

The Indian Reorganization Act, Tribal Sovereignty, and Economic Development

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1. Introduction

In 1934 the United States government passed one of the most important pieces of legislation governing American Indian reservations, the Indian Reorganization Act (IRA). Adoption of the IRA was voluntary and each reservation had 18 months to vote on whether or not to adopt the IRA. Tribes that did not adopt the IRA maintained their own tribal governments and constitutions. If adopted, the IRA imposed a model of tribal governance based on a corporate structure that differed from many of the traditional tribal democratic systems (Rusco 2000). Non-IRA reservations were subject to less administrative oversight from the Secretary of Interior and the Bureau of Indian Affairs (BIA) (Clow 1987; Philp 1999). Federal oversight increases transaction costs and inhibits development, particularly on American Indian reservations (Anderson and Parker 2009). This paper empirically measures the impact of IRA adoption on current reservation economic conditions.

Both current institutions and the formation of institutions are important for economic growth. North (1994) describes institutions as being “made up of formal constraints, informal constraints, and their enforcement characteristics” (360). Formal constraints include the formation of constitutions and the organization of government, both of which were affected by the IRA. Constitutional structure and the ability of governments to credibly commit to their constitutions are both extremely important for long run economic growth (Person & Tabellini

2004; North & Weingast 1989). In discussing fiscal federalism, Oates (1999) suggests that the decentralized provision of public goods increases economic welfare when there are informational or political constraints. Several empirical studies have examined decentralization across countries and also within China and the United States and find mixed results (Thornton 2007; Zhang & Zou 1998; Lin & Lou 2000; Akai & Sakata 2000). The results from this paper suggest that residents of American Indian reservations benefit from having less federal oversight. Informal constraints include social institutions, like cultural differences between Indians and non-Indians, which also play a key role in economic growth (Greif 2006; Greif & Iyigun 2013). Cornell and Kalt (2006) find that organizations that work with indigenous culture are more successful in encouraging economic development on Indian reservations.

The seminal work by Acemoglu, Johnson, and Robinson (2001) highlights the importance of colonization conditions in forming persistent institutions and affecting current economic conditions. Similar historical episodes involving the African slave trade, African missionary activity, and Peruvian *mita* system reveal enduring economic consequences of colonial origins (Nunn 2008; Nunn 2010; Dell 2010). These persistent consequences extend beyond the formative periods of colonization; Dell (2012) finds that weather volatility which occurred during a critical time in the Mexican Revolution led to contemporary differences in land tenure and economic development. My paper is most closely related to Dippel's (2013) work, which finds that indigenous bands that were forced to share a reservation in the late 19th century have substantially lower incomes in 2000 but not in 1990. This is due to policy changes in the late 1980s that led to more intra-tribal conflict between formerly autonomous bands. My paper examines a similarly important period in the formation of contemporary reservation governments.

American Indian reservations have a unique set of institutions governing tribal economic development. Successful tribal self-governance requires a sound set of institutions (Cornell 2003). One legacy of the allotment era was the mixture of land tenure systems on reservations and the negative consequences that these property rights have on housing development and agricultural productivity (Akee 2009; Anderson & Lueck 1992). Jurisdictional disputes between tribes and states have created a murky contracting environment that impacts income, credit access, and casino development (Anderson & Parker 2008; Parker 2010; Cookson 2010). Cornell and Kalt (2000) advocates for the importance of tribal constitutions on economic development and the ability of tribes to govern themselves. In an empirical study of tribal constitutions, Akee et al. (2012) find that constitutional design and in particular a parliamentary system is important for economic development. My paper finds a similarly important relationship between early tribal government structure and reservation development.

Comparing contemporary economic outcomes of adopters and non-adopters of the IRA is problematic because tribes may have adopted the IRA for several reasons that may be correlated with contemporary economic development, resulting in biased empirical estimates. In order to mitigate these selection concerns, I exploit IRA voting results from the mid-1930s by restricting the sample to tribes that held narrowly determined IRA elections. Presumably, the decision to vote for or against the IRA by a small fraction of voters should influence current economic conditions only through the tribal adoption of the IRA, thus providing plausibly exogenous variation in the initial adoption of the IRA.

My empirical specification exploits the narrow IRA voting results in a regression discontinuity (RD) framework to estimate the effect of the IRA on the outcomes of interest. Preliminary regression results using reservation-level data from the 1990 U.S. Census indicate

early adoption of the IRA stifled economic development among reservations that held narrow IRA elections. Per capita income reservation income is over 40 percent lower among IRA reservations on average. Similarly, the fraction of the population receiving income from public assistance was over 55 percent higher among reservations that adopted the IRA. Lower education levels among IRA reservations are one source of the income disparity. The fraction of college-educated individuals on IRA reservations is nearly 35 percent lower, suggesting either lower educational attainment or high skill migration. Another difference between IRA and non-IRA adopters is the level of racial integration. IRA reservations have a significantly higher proportion of the population identifying as Native American. The combination of educational differences and the disparity in racial integration explain a large fraction of the income differential between IRA and non-IRA reservations.

I isolate two mechanisms that may be working to explain the differences between IRA and non-IRA reservations. The first is the role of self-governance. A series of federal laws reduced the severity of BIA oversight in the late 1980s and early 1990s (Legters & Lyden 1994). If BIA oversight imposed by the IRA significantly slowed development than this reduction in administrative oversight should have been more beneficial for IRA reservations. Preliminary results examining differences in 2010 reservation income support this assertion indicating that BIA oversight was partially to blame for the differences in economic development.

The second is the type of governments established under the IRA and non-IRA. There does not appear to be any statistical difference in the likelihood of adopting a constitution or corporate charter between IRA and non-IRA reservations. I am currently collecting early constitution data from the years immediately following the IRA vote to try and determine whether or not there were significant differences in the types of governments IRA and non-IRA

reservations adopted. If these governmental structures differed significantly from traditional forms of government it may have led to increased conflict or corruption, both of which hinder economic development. To measure corruption and conflict, I am collecting *ProQuest* newspaper data on IRA and non-IRA reservations.

This paper contributes to a growing literature on the persistent economic effects of legal institutions on American Indian reservations by quantitatively measuring the long-term effects of the Indian Reorganization Act. The preliminary results indicate increased self-governance was a critical condition for development on reservations. These results further illustrate the importance of historical events for current economic development, especially during periods of colonization and the establishment of government. This paper contributes to the literature on government structure, constitutional form, and the importance of self-governance. By studying the relationship between American Indians and the federal government, this paper provides insight into the economic problems associated with pronounced cultural and social differences between federal and local governments.

2. History of the IRA

The Indian Reorganization Act represented a dramatic change in federal Indian policy. In the early 1930s, at the urge of the new Commissioner of Indian Affairs the IRA proposed restoring tribal self-governance marking a severe departure from the assimilationist policies that had dominated for nearly a century. The IRA ended the allotment of tribal lands, placing allotted and tribal lands in federal trust.¹ It also established the authority of the Secretary of the Interior over matters of tribal lands and natural resources and established a fund that allowed tribes to restore their reservation land base. The IRA also established a revolving credit account for tribal

¹ For more information regarding land tenure on Indian reservations see Anderson and Lueck (1992), Anderson and Parker (2009), and Frye (2012).

governments and corporations in an effort to increase the availability of credit (Carlson, 1981). Congress passed the IRA, also known as the Howard-Wheeler Act, on June 18, 1934.

Within 18 months of the IRA passing Congress, each tribe voted on whether or not to adopt the IRA. Tribes not electing to adopt the IRA maintained their own tribal governments and constitutions if they had them. Each reservation that adopted the IRA was required to form a new tribal constitution or charter, although in practice some did not. These constitutions were reviewed and amended by the BIA. In many instances the resulting IRA constitution imposed a model of tribal governance based on a corporate structure that differed from many of the traditional tribal democratic systems (Rusco 2000).

Non-IRA reservations were also subject to less administrative oversight from the Secretary of Interior and the Bureau of Indian Affairs (BIA) (Clow 1987; Philp 1999). This administrative oversight occurred in several ways. First, any transactions involving land and natural resources or state and local governments required the approval of the Secretary of Interior. Also any tribal or corporate projects using the revolving credit funds were subject to close supervision from local bureau officials assigned to monitor the funds and minimize losses (Mekeel, 1944). Given these administrative barriers several historians have described the IRA as granting tribes “limited sovereignty” (Legters & Lyden 1994) and claiming that IRA reservations were still under the federal government despite the promise of self-rule (Philp 1999). Lemont (2006) claimed that it was not until the early self-determination acts of the mid-1970s that tribes had authority over their own reservations.

3. The Effect of the Indian Reorganization Act on Contemporary Reservation Economic Conditions

3.1 Ordinary Least Squares and Selection

A simple empirical framework for measuring the “treatment” effect of the IRA is

$$Y_i = \beta_0 + \beta_1 IRA_i + Controls'_i \delta + \varepsilon_i$$

where Y_i is the outcome of interest and IRA_i is an indicator for treatment. The coefficient of interest is β_1 , which measures the effect of adopting the IRA conditional on the controls. One obvious problem with this specification is that adoption of the IRA was not random. Tribes voted to adopt the IRA for several reasons, which may be correlated with contemporary reservation development resulting in biased OLS estimates. For example, poorly organized tribes in 1934 may have adopted the IRA because of the high organization costs associated with forming their own constitution and government structure. This organizational dysfunction is likely to persist through time and decrease contemporary economic development. Therefore, poorly organized tribes would likely result in negatively biased OLS estimates.

Tribes that were more assimilated in 1934 may have found the structure of the IRA to be a more familiar form of government and therefore may have been more likely to adopt it, however historical assimilation is likely positively correlated with better economic performance today (Mekeel 1944). Due to the fast implementation of the IRA, the BIA sent several advocates to reservations to promote and educate tribes about the IRA (Mekeel 1944). Given the limited time and resources at the BIA’s disposal they likely recruited in more receptive or developed areas and therefore have a higher probability of IRA adoption in these areas (Lemont 2006). If assimilation, receptiveness to federal programs, or development in 1934 is positively correlated with economic development then the OLS estimates will be positively biased.

In order to mitigate these selection concerns, I exploit IRA voting results from the mid-1930s by restricting the sample to tribes that held narrowly determined IRA elections. Presumably, the decision to vote for or against the IRA by a small fraction of voters should

influence current economic conditions only through the tribal adoption of the IRA, thus providing plausibly exogenous variation in the initial adoption of the IRA.

3.2 Data & Full Sample Summary Statistics

I use several data sources to create an unbalanced reservation-level panel dataset that includes contemporary outcomes, historic and spatial controls, and IRA voting records. The contemporary reservation level census data is from the National Historic Geographic Information System for 1990, 2000 and 2010. The outcomes of interest are per capita income, median household income, the share of households receiving public assistance, the share of individuals older than 25 that completed high school or college, and occupational shares.

IRA voting results were hand collected from *Ten Years of Tribal Government Under I.R.A.* (Haas 1947). Historical census records are from the 1910 oversample, which includes 20 percent of the Indian population and are aggregated to the reservation level based on historic household location. These historical records include basic demographic information, literacy rates, labor force status, and occupational scores. Allotment and land tenure characteristics were hand collected from *Indian Land Tenure, Economic Status, and Population Trends* (OIA 1934). GIS shapefiles for land quality are from the FAO GAEZ, other natural resources and urban location data is from NationalAtlas.gov.

To create the final sample I chose to drop current reservations with less than 150 people.² These reservations are so small that it is unclear whether or not tribal governments operate like larger reservations. I also drop reservations established prior to 1800. This restricts the analysis to reservations established in a relatively similar era. My final sample includes 119 current

² I have used several different population thresholds, including 100, 250, 500, and the empirical results are relatively unchanged.

reservations, each with information regarding current economic conditions, geographic characteristics, 1910 reservation characteristics, 1934 allotment characteristics, and IRA voting records. The following map indicates the distribution of IRA and non-IRA reservations.

Figure 1: Map of Current Reservations by IRA Status

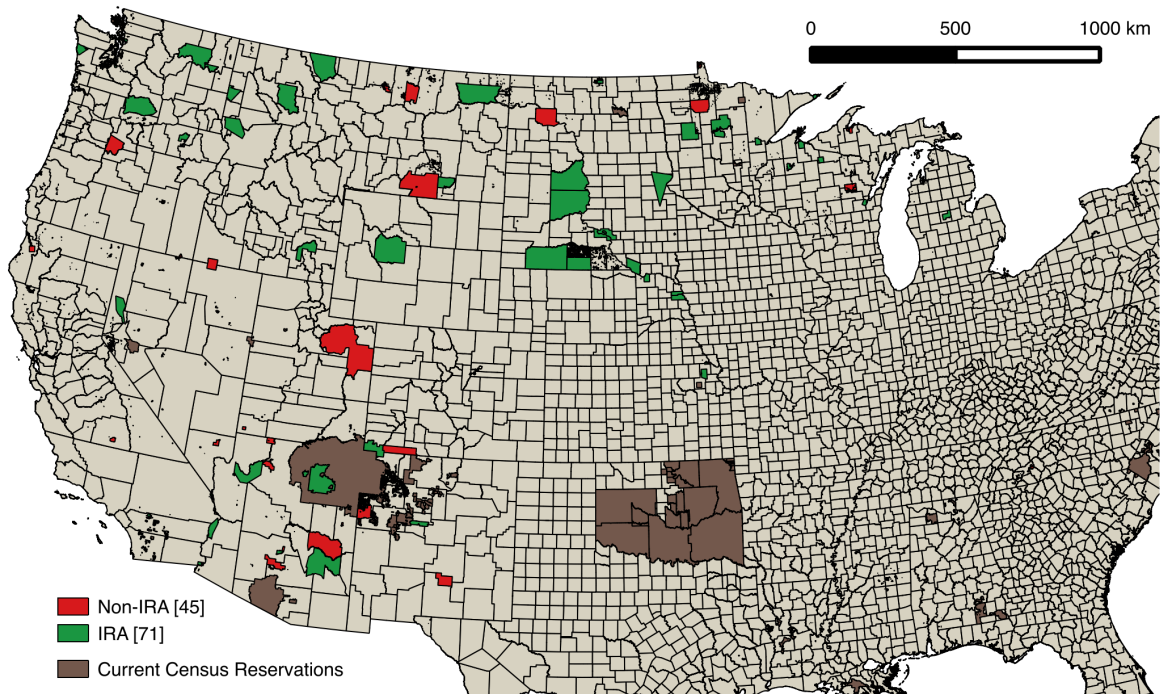


Table 1 presents summary statistics for the full sample of reservations. The table indicates the mean, standard error, and number of observations by IRA status. The final three columns present the difference between IRA and non-IRA reservations and tests whether or not there is a statistical difference between the two groups. Several of the outcomes are different between IRA and non-IRA reservations. IRA reservations have lower incomes, higher proportion of Indians, and lower housing values. Several of the geographic controls exhibit statistical differences. IRA reservations are much closer to coal deposits and have poorer surrounding economic environments. Among the historical controls there appear to be differences in education, marriage and average family size, all of which are related to assimilation. IRA reservations were also less likely to have been allotted and have higher voting populations.

Table 1:

	Summary Statistics for Full Sample									
	IRA Reservations			Non-IRA Reservations			Difference			T-stat
	Mean	SE	N	Mean	SE	N	Mean Diff	SE		
Outcomes										
Per Capita Income	6757.94	375.90	88	7555.65	375.90	31	-797.70	475.28	-1.68	
Median Household Income	17422.85	812.13	88	19913.26	812.13	31	-2490.41	1039.81	-2.40	
Indian per Capita Income	4982.63	289.29	88	5859.61	289.29	31	-876.99	327.15	-2.68	
Population	3722.67	1482.26	88	5330.77	1482.26	31	-1608.10	1564.94	-1.03	
Share of Indians	68.50	5.15	88	53.49	5.15	31	15.02	5.92	2.54	
Median House Value	46219.27	3716.16	88	54287.10	3716.16	31	-8067.82	4335.15	-1.86	
Share Completed High School	63.39	2.62	88	62.40	2.62	31	0.99	2.91	0.34	
Share Completed College	29.81	2.24	88	32.67	2.24	31	-2.86	2.65	-1.08	
Geographic Characteristics										
Distance from MSA (in km)	202.56	36.21	85	177.71	36.21	31	24.85	39.33	0.63	
Avg Suitability for Wheat	34.25	2.97	85	30.23	2.97	31	4.02	3.84	1.05	
Distance to Coal Deposits (in km)	133.87	10.39	88	73.27	10.39	31	60.61	17.61	3.44	
pc Income of Neighboring Counties	11328.02	334.30	83	12107.28	334.30	28	-779.26	417.24	-1.87	
1910 Reservation Characteristics										
Share of Women	48.81	0.68	84	49.42	0.68	31	-0.61	0.86	-0.71	
Fraction under 18 in school	44.22	2.93	84	52.48	2.93	31	-8.26	3.36	-2.46	
Percent Literate	49.57	3.16	84	54.93	3.16	31	-5.37	3.95	-1.36	
Percent in Labor Force	46.50	2.72	84	42.85	2.72	31	3.65	3.31	1.10	
Percent Married	40.22	1.24	84	37.05	1.24	31	3.17	1.39	2.28	
Percent Living on Farms	37.34	4.24	84	36.43	4.24	31	0.92	5.28	0.17	
Avg Age	26.73	0.50	84	27.37	0.50	31	-0.64	0.66	-0.97	
Avg Family Size	5.31	0.20	84	4.79	0.20	31	0.52	0.25	2.05	
Percent White Blood	14.03	1.25	84	12.57	1.25	31	1.46	2.12	0.69	
1934 Allotment Characteristics										
Percent Allotted	0.55	0.08	88	0.71	0.08	31	-0.16	0.10	-1.67	
Avg Allotment Acreage (000s)	155.67	78.75	88	186.30	78.75	31	-30.62	90.29	-0.34	
Avg Number of Allotments	951.67	277.07	88	993.42	277.07	31	-41.75	343.48	-0.12	
Avg Amount of Surplus Land (000s)	89.83	75.17	88	158.34	75.17	31	-68.51	89.96	-0.76	
Avg Acreage Alienated (000s)	57.80	13.60	88	41.78	13.60	31	16.02	22.16	0.72	
IRA Voting Population	624.5909	83.00893	88	426.5484	83.00893	31	198.0425	120.4248	1.64	

Footnote: Data is from the sources described in section 3.2.

3.3 Regression Discontinuity

My empirical specification exploits the narrow IRA voting results in a regression discontinuity (RD) framework to estimate the effect of the IRA on the outcomes of interest. My preferred RD specification is of the form

$$Y_i = \beta_0 + \beta_1 IRA_i + f(x_i) + RezChar_i' \gamma + Allot_i' \delta + Geo_i' \theta + \varepsilon_i,$$

$$\forall x_i \in (c - h, c + h),$$

where Y_i is the outcome of interest, IRA_i is the treatment, and h is the bandwidth. The running variable, x_i measures the difference in the IRA voting divided by the eligible voting population. In most cases not everyone cast a ballot for or against the IRA. A practical interpretation of the bandwidth is the fraction of individuals that need to change their votes to alter the IRA election outcome. I chose to include the eligible voters that abstain from voting because it seems more plausible to induce a smaller fraction of those voters to vote than change a larger proportion of individuals that cast votes.³

The coefficient of interest is β_1 , which measures the effect of adopting the IRA conditional on the controls. I estimate this equation using a Local Linear Regression, which combines a suitable bandwidth and a linear control function, $f(x_i)$. I use the algorithm outlined by Imbens and Kalyanaraman (IK) (2012) to choose my optimal bandwidth. The results are robust to a variety of bandwidths including a newer optimal bandwidth algorithm from Calonico, Cattaneo, and Titiunik (CCT) (2013).

3.4 Regression Discontinuity Sample Summary Statistics

Table 2 compares IRA and non-IRA reservations within the RD sample to check whether or not there were any preexisting differences prior to the IRA election. As described in section 3.2, differences exist in the geographic data, census data, and the allotment data for the full sample. However, within the RD sample these differences are much smaller. To test whether or not any of the controls are statistically different between IRA and non-IRA reservations I run the prior RD specification but replace the outcomes of interest with the control variables. The results indicate that only distance from urban areas is statistically different between IRA and non-IRA

³ I have run the analysis with $x_i = \frac{(yes-no)}{(yes+no)}$, where I only consider the individuals that voted and the results do not change significantly although the optimal bandwidths are much larger.

reservations within the RD sample. This result helps validate the bandwidth choice and supports the need for the RD design to overcome endogeneity concerns.

Table 2:

Summary Statistics of Controls within Optimal Bandwidth								
	IRA Reservations			Non-IRA Reservations			Difference	
	Mean	SE	N	Mean	SE	N	Mean Diff	RD Diff
Geographic Characteristics								
Distance from MSA (in km)	188.50	45.44	49	183.96	45.44	22	4.54	***
Avg Suitability for Wheat	39.61	3.19	49	31.18	3.19	22	8.43	
Distance to Coal Deposits (in km)	159.36	13.81	51	70.26	13.81	22	89.10	
pc Income of Neighboring Counties	10974.69	404.48	48	11973.71	404.48	20	-999.01	
1910 Reservation Characteristics								
Share of Women	48.85	0.79	48	49.59	0.79	22	-0.74	
Fraction under 18 in school	45.78	3.12	48	53.47	3.12	22	-7.69	
Percent Literate	52.68	2.93	48	57.51	2.93	22	-4.83	
Percent in Labor Force	45.40	3.07	48	39.46	3.07	22	5.94	
Percent Married	39.15	1.40	48	36.66	1.40	22	2.49	
Percent Living on Farms	38.58	5.39	48	37.09	5.39	22	1.48	
Avg Age	26.43	0.53	48	27.01	0.53	22	-0.58	
Avg Family Size	5.45	0.25	48	4.89	0.25	22	0.55	
Percent White Blood	16.62	1.51	48	14.08	1.51	22	2.54	
1934 Allotment Characteristics								
Percent Allotted	0.71	0.07	51	0.86	0.07	22	-0.16	
Avg Allotment Acreage (000s)	236.04	66.63	51	168.68	66.63	22	67.36	
Avg Number of Allotments	1382.57	307.63	51	1131.68	307.63	22	250.89	
Avg Amount of Surplus Land (000s)	79.32	74.26	51	143.50	74.26	22	-64.18	
Avg Acreage Alienated (000s)	97.17	16.53	51	48.96	16.53	22	48.22	
IRA Voting Population	804.902	105.2806	51	514.1364	105.2806	22	290.7656	

Footnote: Data is from the sources described in section 3.2.

4. Empirical Results

My primary outcome of interest is per capita income. Figure 2 plots the log of per capita income and fits a 4th order polynomial to the data before and after the cutoff. Apparent from the figure is the large discontinuity around the IRA win margin. Reservations to the left of the margin did not adopt the IRA and Figure 2 indicates these reservations have significantly higher incomes. Table 3 presents the regression discontinuity results for per capita income under several different specifications. The first column presents the results using the IK optimal bandwidth.

The results indicate that reservations who narrowly adopted the IRA have over 48 percent lower incomes measured in 1990. Column 2 reports results using the CCT optimal bandwidth, which is slightly more restrictive and finds a larger effect.

Columns 3 through 5 step in the various controls for historical and contemporary reservation demographics, allotment and land tenure characteristics from 1934, agricultural land quality measures, and several spatial characteristics including the distance to natural resources and the distance to urban areas and major metropolitan areas. These controls are particularly helpful with small sample bias (Imbens & Lemieux 2008). Including these controls only reduces the point estimates slightly. The results indicate that narrow IRA adoption led to substantially lower future incomes on Indian reservations. Table 4 shows RD results for both the full reservation population and only those self-identifying as Native American. The results from column 2 indicate that the IRA less negatively impacts individuals identifying as only Native American on the census. One possible reason is that IRA reservations may have larger tribal governments and have preferential hiring toward Native Americans, which improves Indian incomes relative to other reservation residents. I am currently looking for reservation level data on federal payments to tribal governments or tribal government employment data to test this assertion.

Figure 2: Regression Discontinuity Plot of Per Capita Income

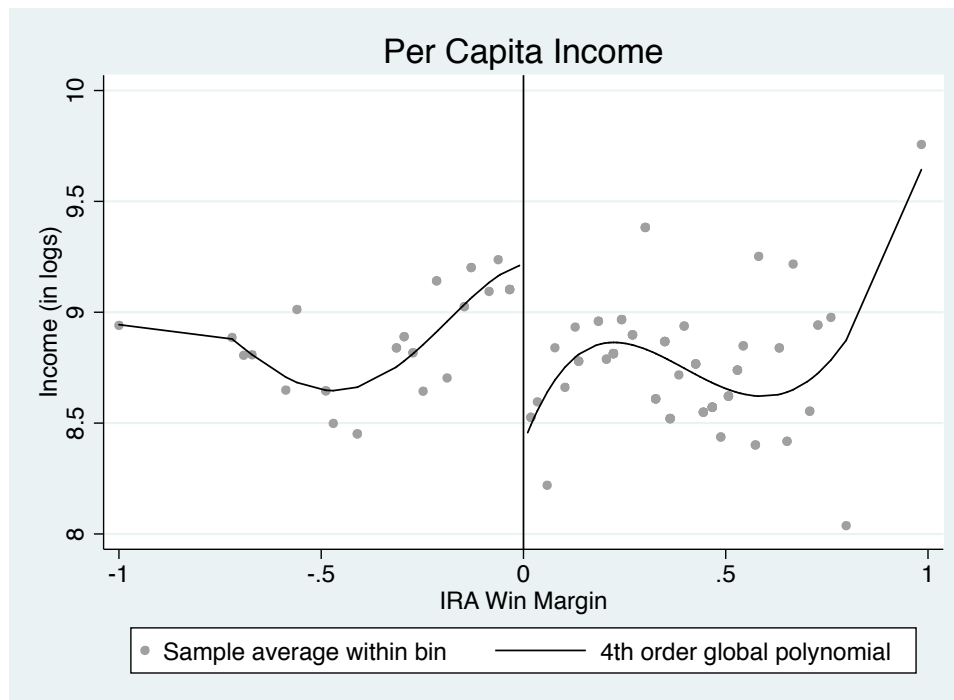


Table 3:

Indian Reorganization Act and Per Capita Reservation Income					
	(1)	(2)	(3)	(4)	(5)
IRA Voting	-0.658*** (0.193)	-0.757*** (0.258)	-0.525*** (0.187)	-0.616*** (0.177)	-0.535** (0.208)
Geography Controls			x	x	x
Allotment Controls				x	x
1910 Controls					x
Bandwidth Type	IK	CCT	IK	IK	IK
Bandwidth	0.426	0.267	0.301	0.301	0.301
LATE in %s	-48.21	-53.09	-40.84	-45.99	-41.43
Observations	73	38	119	119	119

Per capita income is in logs. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Figure 3 shows regression discontinuity graphs for two different measures of education. The first is the proportion of the population with a college degree. The figure seems to indicate that non-IRA reservations have a slightly higher percentage of college educated residents. The second figure repeats the plot for the proportion of reservation residents with less than a 9th grade education and appears to find no result. I would not expect pre-high school dropout rates to be strongly influenced by the IRA given the national trends in high school attendance and the fact that education policy is often set outside of local tribal governments. Columns 3 and 4 of Table 4 support the evidence presented in the figures. The fraction of college educated individuals is over 10 percentage points lower on IRA reservations, based on the sample mean that is a difference of nearly 35 percent.⁴ As expected there is no statistical difference in the proportion of the population with less than a 9th grade education.

Column 5 of Table 4 also reports differences in the level of racial integration between IRA and non-IRA reservations. IRA reservations have a significantly higher proportion of individuals self-identifying as single race Native American. I am hoping to get data on migration by race to determine whether or not this is a result of emigration of Native Americans or immigration of non-Native Americans. Column 6 examines the fraction of individuals using public assistance. The results are consistent with the earlier income results. Individuals living in IRA reservations are over 12 percentage points more likely to be receiving some type of public assistance. Given an average public assistance rate of 22 percent, individuals on IRA reservations are over 56 percent more likely to be receiving some type of public assistance.

⁴ I am currently working on determining if these results may be driven by differential educational attainment or differential migration by skill.

Figure 3: Regression Discontinuity Plot of Education

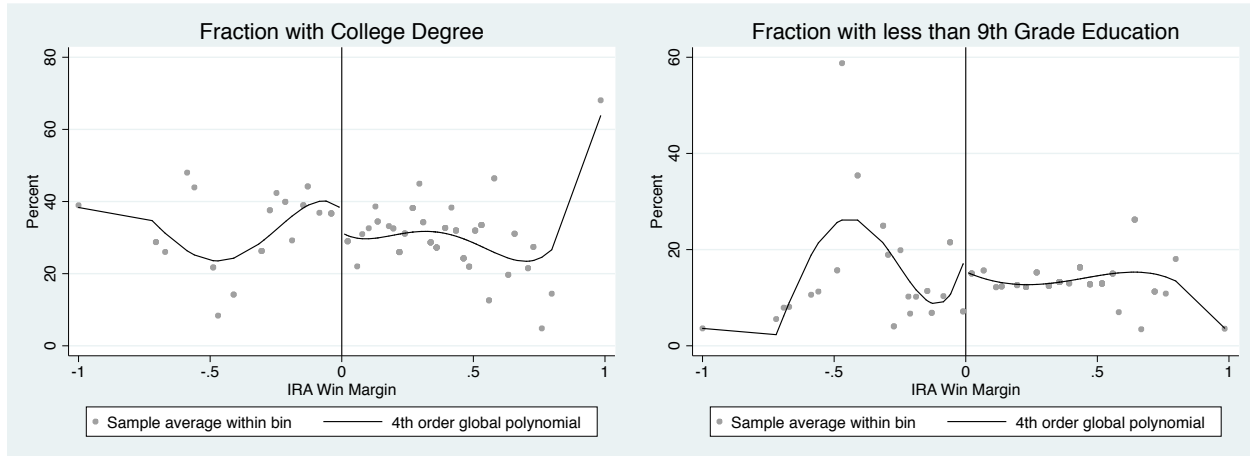


Table 4:

Regression Discontinuity Estimates of the Impact of the Indian Reorganization Act						
	(1)	(2)	(3)	(4)	(5)	(6)
	Indian Per Capita Income	Per Capita Income	Percent Complete College	Percent with Less than HS	Share of Indians	Share Receiving Pub. Assistance
IRA Voting	-0.295** (0.135)	-0.658*** (0.193)	-10.62* (5.739)	2.605 (5.467)	63.43*** (13.24)	12.36** (6.010)
Bandwidth Type	IK	IK	IK	IK	IK	IK
Bandwidth	0.901	0.426	0.410	0.424	0.364	0.524
Outcome Mean	5211.08	6965.75	30.56	14.14	64.59	22.14
LATE in %s	-25.55	-48.21	-34.75	18.42	98.2	55.83
Observations	117	73	69	71	63	93

Per capita income is in logs. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

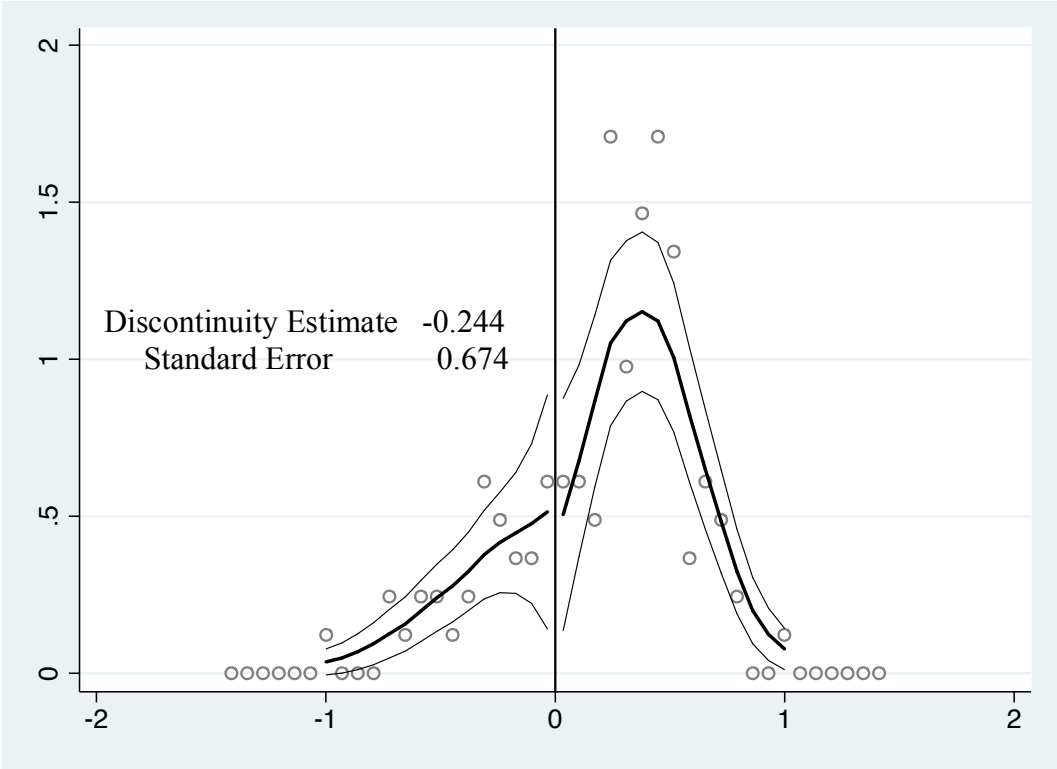
5. Robustness

5.1 Manipulation Around the Threshold

If individuals can manipulate whether or not the tribe passed the IRA, and therefore create a discontinuity around the voting threshold, then RD does not properly correct for the selection problem. One reason this might be problematic in the case of IRA voting are the anecdotal accusations that the BIA altered elections in favor of the IRA (Johansen & Pritzker 2008).

McCrary (2008) developed a non-parametric test that measures whether or not a discontinuity exists around a threshold. Figure 4 presents the results from the McCrary Density Test. The coefficient estimates find no evidence of manipulation of the voting to the other side of the threshold.

Figure 4: McCrary Density Test with IRA Voting



5.2 Alternative Cutoffs

As robustness, I selected four different voting cutoffs and tested whether or not similar discontinuities were present and did not find any evidence of income differences at these different cutoffs.

Table 5:

Indian Reorganization Act and Per Capita Reservation Income with Varying Cutoffs				
	(1)	(2)	(3)	(4)
IRA Voting	0.0634 (0.167)	-0.243 (0.158)	0.137 (0.142)	-0.102 (0.196)
Voting Cutoff	-0.25	-0.1	0.2	0.4
Bandwidth	0.320	0.423	0.370	0.238
Observations	119	119	119	119

Per Capita Income is in logs. Standard errors in parentheses. ***
p<0.01, ** p<0.05, * p<0.1

6. Mechanisms

6.1 Restrictive Federal Oversight

In the late 1980s two important pieces of legislation increased tribal sovereignty, the Indian Gaming Regulatory Act and the Indian Self-Determination and Education Assistance Act (Dippel 2013). These laws reduced BIA oversight, which may have limited the benefits of being a non-IRA reservation. In order to test this assertion I run a Difference-In-Difference (DID) specification that examines whether or not there were differential effects on per capita income of being an IRA reservation in 2000 and in 2010 compared to 1990.

$$Y_{it} = \beta_0 + \beta_1 IRA_i + \beta_2 I_{2000} + \beta_3 I_{2010} + \beta_4 I_{2000} \times IRA_i + \beta_5 I_{2010} \times IRA_i + f(x_i) + RezChar_i' \gamma + Allot_i' \delta + Geo_i' \theta + \varepsilon_{it}$$

The coefficients of interest are β_4 and β_5 , which measure the effect of being an IRA reservation in 2000 and 2010. I expect IRA reservations to benefit more from relaxing administrative oversight; therefore I expect β_4 and β_5 to be positive. The other variables are the same as in the previous regression discontinuity specification. In an effort to address the selection issues from before, I restrict the sample to the same set of reservations from the RD

specifications. The DID specification assumes that in the absence of federal changes, which allowed for increased tribal self-governance, the IRA and non-IRA reservations would have had equal trends. However, it is plausible that the non-IRA reservations would have slightly higher growth in the absence of the federal changes. This suggests that the coefficients of interest, β_4 and β_5 , will be negatively biased. Table 6 presents the DID regression results for a variety of specifications.

Table 6:

Indian Reorganization Act and Per Capita Reservation Income Between 1990 - 2010					
	(1)	(2)	(3)	(4)	(5)
IRA	-0.166** (0.0752)	-0.00356 (0.0775)	-0.863*** (0.229)	-0.554* (0.295)	
IRA x 2000	0.156*** (0.0527)	0.123** (0.0552)	0.155*** (0.0535)	0.123** (0.0561)	0.125** (0.0628)
IRA x 2010	0.0843 (0.0687)	0.0301 (0.0729)	0.0842 (0.0697)	0.0301 (0.0741)	0.0541 (0.0628)
2000	0.162*** (0.0398)	0.158*** (0.0450)	0.162*** (0.0404)	0.158*** (0.0457)	0.162*** (0.0541)
2010	0.296***	0.307***	0.296***	0.307***	0.296***
Geography Controls		x		x	
Allotment Controls		x		x	
1910 Controls		x		x	
Quartic Polynomial			x	x	
Res. Fixed-Effect					x
Bandwidth Type	IK	IK	IK	IK	IK
Bandwidth	0.545	0.545	0.545	0.545	0.545
Observations	282	282	282	282	282
R-squared	0.176	0.472	0.351	0.581	0.848

Per capita income is in logs. Standard errors in parentheses are clustered by reservation. *** p<0.01, ** p<0.05, * p<0.1

Preliminary empirical results indicate the increased tribal sovereignty led to marginal improvements in incomes among IRA reservations relative to non-IRA reservations after 1990. Column 1 presents the standard DID regression results without any controls. The interaction term coefficients indicate that IRA reservations grew approximately 15 percent faster than non-IRA reservations between 1990 and 2000. These results taper off slightly by 2010. Columns 2 through 4 introduce time invariant controls for geography, allotment, and 1910 reservation characteristics. The final specification replaces the controls with reservation fixed-effects. The results are consistent across the different specifications and suggest that the federal oversight faced by IRA reservations was partially responsible for suppressing economic development over the 20th century.

6.2 IRA Era Constitutional Design and Conflict

I am in the process of collecting and examining the early constitutions themselves to determine whether or not there were significant differences between the IRA and non-IRA constitutions that led to the differences in development. Akee et al. (2012) find that tribal constitutions built around a parliamentary system are more beneficial economic development. There does not appear to be any statistical difference in the likelihood of adopting a constitution or corporate charter between IRA and non-IRA reservations.⁵

If the governmental structure imposed by the IRA was sufficiently different from traditional tribal democratic systems then it is possible that it leads to more intra-tribal conflict, which would result in less economic development. Cornell et al. (1995), Cornell and Kalt (2008), and Dippel (2013) have established both qualitative and quantitative connections between local political conflict and income differences on reservations. To address this possible mechanism I

⁵ Regression discontinuity results that determine whether or not a reservation government forms a corporate charter or constitution as a function of IRA status are available by request.

will use *ProQuest* newspaper database to search for instances of political conflict and corruption. Disentangling the effects of federal oversight compared to constitutional differences is important for determining the mechanisms that led to the contemporary income differences we see on reservations today.

7. Conclusion

This paper finds that the Indian Reorganization Act was detrimental for economic development on American Indian reservations. The preliminary findings suggest that among reservations who held narrowly determined IRA elections the IRA led to lower incomes, a smaller fraction of the population with a college degree, less racial integration, and a larger reliance on public assistance. This paper identifies three potential channels through which the IRA effects current economic conditions, tribal governmental structure, increased federal oversight, and inter-tribal conflict. This paper contributes to a growing literature on the intersection of legal and social institutions for economic development.

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