Economics Letters 107 (2010) 122–124

Contents lists available at ScienceDirect

Economics Letters

journal homepage: www.elsevier.com/locate/ecolet

A marketing scheme for making money off innocent people: A user's manual

Kaushik Basu

Government of India, Ministry of Finance, North Block, New Delhi-1, India
Department of Economics, Cornell University, Ithaca, NY 14853, United States

ARTICLE INFO

Article history:
Received 2 July 2009
Received in revised form 27 November 2009
Accepted 5 January 2010
Available online 18 January 2010

JEL classification:
M30
G18
G32
L20
D92

Keywords:
Marketing
Stock options
Financial scams
Product bundling

ABSTRACT

Firms often give away free goods with the product they sell. Firms often give stock options to their managers and employees. Mixing these two practices—giving stocks to consumers who buy the firm's product—creates a deadly brew. People can be lured into buying this product, giving the entrepreneur huge profits and the consumers a growing profit share. But this is a camouflaged Ponzi that will ultimately crash. It is argued, by analogy, that the common practice of giving stock options to employees can be a factor behind financial crashes. Understanding this can help create a better regulatory structure.

1. The idea

This paper describes a marketing scheme that can generate large profits from selling a worthless product. All one needs is a little ingenuity and lack of moral qualms. The scheme uses two common practices, but in combining them creates a deadly brew. First, it is a standard practice in marketing to give "free" gifts with the product being sold—a free music system with the new car. Recently, when I bought a puzzles book, I was touched to find that, in addition to the 298 Sudokus in the book, the publisher had given two "bonus Sudokus", without charging for them. Second, modern corporations often give stock options to their employees.

The marketing scheme presented here gives away free goods with the main product being sold, free goods being stock options. It is like Honda giving Honda shares to each person who buys a car. This bundling of the good with stock options creates a strange chemistry, a camouflaged Ponzi, or 'Camoponzi'.

The aim of this paper is, of course, not to promote such schemes but demonstrate how easy it is to construct marketing strategies, which create short-term gains but end up causing financial crises. By showing how one can weave such schemes into legitimate economic activity the paper hopes to contribute to better legislation in the field of marketing and finance. The paper also alerts us that the practice of giving stock options to managers may be a camouflaged Ponzi.

2. The arithmetic

First, the user's manual. Suppose you, the entrepreneur, sell some product—let me call it 'hotash'. With each hotash you should give the consumer some shares of your company. If the proportions are worked out right—and I am about to show you how this can be done—then it is possible to flood the market with hotashes.

Suppose the cost of producing each unit of hotash is c ($c \geq 0$). You should fix the price of hotash at some p ($> c$). Hence, every time a unit of hotash is sold, it generates a profit of $p - c \equiv \pi$.

In period 1, you should offer for sale 1 unit of hotash and, along with it, a half-share of the company's profit. The remainder of the share remains with you, the entrepreneur. I shall begin by assuming that whatever is offered for sale is purchased by a consumer, and later show that that is indeed the case. Hence, in period 1, the entrepreneur earns $\pi/2$ and the consumer gets one hotash and earns $\pi/2$.

In period 2, you should sell 2 hotashes and with each hotash give a share of $1/8 = 1/2^3$ of the company's profit. So from period 2 onwards, 1/2 profit goes to the buyer of period 1, $1/2^3$ profit goes to each of the two buyers in period 2, and you get a share of $1 - \frac{1}{2} - \frac{2}{2^3} = \frac{1}{4}$.

More generally, here is what the entrepreneur should do in period m, $m = 1, 2, 3, \ldots$. The number of hotashes sold should be 2^{m-1}. With

E-mail address: kb40@cornell.edu.

0165-1765/$ – see front matter © 2010 Elsevier B.V. All rights reserved.
doi:10.1016/j.econlet.2010.01.001

each hotash, give away a profit share of $\frac{1}{2^{2m-1}}$. Note that for $m=1, 2$, this is exactly what was described above.

Let me now show that everybody gains from these offerings. First consider the entrepreneur. By the time period m comes, she has given away the following shares in periods 1, 2, …, m:

$$\frac{1}{2}, 2\times\frac{1}{2^3}, \ldots, 2^{m-1}\times\frac{1}{2^{2m-1}}.$$

Adding these up we find that she has given up a total share of $\frac{1}{2}+\frac{1}{4}+\cdots+\frac{1}{2^m}$, which is, as is easily checked, equal to $1-\frac{1}{2^m}$. Hence, in period m, she gets to keep $\frac{1}{2^m}$ share of the profit. In period m, total profit is $2^{m-1}\pi$. Therefore, the profit earned by the entrepreneur is $\pi/2$. Since m has vanished from the expression, it follows that the entrepreneur earns a profit of $\pi/2$ in every period. Since $\pi/2>0$, this is clearly a scheme for endless profiteering.

What we have to show next is that it is worthwhile for the consumers to buy the hotashes. *Assume* all hotashes on offer get sold. Then the total profit in period 1 is π, in period 2 is 2π and in period m is $2^{m-1}\pi$. Hence, the consumer who buys the product in period 1 earns profits in periods 1, 2, 3, 4,…, as follows:

$$\frac{\pi}{2}, \pi, 2\pi, 4\pi, \cdots$$

Since $\pi>0$ and this is an exponentially growing series, it makes sense for him to buy hotash even if it has no intrinsic value.

Now consider a consumer who buys the good in period m. The profit earned by the consumer in periods m, $m+1$,… is as follows:

$$2^{m-1}\pi\times\frac{1}{2^{2m-1}}, 2^m\pi\times\frac{1}{2^{2m-1}}, \ldots$$

or,

$$\frac{\pi}{2^m}, \frac{\pi}{2^{m-1}}, \cdots$$

This again is a series that begins with a positive number and then gets doubled each period. It is reasonable to pay a price, namely p, and acquire a hotash along with the share options that are on offer in that period.

What has just been described is *equilibrium* behavior in an infinite-horizon game. If other consumers are expected to buy the product, then it is worthwhile for each consumer to buy the product. This is not to deny that there exists another equilibrium in which the scheme fails but that does not detract from the fact that the equilibrium in which the scheme succeeds is robust in the sense of being a *strict* equilibrium, that is, one in which a consumer who deviates unilaterally and does not buy the product actually does worse.

The above description glossed over the details of the consumer's decision. For a consumer the decision to buy a hotash entails choosing between two infinite streams of returns. Buying a hotash generates an infinite stream that comes from the profit share that one gets, plus the pleasure of owning a hotash; and in the first period the consumer loses p. If she decides not to buy a hotash, she gets a stream of 0s. If we are to make this comparison without any discounting, we run into some tricky problems. One way around this is to be prepared to deal with incomplete preference orderings. A reasonable one is an extension of utilitarianism to infinite streams (Basu and Mitra, 2007). According to this 'utilitarian criterion' an infinite stream, $x\equiv(x_1, x_2,\ldots)$ is preferred to $y\equiv(y_1, y_2,\ldots)$ if there exists an integer t such that $x_1+x_2\ldots+x_t>y_1+y_2\ldots+y_t$, and, for all $k>t$, $x_k>y_k$. Clearly, using the utilitarian criterion, it is worthwhile for consumers to buy hotashes, along with the share offerings, even if hotash itself has no value. A similar result is obtained by using the more-familiar overtaking criterion, which has been used in infinite-horizon game theory (Rubinstein, 1979).

Finally, what happens if we want to use the familiar method of discounted present value? If the discount factor is δ (0,1), the present value of the above stream is given by:

$$\frac{\pi}{2^m(1-2\delta)}.$$

For δ close to ½ this will be a large number. Moreover, since hotash can be of zero intrinsic worth its cost of production can be very low. If c is close to zero then π is close to p. It is immediately clear that while the scheme described above is a specific one, for every $\delta<1$, we can redesign a scheme to make the profit growth sufficiently exponential for hotash to be a good buy for all consumers. Hence, the scheme described here is one in which, if all consumers decide to buy the product whenever it is offered, then all consumers will find it worthwhile to buy and you will make a large profit.

3. The ethics

The value of this paper is not in what it teaches the entrepreneur but because it shows up the world for what it is, and prompts the need for legal safeguards.[1] This same ethical point is made by the model of Rubinstein and Spiegler (2008), in which a businessman can sell a dud by "creating a harmful sequence of bilateral transactions" (p. 237), which the buyer accepts. Hence, the entrepreneur who sells a product widely does not *have to* be creating value. The scheme I have outlined also shows how the creators of Camoponzis often do not fully understand what they are doing. Shiller (2000) has written about "naturally occurring Ponzis". Hockett (2009) spells out how Ponzis do not have to be "deliberately" constructed, thereby giving rise to problems not only for the theoretical economist but the legislator and the regulator. It is today common to give out share options to employees. What implicitly happens in these cases is not totally different from what was described above. A bubble gets created that can eventually prompt a crash.

Here is a sketch of how this works. Suppose an entrepreneur has a project which has very low productivity. Suppose each person who works full time in this firm produces output equal to value β. Each person's labor costs c, where $c/2<\beta<c$. Clearly the firm does not produce net value. Yet, it can earn profits, if the entrepreneur is willing to give stock options in cleverly worked out proportions to the employees. Suppose he sets the salary of each employee at $c/2$. If people take up this job offer, then, with each employed person the firm will earn a profit of $\beta-c/2>0$. As the firm grows by employing more and more workers, it can earn more and more profits. The only catch is: why will anybody work for this salary? This is where stock options come in. Suppose the firm employs 1 person in period 1 and gives her some share of the profit; then doubles the number of employees the next month and offers each worker a share of the profit; then again doubles the workforce the following month and again gives out stock options. The salary is throughout kept constant at $c/2$. It is possible to show that by working out the stock option amounts in a way similar to the scheme described in my marketing model the job can be made attractive to each employee.

The reason why giving shares to employees does not always lead to a crash is because productive activity can at times "catch up" with a Ponzi, and diffuse it.[2] Even in my scheme, if the entrepreneur uses the

[1] The market for hotash also helps us get an unusual insight into the positive economics of financial crisis. The close connection between liquidity and crisis has been noted and written about, with the view being often taken that a crisis cannot occur with fully rational agents (for an analytical survey in the context of the current crisis, see Allen and Carletti, 2008). In the market for hotash an illusion of wealth and liquidity is created among consumers, which ultimately leads to a crash. This happens with fully rational agents.

[2] Furthermore, in infinite-period models, it is possible to increase the consumption of the current generation without causing any decline in the consumption of future generations simply by each generation borrowing from the next (Shell, 1971).

profit, once it reaches some critical level, to start up a new productive venture (which has some probability of success) and strikes lucky, it is possible for him or her to then diffuse the Ponzi process. The same is true of the practice of wider and wider distribution of share options. These have the potential for a crash (and may even have contributed to the crash of 2007), but, since most firms are also trying to be productive, they can diffuse the expanding Camoponzi before it crashes.

It is interesting to note that it can be rational to buy hotashes even if it is common knowledge that the scheme will eventually crash.[3] This is because there is no well-defined date when it crashes. We know this from related arguments concerning bubbles and crashes (Abreu and Brunnermeier, 2003).

The scheme described in this paper has the property that it is not easy to prove it as illegal. Modern economics tells us there is nothing intrinsic about value. If consumers buy the bundle of hotash plus shares, we know they value this bundle. There is no easy way of knowing what the value of only the hotash is. The law will eventually catch up with this, but till that happens, this may be your chance to make money and get away to the Bahamas.[4]

Acknowledgements

I am grateful to Levon Barsheghyan, Dan Benjamin, Arkadev Chatterjea, Brian Dillon, Nick Kiefer, Annemie Maertens, Don Peskin, Ariel Rubinstein, Asani Sarkar, Karl Shell, and Jorgen Weibull for comments and suggestions.

References

Abreu, Dilip, Brunnermeier, Markus, 2003. Bubbles and crashes. Econometrica 71, 173–204.
Allen, Franklin, Carletti, Elena, 2008. The role of liquidity in financial crises. 2008 Jackson Hole Conference Proceedings. Federal Reserve Bank of Kansas City.
Basu, Kaushik, Mitra, Tapan, 2007. Utilitarianism for infinite utility streams: a new welfare criterion and its axiomatic characterization. Journal of Economic Theory 133, 350–373.
Hockett, Robert (2009), 'A fixer-upper for finance,' Washington University Law Review, forthcoming.
Rubinstein, Ariel, 1979. Equilibrium in supergames with the overtaking criterion. Journal of Economic Theory 21, 1–9.
Rubinstein, Ariel, Spiegler, Ran, 2008. Money pumps in the market. Journal of the European Economic Association 6, 237–253.
Shell, Karl, 1971. Notes on the economics of infinity. Journal of Political Economy 79, 1002–1011.
Shiller, Robert, 2000. Irrational Exuberance. Princeton University Press, Princeton.
Tirole, Jean, 1982. On the possibility of speculation under rational expectations. Econometrica 50, 1163–1181.

[3] My scheme would not work in a world with a finite termination date. The argument would unwind for the same reason as in Tirole (1982).

[4] The relief is likely to be temporary, though, since, thanks to global warming, the Bahamas is likely to go underwater.