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Income Inequality and Oil Resources: Panel Evidence from the United States*

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Abstract

There has been little research examining income distributional consequences from resource abundance and dependency. Using panel evidence from the United States, we find contrasting non-monotonic outcomes from oil abundance in comparison to oil dependency. Oil abundance mitigates inequality within U.S. states. However, the diminishing impact on inequality tends to lessen with higher levels of oil production. The opposite holds true for oil dependency. The findings suggest that income inequality within U.S. states is more vulnerable to oil dependency.

Keywords: oil resources, income inequality, United States

JEL Classification: D63, O13, O51

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1 Introduction

Resource abundance is seen as the achilles heel to economic development in several resource-rich countries. Since the seminal work of Sachs and Warner (1995), several studies have found a negative relationship between natural resource abundance and growth-promoting factors, such as, income per capita (Gylfason and Zoega, 2006; Arezki and van der Ploeg, 2010), child mortality (Daniele, 2011), weak institutions (Bjorvatn and Naghavi, 2011) and conflict (Brunnschweiler and Bulte, 2009). Recently, literature has explored the dynamics between resource abundance and differences in income distributions (Kim et al., 2020; Parcero and Papyrakis, 2016). Performing cross country analysis, these studies find that oil abundance is associated with lower income inequality, with the exception of high oil-rich economies. We contribute to the literature by examining the link between oil resources and income inequality in the United States (U.S.). Particularly, we are interested in examining differences in inequality outcomes depending on oil abundance (defined as oil production) versus oil dependency (defined as oil consumption).

The United States ranks among the top oil producing (U.S. Energy Information Administration, 2019) and consuming countries in the world. According to the Energy Information Administration (EIA), proven oil reserves in the United States were 43.8 billion barrels of crude oil as of the end of 2018 which represents the largest U.S. proven oil reserves since 1972 (U.S. Energy Information Administration, 2019). The EIA also estimates the United States undiscovered recoverable oil resources to be an additional 198 billion barrels. Moreover, the oil and gas industry supported 10.3 million jobs and contributed 8% of the country's GDP (American Petroleum Institute, 2018). At the same time, inequality levels in the United States have been on the rise. The Census Bureau estimates show that the gini index has increased from 39.7% in 1967 to 48.5% in 2018 (Telford, 2019). Given that the United States is both the highest producer and consumer of oil, with rising inequality, it makes this study a relevant testing ground for the resource-income inequality nexus hypothesis. Note, U.S. states are characterized with similar institutions and face common monetary and fiscal policies, which provides us with an opportunity to separate the effects between oil abundance and oil dependency on income inequality without worrying about differences on quality of institutions or policy respones. We believe that understanding the dynamics that link resources to inequality is necessary in redressing income disparities that determine the gains and losses in societal welfare.

Using panel data analysis, we find a 'u-shaped' non-linear relationship between oil abundance and income inequality for 50 U.S. states over the period 1997-2015. Revenue windfall gains from oil production decrease income inequality. However, as the production level increases, the negative impact on inequality tends to diminish. The findings suggest that even rich countries, such as the United States, with strong institutions can be susceptible to the resource curse (higher inequality), if revenues from oil-abundant states continue unabated. Results also indicate that oil dependent states are more vulnerable to higher income inequality. Interestingly, at higher consumption level, the positive relationship between income inequality and oil dependency lessens. The findings also highlight the importance of understanding the different dynamics between oil abundance and oil dependency.

The remainder of the paper is organised as follows. In the next section, a review of literature is presented. Section 3 describes the data and methodology. Section 4 presents the main results, and Section 5 concludes.

2 Related Literature

Countries with natural resource abundance are expected to outperform resource-scarce countries through financing diversified investments in human capital, or investing in more capital import goods to increase new technologies and industrial development (Tsui, 2010). For example, Brunnschweiler and Bulte (2008) finds that resource abundance results in increased economic growth and quality of institutions. However, most empirical evidence provides contrary findings for resource abundance and economic growth, with most resource-rich countries associated with lower incomes per capita (Arezki and van der Ploeg, 2010; Sachs and Warner, 1995). Several channels have been put forward by the literature to explain this resource curse puzzle. First, countries with weak economic and political institutions are particularly prone to the resource curse as the presence of abnormal resource revenues result in rent-seeking competition and corruption (Papyrakis et al., 2017; Torvik, 2002; Mehlum et al., 2006). The rent-seeking behaviour from resource rents has also been linked to conflicts, especially in regions with high ethnic fractionalisation (Brunnschweiler and Bulte, 2009; Olsson, 2007).

A second channel examines the *Dutch disease* effect caused by resource abundance. In resource-rich countries, there is reduced incentive to invest in non-resource sectors, such as, manufacturing and agriculture, shifting most production factors to the resource sector and leaving the countries vulnerable to adverse global commodity price changes. Resource booms, through the increase in exchange rates, can also lower the competitiveness of non-resource sectors leading to lower total factor productivity and overall delayed growth in the country (Torvik, 2001; Beine et al., 2012; Papyrakis et al., 2017).

Other channels include adverse resource effects on child mortality, gender inequality and poverty alleviation. According to Ross (2008), evidence shows that oil-rich countries have reduced female labour participation and political representation. Similarly, findings by Bulte et al. (2005); Daniele (2011) associate natural resources with lower standards of living, measured by the composite human development index, and higher child mortality.These negative effects however appear to be mitigated by institutional quality in the resource-rich countries.

While a significant proportion of the literature examines the effects of resource abundance on the level of income per capita, we shift our focus to income distribution where an emerging literature finds contrasting results. Resource rents can reduce income inequality if the revenues are distributed equitably as to target lower income groups (Parcero and Papyrakis, 2016). Several studies confirm these findings. For example, Kim and Lin (2018) finds a negative long-run relationship between oil abundance and income inequality, while Parcero and Papyrakis (2016); Steinberg (2017) find that oil is associated with lower income inequality, except in very oil-wealthy economies. Interestingly, Kim et al. (2020) observes that oil abundance decreases income inequality through higher human capital investment and improved quality of institutions, but oil volatility has the opposite effect on income inequality. Moreover, Fum and Hodler (2010) finds that resource abundance decreases income inequality in ethnically homogeneous regions, but increases inequality in ethnically diverse regions.

On the other hand, Leamer et al. (1999) argues that resource abundance leads to higher income inequality through lower human capital accummulation and a relocation of physical capital from manufacturing. Gylfason and Zoega (2003) also finds that income inequality increases with resource abundance when distribution of capital is unequal between resource and non-resource sectors. In addition, Carmignani (2013); Buccellato and Mickiewicz (2009) find a positive association between natural resources and income inequality. Although, Ross (2008); Stijns (2006) fails to find any correlation between naural resources and income inequality, the lack of transparency from governments in resource-rich countries may result in under-reported data on income inequality which can bias estimations.

While much of the literature links the resource curse to resource abundance or revenues, we find limited evidence and aim to fill this gap, on the distinction between resource abundance and dependency. We contribute to the emerging strand of literature on income inequality by examining the effects of oil abundance and dependency on income inequality in the United States.

3 Data and Methodology

We use a panel of 50 U.S. states over the period 1997 to 2015 to estimate the following model:

$$Y_{it} = \alpha_i + \delta_t + \beta_i Z_{it-1} + \beta_i X_{it-1} + u_{it} \tag{1}$$

where Y_{it} is the gini coefficient obtained from the U.S. State-Level Income Inequality Data (Frank, 2009). The data has been updated since publication in 2009.[1] The gini coefficient measures the income distribution across a population. The coefficient is scaled from zero to one, with higher values indicating more inequality. The Z_{it} is a vector containing the main explanatory variables for oil abundance and oil dependency. As a measure for oil abundance, we use the crude oil production at a thousand barrels per day. For robustness check, we also use revenue data collected from mainly oil and gas resource extractions plus other minerals, such as coal, phosphates and hardrock. The revenues include bonuses, rents and royalties for the Native American lands and U.S. federal lands and offshore areas by calendar year. The data is obtained from the Office of the Natural Resources

[1] https://www.shsu.edu/eco_mwf/inequality.html.

Revenue at the U.S. Department of the Interior.[2] For oil dependency, we use the total consumption of all petroleum products at a thousand barrels per day. As a robustness check, we use an oil dependency measure by Michelis et al. (2020) calculated as oil consumed minus oil produced as a percentage of oil consumed. Both crude oil production and total oil consumption variables are obtained from the State Energy Data System.[3]

The X_{it} is a vector of control variables which includes real GDP per capita, education, population and an institutional measure. The real GDP per capita is obtained from the Bureau of Economic Analysis, while education is the total number of college graduates divided by the total state population taken from the U.S. Annual State-Level Human Capital Measures (Frank, 2009). Total population per state and the percentage of legislators who are women are obtained from The Correlates of State Policy Project (Jordan and Grossman, 2020). All variables are logged except the gini coefficient.

State and year fixed effects are captured by the α_i and β_t respectively. We use the fixed effects (FE) method that has been suggested in literature for estimating heterogeneous panels that are large in cross section and large in time series. The FE method gives more efficient estimates because it minimises economic and statistical endogeneity by allowing for unobserved country and time differences through individual specific effects. We also use robust standard errors to deal with potential presence of heteroskedasticity and serial correlation which can result in biased estimates and inferences. To further reduce the potential bias that may come from economic endogeneity in the form of reverse causality, we estimate a model with lagged explanatory variables.[4] The lagged terms also allow us to model a delay in the responsiveness of income inequality to changes in the determinants during the period under review.

4 Results

We report the initial results in Table 1.[5] Columns 1 and 2 present the results that capture the relationship between income inequality and the two measures of oil abundance (oil production and oil revenue). Results show that oil abundance decreases inequality, though the main coefficient for oil production is statistically insignificant. A one standard deviation (2.06) increase in oil production corresponds to a decrease in the gini coefficient by 0.006 points. Likewise, a one standard deviation (3.65) increase in oil revenue decreases the gini coefficient by 0.01 points. Our results are in line with findings by Kim and Lin (2018) who perform cross country analysis and show that oil abundance reduces income inequality, with the exception of high oil-rich economies.

[2]https://revenuedata.doi.gov.

[3]https://www.eia.gov/state/seds/.

[4]The model remains robust with no lags and longer lag structures for the oil resource measures. Results are available on request.

[5]We check for endogeneity in our main explanatory variables using the Durbin score and Wu-Hausman F-test. Both tests reveal that the variables are exogenous. We also check for cross-sectional dependence using the Pesaran (2015) test. We reject the null hypothesis for weak cross-sectional dependence.

Columns 3 and 4 present the findings that capture the relationship between income inequality and oil dependence measures. The initial results reveal that oil dependency decreases inequality within the U.S. states, though the main coefficient for oil consumption is statistically insignificant. A one standard deviation (1) increase in oil consumption leads to the gini coefficient decreasing by 0.01 points, while a one standard deviation (1.81) in oil dependency decreases the gini coefficient by 0.009 points. We believe this is due to the fact that oil-consuming states are vulnerable to changes in oil prices. Resource dependency can expose countries to volatility in oil prices which can increase inequality through inflation Lucas and en Ton Manders (2010).

Figure 1 shows the trend in oil production and consumption over time in relation to income inequality. We observe contrasting non-monotonic distributions emerging for oil production in comparison to consumption as income inequality increases. This suggests heterogeneous effects on income inequality from oil production (abundance) and consumption (dependence). Therefore, we continue the analysis by investigating the existence of nonlinearity in the relationship. Specifically, we check whether the effects on income inequality depend on the level of production of oil. This is performed by squaring the two oil abundance measures. Estimated coefficients of the squared terms (oilproductionsq and oilrevenuesq) in Table 2, Columns 1 and 2 are positive and statistically significant. Findings suggest that the negative impact of oil abundance on income inequality diminishes as the level of oil production and revenue increase. Similarly, we check for non-monotonic relationship between income inequality and oil consumption. Results reveal that the positive impact of oil dependency on income inequality lessens with higher level of oil consumption. Note, the inclusion of both oil production and oil consumption in model 1 do not attenuate the non-linear effects of oil abundance and dependency on income inequality (see Column 5).

These findings present interesting implications in the resource literature. While oil abundance alleviates inequality, its windfall gains become more selective with higher production or revenue level creating potential for widening income disparity. For example, Lucas and en Ton Manders (2010) finds that for net oil-exporting countries, increasing oil prices can increase real national income through higher export earnings. However, part of this gain can be offset by lower demand due to a fall in non-oil exports caused by a rise in the exchange rate ("Dutch disease"). Moreover, Funes (2016); Goderis and Malone (2011) find that an oil boom induces a fall in income inequality due to the migration of unskilled labour from non-resource to the resource sector with higher wages. Over time, the channel works solely through the share of oil revenues in the total income, that is, the greater the revenues are in the total income, the higher is the income inequality (Goderis and Malone, 2011).

Oil-consuming states are vulnerable to changes in oil prices. Resource dependency can expose countries to volatility in oil prices which can increase inequality through inflation. According to Lucas and en Ton Manders (2010), an increase in the price can lead to a transfer of income from oil importing countries to oil exporting countries through a shift in terms of trade. Price increases generally decrease employment and production and increase inflation which can contribute to widening the income inequality gap. On the other hand, the impact from the price increases might be reduced due to national responses, such as a tight fiscal policy to reduce consumption, or switching to other sources of energy, or increasing domestic production.

The control variables are in line with the literature. Higher income per capita decreases income inequality. According to Choi (2006); Ravallion (2009), richer countries may suffer less from unequal income distribution because of their increased capacity for redistribution. Similarly, higher educational attainment corresponds with lower income inequality. This is in line with the results by (De Gregorio and Lee, 2002) who show that more equal distribution of education can contribute to lower income inequality. Population density is negatively associated with income inequality, a result in line with Crenshaw and Ameen (1993); Sylwester (2003). They show that over time higher densities create more stratified societies, and that this greater heterogeneity allows for opportunities for social mobility into activities other than agriculture, resulting in lower income inequality. To control for quality of institutions, we use the the percent of legislators that are women. Even though the quality of institutions corresponds with lower income inequality, the estimated coefficient is not statistically significant.

It should be noted that results are consistent across various specifications of model 1, such as control for initial level of income inequality (gini coefficient for the year 1997) in Table 3 and interacting the oil resource measures with institutions in Table 4. The findings are consistent with the earlier results that oil abundance decreases income inequality at low levels of oil production, but starts to increase as the level of oil production increases. Oil dependency increases inequality at low levels of consumption but decreases inequality as level of consumption increases.

We also disaggregate the United States by regions and find that the non-linear effects for both oil abundance and dependency are prevalent in the South (see Table A3)and West regions (see Table A4).[6] These regions typically have the states with the highest oil producers, such as Texas and New Mexico. The oil production in Alabama, Arkansas, Louisiana, Mississippi, New Mexico, and Texas was the largest in 2019, producing some 8.08 million barrels of crude oil per day.[7] Several of the states in these two regions are also ranked as the highest oil consumers. For example, Texas, California, Louisana and Florida were among the top five energy-consuming states in 2015.[8]

5 Conclusion

This paper investigates the impact of oil resources and income inequality in the United Sates, with a particular focus on the effects of oil abundance versus oil dependency on income inequality. The findings reveal different non-monotonic relationships between oil abundance and income inequality, and oil dependency and income inequality. We find that oil abundance decreases income inequality. Its negative impact on inequality diminishes with higher level of oil abundance. On the other hand,

[6] We do not include the Northeast region due to lack of observations.

[7] https://www.statista.com/statistics/709665/daily-crude-oil-production-by-us-padd/.

[8] https://www.eia.gov/todayinenergy/detail.php?id=32312.

we find that oil dependency significantly increases income inequality and its impact tends to lessen as the level of dependency increases.

The findings from this study can continue to inform policymakers on the link between natural resources and income inequality. For example, our results show that oil-abundant states tend to experience less redistribution of income, while states with low oil dependency will face higher income inequality as the level of dependency increases. Thus, policymakers should pay more attention on redistributive policies concerning oil dependent states and high oil abundance states to promote inclusive growth and to avoid the growth-retarding effects associated with the resource curse.

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6 Figures and Tables

Figure 1: Inequality, oil production and consumption

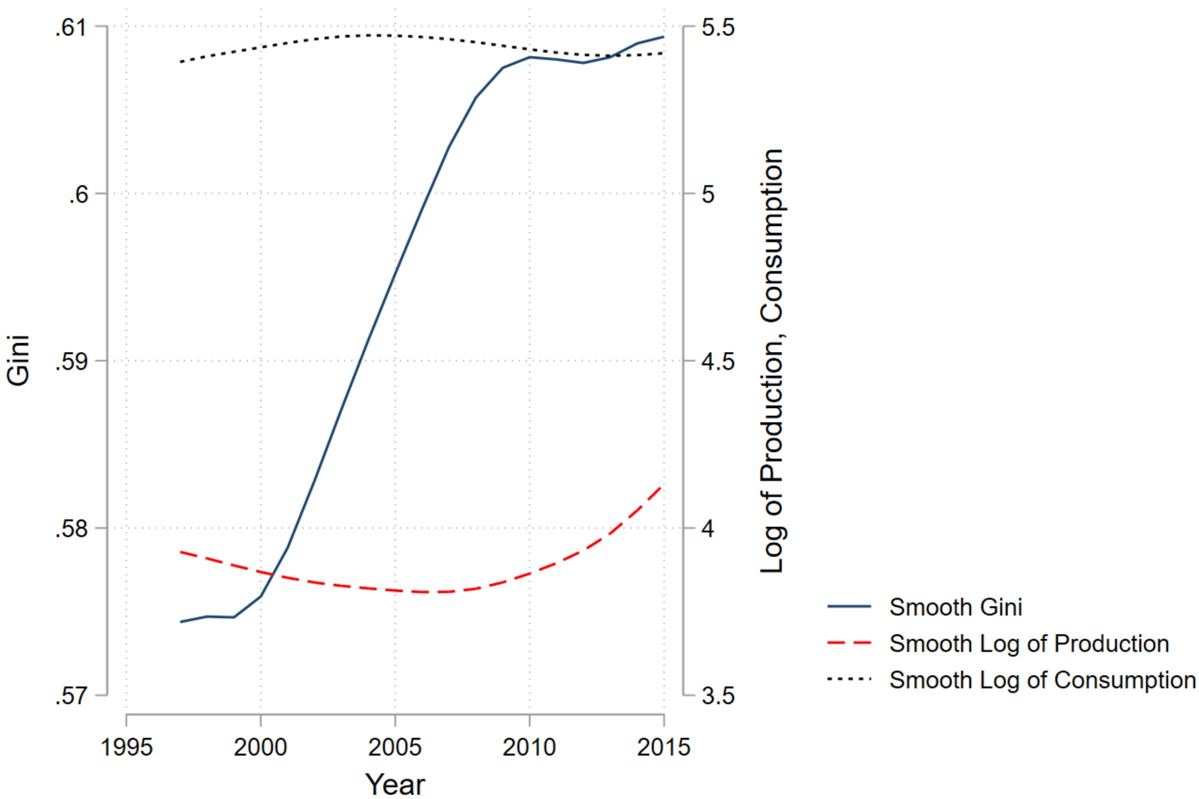

Figure 1 shows the trend in oil production and consumption over time in relation to income inequality in the United States.

Table 1: Income Inequality: Oil abundance vs oil consumption

	Oil Abundance		Oil Dependency		
	(1)	(2)	(3)	(4)	(5)
	Gini	Gini	Gini	Gini	Gini
Oilproduction_t-1	-0.003				-0.001
	(0.004)				(0.004)
Oilrevenue_t-1		-0.003**			
		(0.001)			
Oilconsumption_t-1			-0.010		-0.037**
			(0.013)		(0.017)
Oildependency_t-1				-0.005***	
				(0.001)	
GDP per capita_t-1	-0.022	-0.032*	-0.038**	-0.080***	-0.002
	(0.019)	(0.016)	(0.017)	(0.015)	(0.022)
Education_t-1	-0.041***	-0.099***	-0.038***	-0.044***	-0.045***
	(0.015)	(0.021)	(0.012)	(0.011)	(0.015)
Population_t-1	-0.036	0.100**	-0.010	-0.027*	-0.012
	(0.023)	(0.045)	(0.018)	(0.016)	(0.025)
%Female legislator_t-1	-0.001*	-0.001**	-0.000*	-0.000	-0.001**
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R2-adj	0.758	0.729	0.750	0.757	0.761
Obs	421.000	321.000	746.000	746.000	421.000

Coefficients reported. Robust Standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.
Notes: For oil revenues, data runs from 2003 to 2015. Observations for oil production are lower than oil consumption because several states do not have oil reserves and therefore record zero production and revenues.

Table 2: Income Inequality: Non-linear results

	Oil Abundance		Oil Dependency		
	(1) Gini	(2) Gini	(3) Gini	(4) Gini	(5) Gini
Oilproduction_t-1	-0.023***				-0.028***
	(0.007)				(0.007)
Oilproductionsq_t-1	0.003***				0.003***
	(0.001)				(0.001)
Oilrevenue_t-1		-0.017**			
		(0.007)			
Oilrevenuesq_t-1		0.001**			
		(0.000)			
Oilconsumption_t-1			0.233***		0.236***
			(0.054)		(0.075)
Oilconsumptionsq_t-1			-0.023***		-0.028***
			(0.005)		(0.007)
Oildependency_t-1				0.004	
				(0.003)	
Oildependencysq_t-1				0.001***	
				(0.000)	
GDP per capita_t-1	-0.040**	-0.044**	-0.055***	-0.071***	-0.032
	(0.019)	(0.018)	(0.016)	(0.015)	(0.021)
Education_t-1	-0.041***	-0.093***	-0.037***	-0.045***	-0.043***
	(0.015)	(0.021)	(0.012)	(0.011)	(0.015)
Population_t-1	-0.078***	0.085*	-0.010	-0.020	-0.053**
	(0.024)	(0.045)	(0.018)	(0.016)	(0.027)
%Female legislator_t-1	-0.001	-0.001**	-0.000	-0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R2-adj	0.765	0.732	0.756	0.760	0.781
Obs	421.000	321.000	746.000	746.000	421.000

Coefficients reported. Robust Standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.
Notes: For oil revenues, data runs from 2003 to 2015. Observations for oil production are lower than oil consumption because several states do not have oil reserves and therefore record zero production and revenues.

Table 3: Initial Inequality

	Oil Abundance		Oil Dependency		
	(1)	(2)	(3)	(4)	(5)
	Gini	Gini	Gini	Gini	Gini
Oilproduction_t-1	-0.023***				-0.028***
	(0.007)				(0.007)
Oilproductionsq_t-1	0.003***				0.003***
	(0.001)				(0.001)
Oilrevenue_t-1		-0.017**			
		(0.007)			
Oilrevenuesq_t-1		0.001**			
		(0.000)			
Oilconsumption_t-1			0.233***		0.236***
			(0.054)		(0.075)
Oilconsumptionsq_t-1			-0.023***		-0.028***
			(0.005)		(0.007)
Oildependency_t-1				0.004	
				(0.003)	
Oildependencysq_t-1				0.001***	
				(0.000)	
Gini1997	-1.783*	3.515**	0.817	0.732	-1.879*
	(0.914)	(1.757)	(0.611)	(0.606)	(1.036)
GDP per capita_t-1	-0.040**	-0.044**	-0.055***	-0.071***	-0.032
	(0.019)	(0.018)	(0.016)	(0.015)	(0.021)
Education_t-1	-0.041***	-0.093***	-0.037***	-0.045***	-0.043***
	(0.015)	(0.021)	(0.012)	(0.011)	(0.015)
Population_t-1	-0.078***	0.085*	-0.010	-0.020	-0.053**
	(0.024)	(0.046)	(0.018)	(0.016)	(0.027)
%Female legislator_t-1	-0.001	-0.001**	-0.000	-0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
R2-adj	0.765	0.732	0.756	0.760	0.781
Obs	421.000	322.000	746.000	746.000	421.000

Coefficients reported. Robust Standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.
Notes: For oil revenues, data runs from 2003 to 2015. Observations for oil production are lower than oil consumption because several states do not have oil reserves and therefore record zero production and revenues.

Table 4: Institutions interacted

	Oil Abundance		Oil Dependency		
	(1)	(2)	(3)	(4)	(5)
	Gini	Gini	Gini	Gini	Gini
Oilproduction_t-1	-0.023***				-0.029***
	(0.007)				(0.007)
Oilproductionsq_t-1	0.003***				0.003***
	(0.001)				(0.001)
Oilrevenue_t-1		-0.021***			
		(0.007)			
Oilrevenuesq_t-1		0.001*			
		(0.000)			
Oilconsumption_t-1			0.230***		0.232***
			(0.054)		(0.078)
Oilconsumptionsq_t-1			-0.023***		-0.027***
			(0.005)		(0.007)
Oildependency_t-1				0.010*	
				(0.006)	
Oildependencysq_t-1				0.001***	
				(0.000)	
GDP per capita_t-1	-0.039**	-0.046**	-0.055***	-0.072***	-0.032
	(0.019)	(0.018)	(0.016)	(0.016)	(0.021)
Education_t-1	-0.041***	-0.096***	-0.038***	-0.044***	-0.042***
	(0.015)	(0.021)	(0.012)	(0.011)	(0.015)
Population_t-1	-0.079***	0.090**	-0.012	-0.022	-0.050*
	(0.024)	(0.045)	(0.019)	(0.016)	(0.028)
%Female legislator_t-1	-0.001	-0.004**	-0.001	-0.000	0.001
	(0.001)	(0.002)	(0.001)	(0.000)	(0.003)
Oilproduction*femleg_t-1	0.000				0.000
	(0.000)				(0.000)
Oilrevenue*femleg_t-1		0.000*			
		(0.000)			
Oilconsumption*femleg_t-1			0.000		-0.000
			(0.000)		(0.000)
Oildependency*femleg_t-1				-0.000	
				(0.000)	
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R2-adj	0.764	0.734	0.756	0.760	0.781
Obs	421.000	321.000	746.000	746.000	421.000

Coefficients reported. Robust Standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.
Notes: For oil revenues, data runs from 2003 to 2015. Observations for oil production are lower than oil consumption because several states do not have oil reserves and therefore record zero production and revenues.

7 Appendix

Tables A1 and A2 report the variable definitions and variable statistics. In Tables A3 and A4, we report quantile regressions for oil revenues and oil dependency. Tables A5 to A7 show the regional breakdowns according to the World Bank regional classifications. In Table A8, we include initial income inequality. Table A9 shows the results with no lags, while Table A10 show results for the pooled OLS with no country and year effects. Table A11 includes the institutional variable interacted with the oil resource measures. Table A12 and A13 reports results with a different institutional variable and interaction, namely economic freedom of North America index obtained from the Fraser Institute. We find that the results and overall conclusions drawn from the oil measures remain consistent with the main findings in the paper across the various robustness checks. The interaction term shows that institutions do not mitigate income inequality for the oil abundant states, but are more effective in reducing income inequality in oil dependent states.

Table A1: List of Variables and Definitions

Variable	Description	Source
Gini	Gini coefficient ranging from 0 (low inequality) to 1 (high inequality)	U.S. State-Level Income Inequality Data
Oilproduction	Crude oil production, including lease condensate, at a thousand barrels per day	State Energy Data System
Oilconsumption	Total consumption of all petroleum products at a thousand barrels per day	State Energy Data System
Oilrevenue	Oil and gas resource revenues (rents, bonuses and royalties)	Office of the Natural Resources Revenue
Oildependency	Oil consumed minus oil produced as a percentage of oil consumed	(Michelis et al., 2020)
GDP per capita	Real GDP per capita	Bureau of Economic Analysis
Education	Total number of college graduates divided by the total state population	U.S. Annual State-Level Human Capital Measures (Frank, 2009)
Population	Total population per state	The Correlates of State Policy Project
Female legislator	Percentage of legislators who are women	The Correlates of State Policy Project

Table A2: Descriptive Statistics

	Obs	Mean	Std.Dev.	Min.	Max.
Gini	969	0.59	0.04	0.52	0.71
Oilproduction	539	3.87	2.06	0.00	8.64
Oilrevenue	473	14.51	3.65	4.88	21.74
Oilconsumption	969	5.44	1.00	2.30	8.22
Oildependency	969	0.43	1.81	-18.08	1.00
GDP per capita	969	10.78	0.26	10.31	12.12
Education	969	0.19	0.05	0.10	0.46
Population	816	15.07	1.03	13.08	17.48
Female legislator	946	23.11	7.13	4.30	42.00

Sources: (Michelis et al., 2020), U.S. State-Level Income Inequality Data, U.S. Annual State-Level Human Capital Measures, The Correlates of State Policy Project, Bureau of Economic Analysis, Office of The Natural Resources Revenue, State Energy Data System.

Table A3: Income Inequality: South region

	Oil Abundance		Oil Dependency		
	(1)	(2)	(3)	(4)	(5)
	Gini	Gini	Gini	Gini	Gini
Oilproduction_t-1	-0.013				-0.014
	(0.008)				(0.008)
Oilproductionsq_t-1	0.002*				0.002*
	(0.001)				(0.001)
Oilrevenue_t-1		-0.015*			
		(0.008)			
Oilrevenuesq_t-1		0.001*			
		(0.000)			
Oilconsumption_t-1			0.155		0.394***
			(0.136)		(0.106)
Oilconsumptionsq_t-1			-0.023*		-0.044***
			(0.013)		(0.010)
Oildependency_t-1				0.035**	
				(0.016)	
Oildependencysq_t-1				0.011	
				(0.009)	
GDP per capita_t-1	-0.137**	-0.060	0.026	0.051	-0.031
	(0.057)	(0.051)	(0.040)	(0.063)	(0.027)
Education_t-1	-0.042**	-0.067**	-0.048**	-0.049**	-0.087***
	(0.020)	(0.028)	(0.021)	(0.024)	(0.019)
Population_t-1	0.378***	0.477***	0.356***	0.440***	0.113**
	(0.100)	(0.079)	(0.061)	(0.064)	(0.050)
Female legislator_t-1	-0.001*	-0.004***	-0.003***	-0.003***	-0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R2-adj	0.878	0.805	0.851	0.835	0.769
Obs	98.000	112.000	158.000	158.000	280.000

Coefficients reported. Robust Standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$. Notes: For oil revenues, data runs from 2003 to 2015. Observations for oil production are lower than oil consumption because several states do not have oil reserves and therefore record zero production and revenues.

Table A4: Income Inequality: West region

	Oil Abundance		Oil Dependency		
	(1)	(2)	(3)	(4)	(5)
	Gini	Gini	Gini	Gini	Gini
Oilproduction_t-1	-0.003				-0.014
	(0.027)				(0.008)
Oilproductionsq_t-1	0.000				0.002*
	(0.003)				(0.001)
Oilrevenue_t-1		-0.042***			
		(0.010)			
Oilrevenuesq_t-1		0.002***			
		(0.000)			
Oilconsumption_t-1			0.902***		0.394***
			(0.180)		(0.106)
Oilconsumptionsq_t-1			-0.098***		-0.044***
			(0.019)		(0.010)
Oildependency_t-1				0.023***	
				(0.009)	
Oildependencysq_t-1				0.002***	
				(0.001)	
GDP per capita_t-1	-0.105	-0.094**	-0.082**	-0.069**	-0.031
	(0.068)	(0.040)	(0.037)	(0.035)	(0.027)
Education_t-1	-0.086	-0.040	-0.042	-0.015	-0.087***
	(0.055)	(0.034)	(0.026)	(0.030)	(0.019)
Population_t-1	0.182	0.242**	0.336***	0.206**	0.113**
	(0.139)	(0.114)	(0.092)	(0.079)	(0.050)
Female legislator_t-1	-0.000	0.000	-0.000	-0.000	-0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R2-adj	0.639	0.724	0.797	0.771	0.769
Obs	79.000	107.000	129.000	129.000	280.000

Coefficients reported. Robust Standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.
Notes: For oil revenues, data runs from 2003 to 2015. Observations for oil production are lower than oil consumption because several states do not have oil reserves and therefore record zero production and revenues.

Table A5: Income Inequality: Midwest region

	Oil Abundance		Oil Dependency		
	(1)	(2)	(3)	(4)	(5)
	Gini	Gini	Gini	Gini	Gini
Oilproduction_t-1	-0.060***				-0.014
	(0.017)				(0.008)
Oilproductionsq_t-1	0.006***				0.002*
	(0.002)				(0.001)
Oilrevenue_t-1		0.016			
		(0.025)			
Oilrevenuesq_t-1		-0.001			
		(0.001)			
Oilconsumption_t-1			0.220**		0.394***
			(0.084)		(0.106)
Oilconsumptionsq_t-1			-0.022***		-0.044***
			(0.008)		(0.010)
Oildependency_t-1				-0.008*	
				(0.005)	
Oildependencysq_t-1				-0.000	
				(0.000)	
GDP per capita_t-1	-0.082**	-0.010	-0.055**	-0.129***	-0.031
	(0.037)	(0.032)	(0.027)	(0.032)	(0.027)
Education_t-1	0.036	-0.016	0.009	0.008	-0.087***
	(0.022)	(0.030)	(0.019)	(0.018)	(0.019)
Population_t-1	-0.123*	-0.102	-0.034	-0.057	0.113**
	(0.073)	(0.111)	(0.083)	(0.080)	(0.050)
%Female legislator_t-1	-0.001	-0.001*	-0.001***	-0.001**	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R2-adj	0.892	0.767	0.876	0.882	0.769
Obs	83.000	84.000	120.000	120.000	280.000

Coefficients reported. Robust Standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.
Notes: For oil revenues, data runs from 2003 to 2015. Observations for oil production are lower than oil consumption because several states do not have oil reserves and therefore record zero production and revenues.