

Measuring Religion from Behavior: Climate Shocks and Religious Adherence in Afghanistan

Based on BFI Working Paper 2022-155, “[Measuring Religion from Behavior: Climate Shocks and Religious Adherence in Afghanistan](#),” by Oeindrila Dube, University of Chicago; Joshua E. Blumenstock, U.C. Berkeley; and Michael Callen, London School of Economics

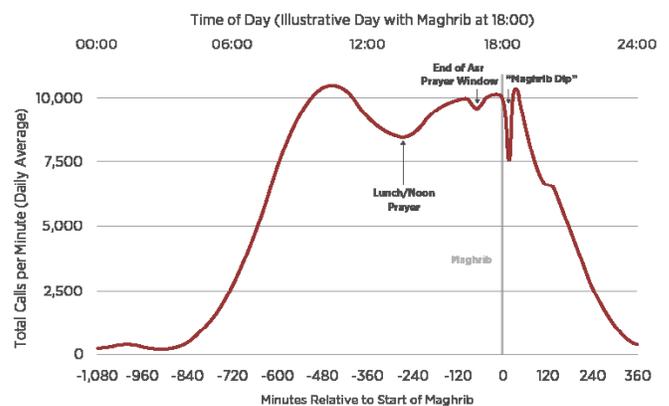
A new measure of religious adherence, developed using cell phone data, shows that when economic conditions in Afghanistan worsen, people become more religiously observant.

While religions shape cultural norms and values, motivate social group organization, and define the contours of political and economic power, we know little about what influences people’s adherence to religious practices. Religious adherence has been hard to study in part because it is hard to measure. Most studies of religious observance rely on surveys, which are undependable owing to infrequent and sparse coverage over space (especially in conflict-prone regions), and because they use stated rather than revealed preferences. In other words, surveys measure what select people say, and not what they do.

In this paper, the authors offer a new approach to measuring religious adherence that they apply to the study of religiosity in Afghanistan. Their approach is based on a simple insight: A core tenet of Islam is to pray five times daily at specific times; therefore, the authors posit that the amount of non-prayer activity observed during the prescribed prayer window provides an indication of religious adherence.

The paper contains both a methodological and applied section, which are briefly described in this Economic Finding (please see the full working paper for more details). In the methodological section, the authors employ anonymized mobile phone data from one of Afghanistan’s largest mobile phone operators to measure religious adherence based on the volume of call drops during the evening Maghrib (sunset) prayer window. Talking to others, including on the phone, is widely considered to invalidate prayer, and the Maghrib prayer window is well-suited to this task because it is short and well-defined, and because it occurs during a time when people are awake and otherwise active.

Figure 1 • Call Volume Throughout the Day

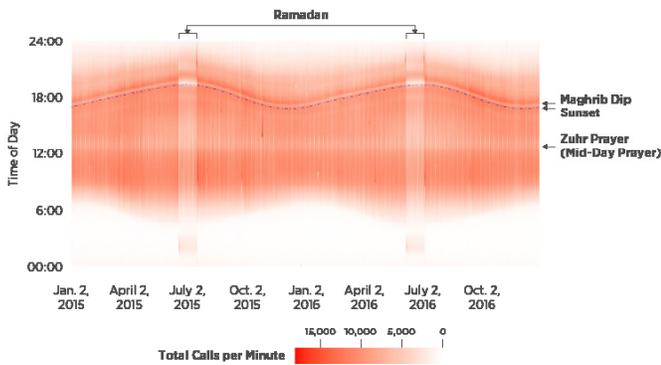


Note: This figure shows the average call volume for each minute of the day, averaged across all days between 2013-2020. Data from different towers and different days are aligned to display call volume relative to the start of Maghrib (bottom x-axis). For illustrative purposes, in the top x-axis, the authors show an example timeline from a day in which Maghrib starts at 18:00 (6pm).

Based on data from nearly 10 million unique phone users and 22 billion phone calls from 2013-2020, the authors find the following:

- There is a substantial decrease in call volume immediately following the start of the Maghrib window. Across Afghanistan, on average, call volumes drop by roughly 25% about 15 minutes into the Maghrib prayer window, which the authors coin as the “Maghrib dip.” (See Figure 1)
- The Maghrib dip tracks sunset: When sunset (and hence the start of the Maghrib prayer time) occurs later in the day, the Maghrib dip also occurs later in the day. (See Figure 2)

Figure 2 • Intensity of Mobile Phone Calls Over Time



Note: This figure plots the total call volume for every minute of every day for two years in our sample (from Jan. 2015 to Dec. 2016.) The light band labeled as the Maghrib Dip shows the drop in call volume during the Maghrib (sunset) prayer.

The authors validate this measure of religious adherence by analyzing survey and geographic connections, to find the following:

- There is a strong correlation between stated religious adherence and a correspondent Maghrib dip; a one standard deviation increase in the survey religiosity index is associated with a 44% increase in the Maghrib dip.
- Geographic variation in the Maghrib dip across Afghanistan correlates with existing data related to religious norms. For example, the Maghrib dip is largest in areas that are contested or controlled by the Taliban, which strictly—and at times violently—enforced religious norms.

Having developed a new methodology to measure religious adherence, the authors then apply this technique to study the effects of economic adversity on religious adherence. On the one hand, adverse economic shocks may lower religious adherence by testing people's faith or by reducing time available to participate in religious activity. On the other hand, economic shocks may increase religious adherence by, for example, lowering the

opportunity cost of participating in religious activities, spurring individuals to seek social insurance, or by helping them cope with adversity. The authors study the relationship between economic adversity and religion by examining the effect of quasi-random climate shocks on religious adherence (shocks that greatly impact Afghanistan's agricultural sector). They find the following:

- Adverse climate conditions significantly increase religious adherence; for example, a major drought increases religious adherence by 24%, as much as the change that occurs when the Taliban contest or take control of a district.
- Climate shocks influence religiosity through their economic impact. In particular, the effects of climate on adherence are concentrated in areas that are most sensitive to droughts, such as pastoral areas and cropland areas that lack access to irrigation.

Climate shocks exert the strongest effects on religious adherence during the growing and post-harvest seasons, and have no statistically significant effect during the harvest season itself. Thus increases in religious adherence stemming from adverse climate conditions do not reflect the opportunity cost of time -- since the agricultural workload, (and hence the opportunity cost of time), reaches a peak during the harvest season. Rather these patterns suggest that people turn to religion to help them cope with the expectation or experience of bad economic downturns.

Bottom line: The authors' simple—yet powerful—insight that aggregate patterns of technology use (and dis-use) can provide a new, quantitative perspective on religious adherence over time and space in Afghanistan is applicable to other religious environments around the world. Indeed, the authors' approach is likely relevant to a wide range of contexts where anonymized digital transaction logs are available.

READ THE WORKING PAPER

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