Comment on "Does quality Win? Network Effects versus Quality in High-Tech Markets"

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1 Introduction

Suppose that two individuals are choosing between platforms of differing quality. Platform A is low quality, while platform B is high quality. Players make their choices at the same time and face the following payoffs

	A	B
A	$2, 2$	$0, 1$
B	$1, 0$	$4, 4$

What will the players choose? To a lay person, the answer is obvious—both players should choose the high quality platform and, consequently, enjoy higher payoffs. To a game theorist, however, the answer is far from clear. If one player expects that the other will choose A, then clearly choosing A and enjoying a payoff of 2 is better than choosing the high quality platform and enjoying a payoff of only 1. Both (A, A) and (B, B) are *equilibria* to the game—the "network effects" associated with coordinating on platform A dominate the benefits of being the sole user of the high quality platform. There is no *a priori* reason to think that users won't get "stuck"

using the low quality platform. In other words,

$$\text{quality} \neq \text{size}$$

While the (A, A) equilibrium follows from the logic of the game, one wonders about its relevance. In an intriguing paper, Tellis, *et al.* (2008) examines how often users get stuck in this equilibrium. They conclude that, as a practical matter, the "market" manages to solve this problem and coordinate on the high quality platform. Indeed, the main message of his analysis is that, in real world markets,

$$\text{quality} \rightarrow \text{size}$$

We offer two caveats to this conclusion. First, in most markets, few consumers can afford to consider product quality in isolation. Instead, consumers are likely to consider the *surplus* they receive from each platform. Clearly, this depends on network effects and inherent platform quality. But, it also depends on prices. These do not simply fall from the sky—they are strategic decisions on the part of platform operators. In other words, price is a "moving target." Firms can continuously change their prices and, consequently, adjust the relative surplus consumers earn from each platform.

Second, while fixed in the short run, platform quality is also a "moving target" in the long run. To see why this matters, consider the following variant of the simple game described above. Suppose now that consumers make platform choices in each of two periods, which make be thought of as the short run and the long run. After the first period, the "winning" platform, thanks to its financial success, invests in quality which increases consumer surplus by 3 units. Thus, if platform A wins in the

short run, payoffs in the second period are

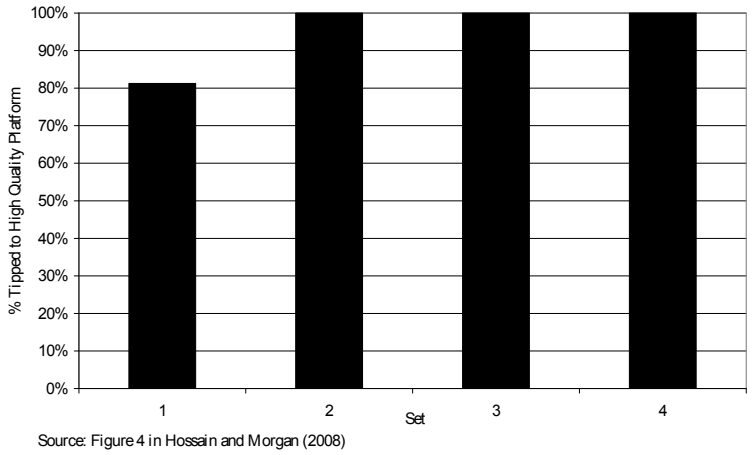
	A	B
A	$5, 5$	$3, 1$
B	$1, 3$	$4, 4$

If the players coordinate on platform A in the second period, then a long run analysis will suggest that the high quality platform prevailed. This, of course, was not the case from the start. Clearly, if quality is a moving target, then it is important to distinguish between the short and long run.

2 Surplus

While the first caveat suggests that it is important to consider surplus (quality *and* price) rather than quality alone, it is extremely difficult to measure surplus in field data. However, controlled laboratory experiments of platform competition can distinguish between surplus and pure quality effects. Hossain and Morgan (2008) report results of experiments where subjects participated in more complicated versions of the games described above. They varied both a platform's quality and its price. Subjects played four "sets," each consisting of 15 periods of the game. At the start of a set, subjects were assigned randomly to a market consisting of four players. Subjects were told about prices and how their payoffs would vary with the number of other players who chose the same platform. After each period, subjects learned about market outcomes.

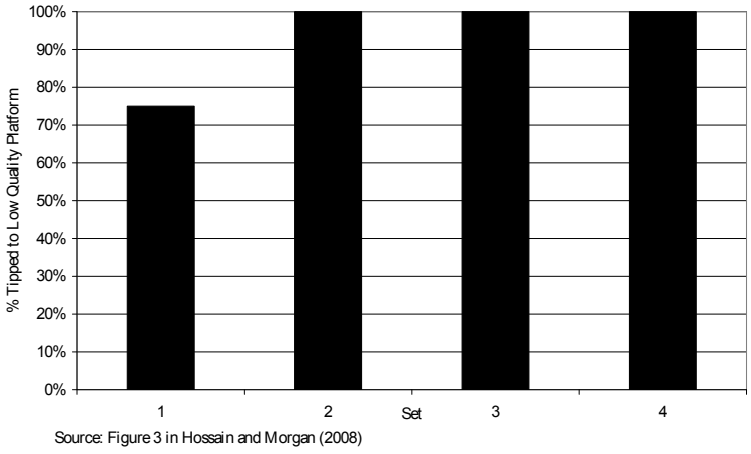
Figure 1: Percent of Markets Tipped to **High** Quality Platform



Source: Figure 4 in Hossain and Morgan (2008)

Figure 1 illustrates the pattern of platform choices in one of Hossain and Morgan's treatments. In light of the Tellis *et al.* findings, their result is reassuring. Although coordinating on the low quality platform is an equilibrium, the market quickly solves the coordination problem and converges to the high quality platform. Changing the payoff parameters, however, produces a "troubling" result, illustrated in Figure 2. Here, subjects get stuck at the low quality platform—the opposite of Tellis' findings. What could be going on?

Figure 2: Percent of Markets Tipped to **Low** Quality Platform



Source: Figure 3 in Hossain and Morgan (2008)

To reconcile the apparent contradiction, it is essential to account for the prices charged by each platform. In Figure 1, the high quality platform charges a low enough price that consumers prefer to coordinate on it, rather than the low quality platform. In contrast, in Figure 2, the high quality platform is "too expensive" to be attractive to consumers. That is, consumers enjoy higher surplus from coordinating on the low quality platform than from coordinating on the high quality platform. Once one accounts for the platform prices, both figures are consistent with consumers coordinating on the high-*surplus* platform, rather than getting stuck on the low-surplus platform. That is,

$$\text{surplus} \rightarrow \text{size}$$

While prices were parameters in the experimental setting, real-world prices are chosen strategically. There is reason to think that the prices charged in Figure 1 are closer to practice than those in Figure 2. After all, the high quality platform can afford to cut its prices and offer higher surplus than the low quality platform.

3 Quality

Success in one dimension can often lead to success in another. For instance, Liebowitz and Margolis (1995) show that success on the quality dimension leads to market share success.

Yet, in principle, the reverse could be true. For example, Psion leveraged the success of its PDA platform (a low-quality alternative to Palm) to transform its EPOC operating system into Symbian—one of the dominant (and high quality) operating systems used in mobile handsets. Microsoft famously uses cash generated from its operations to turn low-quality platforms, such as its first-generation web browser, into

high-quality platforms. These examples support our second caveat: When quality is a moving target, one needs to consider the possibility that, in the long run,

$$\text{size} \rightarrow \text{quality}$$

The Granger causality tests in Tellis, *et al.* address this issue in the short run: they shows that market dominance in the previous period does not lead to more favorable product quality reviews. Nonetheless, given the significant time and investment needed for substantial quality improvements, it is difficult to rule out a long-run effect.

4 Conclusions

The Tellis, *et al.* findings reveal a key limitation of existing theoretical models of platform competition. While the models are mostly static, platform competition is dynamic in practice—prices, quality, networks and total market size may change over time. Moreover, while theory suggests that mutually-held beliefs among sophisticated players can lead low quality platforms to dominate, both in practice and in the lab, this "belief lock-in" rarely seems to arise.

If theoretical predictions of network growth and market efficiency are failing to describe reality, then perhaps it is time to enrich the theory with dynamic modelling and relax the assumption that players are hyper-rational. One potentially fruitful direction, suggested by Friedman (1998), is to use evolutionary models to understand how these markets "evolve." For example, in studying platform competition in US online auctions, Brown and Morgan (2008) show how an evolutionary model can successfully rationalize a number of apparent anomalies between their field experiments

and standard theory. Their model also describes the dynamics leading to the eventual tipping that took place in this market—the closure of Yahoo's auction site.

References

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