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Experiencing breast cancer at the workplace☆

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ABSTRACT

We study a dynamic natural experiment involving nearly 3000 American women of age 50–64 to understand how a woman's propensity to receive an annual mammography changes over time after a co-worker is diagnosed with breast cancer. We find that in the year this event occurs the probability of screening drops by about 6 percentage points, off a base level of 70%. This impact effect is persistent for at least two years. Underlying mechanisms and implications for health policy are discussed.

1. Introduction

How does a woman's propensity to receive a mammography change over time after a co-worker is diagnosed with breast cancer? Even if such an event is likely to become known to nearby colleagues through workplace social interactions, as a benchmark there is no effect to expect for a fully informed, rational decision-maker with given constraints because breast cancer is not an infectious disease, and the underlying non-environmental risk factors are independent among unrelated co-workers. However, effects are possible if we depart from this benchmark. This paper provides an empirical answer to this question.

We gained access to employer records from a large medical organization in the US, which we used to construct a 3-year (2002–2004) panel data set containing demographic, professional, socioeconomic and high-quality health information, including use of mammographies (freely available at the workplace for female employees at the organization after age 40) and breast cancer occurrences at different lags (2000–2005). The records also contain detailed information about an employee's spatial location in the workplace, which allows us to construct reference groups where social interactions plausibly occur on a daily basis.[1]

Focusing on the screening behavior of women 50 years of age and older—i.e., women who, at the time the data refer to, were

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[1] This makes the setting of the natural experiment studied here similar to the field experiment of Duflo and Saez (2003). These authors find that providing an information shock about retirement plans to randomly selected employees increases the enrollment rate of their (nontreated) co-workers as well.

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unambiguously recommended annual mammograms[2] — we find a negative effect at impact: in the year when a woman is diagnosed with breast cancer, her female colleagues who sit nearby at work and are eligible for screening become about 6 percentage points less likely to receive a mammography relative to all other eligible women, off a baseline annual screening rate of about 70%. To get a sense of the magnitude of this effect, it is as if 1 woman out of 12 among those with a co-worker who is diagnosed with breast cancer reacts to the news by postponing screening. This average impact response is persistent for at least two years. Placebo experiments corroborate this result by showing that such dynamic effects are absent when treatment is based on future breast cancer diagnoses, tumors other than breast cancer, and when actual breast cancer occurrences are randomly reallocated across reference groups.

These findings are noteworthy because while the economics of test avoidance has been extensively investigated in individual settings (e.g., Kőszegi, 2003; Caplin and Eliaz, 2003; Oster et al., 2013), little is known about avoidance behavior in social contexts. Behavioral and non-behavioral mechanisms are able to rationalize these findings. Although—as is often the case in natural experiments—the data do not allow us to discriminate among them, we discuss possible underlying mechanisms in light of particular features of the institutional setting under study, and of existing "mechanism experiments" (Ludwig et al., 2011) from the medical literature.

Section 2 describes the data, Section 3 illustrates the econometric design, Section 4 reports the results, Section 5 discusses mechanisms, and Section 6 concludes with some methodological and policy remarks. The working paper version of this article (Zanella and Banerjee, 2014) contains additional material not included here in the interest of space.

2. Data set

The data come from a large not-for-profit medical organization in the US that has over 20,000 employees, 70% of whom are women. All employees are eligible for a health plan run by the organization, and given the plan's comprehensive nature and the lack of substitutes of comparable quality, participation is virtually universal. This insurance plan includes, in particular, free annual mammograms for all women older than 40 (7385 women in our sample), and these eligible women are reminded about their recommended annual mammogram (if they have not already had one) each time they visit their primary care physician. Therefore, many of the barriers typically pointed to when interpreting national rates and trends of mammogram use (e.g., lack of insurance, high copay, and lack of reminders) are absent in our setting. We constructed a three-year panel data set out of the employer's records. Demographic and health care utilization information was gathered from electronic administrative and billing records maintained for all patients. Job and career information came from databases maintained by the human resources department. An employee's physical location in the workplace was obtained from the IT department. We inferred an individual's health status using the classification scheme in Elixhauser et al. (1998), who employ health utilization data to create a set of indicator variables revealing whether an individual has a history of medical claims for a certain health condition. This allows us to construct a detailed set of about 30 health status indicators. Finally, we used a locally maintained tumor registry that keeps records of all patients who are diagnosed with a malignant tumor of any type at the organization (or who are diagnosed elsewhere but treated at the organization) to create cancer diagnosis variables, including the exact date of a diagnosis, for all employees. The health status indicators and whether a woman received a mammogram or not are observed for each year between 2002 and 2004, and this determines the longitudinal span of the panel. The tumor registry is available for all years between 2000 and 2005, so that for each year in the panel (2002–2004) we observe two lags (as well as one lead) of breast cancer occurrences among co-workers.

The resulting data set has two limitations. First, demographic and employment information were made available to us only for year 2004. Therefore, apart from age, we must assume in the longitudinal analysis that they do not change between 2002 and 2004. For most socioeconomic characteristics, this is an acceptable approximation. Our inability to observe moves within the organization is more problematic, because we must assume that an employees physical location in the workplace in 2002 and 2003 is the same as in 2004. Because such moves are not very frequent and because (as explained below) new hires are removed from the estimation sample, the resulting misclassification of reference groups is most likely negligible. Second, we do not observe women who died from breast cancer (or otherwise left the organization) before the end of 2003, because they were removed from the administrative records that were made available to us. We discuss the consequences of these two limitations for inference in greater detail below. It suffices to mention here that they may cause some attenuation bias (because some treated women would be incorrectly classified as non-treated), so that our estimates can be conservatively interpreted as lower bounds for the dynamic effect of interest.

2.1. Estimation sample

We focus on the screening behavior of women who were at most 49 years of age at the beginning of 2002 (the first year of the panel), a group of 2842. This is because there was no ambiguity about annual mammograms for women 50 years of age or above during the time period we study (see footnote 2), whereas both the individual screening recommendation from one's physician or the baseline perception of "normal" preventive screening may have been ambiguous for younger women. Furthermore, we drop 137 women who are new employees at the organization in any year of the panel, because new hires may be less likely to receive a mammography (due to the transition to a new health plan) and at the same time they may be hired to replace or supplement women affected by breast cancer and so they are more likely to end up in treatment groups.[3] This leaves us with a final sample of 2705 women who have been employed at the organization for at least 12 months in the first year of the panel. Table 1 reports summary statistics for this sample, and Table 2 reports screening rates. The latter are larger than the corresponding national rates, as one would expect

[2] There is some controversy over when women should begin breast cancer screening. The American College of Radiology, American Medical Association, National Cancer Institute, and the American College of Obstetrics and Gynecology recommend annual screening starting at age 40. The American Cancer Society adopted this same guideline until October 2015, when it issued a new one recommending women of average risk to have annual mammograms between age 45 and 54, and then every other year. The American College of Physicians recommends that women in the age range of 40–49 make decisions about mammography together with their provider, based on the individual risk profile and the potential costs and benefits of performing a mammogram. In November 2009, the US Preventive Services Task Force advised women below 50 years of age not to get routine mammograms, but to discuss the pros and cons with their provider and decide together when to start screening. This advice—whose rationale is the fact that mammograms may generate false alarms and unnecessary treatment—has generated a lot of debate in the US. Moss et al. (2006) perform a large randomized controlled trial in the UK and find that annual mammographies in the age range of 39–48 do not lead to a significantly lower mortality rate relative to control women who did not screen regularly.

[3] We do, in fact, observe in our data a somewhat higher incidence of new hires in groups where someone is diagnosed with breast cancer. We are grateful to an anonymous referee for raising this point.