

In light of COVID-19, study looks at tradeoffs between economic value and public health

June 12 2020, by Peter Dizikes



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Banks and bookstores. Gyms and juice bars. Dental offices and department stores. The COVID-19 crisis has shuttered some kinds of

businesses, while others have stayed open. But which places represent the best and worst tradeoffs, in terms of the economic benefits and health risks?

A new study by MIT researchers uses a variety of data on consumer and [business activity](#) to tackle that question, measuring 26 types of businesses by both their usefulness and risk. Vital forms of commerce that are relatively uncrowded fare the best in the study; less significant types of businesses that generate crowds perform worse. The results can help inform the policy decisions of government officials during the ongoing pandemic.

As it happens, banks perform the best in the study, being economically significant and relatively uncrowded.

"Banks have an outsize economic impact and tend to be bigger spaces that people visit only once in a while," says Seth G. Benzell, a postdoc at the MIT Initiative on the Digital Economy (IDE) and co-author of a paper published Wednesday that outlines the study. Indeed, in the study, banks rank first in economic importance, out of the 26 [business](#) types, but just 14th in risk.

By contrast, other business types create much more crowding while having far less economic importance. These include liquor and tobacco stores; sporting goods stores; cafes, juice bars, and dessert parlors; and gyms. All of those are in the bottom half of the study's rankings of economic importance. At the same time, cafes, juice bars, and dessert parlors, taken together, rank third-highest out of the 26 business types in risk, while gyms are the fifth-riskiest according to the study's metrics—which include cellphone location data revealing how crowded U.S. businesses get.

"Policymakers have not been making clear explanations about how they

are coming to their decisions," says Avinash Collis Ph.D. '20, an MIT-trained economist and co-author of the new paper. "That's why we wanted to provide a more data-driven policy guide."

And if the COVID-19 pandemic worsens again, the research can apply to shuttering businesses again.

"This is not only about which locations should reopen first," says Christos Nicolaides Ph.D. '14, a digital fellow at IDE and study co-author. "You can also look at it from the perspective of which locations should close first, in another future wave of COVID-19."

The paper, "Rationing Social Contact During the COVID-19 Pandemic: Transmission Risk and Social Benefits of U.S. Location," appears in *Proceedings of the National Academy of Science*, with Benzell, Collis, and Nicolaides as the authors. Benzell is about to start a new position as an assistant professor at Chapman University; in July, Collis will become an assistant professor at the University of Texas at Austin; Nicolaides is also a faculty member at the University of Cyprus.

Cumulative risk

To conduct the study, the team examined anonymized location data from 47 million cellphones, from January 2019 through March 2020. The data included visits to 6 million distinct business venues in the U.S. The 26 types of businesses in the study accounted for 57 percent of those visits, meaning the study covers a broad swath of the economy.

By examining the location data over an extended time period, the scholars were able to determine what the typical crowding level is for all business types in the study.

The study also used payroll, revenue, and employment data from U.S.

Census Bureau to rate the centrality of different industries to the economy. Businesses in the study represented 1.43 million firms, 32 million employees, \$1.1 trillion in payroll, and \$5.6 trillion in revenues. The researchers also added a survey of 1,099 people to gauge public preferences about different types of business.

A key to the researchers' approach is recognizing that during the pandemic, many consumers are trying to limit trips that generate interaction with strangers, while still needing to get essential and useful transactions done.

As Benzell notes, "The idea was, how can we think about rationing social contacts in a way that gives us the most bang for our buck, in terms of meetings, while keeping the risk of COVID transmission as low as possible?"

The study also rates risk on the basis of aggregate public exposure, per business type. On an individual basis, spending a couple of hours in a movie theater with strangers might seem quite risky. But in February 2020, movie theaters had about 17.6 million consumer visits in the U.S., whereas sit-down restaurants had almost 900 million visits in the same month. As a business category, sit-down restaurants would likely generate much more total transmission of COVID-19.

"It's not danger per visit, but it's a cumulative danger," Nicolaidis explains. "If you look at movie theaters, they seem dangerous, but not that many people go to the movies every day ... and restaurants are a good counter-example."

Outlier: Liquor stores staying open

In many cases, the researchers say, policymakers have made reasonable decisions about which types of businesses should be open and closed.

But there are exceptions to this. Take liquor stores, which have been deemed an "essential" business in many U.S. states.

"What really jumps out at us is liquor and tobacco stores," Benzell says. "Most states have allowed liquor stores to remain open. This is a bit of a bad call from our perspective, because liquor stores don't create a lot of social value. If you ask people which stores they want to be open, liquor stores are near the bottom of that list. They don't have that many receipts or employees, and they tend to be these small, crowded places where people are up against each other trying to navigate."

In the study, liquor stores rate 20th out of the 26 business types in economic importance, but 12th highest in risk.

By contrast, the researchers are more bullish about the public health dynamics of college and universities, which they rank 8th out of the 26 business types in economic importance, but just 17th in terms of risk. If campus living arrangements could be made more safe, the researchers think, the other parts of university life could offer relatively reasonable conditions.

"Colleges and universities actually have the potential to offer pretty good social contact tradeoffs," Benzell says. "They tend to be places with big campuses, they tend to be [composed of] consistently the same group of young people, visiting the same places. When people are worried about colleges and universities, they're mostly worried about dormitories and parties, people getting infected that way, and that's fair enough. But [for] research and teaching, these are big spaces, with pretty modest groups of people that produce a lot of economic and social value."

The scholars note that the study contains national ratings, and acknowledge that there might be some regional variation in effect as well.

"If a local government would like to apply this paper [to their policies], it may be a better idea to put in their own data to make decisions," says Nicolaides. That said, the study did not indicate significantly different results for urban and rural settings, something the researchers evaluated.

To be sure, some businesses are adapting to the pandemic by using new protocols or [safety measures](#), such as limited customers in hair salons or safety partitions at supermarket checkout counters. Studying business venues with such safety measures in place would also be valuable, the scholars note.

"Moving forward, an interesting exercise would be to see how dangerous these locations are once you implement these mitigation strategies." Collis says. "Those are all interesting open questions, seeing which business adapt. And some of these adaptations will probably be temporary changes, but other business practices may stick in the COVID age."

More information: Seth G. Benzell et al, Rationing social contact during the COVID-19 pandemic: Transmission risk and social benefits of US locations, *Proceedings of the National Academy of Sciences* (2020). [DOI: 10.1073/pnas.2008025117](https://doi.org/10.1073/pnas.2008025117)

Provided by Massachusetts Institute of Technology

Citation: In light of COVID-19, study looks at tradeoffs between economic value and public health (2020, June 12) retrieved 26 April 2024 from <https://phys.org/news/2020-06-covid-tradeoffs-economic-health.html>

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