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## Promoting Wellness or Waste?

### Evidence from Antidepressant Advertising

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**D**irect-to-consumer advertising (DTCA) of prescription drugs is controversial. Much of the controversy stems from ambiguous potential welfare effects. On the positive side, DTCA could provide information that encourages sick people to seek help from their physicians to potentially get better, through either drug treatment or an alternative. Alternatively, DTCA could be socially costly. Since patients with insurance tend not to pay the full cost of each prescription, advertising may inefficiently drive marginal patients to get prescribed when the benefits do not exceed the full cost. Additionally, DTCA may inefficiently induce switches away from inexpensive generic drugs to expensive branded drugs. Finally, DTCA could mislead individuals into thinking a drug would have significant value for them when it would have little.

To estimate the net social effect of DTCA, I analyze the benefits and costs of advertising for antidepressant drugs. Depression is a chemical imbalance in the brain that leads to decreased self-worth, and it affects roughly 10 percent of Americans at any time. In economic terms, it is characterized by the systematic underestimation of one's marginal product of effort and has been associated with both large direct costs of medical care and large indirect costs of reduced economic activity. Survey evidence suggests that only about half of those who have experienced depression-related disorders have received any kind of professional treatment.

Total DTCA of prescription drugs, while significant, has decreased from about \$3 billion in 2004 to a little more than \$2 billion in 2012. Meanwhile, antidepressant DTCA makes up an important fraction of total DTCA and has increased from about \$200 million in 2004 to a peak of about \$400 million in 2011, declining to about \$300 million in 2012.

By directly measuring costs and benefits to consumers and insurers, I evaluate whether DTCA generates socially inefficient prescriptions. Computing social welfare directly is difficult. First, consumers often value attributes of products that are not observable to the researcher. Second, firm profits are part of social welfare, but firm costs are unobservable. As a result, economics researchers often use revealed preference to measure consumer preferences and then use that result combined with a model of firm conduct to make inferences about social welfare. In the case of DTCA, such a revealed-preference approach is not ideal. First, misleading advertising may generate prescriptions that bring patients less value than the price they face, undermining the premise of using revealed preference to compute consumer surplus. Second, advertising may generate prescriptions that are privately more valuable to patients than the copays but are less valuable than the full price the insurers pay, generating externalities onto insurance markets.

As a result of these difficulties, my approach is to directly measure whether advertising marginal prescriptions brings enough value to justify the costs of those prescriptions to

consumers and to insurers. I consider a number of potential costs. First, increased prescriptions from advertising lead to a direct cost, the price of the drug. Second, it is possible that advertising steers consumers to more expensive drugs, conditional on treatment. Third, I evaluate whether and to what extent advertising leads to increased adverse effects or increased probability of failing to complete a course of treatment. Finally, I measure whether and to what extent advertising increases the rate of adverse drug effects. On the benefit side, I measure the effect of DTCA on labor supply, which is the main observable outcome associated with depression. This approach has the limitation that only observable benefits and costs can be measured. Those potential costs and benefits are not exhaustive, but they are important and they provide a guide for thinking about how big any unmeasured costs or benefits would have to be to swamp those measured here.

I find that DTCA induces more patients to be prescribed antidepressants with an elasticity of about 0.031, leading to a direct cost of DTCA to consumers and insurers. Second, I find that conditional on being prescribed in the previous month, current advertising reduces refill prescriptions by a small amount. Next, I find evidence against DTCA having an economically meaningful effect on either the price or the copay of the drug, conditional on prescription. I also find evidence against an economically meaningful effect of advertising on the generic penetration rate. Finally, I find that DTCA causes benefits in the form of increased labor supply. The benefits of increased labor supply outweigh the total cost of additional prescriptions by more than an order of magnitude. The preferred estimates imply that a 10 percent increase in DTCA brings \$769.5 million in wage benefits while generating \$32.4 million in prescription costs. This finding implies that on average, DTCA is generating prescriptions that are worth more to patients than they cost. In other words, the average DTCA marginal prescription is not a “mistake.”

In addition to the dollar costs and benefits, I find that advertising does not predict increased adverse effects or increased failure to complete a full course of treatment, indicating that advertised marginal prescriptions are no more likely to be poorly tolerated than average prescriptions. If employers have market power in the labor market and employees are paid less than their marginal product, then employers will

also see dollar benefits of the increased labor supply that I do not measure. Additionally, incremental profits to pharmaceutical firms resulting from DTCA could further positively tilt the full social welfare.

To my knowledge, this is the first research linking DTCA to dollar-measurable benefits and costs to consumers. This empirical exercise comes with challenges. First, advertising is endogenously chosen by firms in a way that might lead advertising to be spuriously correlated with sales and outcomes. Second, labor supply is determined by many factors other than depression and, by extension, antidepressant advertising. This leads to a problem of low statistical power in the estimation of the effect of DTCA on labor supply. Finally, any effects of advertising on labor supply are not expected to materialize immediately, as it takes time for a patient to begin to show improvement from treatment. On average, it takes six weeks for patients to begin experiencing beneficial effects of antidepressants, but the interval can vary widely. The need to evaluate both current and lagged advertising effects exacerbates power issues.

To overcome the endogeneity of advertising, I take advantage of the panel nature of the data to consider both individual-specific differences in labor supply and systematic seasonal variation. To control for remaining endogeneity, I make use of random variation in advertising generated by the borders of television markets. Despite decreasing the number of observations in estimation, focusing on borders in this case increases statistical power. Seasonal factors that impact labor supply, such as weather and local labor market conditions, are highly geographically correlated. By making close geographic comparisons, variation in labor supply driven by factors other than advertising is considerably reduced. The reduction of noise in this case outweighs the reduction in observations that would decrease power.

## NOTE

This research brief is based on Bradley Shapiro, “Promoting Wellness or Waste? Evidence from Antidepressant Advertising,” Becker Friedman Institute for Research in Economics Working Paper no. 2018-14, May 2018, [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3130327](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3130327).