The Economics of Cyber-Security

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In economics there exists the concept of non-rival goods. Food, appliances, and similar products can only be consumed or used by one person at a time. However, use of knowledge, safety, or a beautiful view by one person does not prevent its simultaneous use by others. Assets that possess this quality are called non-rival goods. Computer software, made up as it is of digital data whose duplication costs almost nothing, is one type of non-rival good.

By virtue of being digital data, and thus a non-rival good, software can secure incredible profits for software producers, if produced and sold in sufficient quantities. This aspect of non-rival goods production is known as "increasing returns," and is obviously a major factor in the success of software companies.

However, this attribute of software (that it constitutes a non-rival good) also applies to computer viruses. Computer viruses too are software, and thus also enjoy increasing returns: the more viruses that are produced, the more damage is inflicted. With common software applications, increased production has a positive effect on the world, whereas viruses create a proportionally negative effect.

It is important to remember that the damage these computer viruses create is only as widespread as the targeted software. In other words, the popularity of the targeted software is driven by increasing returns, and the more it is used, the greater the increasing returns are for computer viruses—that is, with relatively low outlay in terms of costs, a large amount of damage can be inflicted upon society.

It is well known that many viruses target Microsoft products. This is not because Microsoft products are more vulnerable than the products of other manufacturers, but is rather due to the fact that the people who launch virus attacks know that the high penetration achieved by Microsoft products offers the best prospects for an effective attack. This is just one new issue brought about by the increasing returns inherent in software production.

Microsoft's overwhelming share of the PC software market has often prompted discussion premised on anti-monopoly laws and focusing on their market domination, which was made possible by the increasing returns of software production. Yet, in these times when damage from viruses has reached a level that cannot be ignored, perhaps there should also be discussion of the negative effects on security brought about by the increasing returns of software production.

Of course, this will not be straightforward. It took quite some time for the anti-monopoly law to achieve general acceptance. If, for example, legislation were introduced that found software companies negligent and thus responsible for the damage inflicted on users by viruses, there would be a large financial incentive for software manufacturers to build countermeasures into their products to combat virus infection. This would in turn effectively improve security for society as a whole. The desirability of such a solution must be seriously considered. I hope that this clarifies the need for awareness of this problem.

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