

USING ALTERNATIVE DATA TO STUDY RESERVATION ECONOMIES

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DECEMBER 2, 2022
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CENTER FOR
INDIAN COUNTRY
DEVELOPMENT



FEDERAL RESERVE BANK OF MINNEAPOLIS

MOTIVATION

- Data on the economic infrastructure inside American Indian Reservations (AIRs) are scarce and, when available, often inaccurate (Akee et al., 2021; Evans-Lomayesva et al., 2022; Native Nations Institute, 2016)
 - Federal surveys require oversampling to identify econ conditions of small groups (e.g., American Indians, Alaska Natives, Native Hawaiians/Other Pacific Islanders).
 - Current economic conditions on AIRs rely on 5-year averages in the American Community Survey (latest version, 2016-2020)
 - Thus, the state of economic infrastructure and how the pandemic affected Native communities, to date, requires creative surveys (e.g., CICD 2020/2021 surveys of tribal governments)
- We turn to "**alternative**" data to fill in these gaps:
 - A large panel of individuals whose cellphone locations are tracked (SafeGraph Patterns)
 - Debit/Credit Card Transactions at a large sample of establishments (SafeGraph Spend)

Native Nations Institute. 2016. *Access to Capital and Credit in Native Communities*, digital version, Tucson, AZ: Native Nations Institute

Crane, L. D., Decker, R. A., Flaaen, A., Hamins-Puertolas, A., & Kurz, C. (2022). Business exit during the COVID-19 pandemic: Non-traditional measures in historical context. *Journal of macroeconomics*, 72, 103419

Evans-Lomayesva et al., 2022. » [Advancing American Indian & Alaska Native Data Equity: Representation in Federal Data Collections \(georgetownpoverty.org\)](https://www.georgetownpoverty.org/).

THE MAIN RESEARCH QUESTIONS

We use data collected by Safegraph to ask a host of questions

1. How far do people living on AIRs travel for goods and services?
2. Where do consumers living on AIRs go to buy goods and services? Where do consumers of on-reservation establishments come from?
3. How did the pandemic affect travel patterns and spending patterns to industries located on AIRs? Compared to business activity in border towns? To the US as a whole?

** Research is preliminary. We are looking for feedback**

SOME RESULTS CORROBORATIVE, OTHERS CORRECTIVE

- Consistent with prior research, we find individuals living in AIRs travel very long distances for consumer goods.
- Consistent with prior research, we find large flows of individuals who travel from AIRs to off-reservation establishments
- However, we also find large inflows of individuals who live off of AIRs and shop at on-reservation establishments
- We respect to the pandemic, we find
 - Similar patterns of travel during the dearth of the pandemic in AIRs compared to border towns and rest of the U.S. [potentially omit]
 - We find that average spending with specific industries (e.g., gas stations) are substantially higher throughout 2020 (and later) compared to spending at the same industries located near reservations and in the rest of the U.S.

SAFEGRAPH PLACES/PATTERNS DATA

- Collects aggregate weekly visits to points of interest (POIs) from mobile devices
- Individuals are anonymized and differential privacy is applied to home locations.
- We focus on 2020
 - Before/during the initial year of the pandemic
 - Data does exist from Jan 1, 2018 to the present
- Roughly 5% of all smartphones in USA are tracked by SafeGraph
- Contains information on
 - Visitation counts to over 7 million POIs (in January 2020)
 - *** 15,327 POIs are located on reservations ***
 - Exact Location of POIs (lat/long)
 - Industry type for POIs (e.g., industry "NAICS" codes)
 - *Home locations* for visitors
 - Visitor *home location* is linked to the census block group level



SAFEGRAPH

SAFEGRAPH SPEND DATA

- Contains anonymized monthly place-based transactions data
- Collected from debit and credit card transactions
 - Average transaction size
 - Amount spent in person or online
- Customer demographics
- Data collected from Jan 2020 – July 2022
- Approximately 2000 POIs located within AIRs,



SAFEGRAPH

SETTING UP OUR RESEARCH

- For the weekly patterns data, we
 - Use lat/long of each POI to determine if POI is located on a reservation, just outside a reservation (within a 10 km border) or outside of this border (i.e., in the rest of the US)
 - Since exact location of a visitor is unknown, we infer that a visitor's home location is on an AIR using this assignment rule:
 - A census block group is assumed to be within the boundaries of an AIR if 50% or more of its area overlaps with AIR land.*
 - Under this rule, most census block groups assigned to AIRs are completely contained within reservation boundaries.
- For the monthly spend data, we locate each business and assign it to a reservation, just outside a reservation or outside this border

*: We use areas that are classified as American Indian reservations and trust lands according to the US Census Bureau, which is a subset of the definition for American Indian and Alaska Native areas (AIANAs). See: US Census Bureau. (2022, March 11). *Geographic Areas Reference Manual Chapter 5: American Indian and Alaska Native Areas*. Census.gov. <https://www.census.gov/programs-surveys/geography/guidance/geographic-areas-reference-manual.html>

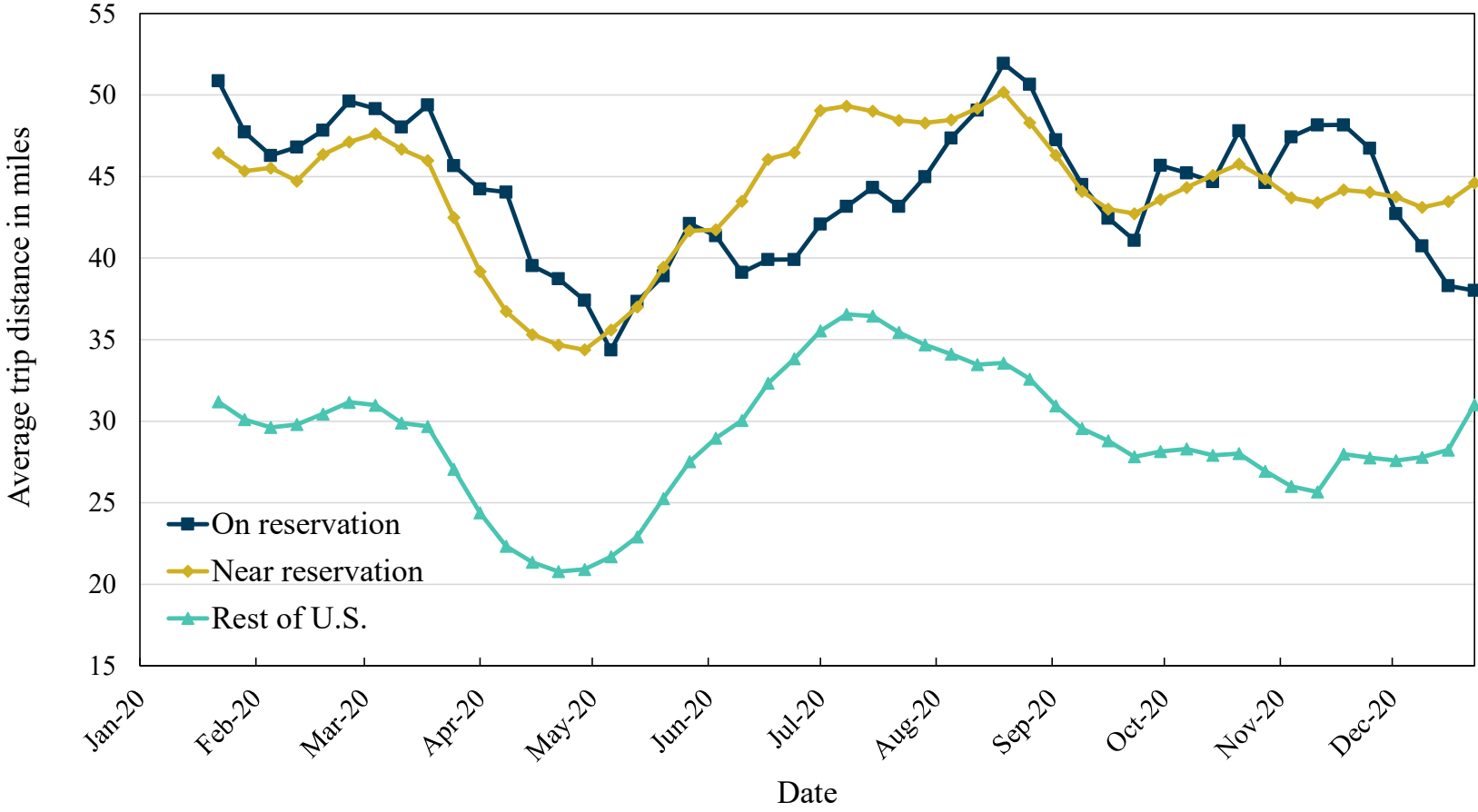
RESEARCH STRATEGY

- We find the average distance traveled to industries located on reservations:
 - For this presentation, we focus on grocery stores, restaurants (full service), gas stations, department stores, and banks.
 - We compare distances traveled by visitors who reside on reservations, just off reservations, and the rest of the US
 - Provides an overview of the economic infrastructure of reservations
- Relatedly, to measure the extent of spillovers of economic activity, we also
 - Find the share of visitors to reservation POIs who traveled from off-reservation census areas (inflow of business activity)
 - Find the share of individuals residing on reservations who travelled to off-reservation POIs (outflow of business activity)
- Last, to measure how the pandemic affected on-reservation economic activity, we
 - Compute the variation in spending in particular industries on reservations (compared to just outside and rest of US) before and during the initial year of the pandemic.

Average Trip Distances Traveled by Industry

	N for On Reservation	Average Distances in Miles (standard deviation in parenthesis)		
		On Reservation	Near Reservation	Rest of U.S.
Restaurants	1190	101.4 (12.3)	93.9 (7.8)	66.4 (6.9)
Grocery Stores	275	44.4 (6.6)	44.3 (5.0)	29.3 (4.8)
Department Stores	28	66.0 (14.3)	54.8 (10.2)	33.5 (6.7)
Gas Stations	862	82.9 (12.2)	89.4 (10.1)	65.8 (6.1)
Commercial Banks	157	34.1 (15.0)	39.1 (8.6)	22.6 (3.4)

Average Trip Distance to Grocery Stores, 2020



Notes: Average trip distance is a 4-week rolling average. Authors' calculations.
Sources: SafeGraph Weekly Patterns and U.S. Census Bureau

When people travel to reservation establishments, where are they coming from?

Industry	Share of Visitors from		
	On Reservation	Near Reservation	Rest of U.S.
Restaurants	11.1%	9.0%	79.9%
Grocery Stores	38.0%	43.5%	18.5%
Department Stores	14.5%	11.4%	74.1%
Gas Stations and Convenience Stores	10.1%	9.9%	80.0%
Commercial Banks	56.2%	17.3%	26.5%

Notes: On-Reservation visitors are defined as individuals who live in census block groups with 50% or more of its area overlapping with American Indian reservation land. "Near Reservation" visitors are defined as individuals who live in a census block group that overlaps with a reservation but 50% or less of its area overlaps with American Indian reservation land. "Rest of U.S." refers to people not located in "on-reservation" or "near-reservation" census block groups.

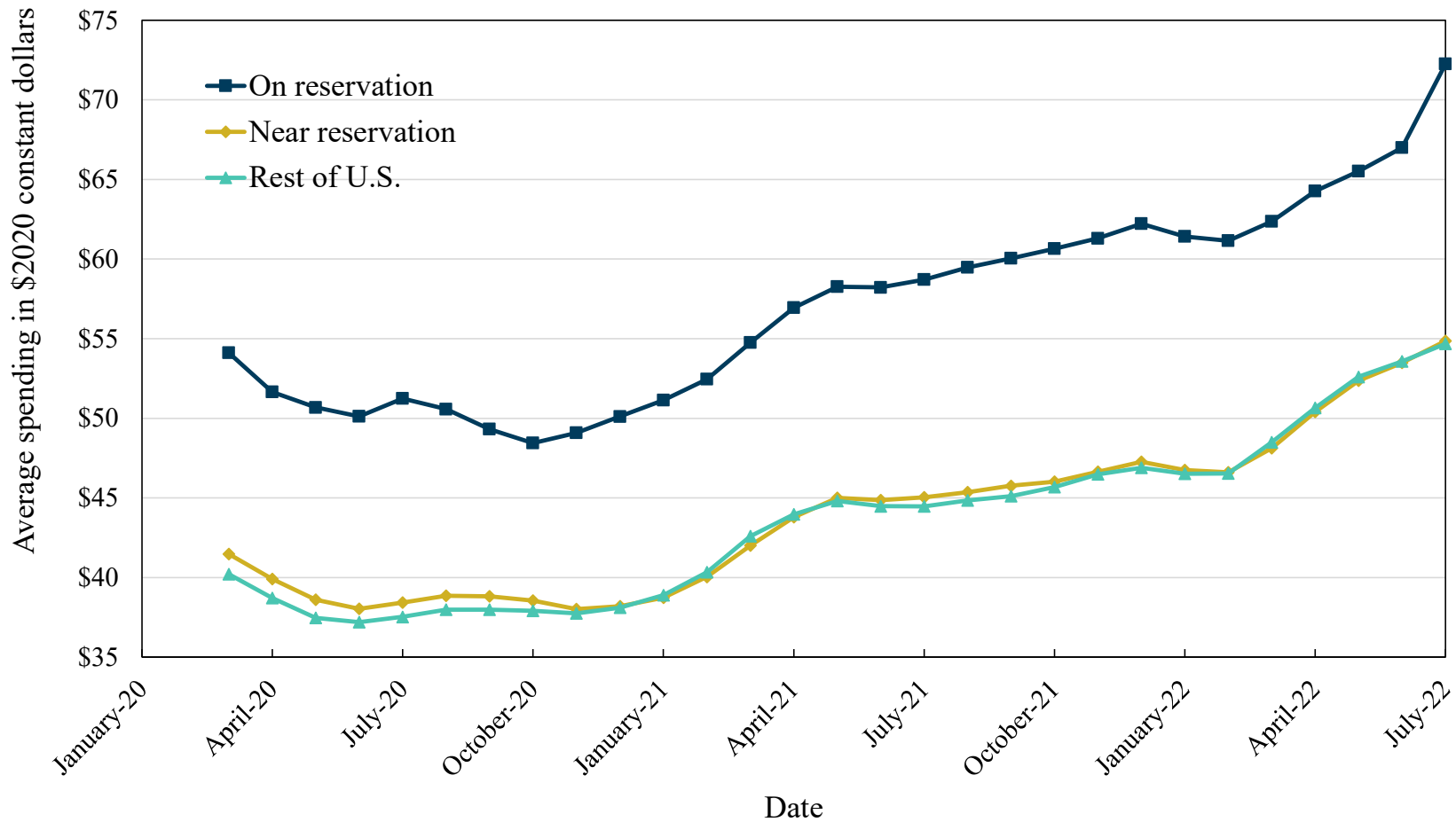
Where do individuals residing on reservations go when they visit..

Industry	Share of On Reservation Customers who traveled to		
	On Reservation	Near Reservation	Rest of U.S.
Restaurants	21.2%	44.7%	34.7%
Grocery Stores	32.1%	41.9%	26.0%
Department Stores	6.1%	47.3%	46.6%
Gas Stations and Convenience Stores	37.6%	32.4%	30.1%
Banks	38.4%	38.2%	23.3%

Notes: An "On-Reservation" POI is defined as an establishment located in an American Indian Reservation or on American Indian off-reservation trust land. A "near reservation" POI is defined as being located within a 10 kilometer band around a reservation. A "Rest of US" POI is an establishment that is not located on a reservation or in the 10km buffer around a reservation.

Source: SafeGraph Weekly Patterns and U.S. Census Bureau; Authors' calculations.

Average Spending at Gas Stations and Convenience Stores, 2020 - 2022



Notes: Average spending is a 3-month rolling average. Average monthly spending is deflated to January 2020 dollars using CPI-U. Authors' calculations.
Sources: SafeGraph Spend and U.S. Census Bureau

QUESTIONS AND FOLLOW-UP

- The goal of the presentation was to provide a brief overview of how to use cellphone and transaction data to understand American Indian Reservation economies.
- Further research: supplement Safegraph data with additional Census data
 - Health outcomes
 - Socioeconomic indicators (income, poverty, etc.)
 - USDA food desert indicators
- Additional questions with this data...
 - Distance to voting locations

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THANK YOU!