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Living in the Garden of Eden : Mineral Resources Foster Individualism*

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Abstract

Using mineral resources discoveries in the United States since 1800, we argue that mineral mining fosters individualism. Measuring individualism and the demand for redistribution by questions of the General Social Survey (GSS), we show that : (i) individuals living in states with mineral resources are more individualistic and support less redistribution by the government ; (ii) the higher the number of mines in a states, the lower the support for governmental redistribution and the higher the individualism ; (iii) individuals that experienced mineral discoveries during their early adulthood are more individualistic and support less redistribution ; (iv) this effect vanishes over time. These results are robust to the introduction of various explanatory variables that may explain the formation of individualistic values.

KEYWORDS : Natural Resources, Individualism, Redistribution.
JEL CODES : Q00, Z10, O13.

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1 Introduction

In recent years, beliefs and values have gained much attention as a determinant of economic outcomes. The effect of values is actually largely documented by a growing literature. However, with the notable exception of Nunn and Wantchekon (2009) or Giuliano and Spilimbergo (2009), the question of their formation remains broadly unexplored by the empirical literature.

In this paper, we argue that mineral mining fosters individualism, using natural resources discoveries in United States over the 1800-2000 period. Measuring individualism and the demand for redistribution by questions of the General Social Survey (GSS), we show that individuals living in states with mineral resources are more individualistic and support less redistribution by the government.

Since the seminal work by Sachs and Warner (1995), the effects of natural resources on economic performance have received much attention. A large literature debates on the significant negative role played by natural resources dependence or abundance on economic growth (see Frankel (2010) for a survey of the resource curse literature). A widely accepted consensus considers natural resource like a potential curse hindering development. Institutions appear to be a decisive factor for the resource curse. The effect of natural resource abundance is conditioned by the institutional level in the country (Mehlum et al. (2006)) or constitutional design. In that later way, Andersen and Alasken (2008) show that resource curse occurs in democratic presidential countries, but not in democratic parliamentary country, and that proportional electoral system matters to reduce the curse.

Empirical studies suffer that countries differ in many dimensions (such as geographic, political and institutional design for example). To avoid these problem, many papers focus only on one country : the United States for Papyrakis and Gerlagh (2007), Peru for Aragon and Rud (2009) or Brazil for Casselli and Michael (2010). The later authors observe that financial windfall caused by oil variation output have no significant effect on municipal non-oil GDP or its composition. Surprisingly, Papyrakis and Gerlagh (2007) show that some states in United States, one of the most developed country, suffer from "resource curse". They show that natural resources dependence have a negative effect on growth. Natural resource dependence decreases investment, schooling, openness and R&D and fosters corruption, affording explanations to this counter-intuitive result.

In developing countries, Isham et al. (2005) resume that "[...] resource abundance simultaneously "strengthens states" and "weakens societies", and thus yields - or at least perpetuates - low levels of development". Many papers point out the issue of the reaction of economic agents to financial windfall induced by natural resources abundance. They mainly focus on incentives played by financial windfall in developing countries on the elite's behavior or on the government's behavior (Verdier et al. (2006), Mehlum et al. (2006)). Natural resources windfall modifies incentives for the elite in power and induces changes in the allocation of their time between productive activities and unproductive rent seeking (Mehlum et al.(2006), Couttenier (2008)).

A great challenge to understand how resource abundance weakens civil societies is to explain the behavior and beliefs of the whole society (not only elite) living in resource abundance area. Diamond (2006) offers a first insight to this question with the case study of Montana. He shows the interplay between natural resources abundance and individual orientations. According to this author, natural resources abundance is part of the state's identity and partly shapes individual beliefs about economic organizations.[1] To our best knowledge, Di Tella et al. (2008) are the first to provide empirical evidence about this issue. They study the correlation between individualism and a measure of "luck" in United States. They approximate the idea of luck, i.e. the belief that income is more linked to randomness than to effort, by the "share of the oil industry in the state's economy multiplied by the price of oil". They show "that societies that depend heavily on oil [...] will experience heavier demand for government intervention".

Our paper provides micro-economic evidence that mining discoveries influence the behavior and values of people living in natural resource abundance area. However, explaining the effect of individualism on growth is beyond the scope of this paper (see Grorodnichenko and Roland (2010) for an investigation of this question). In other terms, we are agnostic concerning the sign of the effect of individualism on economic performance. The Mineral Resources Data System lists all mineral discoveries since 1800 in the United States. It allows to observe the effect of both the spatial and temporal differences in the distribution of mineral discoveries across states on some agent-level beliefs. We focus on the extend of individualism and on the demand for redistribution by individuals. Theses variables are measured using three question of the GSS which allow to

[1] See the appendix for a short presentation of the text by Diamond (2006) on Montana.

capture various aspect of these issues.[2]

We show that : (i) individuals living in states with mineral resources are more individualistic and support less redistribution ; (ii) the higher the number of mines in a states, the lower the support for governmental redistribution and the higher the individualism. These results are robust to the introduction of various explanatory variables that may explain these values. Considering the formation and the transmission of these values, we show that : (iii) individuals that experienced mineral discoveries during their "impressionable years"[3] are more individualistic and support less redistribution ; (iv) the effect of mineral resources on individualism is slowly decreasing over time.

These results can be at least partly explained by the well-known effect of income on the demand for redistribution. In fact, natural resources represent a financial windfall which is likely to induce both an increase of current and expected income. As a consequence, a society with natural resources may *feel* richer than a society without any natural resources endowment. Increasing income or expected income is known to be associated with less willingness to redistribute as shown by a large literature building on Romer (1975), Meltzer and Richards (1981) and Piketty (1995). This relationship has been documented by Alesina and La Ferrara (2005) and Alesina and Giuliano (2009) among others. Alesina and Angeletos (2005) focused in particular on the role of the opinion of respondents on whether income is mostly determined by effort or luck.

This paper is organized as follows. Section 2 presents the data and the methodology. Section 3 presents empirical results about the relationship between mineral resources and individualism. In section 4, we investigate the role played by mineral discoveries in the formation and the transmission of individualistic values. Finally, section 5 briefly concludes.

2 Data and methodology

This section describes the data and the methodology used in this paper.

[2] See section 3 for a detailed presentation of theses variables

[3] Following Giuliano and Spilimbergo (2009), the term "impressionable years" refers to the hypothesis that "core attitudes, beliefs, and values crystallize during a period of great mental plasticity in early adulthood and remain largely unaltered throughout the remaining adult years."

2.1 Mineral Resources Data System

The Mineral Resources Data System[4] (MRDS) describes mineral resources throughout the world. The dataset for the United States contains more than 25 000 observations. About 50% of them have lead to the installation of a mine. For each observation, the dataset contains information about the localization, the year of discovery, the year of first production (if any production has been operated), and the type of commodities, but also various geologic characteristics. Information of major importance that are missing are those about quantities found and extracted. To our knowledge, this paper is the first to use this database in economic research.

The figure 1 presents the distribution of mineral resources discoveries in the United States over the 1800-2000 period. Most of the discoveries have been made between 1875 and the late 50's. However, the distribution is quite heterogeneous across time. Figure 2 displays the spatial distribution of mineral resources mines in the United States according to the MRDS database. This spatial distribution is also very heterogeneous. Clearly, West states have greater endowments in mineral resources than others. Table 8, presented in appendix, shows the number of mines in each States. We distinguish between all observations and places where a production was (or is still) operated. Both distributions are very similar. Since we want to make the distinction between states with and without mineral resources, we have to establish a criterion to split our sample in two parts. The simplest criterion is the median of the sample. This is where we place the threshold between states with and without mineral resources. In all the tables of the paper, the variable *mineral state* equals 1 if the respondent lives in a state with mineral resources, 0 otherwise.

Using MRDS observations to track the extent of mineral resources available in each state offers the advantage of being almost completely exogenous. Papyrakis and Gerlagh (2007) and Di Tella et al. (2008), among others, measure natural resources using the share of local GDP of a specific sector and the price of commodities. This measure is clearly endogenous to economic activity and development, and consequently to social attitudes provided that the later have an effect on the former (see Brunnschweiler (2008) for example). On the contrary, the tenor of the ground itself cannot be influenced by economic activity, nor by values. To a certain extent, one can argue that the discovery of mineral resources is however endogenous to economic development, what is likely to be

[4] http://tin.er.usgs.gov/mrds/

Figure 1: Distribution of mineral resources discoveries in the United Sates (1800-2000)

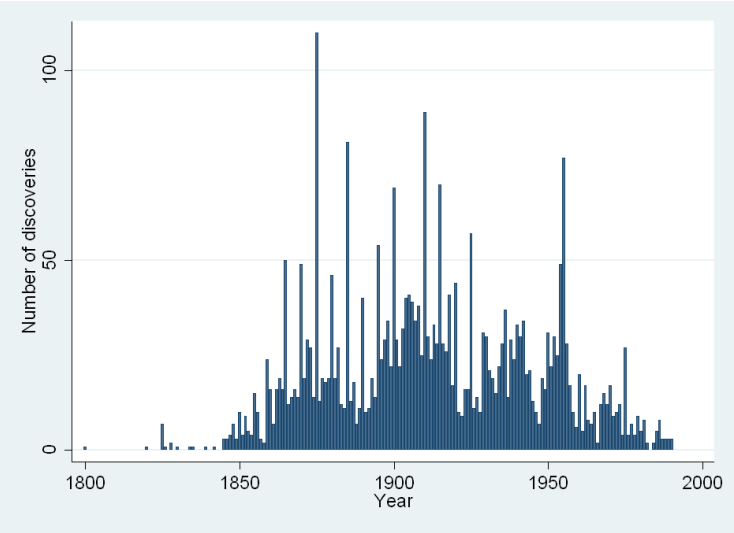
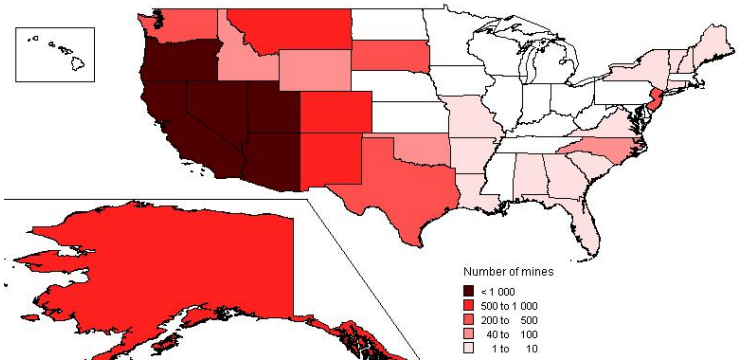


Figure 2: Distribution of mines in the United States (1800-2000)



true. However, it is also possible that once economic development is launched, mineral resources are searched everywhere. On the one hand, the precise date of discovery of mineral resources can be seen as endogenous to economic activity. On the other hand, if we consider that all mineral resources have been searched for (as suggested by 1 which shows that discoveries are scare since 1960) , the categorization of states with and without mineral resources cannot be endogenous to values at the time of interview (the sample of the GSS we use begins in 1974).

Table 9, presented in appendix, describes the main types of mineral commodities found in the MRDS database. Gold, silver and other valuable ores represent a substantial part of the mining activity in the United States.

2.2 Data on Individualism

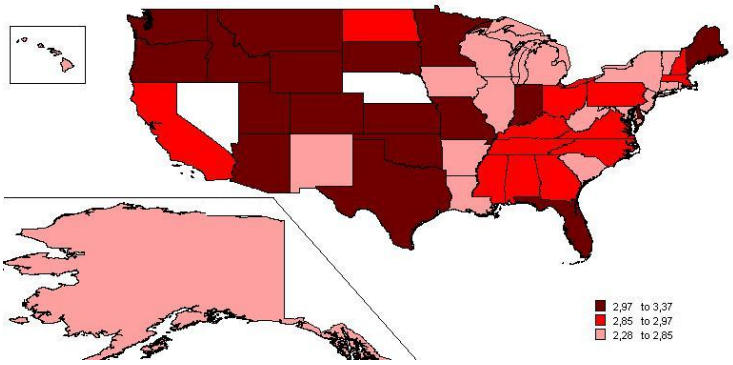
In this paper, we measure individualism at the individual level in the United States by using three questions of the General Social Survey.

The first question used also by Di Tella et al. (2008) is "Some people think that the government in Washington should do everything possible to improve the standard of living of all poor Americans. Other people think it is not the government's responsibility, and that each person should take care of himself. Where would you place yourself on this scale ?". The possible answers are "1 (I strongly agree that the government should increase living standards), 2, 3 (I agree with both answers), 4, 5 (I strongly agree that people should take care of themselves)". We call this variable "*responsibility*".

The second question is "Some people think that the government in Washington ought to reduce the income differences between the rich and the poor, perhaps by raising the taxes of wealthy families or by giving income assistance to the poor. Others think that the government should not concern itself with reducing this income difference between the rich and the poor. What score between 1 and 7 comes closest to the way you feel ?". The possible answers are "1 (Government should do something to reduce income differences), 2, 3, 4, 5, 6, 7 (Government should not concern itself with income differences)". It what follows, we refer to this variable as "*inequalities*".

The last question is "We are faced with many problems in this country, none of which can be solved easily or inexpensively. I'm going to name some of these problems, and for each one I'd like you to tell me whether you think we're spending too much money on it, too little money, or about the right amount.

Figure 3: *Responsibility* by state, GSS 1975-2004.



Mean by state of the answer to the question : "Some people think that the government in Washington should do everything possible to improve the standard of living of all poor Americans. Other people think it is not the government's responsibility, and that each person should take care of himself. Where would you place yourself on this scale ?". The possible answers are "1 (I strongly agree that the government should increase living standards), 2, 3 (I agree with both answers), 4, 5 (I strongly agree that people should take care of themselves)". Data are missing for Nebraska and Nevada.

Are we spending too much, too little, or about the right amount on assistance to the poor ?". The possible answers are "1 (Too little), 2 (About right), 3 (Too much)". We call this variable "*assistance*".

These beliefs offer a converging picture toward individualism and the demand for redistribution. According to Di Tella et al. (2008), the set of values associated with these variables can also be seen as associated with political ideas that are on the right of the political system.

All regressions includes individual characteristics as control variables. Namely, we control for gender, age, marital status, religion, education, employment status, race and income.[5]

Once the availability of control variables is taken into account, we are left with more than 20 000 observations for *responsibility* and *inequalities*. For the variable *assistance*, we have a little more than 14 000 observations.[6]

Figure 3 presents the mean of the *responsibility* variable by state over the period 1975-2004. At the first sight, this variable is higher in the West part of the Unites States, which means that a greater proportion of the population living in those states thinks that each person should take care of himself.

[5] See the appendix for a complete presentation of individual control variables.

[6] Notice that data on *responsibility*, *inequalities* and *assistance* are not available for Nebraska and Nevada.

2.3 Methodology

We estimate the following equation :

$$y_{its} = \alpha M_s + \beta X_{its} + \varepsilon_{its},$$

where the dependent variable y_{its} is the answer of individual i, interviewed at time t and living in state s, to the questions associated with *responsibility*, *inequalities* or *assistance*. The variable M_s indicates the "mineral status" of state s. The vector X_{its} always contains individual characteristics, but also time or geographic fixed effects or state-level variables in some specifications. Since our classification of individuals between those living in states with or without mineral resources is logically made at the state level, all our estimations are made using clustered standard errors at the state level. The limited number of clusters could have made statistical inference difficult as pointed out by Cameron et al. (2008).

Rigorously, since our dependent variables are qualitative variables, ordered logit models should be used. However, all reported results are estimated using linear ordinary least squares such that we can interpret the size of the coefficients. All coefficients have the same sign and the same significance level when using ordered logit models.[7]

When distinguishing between individuals that observed mineral resources discoveries and those who did not, we use the "impressionable years" presented by Giuliano and Spilimbergo (2009). This hypothesis states that "core attitudes, beliefs, and values crystallize during a period of great mental plasticity in early adulthood and remain largely unaltered throughout the remaining adult years." We follow Giuliano and Spilimbergo (2009) by assuming that impressionable years take place between 18 and 25 years. Hence, we are interested in whether an individual observed mineral discoveries when he was between 18 and 25 years old. For example, if an individual aged 50 is interviewed in 1980, its impressive years are between 1948 and 1955.

The General Social Survey does not allow us to know in which state respondent was living when she was young. However, we know if the respondent is still living in the same state as when she was 16 years old. Thus, we have to restrict ourselves to individuals that did not move between the two dates. This left us with around 5000 individuals who were and are still living in mineral

[7] Results are not shown here but available upon request.

Table 1: Tests of the equality of means

	Observations	Mean	Std. Err.
Responsibility			
Mineral states	9918	2.92	.012
Non mineral states	10364	2.87	.011
Difference		.04***	.016
Inequalities			
Mineral states	10251	3.82	.019
Non mineral states	10901	3.66	.018
Difference		.16***	.027
Assistance			
Mineral states	6935	1.48	.008
Non mineral states	7083	1.45	.008
Difference		.03***	.011

*** difference significant at the 1% confidence level

states. Thanks to the MRDS database, we know if they observed any mineral resources discoveries during their early adulthood.

3 Empirical results

This section presents the empirical results and their discussion. We also provide a large number of robustness checks regarding alternative explanations of the relationship between natural resources and individualism.

3.1 Main Results and discussion

We first start by a simple test of equality of the means of our individualism measures across states with and without mineral resources. Table 1 presents the standard t-tests for variables *responsibility*, *inequalities* and *assistance*. In all cases, the average answer is higher in states with mineral resources than in states without mineral endowments. All differences are significant at the 1% level.

Main results

We now regress our measures of individualism on the state's mineral status variable, controlling by individual characteristics to check if the earlier results are not driven by composition effects. Our baseline specification includes usual control variables for gender, age, age squared, marital status, religion, education,

employment status, race and income, as well as fixed effects for the year of interview. Time fixed effects control for potential common temporal determinants of beliefs. Estimated coefficients for dependent variables *responsibility*, *inequalities* and *assistance* are presented in table 2. The estimated coefficients of all individual variables are consistent with other results in the literature (see Alesina and La Ferrara (2005) among others). The effect of age on individualism is very weak relatively to the effect of other variables. Males are more individualistic than females. Being married or employed increase the answers to the three questions. Income also decrease the demand for redistribution (Romer (1975), Meltzer and Richards (1981) and Piketty (1995)). So does the educational level. White are more individualistic than others. Being protestant or catholic also increases individualism and decreases the demand of redistribution.

In all columns of table 2, the estimated coefficient of the dummy variable for individual living in states with mineral resources is positive and significant. The estimated coefficient is about 0.05 when *responsibility* is the dependent variable. As a comparison, the effect of being catholic equals 0.07, the reference being "none/other"; whereas the estimated effect of being married equals 0.18. Hence, the effect of living in a mineral state on *responsibility* is of the same order of magnitude as the one of religion or marital status. Moreover, this effect represents up to one third of the effect of being married, one of the variables with the largest effect on *responsibility*. Using *inequalities* as dependent variable, the estimated effect of the mineral status of the state represents up to half of the effect of being married or protestant. In the case of *assistance*, the estimated effect is even stronger. These estimations allow us to conclude that differences in individualism between states with or without mineral resources are not driven by a composition effect of the populations surveyed, i.e. individuals living in mineral states do not systematically share observable characteristics that favor individualism. In other terms, the effect of residence in a mineral state still holds when controlling for a large set of individual characteristics.

Discussion

At a first sight, these results are opposite to those of Di Tella et al.(2008). These authors show that there is a negative relationship between individualism and oil in the United States. How can we conciliate this two sets of results ?

First of all, Di Tella et al. (2008) argues that the importance of oil industry is a proxy for *luck* at the state level. This, in turn, influences the demand

Table 2: Effect of residence in a mineral state on individualism

	(1) Responsibility	(2) Inequalities	(3) Assistance
Mineral state	0.0509*	0.148***	0.0385**
	(0.0282)	(0.0524)	(0.0189)
Male	0.147***	0.298***	0.0421***
	(0.0158)	(0.0233)	(0.0107)
Age	-0.00921***	0.00194	-0.00530***
	(0.00286)	(0.00434)	(0.00144)
Age squared	0.000148***	3.91e-05	8.92e-05***
	(3.11e-05)	(4.35e-05)	(1.46e-05)
Married	0.185***	0.266***	0.0718***
	(0.0216)	(0.0336)	(0.0107)
Protestant	0.196***	0.290***	0.0605**
	(0.0195)	(0.0397)	(0.0227)
Catholic	0.0721***	0.140***	-0.00391
	(0.0233)	(0.0464)	(0.0256)
Education	0.0416***	0.106***	0.0144***
	(0.00322)	(0.00532)	(0.00255)
Employed	0.119***	0.0890***	0.0561***
	(0.0193)	(0.0310)	(0.0119)
White	0.547***	0.738***	0.254***
	(0.0240)	(0.0465)	(0.0144)
Income	0.0217***	0.0200***	0.00595**
	(0.00329)	(0.00398)	(0.00223)
Constant	1.446***	0.803***	0.935***
	(0.0972)	(0.137)	(0.0705)
Time fixed effects	Yes	Yes	Yes
Observations	20282	21152	14018
R-squared	0.087	0.082	0.059

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses
Standard errors clustered at the state level
OLS regressions

for redistribution of individuals. Indeed, the greater the feeling that luck instead of hard work determines income, the larger the demand for redistribution. Symmetrically, if an individual thinks that income is primarily determined by individual effort, he will exhibit less willingness to redistribute. In fact, the feeling that success is determined by luck is less widespread in our states with mineral resources as shown by table 10 presented in appendix. In table 10, the dependent variable is the answer to the following question : "Some people say that people get ahead by their own hard work; others say that lucky breaks or help from other people are more important. Which do you think is most important?" The possible answers are "1 (Hard work most important), 2 (Hard work, luck equally important), 3 (Luck most important)". We created a dummy variable equal to 1 if the respondent thinks that luck is most important, and equals 0 otherwise. The estimated coefficient of the dummy variable for mineral state is negative and significant. Which means that individual living in mineral states are less likely to think that luck is most important. This differs from the assumption of Di Tella et al. (2008) on the positive effect of oil on luck.

Second, there is also another way to conciliate these two results on the link between resources and individualism. This divergence can be driven by the differences in the characteristics of oil and mineral resources. We focus on mineral resources, as described in table 9, whereas Di Tella et al. (2008) focus on oil industry. This difference remains to be explored. This can be done by looking at the work by Boschini et al. (2007). These authors argue that the effect of natural resources on economic performance depends on the types of resources possessed. In this framework, they point out the role of resource's *appropriability*. According to them, "the concept of appropriability captures the likelihood that natural resources lead to rent-seeking, corruption or conflicts which, in turn, harm economic development" [Boschini et al. (2007)]. They distinguish between *institutional* and *technical* appropriability. The first type of appropriability is related to the institutional capacity to manage natural resources exploitation. Given that we focus only on the United States, we believe that institutional appropriability is fairly homogeneous in our study and thus cannot explain the puzzle presented above. On the other hand, "due to their physical and economical characteristics, certain resources are more likely to cause appropriative behavior". This is what Boschini et al. (2007) define as technical appropriability. This can allow to make a crucial distinction between mineral resources and oil. Indeed, mineral resources in general, and gold and silver in particular (what represent more than 50% of our observations that

Table 3: Effect of the number of mines on individualism

	Responsibility (1)	Inequalilties (2)	Assistance (3)
Number of mines	0.0185	0.0787**	0.0176*
	(0.0157)	(0.0383)	(0.00910)
Observations	20282	21152	14018
R-squared	0.086	0.081	0.058

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at the state level
OLS regressions
All regressions include control variables for gender, age, age squared, marital status, religion, education, employment status, race, income, time of interview and a constant term.

have led to production) are more appropriable than oil. Mineral resources are intrinsically more valuable, transportable and storable. Such resources are thus more likely to raise individualistic incentives and behaviors. In our opinion, this approach offers a valuable way to account for the opposite effects of natural resources on individualism found in Di Tella et al. (2008) and our paper.

Intensity effect

In table 3 we focus on states in which any mining as taken place in the 20th century. We then replace the mineral status variable by a broad measure of the abundance of mineral resources, i.e. by the number of mines in the state as described by table 8. We found that the number of mines has a positive effect on our three measures of individualism at the individual level. This suggest that even within mineral states, the more mineral resources in the state, the more individualistic the state's residents.

3.2 Robustness checks

Omitted variables

The positive effect of mineral endowment on individualism could be determined by omitted variables. In table 4, we add following control variables to our specifications : political orientation, region fixed effects, GDP per capita, the coefficient of Gini and mineral mining dependency.

Geographical bias: As shown by figure 2, the spatial distribution of mining activity in the United States is broadly polarized between West and East.

Hence, our correlation could be driven by a simple omitted variable due to common characteristics shared by geographically close states. This is why we use the regional divisions of the United States Census Bureau as control variables columns 1, 7, and 13 of table 4. This division imply the use of four region fixed effects for Northeast, Midwest, South and West. The estimated coefficient of the mineral status remains significant in the case of *inequalities* and *assistance*. The estimated coefficient when *responsibility* is the dependent variables is no more significant, but not far from the 10% level (the p-value equals 0.14).

Political orientation: As mentioned above, the values we consider as reflecting greater individualism can also be simply associated to right-wing orientations. In order to show that we are not capturing only right-wing ideas, we control for political orientations using the Ranney index in columns 2, 8 and 14.[8] We use a version of the Ranney index that captures the extent to which either the Democratic or Republican Party dominates the upper and lower houses of the state legislatures (see Berkowitz and Clay (2010) for more explanation on Ranney index building). This variable increases when the Democratic party dominates the state at the time of interview. As shown by table 4, the estimated coefficient of our variable of interest is unaffected by the introduction of this variable for two out of our three dependent variables. Furthermore, the estimated coefficient of the Ranney index is negative. This means that people living in states dominated by the Democratic Party have less individualistic values.

GDP Effect: In columns 3, 9 and 15 we include the log of GDP per capita at the time of interview to control for differences in aggregate wealth and development. Adding GDP per capita in the regressions does not harm the significance, nor the magnitude of the mineral status variable.

Inequalities Effect: Then, in columns 4, 10 and 16 we control for a potential inequalities effect on our interest variable. In that sense, we control with a Gini coefficient at the time of interview as a control variable. We find no significant relationship between this variable and individualism. Once again, this does not harm the estimated coefficient of our variable of interest.

The Share of Mining Activity: In columns 5, 11 and 17, we introduce the mineral mining dependency[9] of the state of residence at the time of interview as a control variable. Once again the estimated coefficient of our variable of

[8] The version of the Ranney index we use is not available after 2000. This explains why there are less observations in specifications including the Ranney index.

[9] Mineral mining dependency is measured by the share of mining activity in the state GDP.

interest is unchanged.

When using all control variables simultaneously (columns 6, 12 and 18), the variable *mineral state* is positive and significant for all our measures of individualism. These estimations allow us to conclude that the effect of the mineral status is not driven by omitted variable such as regions fixed effects, political orientations, GDP per capita, Gini coefficient or geographical characteristics.

Selection Effect

A concern about the relationship documented here is that it could be driven by a selection effect, i.e. more individualistic individuals could have been attracted by the "spirit" or by the opportunities offered by mineral states. This interpretation is tackled in table 5. We create a dummy variable equals to one if respondent as changed state since she was 16 years old. This allow to check if movers are more individualistic than non-movers. Furthermore, interacting this variable with the mineral status variable, we are able to check if movers to mineral states demand less redistribution than others. We include time fixed effects in even numbered columns. When the dependent variable is *responsibility* or *assistance* we do not find any support for the hypothesis that movers are more individualistic than non-movers, nor for the idea that mineral states could attract mainly individualistic individuals. In the case of the variable *inequalities* the estimated coefficient on the mover variable is significant and positive. This suggest that movers tend to be more adverse to the reduction of income inequalities than non-movers. However the estimated coefficient of the interaction term is negative, ruling out the former interpretation. Hence, we can conclude that the relationship between the mineral status of the state and the demand for redistribution and individualism is not driven by selection of migration effects.

Spurious correlation

In table 11, presented in appendix, we rule out the possibility that we are documenting a broad distrust to the government and not a specific effect of mineral status on individualism or that our relationship is purely spurious. We measure the general trust in the government and in television using questions of the General Social Survey. The common question reads as *"I am going to name some institutions in this country. As far as the people running these institutions are concerned, would you say you have a great deal of confidence, only some confidence, or hardly any confidence at all in them?*". We use answers

Table 4: Effect of residence in a mineral state on individualism, controlling for political orientation, region fixed effects, GDP per capita, inequalities and mineral dependency

	Responsibility					
	(1)	(2)	(3)	(4)	(5)	(6)
Mineral state	0.0513	0.0439	0.0636***	0.0606**	0.0486*	0.0550*
	(0.0344)	(0.0270)	(0.0218)	(0.0290)	(0.0284)	(0.0308)
Ranney index		-0.00116				-0.000201
		(0.000780)				(0.000700)
GDP per capita (log)			-0.312***			-0.244**
			(0.108)			(0.111)
Gini coefficient				-0.511		-1.024
				(0.706)		(0.637)
Mineral mining dependency					-0.0110	-0.0204
					(0.0134)	(0.0133)
Region fixed effects	Yes					Yes
Observations	20282	18529	20282	20282	20282	18529
R-squared	0.088	0.091	0.088	0.087	0.087	0.093
	Inequalities					
	(7)	(8)	(9)	(10)	(11)	(12)
Mineral state	0.101*	0.147***	0.161***	0.139**	0.148***	0.119**
	(0.0509)	(0.0410)	(0.0501)	(0.0522)	(0.0521)	(0.0458)
Ranney index		-0.00451***				-0.00357***
		(0.000911)				(0.000862)
GDP per capita (log)			-0.323			0.110
			(0.210)			(0.168)
Gini coefficient				0.501		-0.0551
				(1.293)		(0.896)
Mineral mining dependency					-0.00219	-0.0135*
					(0.00827)	(0.00727)
Region fixed effects	Yes					Yes
Observations	21152	19381	21152	21152	21152	19381
R-squared	0.084	0.086	0.082	0.082	0.082	0.086
	Assistance					
	(13)	(14)	(15)	(16)	(17)	(18)
Mineral state	0.0656***	0.0446**	0.0463***	0.0394*	0.0388**	0.0679***
	(0.0217)	(0.0195)	(0.0171)	(0.0196)	(0.0188)	(0.0215)
Ranney index		-0.000136				0.000287
		(0.000623)				(0.000499)
GDP per capita (log)			-0.211**			-0.0889
			(0.0813)			(0.0682)
Gini coefficient				-0.0441		0.392
				(0.455)		(0.405)
Mineral mining dependency					0.00418	0.00120
					(0.00570)	(0.00621)
Region fixed effects	Yes					Yes
Observations	14018	11367	14018	14018	14018	11367
R-squared	0.062	0.060	0.060	0.059	0.059	0.063

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses
Standard errors clustered at the state level
OLS regressions
All regressions include control variables for gender, age, age squared, marital status, religion, education, employment status, race, income, time of interview and a constant term.

Table 5: Effect of residence in a mineral state on individualism, movers incidence

	Responsibility (1)	Inequalities (2)	Assistance (3)
Mineral state (A)	0.0551*	0.191***	0.0393*
	(0.0323)	(0.0634)	(0.0213)
Mover (B)	0.00915	0.115*	-0.000628
	(0.0288)	(0.0603)	(0.0193)
A x B	-0.0178	-0.144*	-0.00140
	(0.0402)	(0.0809)	(0.0235)
Observations	20106	21025	13953
R-squared	0.087	0.082	0.059

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at the state level
OLS regressions
All regressions include control variables for gender, age, age squared, marital status, religion, education, employment status, race, income, time of interview and a constant term.

for the following institutions : "*Executive branch of the federal government*", "*Congress*" and "*TV*". Results of the corresponding regressions are presented in table 11. We find no significant relationship between our mineral status variable and confidence in the government or in television. This suggests that we are indeed documenting a relationship from mineral resources to individualism and not a broad distrust in public institutions or our relationship is purely spurious.

4 Formation and Transmission of Individualistic Values

The above results show the importance of mineral resources for individualistic orientations. As Bisin and Verdier (2001), the literature around the formation and the transmission of beliefs points out two main channels through which values are formed. The first channel is the transmission of values from one generation to the next. The second one is the experiences made by an individual during is life.

Given the data we have, we are not able to develop an empirical strategy that would allow to identify perfectly these two channels. However, in this section, we present two strategies that afford information about the mechanisms of the formation and the transmission of individualistic values in states with mineral resources.

4.1 Effect of Mineral Resources Discoveries during "Impressive Years" Period

Focusing on states with mineral resources, we now distinguish between individuals who observed mineral resources discoveries in the state when they where young and those who did not. This strategy imposes us to focus only on individuals who did not change state between early adulthood and the time of interview. Indeed, we recall that we are not able to know where individuals were living when they were young. Instead, we know if they stayed in the same state.

We create a dummy variable equals to one if respondent is likely to have observed mineral resources discoveries between 18 and 25 years. Figure 4 presents the share of each cohort who observed mineral discoveries.[10] Table 6 presents the results of these regressions. The estimated coefficient of the dummy variable is always positive. Moreover, it is significant at the 5% level for two out of three dependent variables. The magnitude of these coefficients suggests that the effect of having observed mineral resources discoveries is stronger than the simple effect of the mineral status previously estimated. This means that having observed mineral discoveries fosters individualism and harms the individual demand of redistribution. This result still holds when adding different control variables such as the Gini coefficient, GDP per capita, mineral mining dependency, political orientations during impressionable years or cohort fixed effects (results not reported here and available upon request).

By underlying the role of mineral discoveries during early adulthood, these results show that each mineral discovery increases individualistic values in the population. This support the idea that experiences of mineral discoveries play a role in the formation of individualistic values.

4.2 The Long Term Effect of Mineral Resources on Individualism

Considering that shocks represented by mineral discoveries foster individualism, we would like to know if this effect is persistent over time. In other terms, we would like to know how individualistic values are transmitted over time.

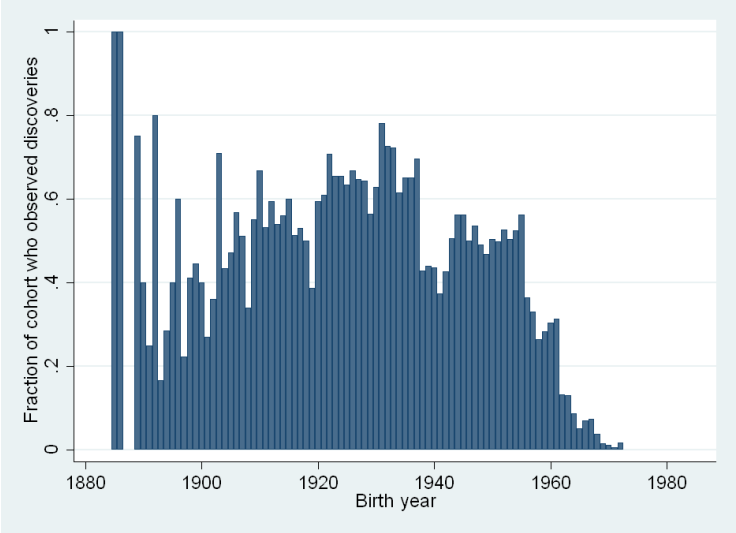
[10] In figure 4, the share of cohort who observed mineral discoveries during impressionable years equals one for cohorts born in 1885 and 1886 because we have only two respondents born respectively in 1885 and 1886. Those two individuals observed mineral discoveries. For cohorts born in 1880-1884 and in 1887-1888, we have not any observation.

Table 6: Effect of the mineral resources discoveries during impressionable years on individualism

	(1) Responsibility	(2) Inequalities	(3) Assistance
Mineral discoveries observed	0.0934**	0.173**	0.0416
	(0.0382)	(0.0824)	(0.0266)
Male	0.170***	0.287***	0.0289
	(0.0273)	(0.0303)	(0.0228)
Age	-0.0112**	-6.81e-05	-0.00431
	(0.00512)	(0.00943)	(0.00282)
Age squared	0.000140**	1.61e-05	7.52e-05**
	(5.48e-05)	(8.83e-05)	(3.14e-05)
Married	0.204***	0.252***	0.0999***
	(0.0301)	(0.0571)	(0.0219)
Protestant	0.227***	0.309***	0.0616
	(0.0334)	(0.0730)	(0.0479)
Catholic	0.0537	0.0833	0.0128
	(0.0398)	(0.0801)	(0.0415)
Education	0.0493***	0.0963***	0.0172***
	(0.00755)	(0.00975)	(0.00395)
Employed	0.119***	0.131**	0.0687***
	(0.0275)	(0.0552)	(0.0232)
White	0.496***	0.760***	0.234***
	(0.0440)	(0.0699)	(0.0317)
Income	0.0239***	0.0164**	0.0119***
	(0.00590)	(0.00634)	(0.00284)
Constant	1.374***	1.047***	0.850***
	(0.132)	(0.222)	(0.107)
Time fixed effects	Yes	Yes	Yes
Observations	5815	6032	4114
R-squared	0.097	0.082	0.069

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses
Standard errors clustered at the state level
OLS regressions

Figure 4: Share of cohort who observed mineral discoveries during impressionable years



Consequently, we define the "peak" of mineral discoveries for each state by taking the five years period with the most discoveries. According to all the former results, this "peak" is a key date in the evolution of individualism in the state. Then, we construct the *distance to discoveries*, which is the difference between the year of interview and the "peak".

For the same reasons as above, we use only non-movers living in states with mineral resources. The effect of the *distance to discoveries* on individualism is presented in table 7. The estimated coefficient of this variable is negative in the three specifications, and significant in two out of three cases. This means that the longer ago the "peak" occurred, the less individualistic the individuals living in states with mineral resources. In other terms, the positive effect of mineral resources on individualism slowly mitigates over time. For example, an increase by 50 years in the distance to discoveries is associated with a 0.1 decrease in inequalities. As a comparison, this is equivalent to the effect of a 1 year decrease in formal education.

These results support the idea that mineral discoveries have a long lasting effect on individualism.

Table 7: Effect of the distance to discoveries on individualism

	(1) Responsibility	(2) Inequalities	(3) Assistance
Distance to discoveries	-0.00972*	-0.0212*	-0.00438
	(0.00531)	(0.0115)	(0.00339)
Male	0.176***	0.290***	0.0310
	(0.0279)	(0.0304)	(0.0229)
Age	-0.00814	0.00422	-0.00282
	(0.00511)	(0.00873)	(0.00311)
Age squared	0.000117**	-1.01e-05	6.53e-05*
	(5.53e-05)	(8.28e-05)	(3.34e-05)
Married	0.208***	0.251***	0.100***
	(0.0300)	(0.0568)	(0.0218)
Protestant	0.226***	0.309***	0.0577
	(0.0326)	(0.0682)	(0.0484)
Catholic	0.0416	0.0620	0.0152
	(0.0394)	(0.0770)	(0.0415)
Education	0.0501***	0.0965***	0.0173***
	(0.00730)	(0.00903)	(0.00402)
Employed	0.122***	0.140**	0.0693***
	(0.0278)	(0.0573)	(0.0228)
White	0.504***	0.773***	0.235***
	(0.0438)	(0.0713)	(0.0325)
Income	0.0236***	0.0155**	0.0120***
	(0.00602)	(0.00649)	(0.00283)
Constant	1.403***	1.117***	0.771***
	(0.142)	(0.389)	(0.114)
Time fixed effects	Yes	Yes	Yes
Observations	5741	5957	4084
R-squared	0.098	0.082	0.069

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses
Standard errors clustered at the state level
OLS regressions

5 Conclusion

In this paper, we show that living in a state with mineral resources leads individuals to be more individualistic and to demand less redistribution. This result is robust to various alternative explanations and is reinforced by the quantity of mineral resources in state. Furthermore, we shown that this effect is likely to be driven by a direct impact of resources discoveries on individuals beliefs, i.e., that, in states with mineral resources, individuals who are likely to have observed resources discoveries during their early adulthood are also more individualistic and demand less redistribution than others. Finally, we have shown that the positive effect of mineral resources on individualism slowly mitigates over time.

In the introduction, we stressed that we are agnostic regarding the effect of individualism on growth. However, if we assume that individualism is detrimental for economic development, then our results afford an additional channel to explain the resource curse.

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A Additional tables

Table 8: Distribution of mineral resources by state

	Observations	Production		Observations	Production
Delaware	0	0	South Carolina	1	1
Hawaii	1	0	Vermont	1	1
Illinois	9	0	Virginia	1	1
Indiana	0	0	New Hampshire	10	3
Iowa	0	0	New York	12	4
Kansas	0	0	Florida	28	5
Kentucky	0	0	Georgia	82	5
Maryland	4	0	Arkansas	14	6
Massachusetts	1	0	Oklahoma	144	47
Michigan	0	0	Wyoming	370	54
Minnesota	2	0	Idaho	237	67
Mississippi	0	0	North Carolina	134	77
Nebraska	0	0	New Jersey	238	224
North Dakota	0	0	South Dakota	395	272
Ohio	0	0	Washington	1598	298
Pennsylvania	8	0	Texas	629	427
Tennessee	5	0	Colorado	1411	546
West Virginia	3	0	New Mexico	947	588
Wisconsin	1	0	Montana	1382	663
Alabama	1	1	Alaska	2432	727
Connecticut	3	1	Arizona	2475	1358
Louisiana	1	1	Utah	2327	1377
Maine	15	1	Nevada	2648	1385
Missouri	1	1	California	4138	1493
Rhode Island	3	1	Oregon	4850	3840
			Total	26562	13475
			Mean	531	270
			Median	8	1

Observations : simple entries in the MRDS database
Production : places where mining has been operated

Table 9: Major commodities present, by type of observation

	Occurrence %	Prospect %	Production %	Total %
Copper	14,6	30,9	9,5	12,6
Gold	31,3	48,2	30,8	31,6
Iron	2,5	1,3	1,8	2,1
Lead	8,1	18,5	10,0	9,4
Silver	13,8	28,8	18,2	16,6
Tungsten	3,7	3,1	3,0	3,3
Uranium	8,6	3,4	5,2	6,7
Zinc	4,2	12,7	3,4	4,1
Other*	38,7	19,4	44,7	41,0

The summ of percentages is not equal to 100 because the same resource may contain several commodities.
* Other means none of the above commodities.
Occurrence : No production has taken place and there has been no or little activity since discovery.
Prospect : Work such as surface trenching, adits, or shafts, drill holes, extensive geophysics, geochemistry, and/or geologic mapping has been carried out.
Production : Mining has been operated.

Table 10: Relationship between luck at the individual level and mineral endowment at the state level

Dependent variable equals 1 if luck is most important to get ahead and 0 otherwise

Mineral state	-0.106*	Education	-0.0219**
	(0.0617)		(0.00889)
Male	0.350***	Employed	-0.00865
	(0.0431)		(0.0709)
Age	0.0277***	White	-0.246***
	(0.00974)		(0.0629)
Age squared	-0.000240**	Income	-0.00504
	(9.61e-05)		(0.00835)
Married	-0.255***	Constant	-2.301***
	(0.0500)		(0.350)
Protestant	-0.281***	Time fixed effects	Yes
	(0.0866)		
Catholic	-0.105	Observations	14933
	(0.0826)	Pseudo R-squared	0.0184

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses
Standard errors clustered at the state level
Logit model

Table 11: Effect of residence in a mineral state on confidence in the government and in television

Confidence in	Executive Branch of Federal Government (1)	The Congress (2)	Television (3)
Mineral state	-0.00972	-0.00726	0.00546
	(0.0143)	(0.0144)	(0.0129)
Observations	21764	21786	22054
R-squared	0.030	0.043	0.047

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at the state level
OLS regressions
All regressions include control variables for gender, age, age squared, marital status, religion, education, employment status, race, income, time of interview and a constant term.

B General Social Survey control variables

All our results are robust to alternative definitions of the variables.

Sex	Respondent's gender. Equals 1 for males and 0 for females.
Age	Respondent's age in years.
Age squared	Square of respondent's age.
Protestant and Catholic	Respondent's religious affiliation. The omitted category is "other" or "none".
Education	Completed years of formal education.
Employed	Respondent's employment status. Equals 1 for "full time", "part time" or "self employed". The omitted category is "retired", "housewife", "student", "unemployed" or "other".
White	Respondent's race. Equals 1 for "white". The omitted category is "black" or "other".
Income	Respondent's family income, corrected for family size. Our measure of income is slightly different from the one use in other analysis using the GSS. Usually, the GSS variable INCOME is used as a measure of income differences. This variable gives information about the respondent's total family income and is coded using 12 income brackets for the entire period covered by the survey. Using this variable without any transformation has two drawbacks. First, this does not take into account the size of the family. Second, the fact that the same coding is used for the whole period makes it an inappropriate measure because both of inflation and the increasing standard of living. Hence, we first create broad family income deciles using the income variables definer for shorter time periods (INCOME72, INCOME77, etc.). Then, we divide this new variable by the household's size using the HOMPOP variable.

C Other variables

Variable	Source
GDP per capita in 1999 dollars	US Census Bureau
Gini coefficient	US Census Bureau
Mineral mining dependency	Bureau of Economic Analysis
Ranney index	Berkowitz and Clay (2010)

D Natural resources and beliefs in Montana

As indicated by its title *Collapse : How societies choose to fail or to survive*, the book of Jared Diamond presents a large number of cases where societies face challenges at some point in their history. Some of them succeed, whereas others fail in doing so.

The first chapter of the book - *Under Montana's big sky* - is devoted to the American state of Montana. This state faces major challenges regarding the evolution of its economy and various natural disasters are threatening its survival. Indeed, the economy of Montana heavily relies on natural resources exploitation. According to Diamond, this economic organization has strong ties with inhabitants attitudes and political orientations. As a consequence, individual attitudes becomes in turn a barrier to solve new problems :

> "*Despite Montanans' longstanding embrace of mining as a traditional value defining their state's identity, they have recently become increasingly disillusioned with mining and have contributed to the industry's near-demise within Montana.*"[11]

> "*In modern times a reason why Montanans have been so reluctant to solve their problems caused by mining, logging, and ranching is that those three industries used to be the pillars of the Montana economy, and that they became bound up with Montana's pioneer spirit and identity.*"[12]

Diamond points out the crucial role of natural resources in Montanan's values by describing "*old timers*" as

[11] *Collapse : How societies choose to fail or to survive*, by Jared Diamond, Penguin Book (2006), page 37.
[12] Page 432.

> "*[...] people born in Montana, of families resident in the state for many generations, respecting a lifestyle and economy traditionally built on the three pillars of mining, logging, and agriculture [...].*"[13]

These values are linked to right-wing orientations and have their roots in the deep history of American development :

> "*[...] Montanans tend to be conservative, and suspicious of governmental regulation. That attitude arose historically because early settlers were living at low population density on a frontier far from government centers, had to be self-sufficient, and couldn't look to government to solve their problems.*"[14]

The work by Jared Diamond offers an rich an interesting case study of the link between natural resources and individual orientations. The book does not offer any support for the hypothesis that natural resources abundance *induces* selfish and anti-redistributive behaviors, however, it documents the interplay between natural resources and individualist orientations. The later have thus an impact both on general economic orientations and on the management of natural resources.

To sum up, Jared Diamond description of Montana's society illustrates the interplay between natural resources, values and economic organization.

[13] Page 57.
[14] Page 63.