive innovation that had material value and that therefore it should not be compensated.

Indeed, to the extent that Microsoft has innovation embedded in processes that use the interfaces, such innovations should not matter for the assessment of the license fee because the interfaces themselves do not constitute the innovation. Typically such information in other software sectors is licensed at only nominal fees.

Another contentious issue was the amount and type of information that Microsoft had to provide. To interconnect with Microsoft's software, rivals needed information about how exactly the interface works. When the trustee found that Microsoft was not giving sufficient information to make this possible, the Commission stepped in with a 'statement of objection' and eventually a further large fine for non-compliance. But this tug-of-war has led to considerable delay in the effective implementation of the remedy.

Conclusions

What more general lessons can be learnt from the Microsoft case about antitrust enforcement in high-tech markets and elsewhere? First, it is worth remembering that the case has gone on for nine years with four statements of objections issued and still no final resolution. This is partly a reflection of the complexity of the technical issues, the legal necessity of due process and Microsoft's financial strength. Many of its server rivals have long since died.

An obvious problem is that the legal timescale is so long compared with the rapid evolution of these markets. By the time a remedy is in place, the marketplace has moved quickly beyond the problems over which the case was fought: even if the judgement and remedy are appropriate, is it 'too little too late'? In our view, the Commission's decision on

Microsoft has had some impact since it is prospective and hence gives the Commission power over future versions of Windows.

Although caution is always warranted before intervention, antitrust authorities cannot take a completely *laissez faire* approach to innovation markets. Much of the positive impact of competition policy is through deterring anti-competitive behaviour without the need for ever taking legal action. And since software markets are replete with examples of similar issues, the case may have contributed to higher deterrence against anti-competitive exclusionary behaviour.

A second observation concerns the status of foreclosure theory. Part of the Commission's case was an explicit consideration of economic incentives and an analysis of the effects of the remedy on innovation. These are clearly important from an economic perspective, even though European legal practice is often ambivalent about getting into these issues.

Despite the difficulty of bringing empirical evidence to bear, consideration of innovation and foreclosure was unavoidable in making a credible economic case. One of the challenges facing modern economics is to develop guidelines for the type of empirical evidence that could be used to test the likelihood of foreclosure being a problem in different markets.

The Commission has been much criticised in its use of foreclosure theory in merger cases. For example, the proposed merger of General Electric and Honeywell was blocked after it had been cleared by the US authorities, only for the judgement (although upheld) to be severely criticised by the Court of First Instance in 2005. And in 2002, the Court actually overturned the Commission's blocking of the Tetra/Sidel merger in 2001, which was based on 'over-speculative' theories.

In a sense, foreclosure theory in a merger case is inherently speculative. Opponents of the merger must produce arguments that a particular type of foreclosure behaviour is more likely to occur as a result of the merger, although there are no exclusionary practices in the pre-merger situation.

The evidential position is better in an abuse of dominance case because the exclusionary behaviour is already alleged to have happened, so there can be an

empirical discussion over whether the behaviour has in fact occurred, whether it could be justified in terms of efficiency, and whether there has been any material effect on the marketplace as a result of this behaviour. This was the case with Microsoft where evaluation was possible. Furthermore, Microsoft's exclusionary mechanisms were lent credibility by the internal emails, the kind of evidence that is rarely seen.

Unfortunately, although foreclosure may be easier to detect in a case over abuse of monopoly power compared with a merger, remedying the problem is much harder. In a merger, there is always the clear choice of simply blocking the proposed transaction. Remedies for an existing monopolist are harder to frame and even harder to enforce.

The Commission and Microsoft have been wrangling for a long time over the terms of the disclosure remedy and it is still not perceived to be effective. Microsoft's main rivals have reached out of court settlements, so the concern may be that smaller firms and potential new entrants could be the main parties to suffer. We are unlikely to have heard the end of this case.

This article summarises 'The Incentives of a Monopolist to Degrade Interoperability: Theory and Evidence from the Personal Computer and Server Market' by Christos Genakos, Kai Uwe Kühn and John Van Reenen, CEP mimeo, and 'Some Economics of European Commission versus Microsoft' by Kai Uwe Kühn and John Van Reenen, forthcoming in *Cases in European Competition Policy: The Economic Analysis* edited by Bruce Lyons (Cambridge University Press).

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