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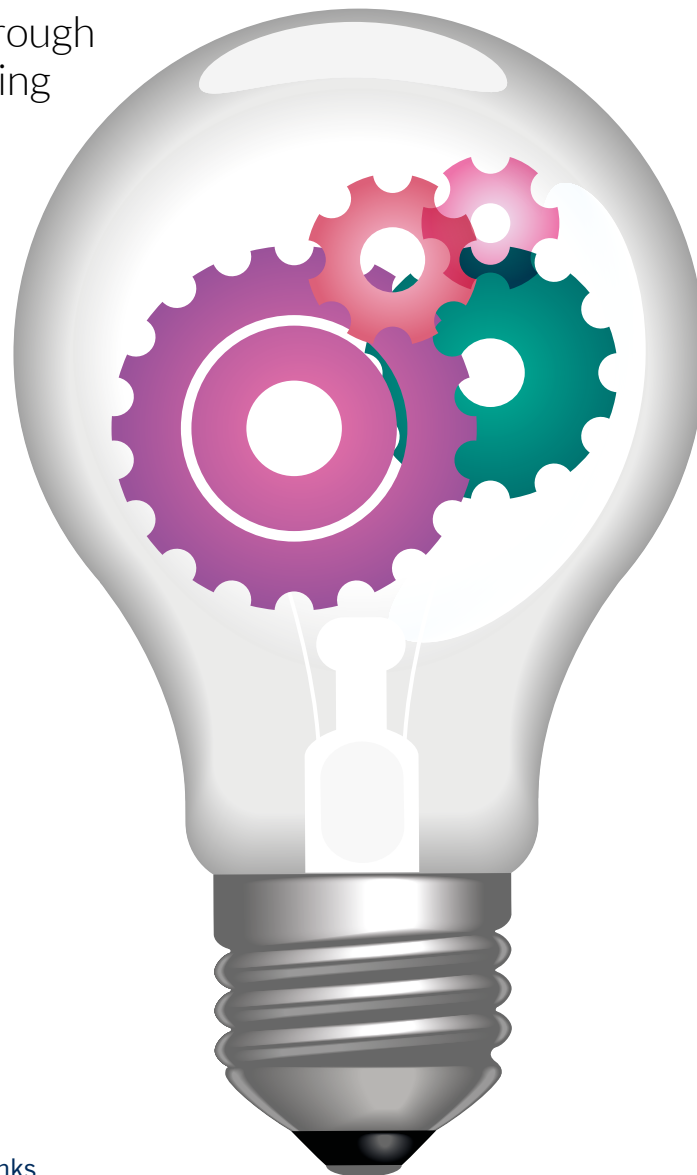
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Why twice as fast doesn't always mean twice the value

By **Stefano Puntoni**

Many people feel pressed for time these days. Not surprisingly, products are sold with the promise that they can do something faster than their competition, whether that's downloading data from the internet or printing a page, or even dicing cabbage.



Unfortunately, you may not be getting the performance you imagine you're getting. Consider Ann, who prints 100 pages a day and owns a printer that prints five pages per minute. To reduce her printing time, she considers buying a printer that speeds up her printing from five to 10 pages per minute (ppm). This would save her 10 minutes ($100/5 - 100/10 = 10$). So should she be willing to pay six times more for a 40ppm printer? Maybe not: an upgrade from 10 to 40 ppm would

save her only 7.5 additional minutes ($100/10 - 100/40 = 7.5$).

The market is full of productivity metrics like this, which put units of output in the numerator and one unit of time in the denominator – pages per minute; megabytes per second – but they misunderstand the way the maths works. To estimate actual time savings, we need to take into account not only the proportional time change, but the change in the base time.

Even when the calculation doesn't involve time, ratios often confuse people. Many consumers, for example, will conclude mistakenly that a price increase of 25 per cent followed by a decrease of 40 per cent yields a higher final price than an immediate price decrease of 25 per cent. However, we seem to have particular difficulty when the ratio involves productivity.

Productivity and judgement

To learn more about why consumers make this error, my colleague Bart de Langhe, an assistant professor of marketing, Leeds School of Business at the University of Colorado at Boulder, and I recruited a number of US residents through Amazon's Mechanical Turk service for several online surveys.

Our first study concerned willingness to pay more for higher modem speeds. We asked respondents how much they would be willing to pay for a higher speed service before and after they had experienced how long it actually took each service to download a 50 Mb file. Once they had experienced the actual difference, fewer said they would be willing to pay for a high-speed service. This confirmed our hypothesis that people tend to assume that a productivity ratio will be directly proportionate to time savings, but will change their mind if they see that the actual difference is not as dramatic as they had believed.

In a second study, participants were asked to choose among four food processors, each with a different speed. We compared interest in each model when they were introduced with or ▶

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without a time productivity metric, such as revolutions per minute. When, along with the productivity metric, we also mentioned the actual time a task would take for each model, the subjects' willingness to pay for a more powerful processor declined. This was consistent with our hypothesis that in the absence of time metrics, consumers don't understand that additional increases in productivity will yield lower time savings as the initial level of productivity increases.

Marketing illusion

Another reason consumers make this mistake is because a lot of product pricing encourages them to think this way. Although they are presumably better at maths than consumers, marketers reinforce this illusion of linear gains.

In printers, for example, we found that manufacturers maintain a simple linear relationship between printer speed and the retail price, although productivity increases offer sharply declining returns in time savings. Even when we conducted a regression analysis that looked at eight other points of differentiation, such as text cost and copy quality, print speed remained the most important predictor of price.

Nor were printer manufacturers alone in not correcting for this error. After performing linear and quadratic equations on the relationship between price and high-speed cable modem download speeds among 77 providers in 24 cities in 2014, we found that they all maintained a linear relationship between price and speed, not the curvilinear connection you would find if the price reflected the reality of the diminishing marginal utility of faster download speeds.

Our studies covered consumer electronics and cooking appliances, but the findings are relevant in other contexts as well. For example, many banks now offer consumers the possibility of goal-specific savings plans, to help buy a car, save for a child's college tuition, or retire. Often, consumers can choose between different options with different expected rates of return per unit of time, such as annual interest rates. In fact, consumers might care more about knowing, for instance, precisely when they will be able to buy that new car.

Time's up

Everyone wants to be able to do more in less time. Unfortunately, although there is a relationship between pro-

ductivity metrics and time savings, consumers tend to systematically overestimate the benefits of productivity increases at high productivity levels and underestimate the value of productivity increases at low productivity levels.

For consumers, the lesson of these experiments is simple: let the buyer beware. Be very careful when making a purchasing decision by comparing options in terms of a particular performance metric, such as Mbps, because unless you do the maths right, you won't actually learn how much time you will save with each one of a range of products when you compare its performance to that of your current model.

For marketers, the implications of our work are also serious. As the evidence grows that consumers have a flawed understanding of productivity and time, using productivity metrics as a point of differentiation is a decision with ethical implications. We hope that governments, consumer advocacy groups, and companies will all consider the use of time metrics instead. ■

This article draws its inspiration from the paper *Productivity Metrics and Consumers' Misunderstanding of Time Savings*, written by Bart de Langhe and Stefano Puntoni and forthcoming in the *Journal of Marketing Research*, 13, 2016, DOI: 10.1509/jmr.13.0229

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