I Z A Institute
of Labor Economics
Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 15861

American Indian Casinos and Native American Self-Identification

Francisca M. Antman
Brian Duncan

JANUARY 2023

I Z A Institute
of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 15861

American Indian Casinos and Native American Self-Identification

Francisca M. Antman
University of Colorado Boulder and IZA

Brian Duncan
University of Colorado Denver

JANUARY 2023

ISSN: 2365-9793

IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

American Indian Casinos and Native American Self-Identification*

This paper links Native American racial self-identification with the rise in tribal gaming across the United States. We find that state policy changes allowing tribes to open casinos are associated with an increase in the probability that individuals with American Indian ancestors will self-identify as Native American and a decrease in the probability that individuals with no American Indian ancestry will self-identify as Native American. Moreover, we find that the magnitudes of the impacts are increasing in the strength of American Indian ancestral ties. Similar results hold when causal identification comes from American Indian casino openings across states over time and suggestive evidence shows stronger impacts if casinos are likely to pay per capita dividend payments to their members. These results are consistent with a conceptual framework in which we tie racial identification to economic motivations as well as social stigma associated with affiliating with a racial group for those without documented ancestral ties. Our results underscore the importance of economic incentives and social factors underlying the individual choice of racial identity.

JEL Classification: J15, L83, Z13

Keywords: race, Native American, identity, casinos

Corresponding author:
Francisca M. Antman
Department of Economics
University of Colorado
Boulder 256 UCB, Boulder
CO 80309
USA

E-mail: francisca.antman@colorado.edu

* We thank Randall Akee, Tania Barham, Patrick Button, Brian Cadena, Tony Cookson, Bill Evans, Terra McKinnish, Giovanni Peri, Jeffrey Zax, and three anonymous referees for their feedback. We are especially grateful to Tad Conner who graciously helped us acquire the data on approved Revenue Allocation Plans. Mark Goldfarb, Priti Kalsi, and Jacob Kirsch provided excellent research assistance. This research was supported by the Implementation of Multicultural Perspectives and Approaches in Research and Teaching (IMPART) Awards Program at the University of Colorado as well as the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)-funded University of Colorado Population Center (Award Number R24HD066613) which offered development, administrative, and computing support. The content is solely our responsibility and does not necessarily represent the official views of the NICHD or the National Institutes.

1. Introduction

Sound policymaking depends on the ability of researchers to target and track populations based on characteristics like race, a trait which is often assumed to be innate and fixed. At the same time, race is typically self-identified in modern surveys and population counts, allowing for the possibility that individuals may change the race(s) with which they identify over time. For some groups, this type of demographic change has been dramatic. Liebler and Ortyl (2014) find more than 1 million "new" American Indians in the 2000 U.S. Census that cannot be attributed to normal sources of population growth like births or immigration. Given the relatively small population of Native Americans[1] in the U.S., their finding suggests that close to 40% of the American Indian population in 2000 had not identified as such in 1990.[2] While demographers have suggested possible explanations for racial switching into and out of minority groups, for the most part this emergent literature has focused on documenting its occurrence and its relationship with factors related to socioeconomic status (Penner and Saperstein 2008; Dahis, Nix and Qian 2020). For the American Indian/Alaska Native population in particular, qualitative studies suggest social and cultural factors may be related to individuals switching into Native American identity (Sturm 2011) and also suggest that some individuals may meet social resistance to identifying as Native American (Liebler 2001). However, most studies in this literature generally focus on trying

[1] As will be explained further in the data section, the Census/ACS survey indicates whether an individual identifies his/her race as "American Indian or Alaska Native" but does not offer an explicitly "Native American" race option. Nevertheless, we use the latter term to avoid confusion with "American Indian" ancestry, an indicator stemming from a distinct survey question, which we also make use of in the analysis. Thus, "Native American" in this paper is synonymous with "American Indian" race.

[2] These figures come from comparing the unexpected increase in 1.105 million U.S.-born respondents identifying as American Indian with the total population of 2.856 million U.S.-born American Indians in 2000 that were not born between Census years (Liebler and Ortyl 2014, p. 1110). While these numbers clearly document a dramatic increase in the self-identified American Indian population, it should be noted that the U.S. Census questionnaire shifted from allowing single to multiple race responses over the period of their study, so the final numbers include individuals who added a racial identity as well as those who switched single racial identities. We discuss changes to the Census questionnaire over the period of our study in the context of our empirical strategy in the Data and Results sections below.

to explain switches into Native American identity, which may be linked to a resurgence in ethnic pride that some trace back to the political movements of the 1960s and 70s (Nagel 1995). In contrast, our paper addresses whether recent changes in public policy may be driving this process and the extent to which they can explain the extraordinary jumps in the population of self-identified Native Americans observed in the latest Census records.[3] At the same time, we contribute to this literature by investigating whether exogenous forces can also explain switches out of Native American identity. To these ends, our paper explores the explicitly causal question of whether racial self-identification responds to economic factors by linking Native American racial self-reports with the rise in tribal gaming and the opening of American Indian casinos.[4]

By law, all tribal gaming profits must benefit the American Indian tribes which they serve. This may include spending on economic development programs or services such as health and education (Akee, Spilde, and Taylor 2015) and in some cases, may even be paid out to tribe members as cash dividends (Conner and Taggert 2013). Thus, the opening of casinos presents an explicitly economic motive for individuals to identify as Native American. At the same time, tribal leaders have explicit authority to recognize the members of their tribe, and thus determine who is and who is not eligible to receive any benefits brought about by casino profits. Indeed, this power is so well acknowledged that some tribes have been suspected of "disenrolling" individuals in order to increase dividend payments to remaining members (Dao 2011; Ferry 2013). Whatever the motive, these incidents strongly suggest that the rise of tribal gaming has increased the salience of tribal leaders' pronouncement on the criteria determining whether individuals can identify as

[3] The most recent data released by the U.S. Census Bureau suggests the population of Native Americans nearly doubled between 2010 and 2020 (Chavez and Kaur 2021).

[4] Tribal gaming is synonymous with "Indian gaming" used elsewhere in the literature (Akee, Spilde, and Taylor 2015), however, we use the term tribal gaming to emphasize that agreements to operate casinos lie at the tribe-state level. This is discussed further in the Background and Data sections below.

members of a tribe. This point is critical for documenting changes in Native American racial identification in the U.S. because, as will be discussed below, surveys often conflate Native American racial identification with tribal membership. As a result, individuals with the weakest claims to American Indian ancestry vis-à-vis tribal membership definitions, for example, those who do not have a documented history of their ancestry, may have a decreased willingness to identify as Native American in response to social stigma surrounding that affiliation. Thus, we hypothesize that American Indian gaming may decrease the willingness to identify as Native American for groups with a weaker sense of American Indian ancestry, just as it may increase the willingness to identify as Native American for those with a stronger sense of American Indian ancestry.[5]

While tribal membership records are not publicly available, we rely on national surveys which aim to collect accurate data on racial self-identification and ancestry of the U.S. population. To identify the causal impact of the rise of tribal gaming on racial identity, we exploit the plausibly exogenous timing of tribal-state gaming compacts which function as agreements to allow tribes to open high-stakes casinos within a state's borders. This intent-to-treat, difference-in-differences style analysis allows us to link state-level sanctions of tribal gaming with Native American self-identification in those populations most likely to be affected by these policy changes. Although racial self-identification measures from public surveys do not in any way ensure individuals will share in the benefits from casino profits, they provide a reasonable measure of individual willingness to identify with a minority group that allows us to pick up demographic changes in a

[5] As we will discuss thoroughly in the Data section below, the distinction between the self-reported race and ancestry responses on official surveys allows us to test these hypotheses. We leverage several pieces of background information to argue that self-reported race is a subjective measure of race in this context, whereas the ancestry response is an objective measure, a critical distinction underlying the research design laid out in the Empirical Strategy section below. In addition, we implement robustness checks to address concerns that ancestry itself may be subjective.

relatively small population. To further explore the root causes of the demonstrated link between state policy changes and racial identification, we employ a hand-collected data set of casino opening dates by state to tie rates of Native American racial identification directly to casino openings. As an extension, we also investigate whether states in which casinos were likely to pay dividends to their members saw disproportionate increases in their Native American populations.

Our results show that tribal-state compacts which permitted the operation of high-stakes American Indian casinos in a person's birth state are associated with an increased probability of self-identifying as Native American for individuals who have American Indian ancestors. At the same time, we find a negative association between tribal-state casino compacts and the probability of self-identifying as Native American for individuals with no American Indian ancestry.[6] We also show that these impacts are increasing in the strength of American Indian ancestry, as proxied by whether American Indian ancestry is listed or not listed, and if it is listed first or second along with a non-American Indian ancestry. These results also hold when we use casino opening date instead of tribal-state compact date as the source of identifying variation in our difference-in-differences analysis. Moreover, our event-study analysis confirms that there are no worrisome pre-trends driving the estimated impacts and shows that effects accumulate somewhat over time. This suggests that our results are not purely driven by widespread promotion of Native American identity in the immediate aftermath of a casino opening, but more likely to be driven by economic

[6] Throughout the text, for simplicity, we refer to individuals who do not list any American Indian ancestry as having no American Indian ancestry, however, we recognize that such persons may still have some idea, based on oral family histories, for example, of American Indian descent. To emphasize this, we sometimes refer to this population as having no *documented* American Indian ancestry. As will be discussed below, the distinction between undocumented and documented American Indian ancestry is important, as only the latter group will be able to prove their lineage and thus benefit explicitly from tribal resources stemming from casino operations. While we have no data on officially documented ancestral ties, it seems unlikely that individuals who have documented their ancestral ties elsewhere would fail to list them in a low-stakes survey environment.

incentives affecting specific populations. The fact that the impacts on Native American racial identification are opposite in sign based on American Indian ancestry also suggests our results are not due to increased economic development that would affect all individuals in a state. Instead, we interpret the evidence as indicative of a rise in economic incentives to identify as Native American for those with American Indian ancestry, and an increase in stigma associated with identifying as Native American for those without American Indian ancestry, once tribes are able to operate casinos, and thus increase their resources and associated influence over the defining characteristics of Native American identity. Finally, we explore whether impacts are driven by dividend payments and find that impacts within groups defined by the strength of American Indian ancestry are generally larger in magnitude when casino profits are likely to be paid as dividends, though impacts are similar in sign and statistical significance for non-dividend paying casinos. In sum, these results suggest that casino profits, whether spent on individual dividend payments or other sources of tribal economic development, can be closely linked with changes to racial self-identification.

These findings are consistent with work showing individuals respond to economic incentives in reporting their racial identities in the United States (Antman and Duncan 2015) and abroad (Francis and Tannuri-Pianto 2013; Cassan 2015; Jia and Persson 2017).[7] In addition, this study contributes to the growing literature documenting important distinctions between self-reported measures of race and ethnicity and more objective measures of racial and ethnic heritage such as ancestry and birthplace (Antman, Duncan, and Trejo 2020; Antman, Duncan, and Trejo 2016; Duncan and Trejo 2011). More broadly, this paper is connected to the wider literature on

[7] Botticini and Eckstein (2007) also look at patterns of selective attrition out of Jewish identity that culminated in changes in economic status.

identity formation and its economic origins (Akerlof and Kranton 2000) which may encompass gender, race, ethnicity, and religion (Botticini and Eckstein 2007).

At the same time, this paper contributes to the literature evaluating the impacts of legalized gambling and casinos in particular (Kearney 2005), which have raised the prospect of both positive and negative effects. For example, Evans and Topoleski (2002) find that casinos improve employment rates and reduce poverty in surrounding communities, but may have some negative effects such as increased crime. Grinols and Mustard (2006) echo these concerns and show that the impact of casinos on crime rates grows over time. Akee, Spilde, and Taylor (2015) review the literature on both the positive and negative impacts of tribal gaming in particular and find overall net positive effects on American Indian communities. The latter would be consistent with our hypothesis that positive incentives would lead to increases in Native American racial identification for those groups with American Indian ancestry. Finally, Conner and Taggert (2013) find that reservations with the most profitable types of casino gambling (Class III) and those paying out dividends to members experience the biggest improvements in reservation conditions. These results support our focus on Class III casinos and our findings suggestive of larger impacts associated with casinos linked to tribal dividend payments. Moreover, our paper broadens the economics literature on tribal gaming to consider its impacts on racial identity formation and change.

The paper proceeds as follows. Section 2 discusses the historical and legislative background on the rise of American Indian casinos. Section 3 presents the conceptual framework to motivate predictions regarding the relationship between tribal gaming and American Indian racial identification. Section 4 reviews the data on tribal-state compacts, casino operations, and racial identification used in the analysis and reports relevant summary statistics. Section 5 explains

the empirical strategy linking racial identification with tribal-state compacts, casino operations, and dividend payments. Section 6 presents the results and Section 7 concludes.

2. Background

The birth of the tribal gaming movement began in the late 1970s and early 1980s when some tribes began to experiment with bingo halls and casinos in order to boost economic development (Evans and Topoleski 2002). Several states brought legal challenges against these operations resulting in a series of court rulings that were primarily decided in favor of the tribes' right to open casinos under certain conditions. Most notably, the 1987 *California v. Cabazon* decision culminated in the understanding that if a state's policy toward tribal gaming was civil in nature, rather than criminal, tribes could not be prohibited from opening casinos (Evans and Kim 2008). Thus, tribes had the right to open casinos in states where gambling was already permitted in some form (Evans and Topoleski 2002).

To provide some limitations on tribal gaming operations, the Indian Gaming Regulatory Act (IGRA) of 1988 established a federal regulatory commission, the National Indian Gaming Commission (NIGC), and classified tribal gaming into three varieties (Akee, Spilde, and Taylor 2015). We follow the literature in focusing on Class III operations, as these are recognized to most closely approximate Las Vegas-style casinos which would likely generate the most profits (Cookson 2010). Under the IGRA, tribes can only legally operate a Class III casino if it is situated on federally-recognized trust land, sanctioned by a commission-approved tribal ordinance, agreed upon by a tribal-state compact, and situated in a state that allows some form of gambling, broadly construed (Evans and Topoleski 2002). The IGRA also stipulates that tribal proceeds from casinos may only be used in specific ways, such as funding tribal government operations, economic development, and/or providing for the general welfare of tribal members (Akee, Spilde, and Taylor

2015). Under this policy, tribes are permitted to distribute gaming revenues in the form of per capita dividend payments to their members, provided they file a Revenue Allocation Plan (RAP) which is subject to approval by the Interior Secretary (Conner and Taggart 2013).

While tribal sovereignty was a well-established principle long before the opening of casinos, the increase in resources stemming from gaming profits also suggests a corresponding rise in the influence of tribal leaders over this period as well. Quite simply, the power to recognize individuals as tribal members and potentially rescind that recognition would have greater implications after the opening of casinos (Dao 2011; Ferry 2013). As such, we conjecture that the social construction of Native American racial identity, as defined by tribal authorities, gained salience with the openings of casinos and suggests that individuals with documented American Indian ancestry would be more likely to identify as Native American after the opening of casinos just as those without documented American Indian ancestry would be less likely. We formalize these predictions in the following section.

3. Conceptual Framework

3.1. A Simple Model of Racial Self-Identification with Two Types of Ancestry

To develop intuition on how the opening of tribal gaming should affect racial self-identification of individuals with and without American Indian ancestry, we begin by setting up a simple model in which individuals choose to identify racially as Native American or non-Native American.[8] As in Akerlof and Kranton (2000), individuals choose the identity which yields the highest utility, subject to the constraints imposed by society and their individual characteristics.

[8] To avoid confusion, we use the term "Native American" throughout to distinguish racial identity from "American Indian" ancestry. Section IV discusses the terminology used in the data on race and ancestry.

We abstract from the myriad of individual and societal incentives, disincentives, and constraints which enter into the individual's decision to identify, and focus on the impact of the particular change in incentives brought about by tribal gaming opportunities for those with and without American Indian ancestry.[9]

For simplicity, we allow for individual j to be one of two discrete types: either she has American Indian ancestry (a_j=1) or no American Indian ancestry (a_j=0).[10] As a baseline, we assume that the value of identifying as non-Native American is associated with some level of utility, V, while the utility of identifying as Native American is the sum of the benefit of identifying (w) and the extent to which a person thinks that identifying as Native American carries a social cost (θ):

$$V_{Non-NA} = V$$

$$V_{NA} = w(a_j, \varepsilon_j; g) - \theta(a_j; g)\,.$$

Note that the benefit to identifying as Native American, $w(a_j, c, \varepsilon_j)$, counts all wage and non-wage compensation associated with identifying as Native American including any dividend payments associated with tribal gaming (g) that individuals with demonstrated American Indian ancestry would be able to collect, as well as a random draw ε_j from a standard normal distribution that could affect the wage. Moreover, we stipulate that an individual with $\theta = 0$ does not think there

[9] Note that this simple model abstracts from any utility derived directly from identity itself, which can be incorporated into the model as in Akerlof and Kranton (2000). However, including that component of utility does not shed light on the particular changes in incentives brought about by tribal gaming, so we abstract from it here.

[10] As noted above, we use the shorthand dichotomy of defining individuals as either having or not having American Indian ancestry, but we emphasize that the critical distinction is whether individuals have *documented* American Indian ancestry. Thus, some individuals with American Indian ancestry but with no documentation will be classified as having no American Indian ancestry for purposes of this model, which is entirely consistent with the empirical framework and incentive structure which requires documentation to prove eligibility for benefits.

is any particular stigma to identifying as Native American while those with positive θ feel a stigma associated with identifying as Native American. For simplicity, we set the value of θ to be zero for individuals with American Indian ancestry while individuals with no American Indian ancestry, (a_j=0), have a positive value of θ, reflecting some baseline stigma associated with identifying with a race with which they have no documented ancestral ties.

In a utility maximizing setting, individual *j* will choose to identify as Native American if the net value of Native American identification relative to non-Native American identification, I_j, is greater than zero:

$$I_j = V_{NA} - V_{Non-NA} > 0$$

All else equal, it follows that individuals with American Indian ancestry will be more likely to identify as Native American, since they do not bear any potential stigma of identifying as such.[11]

3.2. Racial Self-Identification with Tribal Gaming

Now consider a change in the external environment that allows for tribal gaming, (g_j> 0). Since American Indian ancestry must be documented in order to confer the highest level of benefits, it raises the stakes of racial self-identification in two ways. First, it raises the returns to identifying as Native American, but only for those individuals with American Indian ancestry:

$$\frac{\partial w(a_j;g)}{\partial g} > 0 \text{ iff } a_j = 1.$$

[11] More generally, this theoretical prediction would hold even if there were some stigma associated with identifying as Native American for those with American Indian ancestry, so long as the magnitude of that stigma was lower than for those with no American Indian ancestry.

For individuals without American Indian ancestry, i.e., $a_j = 0$, it is likely that $\frac{\partial w(a_j;g)}{\partial g} = 0$, since they have no way of proving eligibility to receive benefits from tribal gaming. Second, individuals with no American Indian ancestry who choose to identify as Native American may now worry that they may be seen to be doing so for a corrupt motive, i.e., explicitly seeking rents to which they are not entitled, which implicitly lowers payouts to those who are perceived as more legitimate beneficiaries. This may also be connected to the increased salience of tribal leaders' official recognition of tribal members based on documented ancestry following the introduction of casinos and the increased resources associated with that change. In short, the entry of tribal gaming raises the stigma of identifying as Native American for those with no American Indian ancestry:

$$\frac{\partial \theta(a_j;g)}{\partial g} > 0 \text{ iff } a_j = 0$$

All else equal, it follows that the net value of Native American identification relative to non-Native American identification, I_j, increases with the opening of tribal gaming for those with American Indian ancestry and decreases with the opening of tribal gaming for those with no American Indian ancestry:

$$\frac{\partial I_j}{\partial g} > 0 \text{ if } a_j = 1 \text{ and } \frac{\partial I_j}{\partial g} < 0 \text{ if } a_j = 0.$$

Thus, the prediction stemming from this simple model is that the introduction of tribal gaming will induce individuals with American Indian ancestry to be more likely to identify as Native American while individuals with no American Indian ancestry will be less likely to identify as Native

American.[12]

3.3. Extensions to Multiple Types of American Indian Ancestry and Tribal Affiliation

The simple model above was predicated on the assumption of only two types: individuals with American Indian ancestry ($a_j = 1$) and individuals with no American Indian ancestry ($a_j = 0$). More generally, we can easily extend the model to allow for a continuum of types, $a_j \in [0,1]$, i.e., a range of American Indian ancestry which can be ranked in order of the strength of ancestral and cultural ties. This would allow us to incorporate information on whether the American Indian ancestry is primary or secondary to non-American Indian ancestry, as well as whether the individual has maintained affiliation with a specific American Indian tribe. Allowing the model to reflect multiple types of ancestry will more closely match the analysis in the empirical portion, where we take advantage of this information in the Census/ACS data, however, the theoretical implications are modest extensions of the simple model from above.

Specifically, tribal gaming should increase the returns to identifying as Native American more for those individuals with stronger ancestral ties and tribal affiliations, as they will be more likely to prove their affiliation to external authorities:

$$\frac{\partial w(a_j; g)}{\partial g \, \partial a_j} > 0.$$

[12] Again, more generally, there may be some stigma associated with identifying as Native American for those with American Indian ancestry, and this stigma might also rise with the advent of tribal gaming. In that case, whether the overall magnitude of the impact of the advent of tribal gaming on Native American identification for those with American Indian ancestry is positive or negative would remain an empirical question, depending on whether the increase in stigma exceeded the increase in benefits. As we will see below, the empirical results most closely match the theoretical predictions in the main text, suggesting that stigma is most relevant in explaining the behavior of those without American Indian ancestry.

At the same time, tribal gaming should increase any stigma of identifying as Native American more for individuals with weaker ancestral ties, who will be viewed to have less of a claim on the benefits of tribal gaming relative to those with stronger ties:

$$\frac{\partial\theta(a_j; g)}{\partial g\,\partial a_j} < 0.$$

Aside from being seen as having a corrupt motive, this may also stem from stigma associated with asserting Native American or tribal identity when no direct ancestral tie has been established, as required by tribal authorities. Thus, even for individuals who may have a self-perceived tie to American Indian ancestry but who cannot document it explicitly, there may be increased social stigma to identifying as Native American race following the opening of tribal gaming if tribal leaders have appeared to reject their claims to tribal affiliation. It follows that the net benefit of Native American identification will be increasing in the strength of ancestral and cultural ties to American Indian ancestry:

$$\frac{\partial I_j}{\partial \mathrm{g}\,\partial a_j} > 0\,.$$

In other words, persons with stronger ties to American Indian ancestry will be more likely to identify as Native American race relative to those with weaker ancestral or cultural ties following the introduction of tribal gaming.

While it is an empirical question whether the increased benefits of Native American identification will outweigh the increased costs of identifying for individuals with weaker ties to American Indian ancestry, it remains likely that at the extremes of the distribution, the predictions from our simple model will hold:

$$\frac{\partial I_j}{\partial g} > 0 \text{ if } a_j = 1 \text{ and } \frac{\partial I_j}{\partial g} < 0 \text{ if } a_j = 0 .$$

In short, tribal gaming will make it more likely that individuals with the strongest ancestral ties and tribal affiliations will identify as Native American, since they see mainly increased benefits of identification. Conversely, tribal gaming will make it less likely that individuals with the weakest ties to American Indian ancestry identify as Native American, since they mainly see increased costs of identification.

4. Data

4.1. Data on Tribal Gaming

As explained below, our main empirical strategy relies on exploiting the plausibly exogenous dates of tribal-state compacts which function as agreements between American Indian tribes and state governments approving the opening of Class III casinos. These data are public and comprehensive and come from the Bureau of Indian Affairs.[13] While individual tribes negotiate agreements with the state in which they lie, our analysis relies on the year of the first tribal-state compact as a measure of when a state first approved Class III American Indian casinos.

In extensions, we also examine the link between racial identification and American Indian casino openings explicitly. As no official, comprehensive list of casino opening dates exists to employ in this analysis, it was necessary to collect these data ourselves. To do so, we first obtained a list of tribes with approved Class III tribal gaming ordinances from the Federal Register and National Indian Gaming Commission. Opening dates were collected primarily from internet searches of websites such as the Better Business Bureau (BBB), The Museum of Gaming History

[13] U.S. Department of the Interior Bureau of Indian Affairs. Indian Gaming Compacts. Retrieved from https://www.indianaffairs.gov/as-ia/oig/gaming-compacts. Downloaded on April 4, 2018.

(themogh.org), 500nations website (500nations.com), and casino-specific websites. This appears to be a similar data collection method to that which has been used in past papers utilizing variation in casino opening dates (Grinols and Mustard 2006; Conner and Taggart 2013), though our analysis aggregates to the state level.

Ideally, racial self-identification could be linked directly to casino profitability and the channels toward which tribes direct their casino profits. Unfortunately, these data are not available. However, just as researchers have come to rely on the Class III distinction to identify the more profitable casinos, so too have they used an approved Revenue Allocation Plan (RAP) as a proxy indicating that tribes make dividend payments to their members (Conner and Taggart 2013). In fact, it is an express requirement that "any Indian tribe that intends to make a per capita payment from net gaming revenues must submit one" (25 CFR Part 290.6 2000). Our analysis of the influence of dividend payments on racial identification relies on the date when a tribe first obtained approval of a RAP and vary at the state level.[14]

Figure 1 charts the number of states with a tribal-state compact and the number of new tribal-state compacts between 1990 and 2018. The line shows the cumulative number of states with a tribal-state compact by year while the bars show the number of new tribal-state compacts which went into effect each year. As can be seen from the figure, there are a substantial number of new tribal-state compacts signed throughout the entire period, but the number of states with a tribal-state compact rises steeply in the early-to-mid 1990s and levels off soon after. This corresponds to the period following the IGRA and coincides with the most striking period of rising

[14] The RAP data are compiled from a list of tribes which obtained approval of a RAP. This list was procured by Dr. Thaddieus Conner of New Mexico State University from the Bureau of Indian Affairs in 2009. We attempted to obtain an updated list of the RAP approval dates from these sources, but were unable, thus our analysis of the RAP dates does not extend beyond 2008.

Native American self-identification discussed above, to be documented below. While the analysis will take into consideration the entire period in the sample, these facts motivate an exploration of the link between American Indian gaming and changes in the population identifying as Native American.

4.2. Data on Native American Self-Identification and Ancestry

The demographic data used in the analysis come from the 5 percent public use samples of the 1990 and 2000 Census, as well as the 2001–2018 American Community Survey (ACS) (as distributed by Ruggles et al. 2021). We limit all samples to U.S.-born individuals and drop those individuals with an allocated race or Hispanic origin to exclude those individuals whose responses would have been assigned to racial and ethnic categories after the survey. For the main analysis, we focus on the working age population (ages 18-59) and analyze children (ages 0-17) separately from adults to see whether the race outcome responds differently for those at younger ages.[15] Moreover, we employ two separate elements of the Census/ACS questionnaire in our analysis, individuals' self-reported race and ancestry, and discuss the important distinctions between those classifications here.

4.2.1. Native American Race

Our definition of self-reported "Native American" includes all individuals who are coded as "American Indian or Alaska Native" in response to the race question: "What is [this person]'s race?" (U.S. Census Bureau 2011a).[16] While the U.S. Census Bureau adheres to the 1997 Office

[15] Note also that since children are not personally responding to the survey, the race responses for children most likely reflect the parent's view of the child's race, an important factor in the child's own view of race.

[16] To be clear, the Census/ACS combines "American Indian" and "Alaska Native" into one race category if a person selects two or more races. Thus, in order to include all individuals who identify as "American Indian" race, part of the analysis focuses attention on this broader group of "Native Americans." Moreover, our use of the term "Native American" throughout allows us to distinguish the race response from the "American Indian" ancestry response.

of Management and Budget (OMB) guidelines which stipulate that "an individual's response to the race question is based upon self-identification," several aspects of the racial response for Native American link racial identity explicitly with tribal authority. First, unlike other race responses (e.g. White, Asian-American, Black/African-American) which do not ask individuals for any further race information, individuals who select to identify as Native American are asked within the same question to "print name of *enrolled or principal tribe*" (U.S. Census Bureau 2011a, emphasis added). Moreover, the official Census definition classifies American Indian/Alaska Native as "A person having origins in any of the original peoples of North and South America (including Central America) *and who maintains tribal affiliation or community attachment*" (U.S. Census Bureau 2020, emphasis added).[17] Our indicator for identifying as "American Indian Tribe" refers to individuals who self-identify as Native American and also list a specific American Indian tribe in response to the race question.[18] Thus, while racial self-identification is stipulated to be based upon self-identification, the U.S. government incorporates the weight of tribal authority into that definition, inherently posing a limit on the extent to which individuals so identify.

While tribes have explicit authority to determine their own membership, the U.S. Bureau of Indian Affairs assists in that process by issuing a Certificate Degree of Indian Blood (CDIB) that shows blood quantum and tribal affiliation (Bureau of Indian Affairs 2020). It is also noteworthy that the U.S. government defines individuals to be American Indian/Alaska Native for purposes of eligibility in various social programs using metrics such as tribal enrollment (U.S.

[17] Note that prior to 2000, the Census definition was less inclusive as it did not refer to South America or Central America explicitly (Liebler and Ortyl 2014). This shift coupled with allowing multiple race responses in 2000, may have increased the number of persons identifying as Native American, however, as we note below, our empirical strategy incorporating survey year fixed effects should address this difference across survey waves. As a robustness check discussed in the text below, we also limit the sample to 2000 and beyond.

[18] The actual name of the tribe is only publicly available for American Indians who report a single response to the race question.

Department of Health and Human Services 2021). Thus, while the race question on the U.S. Census/ACS is asked in a "low-stakes" survey environment which is not immediately connected with the conferral of any direct benefit or detriment to the respondent household, the close connection between the Native American race response and American Indian tribal authority suggest it is more likely to serve as a marker of tribal affiliation.

While the 2000 Census and 2001-2018 ACS allow multiple race classifications for each individual, it is important to point out that the 1990 Census only allowed for individuals to select one race. Note that this should not present a problem for our identification strategy since the survey change was common to all individuals in all states and thus will be differenced out by the year fixed effects included in the regression model. Nevertheless, in additional analyses to be discussed below we limit the sample to years 2000 and later to show that the results are not driven by the change in the Census question that occurred between 1990 and 2000.

4.2.2. American Indian Ancestry

In addition to the demographic information culled from the race question, we also make use of information collected as part of the ancestry question, namely: "What is this person's ancestry or ethnic origin?" (U.S. Census Bureau 2011a). Up to two ancestries are available to us in all waves of the Census and ACS. Our indicator for "American Indian ancestry" includes all American Indian tribes. It does not include Aleut, Eskimo, Inuit, Mexican Indian, Mexican American Indian, Central American Indian, South American Indian, or Asian Indian.

We view the race and ancestry questions as conceptually distinct, an idea that is supported by the survey instructions. In particular, the survey instructions allude to the fact that the race question is subjective in the sense that it is connected to the individual's choice of self-

identification, but at the same time also carries the weight of tribal authority for the Native American race response, as explained above. In contrast, the survey instructions support our view that the ancestry question is designed to elicit a more objective measure of racial and ethnic lineage: "*Ancestry* refers to the person's ethnic origin or descent, 'roots,' or heritage. *Ancestry* may also refer to the country of birth of the person or the person's parents or ancestors before their arrival in the United States" (U.S. Census Bureau 2011b, emphasis in original). This supports our use of self-reported race as the outcome variable in the analysis, while ancestry and its interactions are used as independent variables to infer heterogeneous effects of the impacts of American Indian casino openings.

As individuals may list up to two ancestries, we differentiate the strength of individuals' ancestral ties by means of which ancestries they list, as well as the order in which they list their ancestries, where individuals listing American Indian ancestry first are presumed to have stronger American Indian ties than individuals listing American Indian ancestry second. More specifically, we categorize individuals in increasing order of American Indian ancestral ties as follows: No American Indian ancestry listed; Other ancestry listed first, American Indian ancestry listed second; American Indian ancestry listed first, Other ancestry listed second; Only American Indian ancestry listed. We are then able to investigate the theoretical implications raised in Section III, for example, whether individuals with stronger American Indian ancestry are more likely to identify as Native American than individuals with weaker ties after the introduction of tribal gaming.

4.2.3. Descriptive Statistics

Table 1 provides summary statistics linking the race and ancestry responses for children and adults. First, it shows that for both groups, rates of Native American racial identification are

very low for those with no American Indian ancestry (0.70% and 0.51%, respectively). As expected, rates are much higher for those with American Indian ancestry, but perhaps not as high as one might expect. In particular, a significant fraction of individuals with American Indian ancestry do not self-identify as Native American. For instance, only 54.67% of children (ages 0-17) are identified as Native American despite having only American Indian ancestry. Rates are substantially lower for children of mixed ancestry, with those who list American Indian ancestry first with another ancestry listed second having higher rates of identification as Native American race relative to children who list American Indian ancestry second with another ancestry listed first (23.41% versus 14.51%, respectively). A similar pattern holds true of the Native American identification rates for adults based on the strength of their American Indian ancestry. Approximately 46.41% of adults with only American Indian ancestry identify racially as Native American race, whereas the same is true of only 21.03% of adults with American Indian ancestry listed first and 11.66% of adults with American Indian ancestry listed second. The fact that many individuals are not identifying as Native American race despite reporting American Indian ancestry suggests there is ample room to investigate possible reasons underlying the decoupling of the race and ancestry responses.

Figure 2 shows how rates of identification have changed over time. Importantly, the sample here is limited to those already born and relatively young in 1990 (ages 0-40), so issues of differential fertility and mortality have already been purged from the graph, and we should expect that any observed changes are due mainly to changes in survey responses. First, Panel A documents that the percent of the U.S. population with American Indian ancestry has declined slightly, going from 4.2% of the U.S. population to 3.9% of the U.S. population between 1990 and 2018. Its relative stability supports our view of the ancestry question as a much more objective

demographic measure. Over the same time period, however, Panel B shows that the population identifying as Native American race almost doubled, going from 1% to 1.9% of the U.S. population. We also note that the largest increase in Native American identification is observed between 1990 and 2000, which was the period of highest growth in the number of states approving tribal gaming observed in Figure 1.[19] Panels C through F of Figure 2 track the percent of the U.S. population identifying as Native American based on the extent of American Indian ancestry. For all groups we see a general increase in rates of Native American identification between 1990 and 2018, with notable increases between 1990 and 2000, but with considerable variation in growth rates across groups. Of course, these are only summary statistics, and accounting for changes that would be common to all groups in a specific time period as well as changes common to specific groups across time will be important elements to incorporate in the regression analysis. Nevertheless, these descriptive graphs motivate our analysis below connecting the Native American racial self-identification of individuals based on American Indian ancestry to changes in tribal gaming policies over the entire period.

5. Empirical Strategy

5.1. State Approval of Class III American Indian Casinos: Difference-in-Differences Analysis

Our empirical strategy exploits variation in the year in which states approved Class III American Indian casinos to investigate the impact of tribal gaming on Native American self-identification rates.[20] A first attempt at exploring this question might begin by estimating the following difference-in-differences regression:

$$NativeAm_{ist} = \pi Compact_{st} + \boldsymbol{X_{ist}\beta} + \mu_s + \delta_t + \theta_s t + \varepsilon_{ist}, \quad (1)$$

[19] As noted above, the Census also began allowing multiple race responses in 2000, which will be addressed in the empirical strategy and robustness checks below.

[20] As noted above, this analysis is focused exclusively on the approval and operation of Class III American Indian casinos, as is commonplace in the literature.

where $NativeAm_{ist}$ is a dummy variable equal to one if person *i* born in state *s* and observed in survey year *t* identifies as Native American race and zero otherwise.[21] $Compact_{st}$ is an indicator variable equal to one if state *s* had a signed tribal-state gaming compact in year *t*.[22] The reference category indicates not having a tribal-state gaming compact in year *t*. The vector $\boldsymbol{X_{ist}}$ includes controls for age, age squared and gender. The regression also includes birth-state fixed effects (μ_s), year fixed effects (δ_t), and state-specific linear time trends ($\theta_s t$). Standard errors are clustered at the state level and Eq. (1) is estimated separately for the overall population of children (ages 0 to 17) and adults (ages 18 to 59).[23]

Given the relatively small size of the U.S. Native American population and the overall patterns observed in Figure 2, however, we would not necessarily expect to find large effects among the general population. In fact, the coefficient estimates from Eq. (1) do not show any sizable or statistically significant relationship between a state having a tribal-state compact and Native American identification among the general population (Appendix Table A.1). Nevertheless, as highlighted in the conceptual framework (Section III), American Indian gaming may have particular effects on Native American racial identification based on the extent to which individuals have American Indian ancestors. Moreover, if these impacts are opposite in sign as hypothesized above, it may appear as though no effect exists among the general population even when there are strong impacts among subgroups.

[21]We follow the common practice of assigning individuals to birth states to avoid issues surrounding endogenous migration patterns, however, results are very similar if individuals are assigned to their state of current residence instead.

[22] The compact variable is essentially an interaction between a "treated" state indicator and "post" treatment indicator. The treated state indicator is subsumed by the state fixed effects and the post treatment indicator is subsumed by the year fixed effects.

[23] We estimate separate effects for children because the answer to the ACS race question for children most likely comes from a parent or caretaker, whereas for adults, the answer comes either from the individual or from the household respondent. Either way, adult responses most likely reflect the individual's own view of his/her race, whereas child responses most likely reflect the parent's view of the child's race.

Before investigating the impact of tribal gaming on Native American identity by the extent of American Indian ancestry, we first consider whether tribal-state compacts could affect an individual's willingness to report American Indian ancestry. As noted in Section IV, the ACS ancestry question is designed to be an objective measure of lineage, rather than the more subjective measure of race. However, we recognize the possibility that knowledge of one's family history is not necessarily an immutable concept and could change over time based on external factors. Indeed, Nagel (1995) argues that federal Indian policy, though not specifically tribal gaming, may encourage individuals to reclaim their Native American ancestry. This raises the question of whether knowledge of or willingness to report family ancestry is itself endogenous and potentially influenced by the economic conditions of those who share a common heritage. If this were the case, our estimates of the impact on racial identity might be capturing a change in the ancestry response instead. While Panel A of Figure 2 provides suggestive evidence to the contrary, i.e., American Indian ancestry actually declined somewhat among the general population and moved in the opposite direction of Native American racial identification, we address this possibility directly in a regression framework. Specifically, we estimate the relationship between tribal-state compacts and one's American Indian ancestry using the following multinomial logit regression model:

$$AmIndAncestryCat_{ist} = \pi Compact_{st} + \boldsymbol{X_{ist}\beta} + \mu_s + \delta_t + \theta_s t + \varepsilon_{ist}, \quad (2)$$

where $AmIndAncestryCat_{ist}$ is a categorical variable indicating that person *i* born in state *s* and observed in survey year *t* falls into one of the following mutually exclusive and exhaustive ancestry categories: (*i*) no American Indian ancestry; (*ii*) other (non-American Indian) ancestry listed first, American Indian ancestry listed second, (*iii*) American Indian ancestry listed first, other (non-American Indian) ancestry listed second, or (*iv*) only American Indian ancestry. All of the other

variables are defined as they are in Eq. (1). As reported in Appendix Table A.2, the estimates of Eq. (2) are all extremely small and statistically insignificant, showing no evidence of a relationship between tribal-state compacts and reports of American Indian ancestry.[24] This allows us to estimate the effect of tribal-state compacts on Native American self-identification rates among individuals by extent of American Indian ancestry, with some assurance that any estimated effects are being driven by changes in Native American racial self-identification rather than by any underlying changes in reported American Indian ancestry.

We do this by adding interaction terms to the difference-in-differences regression model to estimate:

$$\begin{aligned} NativeAm_{ist} = {} & \pi_1(Compact_{st} \times NoIndAnc_{ist}) \\ & + \pi_2(Compact_{st} \times OtherAnc1st, IndAnc2nd_{ist}) \\ & + \pi_3(Compact_{st} \times IndAnc1st, OtherAnc2nd_{ist}) \\ & + \pi_4(Compact_{st} \times OnlyIndAnc_{ist}) + \pi_5(OtherAnc1st, IndAnc2nd_{ist}) \\ & + \pi_6(IndAnc1st, OtherAnc2nd_{ist}) + \pi_7 OnlyIndAnc_{ist} + \boldsymbol{X_{ist}\beta} + \mu_s \\ & + \delta_t + \theta_s t + \varepsilon_{ist}, \end{aligned} \tag{3}$$

where the dummy variables $NoIndAnc_{ist}$, $OtherAnc1st, IndAnc2nd_{ist}$, $IndAnc1st, OtherAnc2nd_{ist}$, and $OnlyIndAnc_{ist}$ are mutually exclusive and exhaustive categories arranged in order of increasing American Indian ancestral ties: *(i)* no American Indian ancestry, *(ii)* other (non-American Indian) ancestry listed first and American Indian ancestry listed second, *(iii)* American Indian ancestry listed first and other (non-American Indian) ancestry listed second, and *(iv)* only American Indian ancestry, respectively. All other variables are defined as they are in Eq. (1) and standard errors are clustered at the state level.

[24] Numerous variations of Eq. (2) that include lags, leads, the number of state-compacts that have been signed, as well as comparable regressions using American Indian casino openings in a state, yield similar results.

The estimated coefficients of interest, $\hat{\pi}_1$, $\hat{\pi}_2$, $\hat{\pi}_3$, and $\hat{\pi}_4$ are the difference-in-differences estimates for individuals with no American Indian ancestry, individuals with other (non-American Indian) ancestry listed first and American Indian ancestry listed second, individuals with American Indian ancestry listed first and other (non-American Indian ancestry listed second, and individuals with only American Indian Ancestry, respectively.[25] Alternatively, we could estimate a standard triple difference-in-differences model, where we estimate the impact of $Compact_{st}$ on individuals with stronger ancestral ties relative to those with weaker ancestral ties directly. However, that formulation would overlook the possibility that individuals with varying strengths of American Indian ancestry were all potentially "treated" by the approval of Class III American Indian casinos, although each group may have experienced heterogeneous effects. It would also obscure the potentially negative effects of tribal gaming on the individuals with the weakest ties to American Indian ancestry hypothesized in the Conceptual Framework. To properly investigate these heterogeneous effects, we present parallel difference-in-differences estimates rather than the full set of triple-difference estimates.[26] The identifying assumption is that, in the absence of the policy change, states that ultimately approved of Class III American Indian casinos would have maintained parallel trends in Native American identification rates by American Indian ancestral group with states that did not approve of these casinos, after accounting for state-specific linear trends and other control variables at the individual level (age, age squared and gender).

[25] Note that this formulation obviates the need for a separate *Compact* indicator which is subsumed by the interaction terms with the set of dummy variables describing American Indian Ancestry.

[26] Of course, one can also calculate the triple-difference estimates from the Eq. (3) coefficients, for example between individuals with only American Indian ancestry and individuals with no American Indian ancestry as: $\hat{\pi}_4 - \hat{\pi}_1$. As can be verified from the estimates of Eq. (3) in the following section, calculating the triple-difference estimates does not change any of the conclusions of this paper.

5.2. State Approval of Class III American Indian Casinos: Event Study Analysis

We also recognize that there may be an immediate effect of approving Class III American Indian casinos in a state that may grow or even dissipate as time goes on. We allow for this possibility using a model that traces out the impact of a state's first tribal-state gaming compact over time. This is done by estimating the following difference-in-differences event study regression model:

$$\begin{aligned} NativeAm_{ist} = & \sum_{\substack{k=-4 \\ k\neq -1}}^{3} \omega_k (CompYear_{kst} \times NoIndAnc_{ist}) \\ & + \sum_{\substack{k=-4 \\ k\neq -1}}^{3} \alpha_k (CompYear_{kst} \times OtherAnc1st, IndAnc2nd_{ist}) \\ & + \sum_{\substack{k=-4 \\ k\neq -1}}^{3} \lambda_k (CompYear_{kst} \times IndAnc1st, OtherAnc2nd_{ist}) \\ & + \sum_{\substack{k=-4 \\ k\neq -1}}^{3} \theta_k (CompYear_{kst} \times OnlyIndAnc_{ist}) + \gamma_1 (OtherAnc1st, IndAnc2nd_{ist}) \\ & + \gamma_2 (IndAnc1st, OtherAnc2nd_{ist}) + \gamma_3 OnlyIndAnc_{ist} + \boldsymbol{X_{ist}\beta} + \mu_s + \delta_t + \theta_s t + \varepsilon \end{aligned} \quad (4)$$

where $CompYear_{kst}$ is a dichotomous variable equal to one indicating that state *s* in year *t* falls into one of seven event year categories, *k*, representing: 9 or more years before, 6 to 8 years before, 3 to 5 years before, less than three years after, 3 to 5 years after, 6 to 8 years after, and 9 or more years after the state approved Class III American Indian casinos.[27] The reference category includes states less than three years before a tribal-state compact was signed and states that never had a

[27] The number of observations in one-year bins is too small to produce stable results, however, alternative two- or four-year bins produce the same results as those used in Eq. (3).

tribal-state compact.[28] Pre-treatment leads are included to test for pre-existing trends, and thus provide empirical support for the parallel trends assumption underlying identification. All other variables are defined as they are in Eq. (1).

5.3. State-level Openings of Class III American Indian Casinos: Event Study Analysis

Our main empirical approach laid out above relies on exploiting state-level policy changes given by the timing of tribal-state compacts. These can be viewed as intent-to treat style estimates of the impact of American Indian casinos on racial identification. We view using the year the state policy changed as a more cautious, conservative approach, compared to using the year casinos first opened, as the latter may be more influenced by tribal characteristics within the state.[29] Nevertheless, we recognize the value of tying racial self-identification directly to changes in the economic environment brought about by the explicit openings of casinos. To this end, we also estimate a version of Eq. (4) in which we replace the tribal-state compact indicator variables with analogous variables indicating that a Class III American Indian casino is open in state s in year t.[30]

5.4. Dividend Payments Analysis

To shed some light on the possible economic mechanism underlying changes in racial identification, we investigate whether the results above are especially driven by those tribes

[28] Results are also similar when the set of control states is limited to those that had a Native American population greater than 6,000 or greater than 10,000 in 1990.

[29] Note that this strategy can be thought of as using variation in the timing of the first casinos to operate in a state and thus is analogous to the primary identification strategy which leverages the timing of the first tribal-state compact in a person's birth state. We view the data on first casino openings as more likely to be exogenous than data which relied on openings and closings at the individual casino level, and also less vulnerable to measurement error in data collection. However, we recognize that the first tribal state-compact in a person's birth state is closer to a policy change and thus more likely to be exogenous than the casino opening data, which is why the former remain our primary source of causal identification.

[30] Several tribes operated Class II bingo halls prior to signing a tribal-state compact, and were able to quickly open Class III casinos. Others took time to build new facilities or ran into local or legal opposition that delayed the process. In all, seven states began offering Class III gaming the year the tribal-state compact was signed, with the average time from approval to Class III casino opening being 1.08 years (2.08 excluding those who opened a Class III casino the same year the tribal-state compact was signed).

making dividend payments to their members. Thus, we modify Eq. (3) to allow for heterogeneous effects based on whether a given state has an operating Class III casino and a tribe that has filed a Revenue Allocation Plan (RAP). The resulting specification is:

$$\begin{aligned} NativeAm_{ist} = {} & \phi_1(nonRAPCasino_{st} \times NoIndAnc_{ist}) + \phi_2(RAPCasino_{st} \times NoIndAnc_{ist}) \\ & + \phi_3(nonRAPCasino_{st} \times OtherAnc1st, IndAnc2nd_{ist}) \\ & + \phi_4(RAPCasino_{st} \times OtherAnc1st, IndAnc2nd_{ist}) \\ & + \phi_5(nonRAPCasino_{st} \times IndAnc1st, OtherAnc2nd_{ist}) \\ & + \phi_6(RAPCasino_{st} \times IndAnc1st, OtherAnc2nd_{ist}) \\ & + \phi_7(nonRAPCasino_{st} \times OnlyIndAnc_{ist}) \\ & + \phi_8(RAPCasino_{st} \times OnlyIndAnc_{ist}) + \gamma_1(OtherAnc1st, IndAnc2nd_{ist}) \\ & + \gamma_2(IndAnc1st, OtherAnc2nd_{ist}) + \gamma_3 OnlyIndAnc_{ist} + \boldsymbol{X_{ist}\beta} + \mu_s + \delta_t + \theta_s t \\ & + \varepsilon_{ist}, \end{aligned} \tag{5}$$

where $nonRAPCasino_{st}$ is an indicator variable equal to one if state *s* has a Class III casino open in year *t* but not a RAP, and zero otherwise.[31] Similarly, $RAPCasino_{st}$ is an indicator variable equal to one if state *s* has a Class III casino open in year *t* and a RAP, and zero otherwise. The reference category consists of those states that did not have a Class III casino in year *t*. For ease of presentation, we do not include the full set of event study year indicators in Eq. (5) to trace these effects across time. All other variables are as described in Eq. (1), and standard errors are again clustered at the state level.

[31] In this specification we use an indicator for Class III casinos open, rather than approved, because we are investigating the potential impact of dividend payments; however, the results are similar when we use the *compact* indicator instead.

6. Results

6.1. State Approval of Class III American Indian Casinos: Difference-in-Differences Analysis

Table 2 presents results from estimating the simple difference-in-differences specification in equation (3). For both children and adults, it is clear that the existence of a tribal-state compact to operate an American Indian casino is associated with an increased likelihood that an individual with any American Indian ancestry self-identifies as Native American. Moreover, the magnitudes of these estimates increase with the strength of the ancestral tie, as proxied by the listing of American Indian ancestry as the second ancestry, the first ancestry, or the only ancestry. This is true for both children and adults, with point estimates in order of increasing ancestral ties of 0.1111, 0.1985, and 0.4128 for children and 0.0699, 0.1496, and 0.3894 for adults, respectively (all statistically significant at the 1 percent level). We can also interpret the magnitudes of these impacts relative to the rates of identification by ancestry for children and adults (Table 1), which suggests the relative magnitudes rise consistently for adults by strength of ancestry (ranging from 59.9% to 71.1% to 83.9%, respectively) and more or less for children as well (ranging from 76.6% to 84.8% to 75.5%). This is consistent with the conceptual framework suggesting that benefits from tribal gaming, as proxied by state compacts allowing for Class III Casinos, rise with the strength of ancestral ties.

Moreover, we also see that the net impact of tribal gaming is negative for those with no ancestral ties (point estimates of -0.0120 for children and -0.0103 for adults). While these estimates are statistically significant and may appear small as regression coefficients, when compared with the very low rates of Native American identification for individuals with no American Indian ancestry (0.70% for children and 0.51% for adults from Table 1), the relative magnitudes are on the order of -171% and -202%, respectively. This is consistent with the

hypothesis of a pronounced stigma associated with identifying as Native American for those individuals with no American Indian ancestry following a tribal-state gaming compact and the associated preparations for opening a tribal casino. In fact, the sign and magnitude suggest this stigma is so strong that it may overwhelm any possible benefit from attempting to identify as Native American when one has no ancestral ties—a benefit which was likely to be weak to begin with. However, it should be noted that the results across all levels of ancestral ties, from the weakest (none reported) to the strongest (only American Indian ancestry reported), are consistent within the same conceptual framework suggesting that the *net* benefits of Native American identification once the state has approved of tribal gaming directly impact racial self-reports. Moreover, these large magnitudes suggest that the institutional changes in the tribal gaming environment noted in Figure 2 are a root cause of the changes in Native American self-identification. For robustness, we can also confirm that these results are not driven by the 1990 Census year. Table A.3 of the Appendix shows that the results are similar in sign, magnitude, and statistical significance if we drop the 1990 Census year from the analysis sample. Thus, we can conclude that racial identity is changing in response to the economic and social environment and is not an artifact of the survey questionnaire.

One concern with these results stems from the growing body of literature that calls into question the validity of the assumptions underlying the staggered difference-in-differences design as well at the interpretation of the estimates as the average effect of treatment on the treated or the overall ATT (Goodman-Bacon, 2021; Callaway and Sant'Anna, 2021). These points are particularly salient if there are heterogeneous treatment effects and alternative robust estimators have been proposed by Cengiz et al. (2019), Sun and Abraham (2021), Callaway and Sant'Anna (2021), de Chaisemartin and D'Haultfoeuille (2020), and Gardner (2021). Table 3 presents the

results from estimating a two-stage difference-in-differences (2sDiD) regression of equation (3) following Gardner (2021).[32] The coefficients in Table 3 are nearly identical to the corresponding estimates in Table 2, with the exception that the effect of a tribal-state gaming compact on those without American Indian ancestry is smaller and statistically insignificant in the 2sDiD regressions. The pattern of results, however, remains the same. We therefore conclude that our DiD estimates are not significantly biased by heterogeneous treatment effects or staggard timing of treatment.

6.2. State Approval of Class III American Indian Casinos: Event Study Analysis

To explore the timing of these impacts further and confirm that no underlying pre-trends may bias the effects, our main results stem from estimating equation (4). For the sake of brevity, these results are presented in Figure 3, where the coefficients on the years before and after the policy change are graphed along with their corresponding 90% confidence intervals. Panels A and B graph the coefficient estimates on the interaction between the Tribal-State Compact indicators and No American Indian ancestry indicator (ω_k) for children and adults, respectively. Similarly, Panels C and D graph the coefficient estimates on the interaction between the Tribal-State Compact indicators and the multiple ancestry indicators (i.e., Other ancestry listed 1st, American Indian ancestry listed 2nd (α_k); American Indian ancestry listed 1st and Other ancestry listed 2nd (λ_k) for children and adults. Finally, Panels E and F graph the coefficient estimates on the interaction between the Tribal-State Compact indicators and Only American Indian ancestry

[32] As the name suggests, the 2sDiD estimator is a two-step procedure that first removes year and state level fixed effects using only the untreated periods. The overall ATT is then estimated from the adjusted outcome. The 2sDiD estimator is robust to heterogeneous effects with staggard implementation of treatment (Gardner 2021) and allows for fixed or time-varying controls, however Sant'Anna and Zhao (2020) show that including time-varying covariates in a DiD model can cause bias if the treatment influences the control, and Gardner (2021) deliberately does not include covariates. Therefore, as an additional robustness check, the 2sDiD results presented in Table 3 do not include any of the time-varying covariates listed in Table 2, however, including these covariates has a trivial effect on the estimated coefficients.

indicator (θ_k) for children and adults. Note that each column of Figure 3 represents the results from a single regression (left-hand-side for children, right-hand-side for adults), so a comparison of lines across panels on each side of the figure show heterogeneous effects of the policy change by ancestry. Finally, as noted in equation (4), interactions with indicators for years prior to and years since the first tribal-state compact are included to check for pre-existing trends as well as prolonged impacts.

Thus, Figure 3 represents the dynamic extension of the results from Table 2, and paint a similar picture in graphical form. In particular, the top two panels (A and B) show essentially no movement in Native American identification in the years leading up to Tribal State-Compacts. This shows that there are no worrisome pre-trends in racial identification driving the estimated impacts, and supports the notion that states that never had American Indian casinos would likely have maintained parallel trends in racial self-identification with states that approved of American Indian casinos in the absence of the policy change. Looking at the post-compact periods, however, we see a notable decline in identification for children and adults that rises with the number of years since the compact allowing tribal gaming (panels A and B). After 9 or more years following the tribal-state compact, children and adults are about 1.7 and 1.4 percentage points less likely to identify as Native American, respectively, relative to the 3-year period immediately preceding the tribal state compact. This is consistent with the hypothesis laid out in the conceptual framework section showing overriding negative impacts on Native American identification for those with no American Indian ancestry due to increased stigma associated with identification following the opening of casinos.

Meanwhile, the effects of tribal-state compacts are positive for those individuals with American Indian ancestry (panels C through F), with magnitudes that are increasing in the strength

of ancestral ties. For children with multiple ancestries (panel C), the coefficient estimates are higher for individuals who list American Indian ancestry than for those who list American Indian ancestry second 9 years or more after the tribal-state compact (0.209 versus 0.116) and the same pattern is true for adults (panel D, coefficient estimates of 0.157 versus 0.072). Analogous coefficient estimates are even higher for individuals with only American Indian ancestry, whether they are children (panel E, 0.419) or adults (panel F, 0.401). These results are consistent with the hypotheses laid out in Section III, suggesting that positive net benefits associated with Native American identification for individuals with American Indian ancestry following the advent of tribal gaming results in rising rates of Native American identification that are increasing in the strength of ancestral ties after the policy change.

Another takeaway from the graphs in Figure 3 is the impact of duration since the first tribal-state compact was signed on rates of racial self-identification. Relative to the period just prior to the signing of a tribal-state compact, coefficients indicate magnitudes of the impacts increase steadily with the duration since the policy change, both for those with no American Indian ancestry and for those with American Indian ancestry. While there are indications of immediate changes in self-identification (0-3 years after the tribal-state gaming compact goes into effect and 3-5 years post-policy change), the latter estimates are not always statistically significant at the 10% level. The remaining coefficients (6-8 years post-policy, and 9+ years post-policy) are statistically significant and in the predicted directions, with higher magnitudes than the coefficients estimated in the immediate post-policy period. Together, this evidence suggests that the impact of tribal state compacts on Native American identification grows beyond the initial period, a pattern which could be due to the establishment of successful casino operations, a hypothesis we explore below.

To address concerns over staggered treatment timing, we employ an adapted version of the Gardner (2021) 2sDiD procedure used to estimate the results in Table 3 to produce event study graphs. Figure 4 presents 2sDiD event study estimates of equation (4). The pattern of results in Figure 4 are identical to those in Figure 3. As we saw with the comparison of results above, we note that the effects of tribal-state gaming compacts on those without American Indian ancestry are smaller in the 2sDiD event study regressions.[33]

As a robustness check, we investigate whether these results stand up to dropping observations from 1990, when, as noted above, only one race response was permitted on the Census. By limiting the sample to 2000 and later, we also ensure that the results are not driven solely by two points in time, 1990 and 2000, during which there were a large number of casino openings, but which may raise concerns regarding unobserved variables due to the long period between survey waves. Thus, by focusing on the variation we are able to exploit in 2000 and later, when the ACS conducted annual surveys, we limit these concerns. Figure 5 restricts the sample to years 2000-2018 and finds very similar results. Thus, we conclude that our results are robust to limiting the sample to a shorter period of time, during which the race question remained consistent and over which annual surveys were conducted.[34]

6.3. Tribal Identity

Since permission to operate a casino in a state is granted at the tribe level and individual tribes have the authority to recognize their own members and determine the distribution of their casino profits (Section II), we also extend the results from Table 2 by exploring whether tribal

[33] As with the 2sDiD results presented in Table 3, as an additional robustness check, the Figure 4 2sDiD estimates do not include any time-varying covariates. However, including the time-varying covariates does not affect the results.
[34] Appendix Figure A.1 also restricts the sample to years 2000-2018 and estimates the event study regressions using the Gardner (2021) 2sDiD procedure without including time-varying covariates. The results are very similar to those in Figure 5.

identity becomes more salient following compacts to operate casinos. To do this, we make use of the fact that the Native American identification outcome used here is based on a survey question that asks respondents whether their race is American Indian/Alaska Native and, if so, simultaneously asks the name of their tribe. While the tribal identification outcome used here is only available for individuals who report a single race, reporting only one race is also arguably a stronger indicator of singular racial identity, and thus, allows us to explore another aspect of racial identity which may have changed in response to the rise of tribal casinos. As shown by the relatively low shares of individuals reporting an American Indian tribe identification in Table 1, there is significant room to increase the shares of individuals with a more salient tribal identity. This is consistent with evidence elsewhere suggesting a significant fraction of the American Indian population has a non-salient tribal identity (Liebler and Zacher 2013).

To investigate whether the rise of tribal gaming is associated with an increase in the salience of tribal identity, we focus on the sample who identifies as Native American and estimate a regression model analogous to equation (3) after replacing the dependent variable with a variable indicating whether the respondent lists an American Indian tribe.[35] The results are presented in Table 4, where we have collapsed the categories with American Indian ancestry to two mutually exclusive and exhaustive categories, No American Indian Ancestry and (any) American Indian Ancestry, due to the much smaller sample size. The signs of the coefficient estimates are as anticipated, and statistically significant positive effects are observed for children (at the 10% level) and adults with American Indian ancestry. In particular, tribal-state compacts authorizing tribal gaming increase the likelihood of listing a tribe by about 7 percentage points for children and

[35] As noted above, this information is only available for respondents reporting a single race (American Indian/ Alaska Native).

adults, which is equivalent to about 11% relative to the mean of the dependent variable for this group. This is consistent with the hypothesis that tribal identity in particular is increasing following the openings of casinos, and again suggestive of racial identity responding to changes in the net benefits of racial identification following this policy change.

6.4. State-level Openings of Class III American Indian Casinos: Event Study Analysis

To further address the mechanism underlying the demonstrated link between tribal-state compacts and changes in racial identification for individuals with varying ties to American Indian ancestry, we tie racial self-identification directly to changes in the economic environment brought about by the explicit openings of casinos. To this end, Figure 6 presents results from estimating equation (4) where instead of using the signing of the first tribal-state compact, we use the opening of the first Class III casino in a state as the critical event around which we structure the event-study graphs.

Since the compact dates and first casino openings are closely related, it is perhaps unsurprising that Figure 6 paints a very similar picture to Figure 3. Point estimates for children with no American Indian ancestry range from -.002 to -.015 after the opening of the first Class III casino (panel A), relative to the period just prior to the opening of the first casino, with magnitudes that increase with duration since the first casino opening, and almost no effects in the years leading up to the first casino opening. Results for adults with no American Indian ancestry are very similar (panel B, point estimates from -.002 to -.013). Again, this pattern is consistent with the hypothesis in Section III suggesting a rise in stigma associated with identifying as Native American for individuals with no American Indian ancestry following the rise of tribal gaming which results in negative impacts on Native American identification for this group. In contrast, children and adults with American Indian and non-American Indian ancestries (panels C and D, respectively) exhibit

increasing rates of Native American identification that increase with the duration of years since the opening of the first Class III casino. Finally, children and adults with only American Indian ancestry (panels E and F, respectively) again exhibit the largest positive impacts of the opening of Class III casinos on Native American identification, with point estimates ranging from 0.162 for children and 0.122 for adults in the immediate period to 0.424 for children and 0.404 nine or more years following the opening of the first Class III Casino. Overall, these results are very close to the results using the tribal-state compact variation and suggest the mechanism underlying the prior results are in fact driven by the opening of casinos, as opposed to some other explanation.

6.5. Dividend Payments Analysis

As discussed in Section II and reviewed in the literature on tribal gaming, Class III casinos can potentially affect individuals in a variety of ways, which on balance have been found to be positive for American Indian communities (Akee, Spilde, and Taylor 2015; Akee et al. 2010). Our focus is on uncovering evidence for economic factors that may play a role in the individual's decision to self-identify as Native American. While these may include employment-related considerations at the casino or linked with the use of casino profits on reservations, one of the most salient economic factors is the possibility of earning casino dividends based on tribal identification. As explained above, since data on casino profitability and explicit dividend payments are not available, we rely on an indicator used in the literature as a proxy for casino dividends, namely, whether the tribe has filed a Revenue Allocation Plan (RAP) for the period over which that information is available.

Table 5 shows results from the estimation of equation (5) which relies on variation in the year in which a tribe first filed a RAP in a person's birth state. These results allow us to explore whether the magnitude of the racial identification response to tribal gaming is larger in response

to RAP casinos versus non-RAP casinos, within the same groups of individuals classified based on their American Indian ancestry. As can be seen from the table, for those without American Indian ancestry, both the coefficient on having a RAP casino and the coefficient on having a non-RAP casino are negative in sign, and somewhat larger in magnitude for the RAP Casino interaction coefficient than for the non-RAP analogue. For example, these estimates are -0.0073 and -0.0063, respectively, for adults with no American Indian ancestry where both estimates are statistically significant at the 5% level. This is consistent with the hypothesis above that individuals with no American Indian ancestry are not primary beneficiaries of casino profits, and face greater stigma associated with identifying as Native American following the openings of casinos. Moreover, the stigma associated with identification for this group appears to be even larger when the casino profits are more likely to be distributed as dividend payments.

In contrast, coefficient estimates are positive for individuals with American Indian ancestry, and they are almost always larger on the RAP casino interaction terms compared with the non-RAP casino term within the same group classified by American Indian ancestry. For example, these point estimates are 0.1029 and 0.0751, respectively, with both statistically significant at the 1% level, for children listing other ancestry first, American Indian ancestry second. At the same time, the results from Table 5 are consistent with the results from above suggesting casino operations are increasing rates of Native American identification of individuals with American Indian ancestry and decreasing rates of identification for those without American Indian ancestry. They also show a similar pattern showing magnitudes of point estimates increasing in the strength of American Indian ancestry. Finally, for those concerned about the use of the 1990 Census year, Table A.4 of the Appendix limits the sample to exclude that year and finds substantially similar results. Again, the magnitude of the point estimates on the RAP casino

interaction terms are almost always higher than the magnitude of the point estimates on the non-RAP casino interaction terms within groups defined by American Indian ancestry. Nevertheless, it should be noted that confidence intervals for RAP and non-RAP interaction term coefficients in many cases overlap, and the non-RAP casino interaction terms are also statistically significant predictors of Native American racial identification. Thus, we cannot say that dividend payments *per se* are singularly driving changes in rates of self-identification, however, these results support the view that they are a factor in that determination.

7. Conclusion

By linking Native American self-identification rates with the rise of tribal gaming, this paper offers one explanation for the dramatic changes observed in the number of individuals identifying as Native American since 1990. We find that the signing of the first tribal-state gaming compact is associated with a significant increase in the probability of self-identifying as Native American for individuals with American Indian ancestry and suggestive evidence of an increase in the salience of tribal identity for those with the strongest ancestral ties. At the same time, we find that the same policy change is associated with a decrease in the probability of self-identifying as Native American for individuals without American Indian ancestry. This is consistent with our conceptual framework linking Native American racial self-identification with higher net benefits for those with American Indian ancestry, as well as higher stigma for those without American Indian ancestry, after the opening of casinos.

While the magnitudes of our estimates are large, so are the overall changes in racial identification of the Native American population which have been documented elsewhere (Liebler et al. 2014; 2016, 2017). This suggests that the economic factors explored here may play an important role in this important demographic shift. Moreover, the fact that magnitudes are

increasing in the strength of American Indian ancestry bolsters our interpretation that these demographic changes are linked to racial choice and not some other driver which might affect the population at large. In addition, our analysis linking opening dates of Class III American Indian casinos to Native American identification shows that magnitudes generally increase over time after the opening of casinos before leveling off. Thus, the results are not simply an artifact of enthusiasm surrounding an agreement between tribes and states, but more likely to be due to economic incentives that are likely to be linked with the profitability of casinos. While our analysis using variation in dividend payments does not conclusively point to dividend payments checks as the sole mechanism driving these effects, results are consistent with the hypothesis that changes in racial identity may be driven by higher net benefits for those with American Indian ancestry, as well as higher stigma of Native American identification for those without American Indian ancestry—both of which may be higher in a context of individual payouts. This supports the notion that changes in racial identity are tied to economic considerations and not simply a general rising profile of Native American identity.

At the same time, there are important limitations of this study that should be noted. First, we cannot entirely rule out that social factors surrounding Native American identity that coincide with casino openings may explain the results. For example, the promotion of Native American identity among those with American Indian ancestors could explain our findings showing increased willingness to identify as Native American among those with American Indian ancestors, so long as it also coincided with an increased social stigma associated with identifying as Native American among those without American Indian ancestors. These effects may be stronger in tribes with casinos that make dividend payments, thus blurring the line between economic and social factors explaining the results. Second, in the absence of data on profitability and dividend

payments, we rely on proxy measures that are accepted in the literature, but that ideally would be replaced by explicit data on profitability across casinos over time, the ends to which those profits are directed, and individual per capita payments from tribal rosters. Third, our analysis relies on large public surveys that enable us to pick up relatively small populations and their resulting demographic changes. Ideally, we would have longitudinal data sources from tribal rosters that would allow us to identify changes over time at the individual level and how they are affiliated with tribes. Given that these ideal data sources are private and closely held, however, makes it unlikely that they are to become widely available in the near future. Thus, while our study represents an important step in establishing the casual impact of economic incentives on racial identity, future research would ideally yield more precise estimates of this important relationship.

Nevertheless, these results break new ground in linking racial identity and economic incentives, and should raise concerns for policymakers and researchers alike given widespread interest in monitoring the persistence of racial gaps in socioeconomic outcomes and how they are impacted by changes in policy. Not only can racial self-reports change over time, but, as seen in this study, dramatic demographic responses to policies are possible over even a relatively short period of time. It is also important to note that while we have focused on casino openings that confer positive net economic benefits on populations with strong ties to minority groups and thus increase their likelihood of identifying with the group, we expect that the opposite result would hold if negative economic effects were predominant. Thus, in contexts where discrimination in employment, education, and mistreatment by society overall prevail, the affected populations of self-identified racial groups could actually fall. While some research has begun to explore this possibility, further research examining reduced willingness to identify with certain racial groups is warranted.

References

25 Code of Federal Regulations (CFR) Part 290 (2000). "Tribal Revenue Allocation Plans." Available at https://www.ecfr.gov/current/title-25/chapter-I/subchapter-N/part-290. Accessed on January 6, 2023.

Akee, Randall, Katherine A. Spilde and Jonathan B. Taylor (2015). "The Indian Gaming Regulatory Act and Its Effects on American Indian Economic Development." *The Journal of Economic Perspectives*, 29(3): 185-208.

Akee, Randall K.Q., William E. Copeland, Gordon Keeler, Adrian Angold, and E. Jane Costello (2010). "Parents' Income and Children's Outcomes: A Quasi-experiment Using Transfer Payments from Casino Profits." *American Economic Journal: Applied Economics* 2(1): 86-115.

Akerlof, George A. and Rachel E. Kranton (2000). "Economics and Identity." Quarterly Journal of Economics, 115(3): 715-53.

Antman, Francisca and Brian Duncan (2015). "Incentives to Identify: Racial Identity in the Age of Affirmative Action." *Review of Economics and Statistics*, 97(3): 710-13.

Antman, Francisca M., Brian Duncan, and Stephen J. Trejo (2020). "Ethnic Attrition, Assimilation, and the Measured Health Outcomes of Mexican Americans." *Journal of Population Economics*, 33(4): 1499-1522.

Antman, Francisca M., Brian Duncan, and Stephen J. Trejo (2016). "Ethnic Attrition and the Observed Health of Later Generation Mexican Americans." *American Economic Review*, 106(5): 467-71.

Botticini, Maristella and Zvi Eckstein (2007). "From Farmers to Merchants, Conversion and Diaspora: Human Capital and Jewish History." *Journal of European Economic Association*, 5(5): 885-926.

Bureau of Indian Affairs (2020). "Genealogy." Available at https://www.bia.gov/bia/ois/tgs/genealogy. Accessed July 27, 2020.

Callaway, Brantley, and Pedro H. C. Sant'Anna (2021). "Difference-in-differences with multiple time periods." *Journal of Econometrics*, 225(2): 200-230.

Cassan, Guilhelm (2015). "Identity-Based Policies and Identity Manipulation: Evidence from Colonial Punjab." *American Economic Journal: Economic Policy, 7(4): 103–131.*

Cengiz, Doruk, Arindrajit Dube, Attila Lindner, and Ben Zipperer (2019). "The Effect of Minimum Wages on Low-Wage Jobs." *The Quarterly Journal of Economics*, 134(3): 1405-1454.

Chavez, Nicole and Harmeet Kaur (2021). "Why the Jump in the Native American Population May Be One of the Hardest to Explain." *Cable News Network*. Available at https://www.cnn.com/2021/08/19/us/census-native-americans-rise-population. Accessed August 23, 2021.

Conner, Thaddieus and William A. Taggart (2013). "Assessing the Impact of Indian Gaming on American Indian Nations: Is the House Winning?." *Social Science Quarterly*, 94(4):1016-1044.

Cookson, J. Anthony (2010). "Institutions and Casinos on American Indian Reservations: An Empirical Analysis of the Location of Indian Casinos." *Journal of Law and Economics*, 53(4): 651-87.

de Chaisemartin, Clément, and Xavier D'Haultfoeuille (2020). "Two-Way Fixed Effects Estimators with Heterogeneous Treatment Effects." *American Economic Review*, 110 (9): 2964-96.

Dahis, Ricardo, Emily Nix, and Nancy Qian (2020). "Choosing Racial Identity in the United States, 1880-1940." NBER Working Paper 26465.

Dao, James (2011). "In California, Indian Tribes with Casino Money Cast Off Members." *The New York Times*, December 12, 2011. Retrieved from http://www.nytimes.com/2011/12/13/us/california-indian-tribes-eject-thousands-of-members.html?_r=0 on October 7, 2015.

Duncan, Brian and Stephen J. Trejo (2011). "Intermarriage and the Intergenerational Transmission of Ethnic Identity and Human Capital for Mexican Americans." *Journal of Labor Economics,* 29(2): 195-227.

Evans, William N. and Wooyoung Kim (2008). "The Impact of Local Labor Market Conditions on the Demand for Education: Evidence from Indian Casinos." Unpublished Manuscript. University of Notre Dame.

Evans, William N. and Julie H. Topoleski (2002). "The Social and Economic Impact of Native American Casinos." National Bureau of Economic Research Working Paper No. 9198.

Ferry, David (2013). "I Know I Am, But What Are You." *This American Life*. Episode 491: Tribes. WBEZ Chicago. Original Air Date: March 19, 2013. Available at https://www.thisamericanlife.org/radio-archives/episode/491/tribes?act=1

Gardner, John (2021). "Two-stage differences in differences," working paper (dated April 2021), University of Mississippi.

Goodman-Bacon, Andrew (2021). "Difference-in-differences with variation in treatment timing." *Journal of Econometrics*, 225(2): 254-277.

Grinols, Earl L. and David B. Mustard (2006). "Casinos, Crime, and Community Costs." *The Review of Economics and Statistics*. 88:1, 28-45.

Jia, Ruixue and Torsten Persson (2017). "Individual vs. Social Motives in Identity Choice: Theory and Evidence from China." Unpublished Manuscript. University of California San Diego.

Kearney, Melissa Schettini (2005). "The Economic Winners and Losers of Legalized Gambling." *National Tax Journal*, 58(2): 281-302.

Liebler, Carolyn April (2001). "The Fringes of American Indian Identity." Unpublished Ph.D. Dissertation. University of Wisconsin-Madison.

Liebler, Carolyn A., Renuka Bhaskar, and Sonya R. Porter (née Rastogi) (2016). "Joining, Leaving, and Staying in the American Indian/Alaska Native Race Category Between 2000 and 2010." *Demography*, 53(2): 507-40.

Liebler, Carolyn A. and Timothy Ortyl (2014). "More than 1 Million New American Indians in 2000: Who Are They? *Demography*, 51: 1101-30.

Liebler, Carolyn A., Sonya R. Porter, Leticia E. Fernandez, James M. Noon, and Sharon R. Ennis (2017). "America's Churning Races: Race and Ethnicity Response Changes Between Census 2000 and the 2001 Census." *Demography*, 54(1); 259-84.

Liebler, Carolyn A. and Meghan Zacher (2013). "American Indians without Tribes in the Twenty-first Century." *Ethnic and Racial Studies*, 36:11, 1910-1934.

Nagel, Joane (1995). "American Indian Ethnic Renewal: Politics and The Resurgence of Identity." *American Sociological Review*, 60(6): 947-965.

Ruggles, Steven, Sarah Flood, Sophia Foster, Ronald Goeken, Jose Pacas, Megan Schouweiler and Matthew Sobek (2021). IPUMS USA: Version 11.0 [dataset]. Minneapolis, MN: IPUMS, 2021. https://doi.org/10.18128/D010.V11.0

Sant'Anna, P.H.C and Zhao, J. (2020). "Doubly Robust Difference-in-Differences Estimators." *Journal of Econometrics*, 219(1): 101-122.

Sturm, Circe (2011). *Becoming Indian: The Struggle over Cherokee Identity in the Twenty-first Century.* Santa Fe, NM : School for Advanced Research Press.

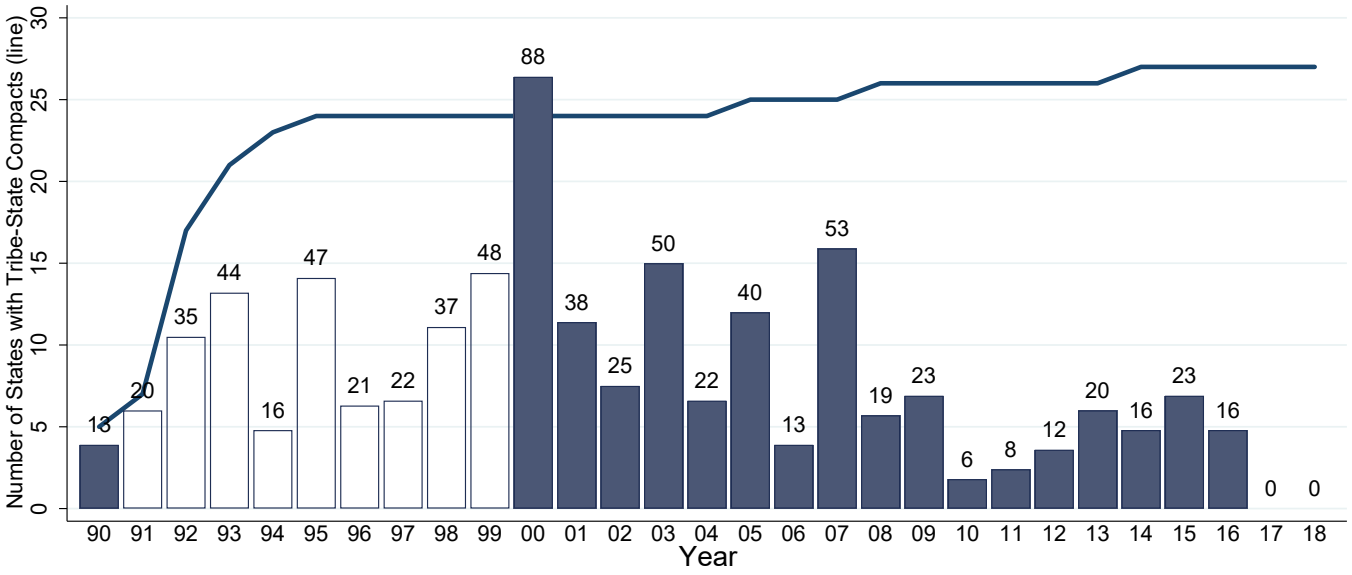
Sun, Liyang, Abraham, Sarah (2021). "Estimating dynamic treatment effects in event studies with heterogeneous treatment effects," *Journal of Econometrics*, 225(2): 175-199.

U.S. Census Bureau (2011a). The American Community Survey Questionnaire. Retrieved from http://www.census.gov/acs/www/Downloads/questionnaires/2011/Quest11.pdf on July 14, 2013.

U.S. Census Bureau (2020). https://www.census.gov/topics/population/race/about.html Accessed on July 18, 2020.

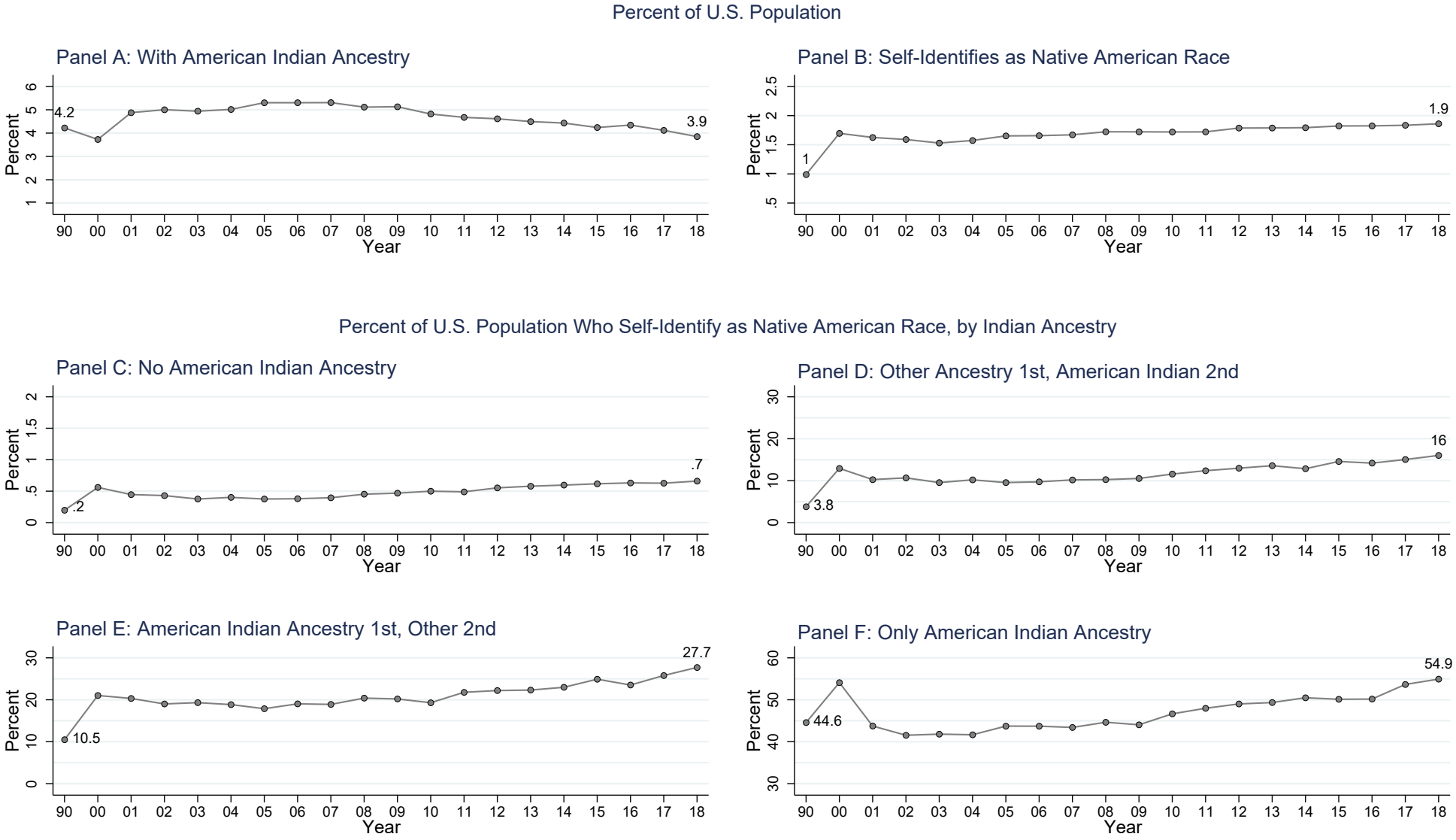
U.S. Department of Health and Human Services (2021). "Indian Health Services Chapter 1: Eligibility for Services." Available at https://www.ihs.gov/IHM/pc/part-2/p2c1/#2-1.2A. Accessed on August 6, 2021.

Figure 1: Number of States with a Tribal-State Compacts (line) and Number of New Tribal-State Compacts (bars), by year



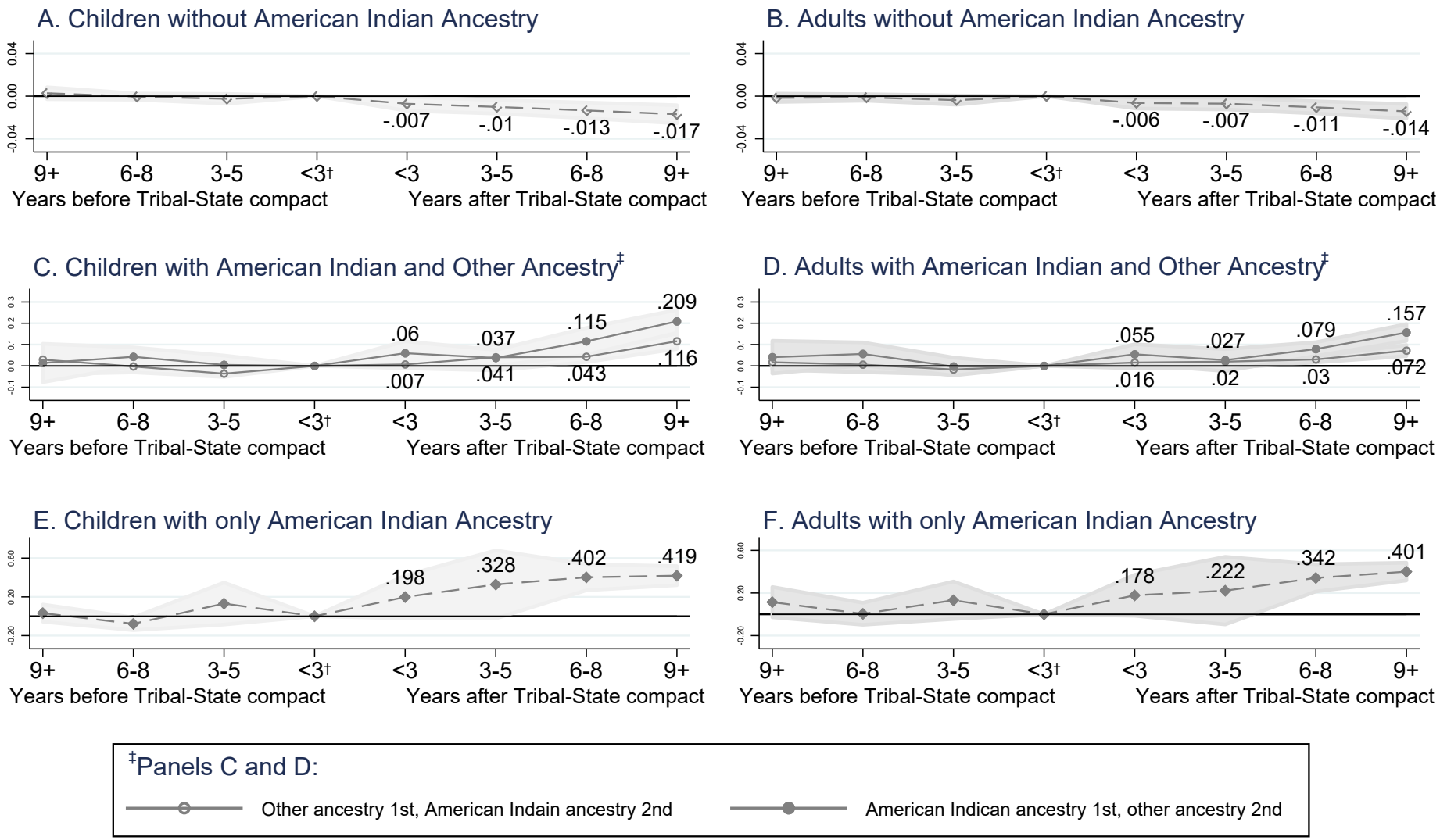
Source: U.S. Department of the Interior Bureau of Indian Affairs. Indian Gaming Compacts. Retrieved from https://www.indianaffairs.gov/as-ia/oig/gaming-compacts. Downloaded on April 4, 2018. Data in our main analysis is extracted from the 1990 and 2000 5% Census and the 2001–2018 American Community Survey (shaded bars).

Figure 2: Percent of Population with American Indian Ancestry and who Self-Identify as Native American Race, Overall and by American Indian Ancestry



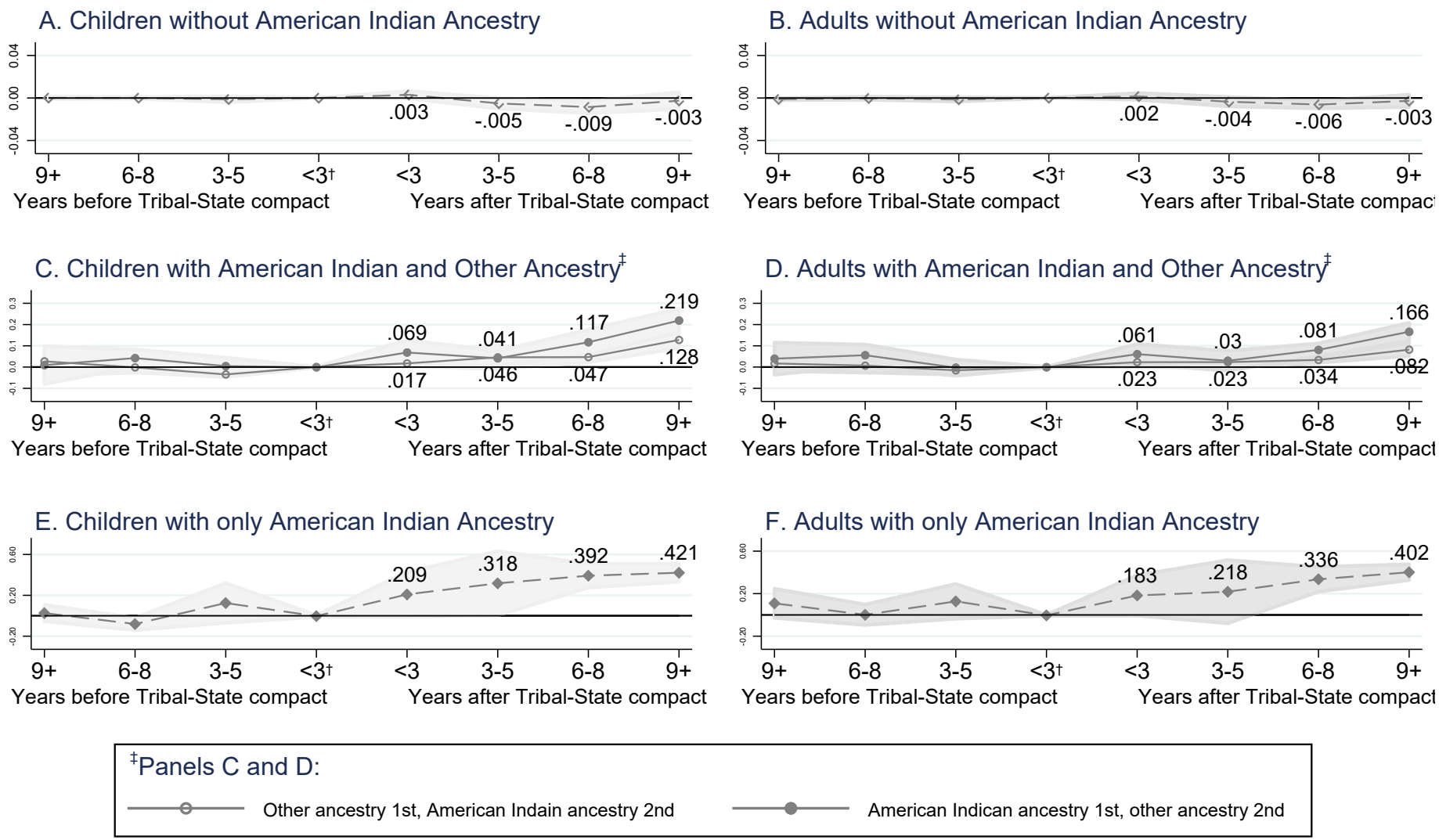
Source: 1990 and 2000 Census Data, 2001-2018 American Community Survey (ACS) data. The sample includes U.S.-born individuals 0 to 40 in 1990. Individuals with an allocated race or Hispanic origin are excluded. Sampling weights were used in the calculations.

Figure 3: Relationship between Tribal-State Compacts in Birth State and Native American Identification



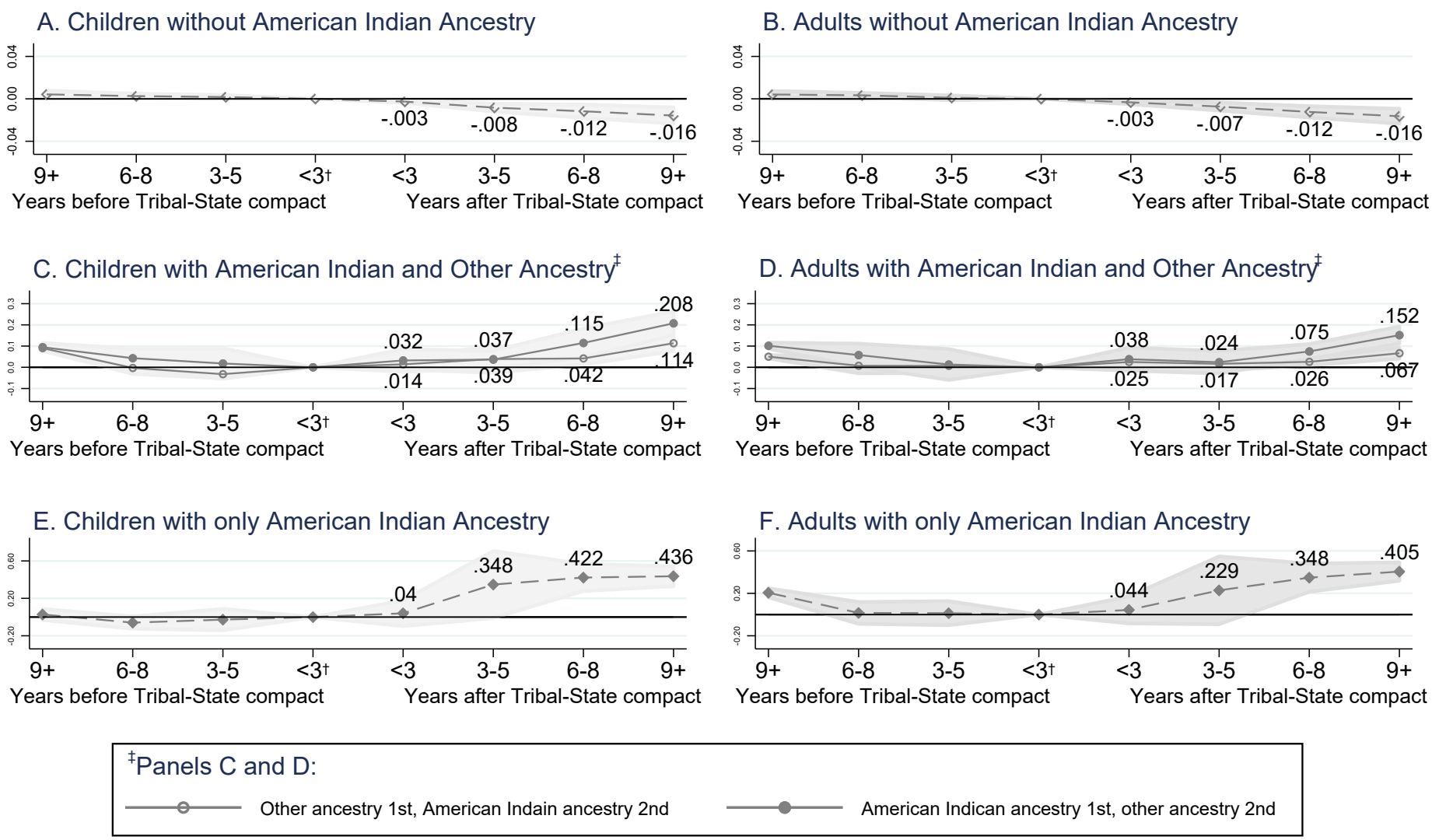
The reference category are states less than three years before a Tribal-State compact was signed and states that never had a Tribal-State compact.
Source: 1990 and 2000 Census Data, 2001-2018 ACS data.
Note: The samples include U.S.-born children (ages 0-17) and adults (ages 18-59). All regressions include controls for age, age squared, gender, indicators for the three ancestry categories with no American Indian ancestry as the reference category, state and year fixed effects, and state specific linear time trends. Sampling weights were used in the calculations. 90% confidence levels are calculated from standard errors clustered at the state level.

Figure 4: Two-stage Difference-in-Differences Regressions of the Relationship between Tribal-State Compacts in Birth State and Native American Identification



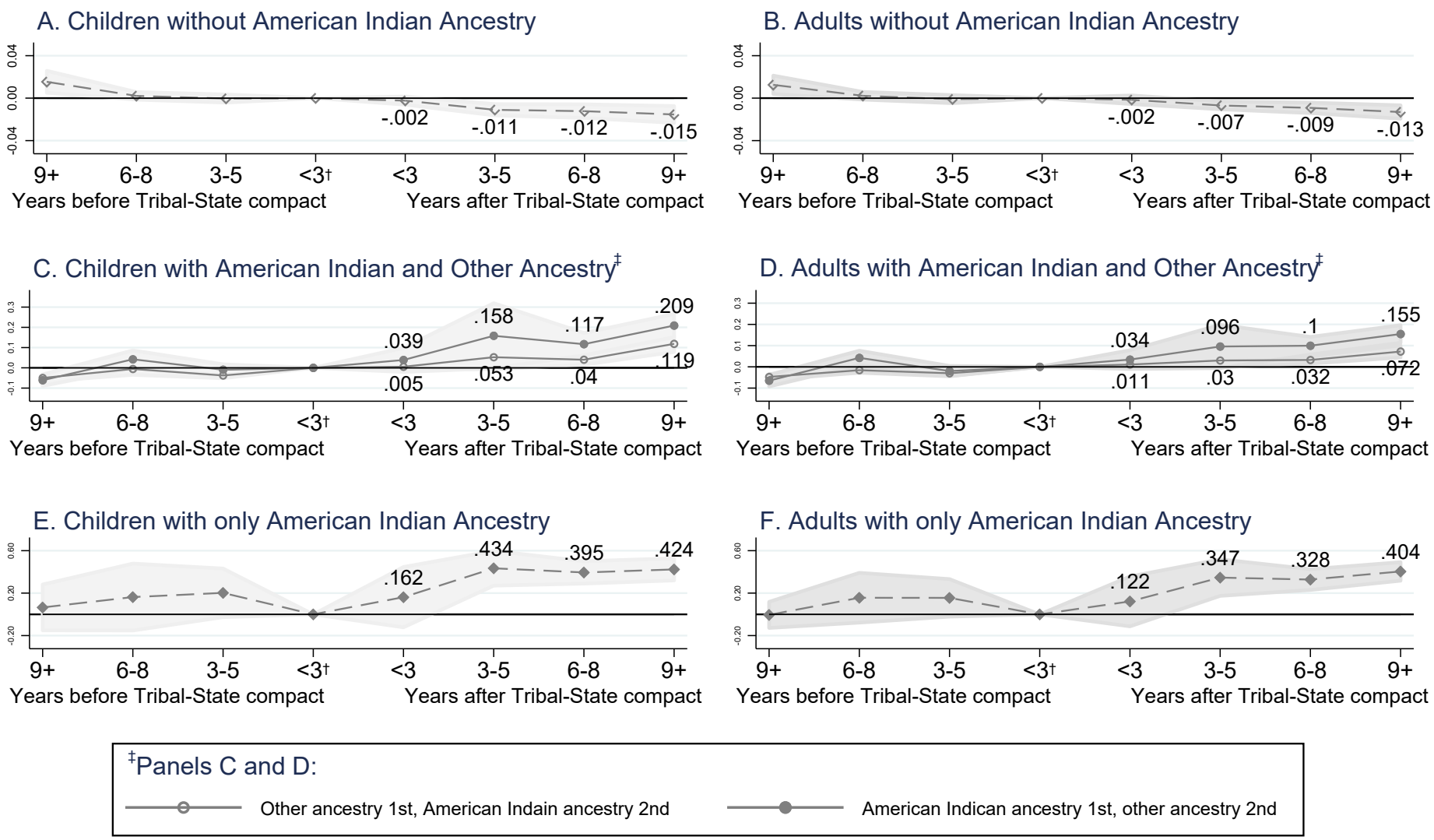
The reference category are states less than three years before a Tribal-State compact was signed and states that never had a Tribal-State compact.
Source: 1990 and 2000 Census Data, 2001-2018 ACS data.
Note: Estimates calculated using the Stata did2s command following Gardner (2021). The samples include U.S.-born children (ages 0-17) and adults (ages 18-59). First-stage controls include indicators for the three ancestry categories with no American Indian ancestry as the reference category, and state and year fixed effects. Sampling weights were used in the calculations. 90% confidence levels are calculated from standard errors clustered at the state level.

Figure 5: Relationship between Tribal-State Compacts in Birth State and Native American Identification, Sample Limited to Years 2000 to 2018.



The reference category are states less than three years before a Tribal-State compact was signed and states that never had a Tribal-State compact.
Source: 1990 and 2000 Census Data, 2001-2018 ACS data.
Note: The samples include U.S.-born children (ages 0-17) and adults (ages 18-59). All regressions include controls for age, age squared, gender, indicators for the three ancestry categories with no American Indian ancestry as the reference category, state and year fixed effects, and state specific linear time trends. Sampling weights were used in the calculations. 90% confidence levels are calculated from standard errors clustered at the state level.

Figure 6: Relationship between Class III Casinos Open in Birth State and Native American Identification



The reference category are states less than three years before Class III Indian casino opened and states that never had a Class III Indian casino.
Source: 1990 and 2000 Census Data, 2001-2018 ACS data.
Note: The samples include U.S.-born children (ages 0-17) and adults (ages 18-59). All regressions include controls for age, age squared, gender, indicators for the three ancestry categories with no American Indian ancestry as the reference category, state and year fixed effects, and state specific linear time trends. Sampling weights were used in the calculations. 90% confidence levels are calculated from standard errors clustered at the state level.

Table 1: Self-reported Race of Children and Adults, by American Indian Ancestry

Panel A: Children Self-Reported Race	No Indian Ancestry	Other 1st Indian 2nd	Indian 1st Other 2nd	Only Indian Ancestry
Native American	0.70	14.51	23.41	54.67
American Indian tribe	0.16	1.81	5.57	40.89
White	74.52	84.75	86.82	41.83
Black	17.23	15.85	8.60	5.00
Asian	4.88	1.20	1.39	8.42
Sample size	15,320,115	252,026	157,297	255,381
Panel B: Adults Self-Reported Race	**No Indian Ancestry**	**Other 1st Indian 2nd**	**Indian 1st Other 2nd**	**Only Indian Ancestry**
Native American	0.51	11.66	21.03	46.41
American Indian tribe	0.12	1.48	5.64	34.82
White	81.93	85.06	86.81	55.46
Black	14.30	13.48	7.14	4.81
Asian	1.91	0.42	0.49	1.42
Sample size	32,464,010	628,749	340,255	572,517

Source: 1990 and 2000 Census Data, 2001–2018 ACS data. The samples include U.S.-born individuals aged 0–59 with the indicated ancestry. Individuals with an allocated race or Hispanic origin are excluded.
Notes: All numbers are percentages. Race categories are not mutually exclusive or exhaustive. American Indian ancestry includes all American Indian tribes. It does not include Aleut, Eskimo, Inuit, Mexican Indian, Mexican American Indian, Central American Indian, South American Indian, or Asian Indian. Native American race identification includes individuals who self-identify as American Indian and/or Alaska Native on the race question. American Indian Tribe identification includes individuals who indicate a single race of American Indian/Alaska Native and list a specific American Indian tribe. Sampling weights were used in the calculations.

Table 2: Relationship between Tribal-State Gaming Compacts in Birth State and Native American Identification for Adults and Children with and without American Indian Ancestry

	Native American Identification	
	Children	Adults
Compact × No American Indian ancestry	-.0120***	-.0103***
	(.0034)	(.0027)
Compact × (Other ancestry 1st, Am. Indian 2nd)	.1111***	.0699***
	(.0205)	(.0145)
Compact × (Am. Indian ancestry 1st, other 2nd)	.1985***	.1496***
	(.0323)	(.0238)
Compact × Only American Indian ancestry	.4128***	.3894***
	(.0582)	(.0505)
Sample size	15,984,819	34,005,531

*Statistically significant at 10% level; **at 5% level; ***at 1% level.
Source: 1990 and 2000 Census Data, 2001-2018 ACS data.
Notes: Standard errors clustered at the state level are shown in parentheses. Sampling weights were used in the calculations. The samples include U.S.-born children (ages 0-17) and adults (ages 18-59). Individuals with an allocated race or Hispanic origin are excluded. All regressions include controls for age, age squared, gender, indicators for the three ancestry categories with no American Indian ancestry as the reference category, state and year fixed effects, and state specific linear time trends. The four American Indian ancestry categories are mutually exclusive and exhaustive. Compact is an indicator variable equal to one if the individuals birth state has signed a tribal-state gaming compact.

Table 3: Two-stage Difference-in-Differences Regressions of the Relationship between Tribal-State Gaming Compacts in Birth State and Native American Identification for Adults and Children with and without American Indian Ancestry

	Native American Identification	
	Children	Adults
Compact × No American Indian ancestry	-.0028	-.0028
	(.0045)	(.0033)
Compact × (Other ancestry 1st, Am. Indian 2nd)	.1178***	.0764***
	(.0230)	(.0171)
Compact × (Am. Indian ancestry 1st, other 2nd)	.2051***	.1563***
	(.0337)	(.0255)
Compact × Only American Indian ancestry	.4142***	.3914***
	(.0536)	(.0465)
Sample size	15,984,819	34,005,531

*Statistically significant at 10% level; **at 5% level; ***at 1% level.

Source: 1990 and 2000 Census Data, 2001-2018 ACS data.

Notes: Estimates calculated using the Stata did2s command following Gardner (2021). Standard errors clustered at the state level are shown in parentheses. Sampling weights were used in the calculations. The samples include U.S.-born children (ages 0-17) and adults (ages 18-59). Individuals with an allocated race or Hispanic origin are excluded. First-stage controls include indicators for the three ancestry categories with no American Indian ancestry as the reference category, and state and year fixed effects. The four American Indian ancestry categories are mutually exclusive and exhaustive. Compact is an indicator variable equal to one if the individual's birth state has signed a tribal-state gaming compact.

Table 4: Relationship between Tribal-State Gaming Compacts in Birth State and Tribal Identification Among Individuals who Identify as Native American Race

	American Indian Tribe Identification	
	Children	Adults
Compact × No American Indian ancestry	-.0435	-.0264
	(.0422)	(.0348)
Compact × American Indian ancestry	.0749*	.0712**
	(.0381)	(.0305)
Mean of dependent with no Indian ancestry	.2667	.2664
Mean Dependent with Indian ancestry	.6282	.6198
Sample size	344,263	596,489

*Statistically significant at 10% level; **at 5% level; ***at 1% level.
Source: 1990 and 2000 Census Data, 2001-2018 ACS data.
Notes: Standard errors clustered at the state level are shown in parentheses. Sampling weights were used in the calculations. The samples include U.S.-born children (ages 0-17) and adults (ages 18-59) who identify as Native American race. Individuals with an allocated race or Hispanic origin are excluded. American Indian Tribe Identification is an indicator for individuals who list an American Indian tribe in response to the race question; note that this information is only available for those who list a single race (American Indian/Alaska Native). All regressions include controls for age, age squared, gender, an indicator for American Indian ancestry, state and year fixed effects, and state specific linear time trends. The four American Indian ancestry categories are mutually exclusive and exhaustive. Compact is an indicator variable equal to one if the individuals birth state has signed a tribal-state gaming compact.

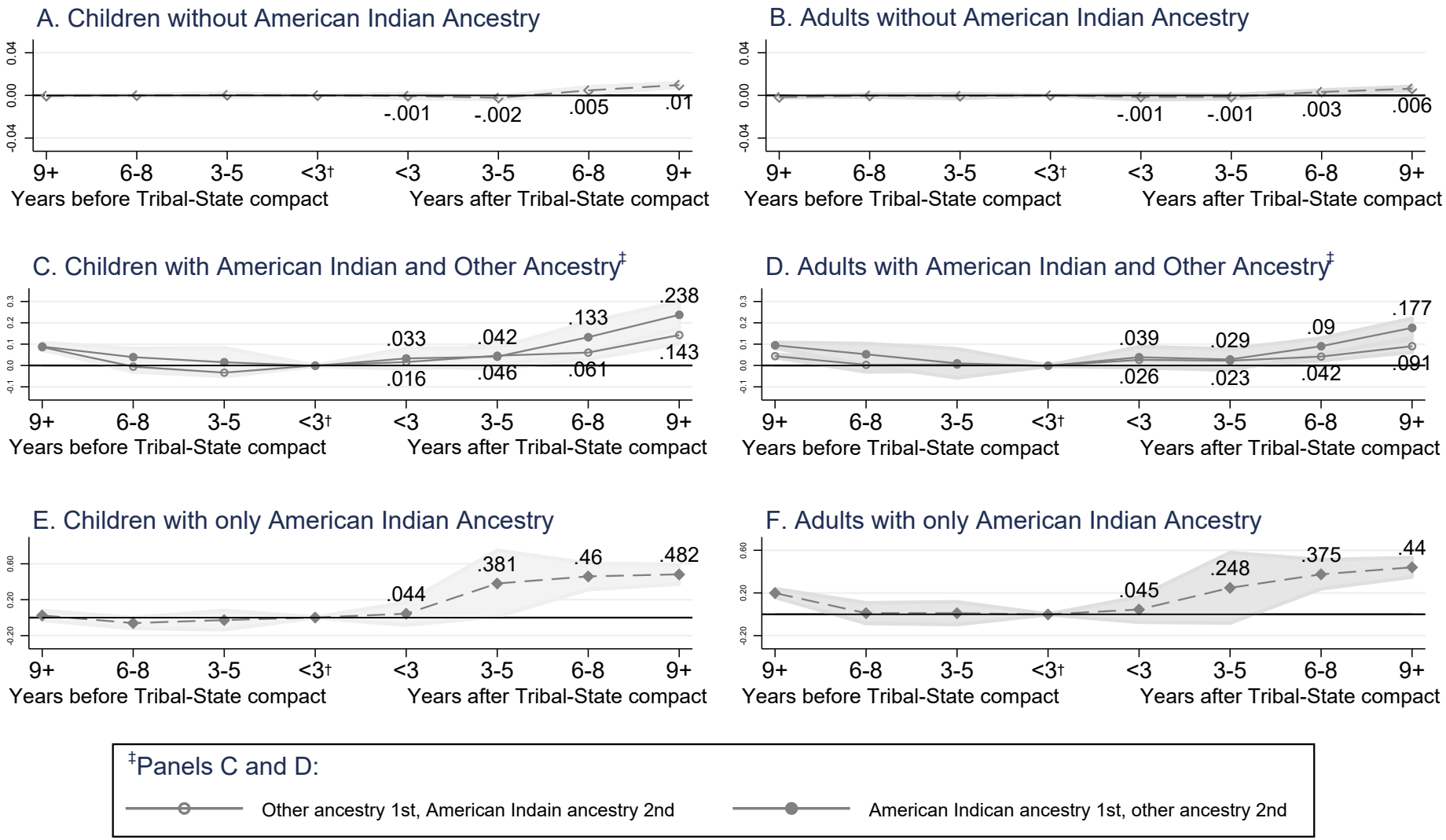
Table 5: Relationship between RAP and Non-RAP Class III Casinos Open in Birth State and Native American Identification for Adults and Children with and without American Indian Ancestry

	Native American Identification	
	Children	Adults
No American Indian ancestry ×		
Has Non-RAP casino	-.0062	-.0063**
	(.0048)	(.0030)
Has RAP casino	-.0079***	-.0073***
	(.0022)	(.0021)
Other ancestry 1st, Am. Indian 2nd ×		
Has Non-RAP casino	.0751***	.0586***
	(.0235)	(.0158)
Has RAP casino	.1029***	.0663***
	(.0240)	(.0175)
Am. Indian ancestry 1st, other 2nd ×		
Has Non-RAP casino	.1587***	.1314***
	(.0546)	(.0386)
Has RAP casino	.1881***	.1499***
	(.0354)	(.0238)
Only American Indian ancestry		
Has Non-RAP casino	.3784**	.3987***
	(.1529)	(.1201)
Has RAP casino	.3829***	.3492***
	(.0658)	(.0512)
Sample size	9,821,565	20,292,357

*Statistically significant at 10% level; **at 5% level; ***at 1% level.
Source: 1990 and 2000 Census Data, 2001-2008 ACS data.
Notes: Standard errors clustered at the state level are shown in parentheses. Sampling weights were used in the calculations. The samples include U.S.-born children (ages 0-17) and adults (ages 18-59). Individuals with an allocated race or Hispanic origin are excluded. All regressions include controls for age, age squared, gender, indicators for the three ancestry categories with no American Indian ancestry as the reference category, state and year fixed effects, and state specific linear time trends.

APPENDIX FIGURES AND TABLES

Figure A.1: Two-stage Difference-in-Differences Regressions of the Relationship between Tribal-State Compacts in Birth State and Native American Identification, Sample Limited to Years 2000 to 2018.



The reference category are states less than three years before a Tribal-State compact was signed and states that never had a Tribal-State compact.
Source: 2000 Census Data, 2001-2018 ACS data.
Note: Estimates calculated using the Stata did2s command following Gardner (2021). The samples include U.S.-born children (ages 0-17) and adults (ages 18-59). First-stage controls include indicators for the three ancestry categories with no American Indian ancestry as the reference category, and state and year fixed effects. Sampling weights were used in the calculations. 90% confidence levels are calculated from standard errors clustered at the state level.

Table A.1: Relationship between Tribal-State Gaming Compacts in Birth State and Native American Identification for Adults and Children

	Native American Identification	
	Children	Adults
Compact	0.0006	-0.0001
	(0.0005)	(0.0006)
Sample size	15,984,819	34,005,531

*Statistically significant at 10% level; **at 5% level; ***at 1% level.
Source: 1990 and 2000 Census Data, 2001-2018 ACS data.
Notes: Standard errors clustered at the state level are shown in parentheses. Sampling weights were used in the calculations. The samples include U.S.-born children (ages 0-17) and adults (ages 18-59). Individuals with an allocated race or Hispanic origin are excluded. All regressions include controls for age, age squared, gender, indicators for the three ancestry categories with no American Indian ancestry as the reference category, state and year fixed effects, and state specific linear time trends. Compact is an indicator variable equal to one if the individual's birth state has signed a tribal-state gaming compact.

Table A.2: Multinomial Logit Estimates of the Relationship Between Tribal-State Gaming Compacts in Birth State and American Indian Ancestry

	Children		Adults	
Compact effect on ancestry outcome:	Logit Coef.	Marginal Effect	Logit Coef.	Marginal Effect
No American Indian ancestry		.0013		.0025
		(.0018)		(.0019)
Other ancestry 1st, Am. Indian 2nd	.0500	.0008	-.0090	-.0001
	(.0355)	(.0006)	(.0474)	(.0009)
Am. Indian ancestry 1st, other 2nd	.0047	.0001	-.0831	-.0009
	(.0631)	(.0006)	(.0508)	(.0005)
Only American Indian ancestry	-.1571	-.0022	-.0976	-.0015
	(.0969)	(.0013)	(.0555)	(.0009)
Sample size	15,984,819		34,005,531	

*Statistically significant at 10% level; **at 5% level; ***at 1% level.

Source: 1990 and 2000 Census Data, 2001-2019 ACS data.

Notes: Standard errors clustered at the state level are shown in parentheses. Sampling weights were used in the calculations. The samples include U.S.-born children (ages 0-17) and adults (ages 18-59). Individuals with an allocated race or Hispanic origin are excluded. All regressions include controls for age, age squared, gender, state and year fixed effects, and state specific linear time trends. Marginal effects are discrete average marginal effects.

Table A.3: Relationship between Tribal-State Gaming Compacts in Birth State and Native American Identification for Adults and Children with and without American Indian Ancestry, Sample Limited to Years 2000 to 2018.

	Native American Identification	
	Children	Adults
Compact × No American Indian ancestry	-.0075***	-.0083***
	(.0022)	(.0026)
Compact × (Other ancestry 1st, Am. Indian 2nd)	.1133***	.0691***
	(.0229)	(.0160)
Compact × (Am. Indian ancestry 1st, other 2nd)	.2012***	.1491***
	(.0355)	(.0257)
Compact × Only American Indian ancestry	.4393***	.4018***
	(.0653)	(.0546)
Sample size	13,010,167	27,922,780

*Statistically significant at 10% level; **at 5% level; ***at 1% level.
Source: 2000 Census Data, 2001-2018 ACS data.
Notes: Standard errors clustered at the state level are shown in parentheses. Sampling weights were used in the calculations. The samples include U.S.-born children (ages 0-17) and adults (ages 18-59). Individuals with an allocated race or Hispanic origin are excluded. All regressions include controls for age, age squared, gender, indicators for the three ancestry categories with no American Indian ancestry as the reference category, state and year fixed effects, and state specific linear time trends. The four American Indian ancestry categories are mutually exclusive and exhaustive. Compact is an indicator variable equal to one if the individuals birth state has signed a tribal-state gaming compact.

Table A.4: Relationship between RAP and Non-RAP Class III Casinos Open in Birth State and Native American Identification for Adults and Children with and without American Indian Ancestry, Sample Limited to Years 2000 to 2018.

	Native American Identification	
	Children	Adults
No American Indian ancestry ×		
Has Non-RAP casino	-.0051	-.0072**
	(.0037)	(.0027)
Has RAP casino	-.0100***	-.0091***
	(.0015)	(.0017)
Other ancestry 1st, Am. Indian 2nd ×		
Has Non-RAP casino	.0721***	.0519***
	(.0244)	(.0161)
Has RAP casino	.0964***	.0589***
	(.0231)	(.0166)
Am. Indian ancestry 1st, other 2nd ×		
Has Non-RAP casino	.1539***	.1248***
	(.0558)	(.0387)
Has RAP casino	.1839***	.1444***
	(.0360)	(.0238)
Only American Indian ancestry		
Has Non-RAP casino	.4140**	.4148***
	(.1612)	(.1244)
Has RAP casino	.4216***	.3689***
	(.0716)	(.0541)
Sample size	6,846,913	14,209,606

*Statistically significant at 10% level; **at 5% level; ***at 1% level.
Source: 2000 Census Data, 2001-2008 ACS data.
Notes: Standard errors clustered at the state level are shown in parentheses. Sampling weights were used in the calculations. The samples include U.S.-born children (ages 0-17) and adults (ages 18-59). Individuals with an allocated race or Hispanic origin are excluded. All regressions include controls for age, age squared, gender, indicators for the three ancestry categories with no American Indian ancestry as the reference category, state and year fixed effects, and state specific linear time trends.