Placebo Reforms: Correction of Minor Error in Proof of Proposition 1*

Ran Spiegler

December 11, 2017

In the proof of Proposition 1 of the paper "Placebo Reforms" (*American Economic Review* 103, 1490-1506, 2015), the derivation of the final expression for player t's expected gross payoff (which appears at the very bottom of p. 1495 of the published version) is inaccurate. The expression itself is correct. The following is a correct derivation.

Define player t's *gross payoff* from choosing $a \neq 0$ to be equal to his payoff from this action plus ε^t. Let us first verify that the strategy described in the statement of the result is an equilibrium strategy. Suppose that player t chooses some $a \neq 0$ and that $r(t) = t + n$. Then, player t's gross payoff is

$$(1-\delta)\left[\sum_{j=1}^{n}\delta^{j-1}(j\mu_a + \varepsilon^{t+j}) + \sum_{j=n+1}^{\infty}\delta^{j-1}(n\mu_a + \varepsilon^{t+n})\right]$$

The term ε^{t+j} for $j = 1, ..., n$ is missing from the original version. Given that all players $s > t$ intervene if and only if $\varepsilon^s < \varepsilon^*$, player t's expected gross payoff from choosing $a \neq 0$ is therefore

$$(1-\delta)\sum_{n=1}^{\infty}F_a(\varepsilon^*)(1-F_a(\varepsilon^*))^{n-1}\left[\sum_{j=1}^{n-1}\delta^{j-1}\left(j\mu_a + E(\varepsilon \mid \varepsilon > \varepsilon^*)\right) + \sum_{j=n}^{\infty}\delta^{j-1}\left(n\mu_a + E(\varepsilon \mid \varepsilon < \varepsilon^*)\right)\right]$$

where

$$E(\varepsilon \quad | \quad \varepsilon > \varepsilon^*) = \frac{\int_{\varepsilon^*}^{\infty}\varepsilon f_a(\varepsilon)d\varepsilon}{1 - F_a(\varepsilon^*)}$$

$$E(\varepsilon \quad | \quad \varepsilon < \varepsilon^*) = \frac{\int_{-\infty}^{\varepsilon^*}\varepsilon f_a(\varepsilon)d\varepsilon}{F_a(\varepsilon^*)}$$

The reason is that when $r(t) = t + n$, it must be the case that $\varepsilon^{t+j} > \varepsilon^*$ for all $j = 1, ..., n-1$ and $\varepsilon^{t+n} < \varepsilon^*$.

*I am extremely grateful to Kfir Eliaz for discovering the error in the proof.

Now, straightforward algebra establishes that

$$\sum_{n=1}^{\infty} F_a(\varepsilon^*)(1 - F_a(\varepsilon^*))^{n-1} \left[\sum_{j=1}^{n-1} \delta^{j-1} E(\varepsilon \mid \varepsilon > \varepsilon^*) + \delta^{n-1} E(\varepsilon \mid \varepsilon < \varepsilon^*) \right] = 0$$

Therefore, the expression for player t's expected gross payoff can be rewritten as

$$(1-\delta) \sum_{n=1}^{\infty} F_a(\varepsilon^*)(1-F_a(\varepsilon^*))^{n-1} \left[\sum_{j=1}^{n} \delta^{j-1} j\mu_a + \sum_{j=n+1}^{\infty} \delta^{j-1} \left(n\mu_a + E(\varepsilon \mid \varepsilon < \varepsilon^*) \right) \right]$$

which is the exact same expression that appears in the original proof. This expression in turn is indeed equal to

$$\frac{\mu_a + \delta \int_{-\infty}^{\varepsilon^*} \varepsilon f_a(\varepsilon) d\varepsilon}{1 - \delta(1 - F_a(\varepsilon^*))}$$

as appears at the very bottom of p. 1495 of the published version.