Keynote Address

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The female mosquito will bite you and take your blood, but not much of it—perhaps less than 1/100th of a milliliter. For comparison, the Red Cross takes a pint, which is over 400 milliliters. I don't particularly begrudge the mosquito her tiny droplet of my blood. But I do resent the side effects, or in economic jargon, the transaction costs.

The World Health Organization estimates that malaria annually causes hundreds of millions of illnesses, and more than half a million deaths. Surely these transaction costs of mosquito bites vastly exceed the value of the blood actually taken. In payment instruments, of course, a major goal is to reduce transaction costs, and intuitively cutting those costs seems especially urgent when they are large relative to the transfer made. Transaction costs include time, and for small payments the time cost can dwarf the payment, as at some toll booths, or small cash register transactions with a long line.

The ratio of transaction cost to value transferred can be high if transaction costs are large, or if the value transferred is small. Getting that ratio down in the latter circumstance is, I think, what people mean by the problem of micropayments. Metaphorically, I'll call this the mosquito problem.

By that definition perhaps the micropayment problem can never be solved, because however low your transaction costs, they will be large compared to some payments you might like to make. Andrew Odlyzko has argued that micropayments will continue to disappoint. I suggest a more optimistic view. First, I think micropayments are a problem on which we can make progress, though not one we can solve: in fact, progress on micropayments is closely aligned with progress on payment instruments generally. Second, I argue that explicit micropayments in the sense of stand-alone small money transfers are not the only way to pay for small transactions: business creativity can work around the difficulties of doing that (as indeed Odlyzko has noted). However, qualifying my optimism, I point out that one widely used such work-around, namely advertising, raises privacy concerns.

We see a lot of experimentation, competition, and innovation in how we pay for things. Businesses experiment and optimize in search of more business, and customers choose the best offer open to them. This doesn't work perfectly, but it can work pretty well. Here, I will present a relatively optimistic view of the business side, and a mostly but not completely optimistic view of the consumer side.

If explicit micropayments systems are challenging, business arrangements can sometimes substitute. One arcane pleasure of economics is seeing how business creativity can handle such problems. I'll mention several broad strategies for the mosquito problem: that is, strategies to bring under control those pesky transaction costs for small transactions.

One strategy is the bundling of transactions to spread transaction cost. The ratio of transaction cost to value transferred is usually much lower when more value is transferred. Thus one can address the mosquito problem by bundling small transactions into bigger ones.

As one example, phone cards control pay-per-call transaction costs by bundling many calls. Following an upfront payment in money, you can draw on your credit with the phone card company. A privately created stored-value system, your account on the phone card, lets you skip some of the transaction cost of paying for a single phone call (though there is a transaction cost of using the phone card); and then you bundle those together in such a way that buying a phone card is a tolerably efficient transaction. Still on phone calls, a further step toward bundling is the prevalence of all-you-can-eat calling plans, saving on keeping track of calls made.

Newspapers are another example of this bundling strategy (as well as illustrating another technique below). A newspaper or a news magazine bundles dozens of news items into something valuable enough to justify newsstands and cash transactions; subscriptions of course further bundle these bundles over time.

Similarly, music albums bundle together different songs; one payment transaction cost is spread over multiple songs. But many consumers rather like to buy songs individually. To make unbundling small-value items work, you need to get the transaction cost down in nonbundling ways. One way that iTunes does that is by leveraging other payment instruments.

iTunes is trusted enough that many consumers are willing to have them store credit card information—this involves both trust about not abusing the information, and a password or other authentication system to control access to your iTunes account. This enables them to leverage off other payment mechanisms: when I buy a song on iTunes, they charge my credit card, which is paid by automatic payment from my bank account, which in turn is topped up by my employer.

But the central "mosquito control" strategy that I want to focus on hinges on economic complementarities, a key tool for indirectly processing payments.

In a two-sided market, or more generally with complements, cutting price on one side raises the demand curve on the other side, and a seller can profit with a higher price and/or more sales there. That added profit can be viewed as an indirect payment from the first customer, either in addition to, or in lieu of, explicit payment. An extreme form is to make one side free, which is particularly useful if transaction costs would be high on that side.

We see this in many contexts, notably newspapers and broadcasting, and in "free Internet content." In those cases, the paying side has often been advertising. Ad support involves an indirect micropayment from consumer to content provider; willingness to be exposed to ads is a way for consumers to transfer value to advertisers and hence indirectly to the content provider. In many cases this value transfer is quite small; advertising thus serves as an indirect micropayment mechanism.

In that role, it has some real advantages. It works through payments and negotiations between commercial entities—no individual consumers fumbling in their pockets, and fewer security issues than many alternatives. People often say that "free" is a particularly convenient price; perhaps a better way to say it is that two-sided pricing with one side of the market being "free" may lower total transaction costs. And the transaction-cost gap between free and cheap might be even bigger in the Internet environment.

One example: newspapers. Some print publications don't ask for money directly from the reader: they get all of their money—instead of the traditional roughly 80 percent of their money—from advertisers. As a result their newsstands don't need an attendant or a coin box, and it's quick and easy for a reader to grab a copy.

Another example is broadcasting. Traditionally both television and radio used the free (to the consumer) approach and were supported by ads. This was perhaps less of a choice and more a reflection of a constraint: they were perceived as non-excludable goods on the consumer side, so there was little possibility of implementing a subscription or direct-payment mechanism.

But once the possibility of charging consumers opened up, technologically or in regulatory terms, the question arose whether "free to the consumer" with advertising support was the best pricing model. Do you really want your visual entertainment interrupted multiple times per hour, as a way for you to contribute a few cents to the content creator? How much is your time worth? Perhaps this was not a very efficient payment mechanism after all.

Thus in television, and to some extent in radio, excludable forms of program distribution (principally cable and satellite), with subscriptions, were introduced. Ad financing was then partly supplanted by bundling-and-subscription, and partly supplemented by it: there are plenty of ads on cable. That slightly surprises me, as someone who finds repeated short ads distracting—but there seems to be a reasonable market test in there.

This brings us to the customer side. Often customer choice works pretty well, although sometimes it takes analysis and perhaps even a little faith to see this. For instance, sometimes a cash register transaction is delayed because a customer ahead of one in line is using a time-consuming coupon. I admit that I often vent about coupons and standing in line, but I also recognize it can lead us to an important economic point. The consumer can learn how long a particular supermarket's lines are. If a coupon scheme slows down the line, and the merchant doesn't add enough checkout counters, then some customers may no longer walk in the door. The merchant will take that into account. It's not perfect, but an only mildly over-optimistic view is that the merchant will weigh those effects pretty well. Similarly, the consumer facing part of newspaper or broadcast ads doesn't raise a lot of problems. Those ads are easy to ignore if you do not like them, and if you dislike them, you will likely know right away.

But, at this point in the development of our market institutions, customer choice is much less informed and not so reliably effective when it comes to privacy issues in targeted advertising. This was a substantial focus of the FTC's recent privacy framework report. From a payments system viewpoint, the issue is that ongoing changes in the ad-support micropayment model—changes that make it more effective, in some respects, by more tightly targeting ads — also weaken the presumption that consumers choose the best offer facing them. That presumption was a key to the market-mechanism argument that payment system evolution will lead to good outcomes. In other words, tighter targeting of internet ads may not fit the model that says the merchant—or the creator of content in this case—has an incentive to properly take into account any consumer harm. As a good deal of public policy discussion, including the recent FTC privacy framework, indicates, that remains a public policy concern.

In other words, what if the consumer cost of ads includes potential compromises to privacy and data security, rather than the simple annoyance of ads interrupting your programming? From an economic point of view, a key difference is the real risk that consumers are much less able to evaluate it and respond to it through their demand for the content.

Alternative (non-advertising) forms of micropayments could help. The "free content" versus privacy trade-off might be defused if we can make progress on paying through some alternative means—perhaps money, perhaps another indirect form of payment—in a way that reduces the pressure to serve targeted ads. We could get then a better market test of the efficiency and innocence of such ads; and if they are problematic, an alternative. If privacy concerns about targeted advertising can be assuaged through progress on other means for micropayments, perhaps the perceived trade-off between privacy and ready access to the long tail of Internet content can be relaxed. In other words, by working on payment systems, you may be protecting both privacy and the lively ecosystem of speech on the Internet.

ENDNOTES

[1] *http://www.mosquitoworld.net/mosquitofaqs.php*

[2] *http://www.redcrossblood.org/donating-blood/donation-faqs*

[3]See e.g., *http://www.who.int/mediacentre/factsheets/fs094/en/*; malaria is by no means the only mosquito-borne disease: see for instance *http://www.who.int/mediacentre/factsheets/fs117/en/*

[4]See Andrew Odlyzko, "The Case Against Micropayments," *http://www.dtc.umn.edu/~odlyzko/doc/case.against.micropayments.pdf*

[5]An added benefit, for the phone card company and the user jointly, is often much better negotiating ability in dealing with the telecom company that supplies the actual telephone connection.

[6]This can of course go wrong if the user thinks he is in the all-you-can-eat zone and belatedly learns that he has ventured outside it. The FCC has expressed concern with this "bill shock" problem.

[7]For instance, I'm told that advertising rates, in ballpark terms, for a 30-second spot on over-the-air television are in the ballpark of $5 to $50 CPM: that is, per thousand viewers. That means somewhere between a half cent and a nickel per viewer exposed to the ad.

[8]See for instance Catherine Tucker, "The Economics of Advertising and Privacy," working paper 2011, MIT.

Author's note: Joseph Farrell is Professor of Economics at the University of California, Berkeley, currently on leave at the Federal Trade Commission (FTC). These remarks represent his own views and do not purport to be the views of the FTC or any individual Commissioner.