

The Economy of Bitterness

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Abstract

Prolonged bitterness is a bad thing in an individual. When workers experience bitterness, it harms their individual productivity, and, by spreading bitterness to colleagues, excessive and repetitive worker bitterness can be costly to the firm[2]. This paper proposes a bitterness economy, and derives exact results in the furtherance of a method for limiting the spread of bitterness.

Keywords: Bitter men, bitter women, bitter work. Bitter keywords.

1 Bitter pills, not happy pills

The bitterness economy is a system of exchange where individual reinforcers of target behaviour are administered, and later exchanged, for backup reinforcers.

For example, Alfred is very upset at the way he is being treated by his profession. The Nobel committee haven't called, and he is getting upset about that. Alfred calls Bob, to spread the bitterness. If Alfred spends enough time moaning at Bob, Bob may become embittered himself, and slump off to his office to brood for the day, rather than working on his new paper. To make Alfred feel better, to halt the toxic, productivity-sapping spread of his bitterness, as well as stopping too much of Bob's time being taken up listening to Alfred, we issue Alfred with a bitterness token (or bitter pill¹). When he wants to talk to Bob, Alfred must give Bob the token. Bob is thus compensated for absorbing Alfred's bitterness, and, of course, Alfred is discouraged from spreading his bitterness around too much, because those

*I thank my bitter KBS colleagues for bitterly inspiring this bitter little paper.

¹Or whine dollar, whinos, the Alanis, and so on. Suggested names are most welcome via correspondence with the author.

tokens are in short supply. Alfred leaves happy, his bitterness is both spent and contained in one outburst, and Bob has his bitter token. Bob exchanges bitter tokens for tea, coffee, etc., at market prices.

Now, say Bob begins to become worried about another issue later that day. He can pay Carol a bitter token for a few minutes of her time, and so the system keeps going. An economy is born.

Of course, the above presupposes that there is only one *level* of bitterness. An hour long heart-to-heart with a colleague over a personally sensitive issue cannot be priced the same as a five minute rant in the corridors about the new syllabus for a module. We start with a low price for small amounts of bitterness-transmission. Ultimately, as with all economies, demand can determine the cost of the reinforcers. However a guide price at the beginning of the process should mitigate any collusive behaviour on the part of the relentlessly bitter.

The advantages of the bitter tokens are: they allow for unobtrusive, continuous feedback to worker on the state of their bitterness at any particular moment, they price differential valuing of positive and negative behaviour, and build in experiences in delayed gratification as wait for token exchange times. Token scarcity by the most bitter, and token hoarding by the happy people in the organisation, are also matters for policy-makers within the bitter economy.

2 The bitter central-banker

Naturally the bitterness system will require a central bank, a list of accounts for each person participating. The bitterness central banker will issue tokens, compute their velocity of circulation, and of course increase or decrease the supply of tokens (with the attendant bitterness inflation or deflation), as appropriate. The bitterness token is thus the reward for limited (and limiting) prosocial behaviour. The central banker, as the one who sets the price for bitterness, is the one in a position to define the price vector which, regardless of preferences, individuals will adjust their behaviour to over time.

3 Games of bitterness

Idea. There are a number of people, of varying degrees of happiness. When the person is unhappy for a few periods of the game, they become bitter. When bitter people interact with happy people, they transmit bitterness. The network which is formed when the bitter interact with the happy

spreads, with bitterness diffusing through the system at some rate γ . The objective of the central banker of bitterness is to minimise γ . The way to keep γ low is to make it costly (but not too costly) to spread bitterness, here modeled as a negative externality on a network, around to other people.

More formally, I model marginal externality pricing on a network². This is similar in spirit to Pigou [4], who advised the policy maker to charge people for the externalities that they would create at the efficient state in order to render this state an equilibrium.

I'm interested in the marginal impact that a person choosing to be bitter, b , has on other people close to them. It's important to note I assume someone *chooses* to be bitter—bitterness is not a disease they catch by transmission or repeated exposure, but a worldview the newly-bitter buy into. Thus a contagion model like [1], or demographic diffusion model[3], isn't appropriate.

The natural thing to think of here is how one person's bitterness affects the common payoff $F_h(x)$, the payoff to being happy, when the current situation is x . x can be a state of the world, or a set of action distributions. The marginal impact of an extra bitter person is the partial $\partial F_h / \partial x_b$. We can also think usefully of population states—entire rooms full of bitter people—and define the type distribution as $z_{\theta,b}$, that is the set of people z who are naturally bitter θ and choose to be bitter, b . The population state z^* is going to be the Nash equilibrium, where everyone in the system chooses the best response to their neighbours. Formally the population state, in terms of overall utility, U , will be

$$i = \arg \max U_{\theta,b}(z^*) \quad \text{whenever} \quad z_{\theta,b}^* > 0. \quad (1)$$

I assume bitterness reduces U . Over time, levels of bitterness in the organisation will shift, with dynamics defined by the differential equation $\dot{z} = g(z)$. The function g maps the population state to the direction of motion over time of z . Clearly, if unregulated, if there were 100 individuals at the start of a game, and 50 were bitter, with 50 happy, then, by randomly associating over time, bitter people may dominate, or may become a segregated enclave, following [6].

Now let's introduce the bitterness tokens. These should be issued by our central banker of bitterness, and priced according to the policy variable γ , which at each moment is given by:

²The best paper I've found in this area is Sandholm[5].

$$\gamma = P_b^*(x) = - \sum_h x_h \frac{\partial F_h}{\partial x_b}(x). \quad (2)$$

So, the price a person pays another to be bitter at them (choose action b) is equal to the marginal impact the person has on others by choosing this action. The price scheme P is defined by current payoff levels, meaning it can step up when the proportion of bitter people increases, and drop down when happy chappies (and chapettes) dominate³.

The variability in prices also serves another crucial role. Suppose that the planner has enough information to set some Pigouvian prices over time. The creates efficient state—an equilibrium—but, there is generally no reason to expect that the people playing the game would learn to play this equilibrium if play began at an arbitrary disequilibrium state, e.g. (80 bitter, 20 happy).

A successful price scheme must ensure that the efficient state is not simply an equilibrium—it must be an equilibrium people can easily *learn* to play. This property depends critically on how prices are defined at out-of-equilibrium states, thus the crucial role of the bitter central banker.

4 Implementation

To implement the bitter economy for experimental bitter behaviour modification, we require a large number of rewards, keyed to the pricing system set by γ , a large number of tokens, with little or no physical value, because they are fiat money (but these bitterness tokens can be traded for rewards). We initially allocate tokens randomly, then at defined periods (a week, a month, etc), the central banker of bitterness computes the optimal price vector, assesses the token velocity and supply, and adjusts the payoffs accordingly. The important feature of the bitter economy is that the central banker does not seek to eliminate bitterness—they recognise bitterness is a part of life and work, and talking about the causes of bitterness can mitigate its effects. Thus the central banker seeks to monitor, influence, and minimise bitterness through the bitter economy.

³Importantly, under standard Pigouvian pricing, the planner fixes prices equal to the marginal externalities created at the efficient state. By doing so, he renders this state an equilibrium. In the implementation problem considered here, the planner does not know the type distribution a priori, and so is unable to identify the efficient state. One function of the variability in prices is to ensure that the efficient state is an equilibrium, regardless of what this state turns out to be.

References

- [1] F. Allen and D. Gale. Financial contagion. *Journal of Political Economy*, 108(1):1–31, 2000.
- [2] E. Hatfield, J. Cacioppo, and R. L. Rapson. Emotional contagion. *Current Directions in Psychological Science*, 2(3):96–99, June 1993.
- [3] E. Mansfield. The speed of response of firms to new techniques. *Quarterly Journal of Economics*, 77(2):290–311, 1963.
- [4] A. C. Pigou. *The Economics of Welfare*. Macmillan & Co., 4th edition, 1932.
- [5] W. Sandholm. Negative externalities and evolutionary implementation. *Review of Economic Studies*, 72(3):885–915, 2005.
- [6] T. Schelling. *Micromotives and Macrobehavior*. W.W. Norton Co., 1978.