Growth and Institutions in Latin American Countries: An Experimental Review for the XXI Century[1]

Crecimiento e instituciones en los países de América Latina: Una revisión experimental para el siglo XXI

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ABSTRACT: Institutions have been widely studied as triggers of economic growth. Latin American countries in the XXI century have shown an increment in State interventionism; nevertheless, the region exhibited an average annual growth rate around 3.31 percent in the first seventeen years. This research is trying to establish the causality between economic freedom, oil-production, and collectivism with economic growth. In this research in progress report we show early results of our experimental design, which demonstrates the importance

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of these institutions. Using basic statistics on growth, we conclude that countries that reduced their economic freedom experienced an economic growth of about 1.81 percentage points lower than those countries that did not reduce it, at 1% of significance level. On average, our findings suggest that in Latin America during the analyzed timeframe (2001-2017), non-oil producer countries enjoyed an average annual economic growth rate of about 1.14 percentage points higher that the economic growth experienced by oil-producers. Interestingly, more-collectivist countries grew 0.48 percentage points more than less-collectivist. Finally, we estimated a difference-in-differences model using OLS, and generated instruments (Lewbel, 2012; Lewbel, 2018) accounting for country fixed effects, and applied a variety of estimators to determine the effect of economic freedom in these countries. Our results, statistically significant, suggest that Latin American countries that lose economic freedom grow at a lower rate than the rest of the countries.

KEYWORDS: Latin American, Economic Analysis , Growth, Freedom.

RESUMEN: Las instituciones han sido ampliamente estudiadas como impulsoras del crecimiento económico. Los países Latinoamericanos en el siglo XXI han tenido un incremento en el intervencionismo del Estado; sin embargo, la región presenta un promedio de la tasa anual de crecimiento alrededor de 3.31 por ciento en los primeros diecisiete años. Esta investigación está tratando de establecer la causalidad entre la libertad económica, producción petrolera y colectivismo con el crecimiento económico. En este informe de investigación en progreso, mostramos los primeros resultados de nuestro diseño experimental, el cual demuestra la importancia de estas instituciones. Utilizando estadísticas básicas de crecimiento, concluimos que los países que redujeron su libertad económica experimentaron aproximadamente una tasa de crecimiento

de 1.81 puntos porcentuales menos que aquellos países que no redujeron la libertad económica, este resultado es estadísticamente significativo al 1%. En promedio, nuestros hallazgos sugieren que en Latinoamérica durante el período de estudio (2001-2017), los países no-petroleros disfrutaron en promedio de una tasa anual de crecimiento aproximadamente 1.14 puntos porcentuales mayor que los países petroleros de esta región. Sin embargo, los países más-colectivistas crecieron a una tasa anual promedio que superó en 0.48 puntos porcentuales a la de los menos-colectivistas. Finalmente, estimamos un modelo de diferencias en diferencias, para ello utilizamos MCO, y variables instrumentales generadas controlando por efectos fijos por país y aplicando una serie de estimadores para determinar el efecto de la libertad económica en estos países. Nuestros resultados, estadísticamente significativos, sugieren que los países Latinoamericanos que pierden libertad económica crecen a una menor tasa que el resto de los países.

PALABRAS CLAVE: América Latina, Análisis Económico, Crecimiento, Libertad.

INTRODUCTION

Scholars are interested in economic growth because of its relationship with prosperity, quality of living, and the human well-being (Pritchett, 2000). Nevertheless, understanding and analyzing economic growth is thorny and sensitive for the many endogenous and exogenous factors that affect the performance of countries. In the literature, researchers tend to explain the great differences in the living standard among countries through small differences of economic growth for long periods of time as Pritchett (2000) defines it as "the power of compound interest, over long periods" (p. 221). Following this trend, we could state that the effect of 0.09 percent difference in the economic growth rate between Uruguay and Chile helped the latter surpass the former in terms of GDP per capita, consolidating Chile as the best performing economy in

the Region with the higher standard of living in our period of analysis. Nevertheless, such as statement would rely on just the result of the economic performance and could not consider other important characteristics that countries of this region have and that could affect their economic growth.

However, the question of whether institutions could affect, positively or negatively, the economic growth is a basic concern for researchers in the field of economic growth and development that has not a general accepted answer. Many scholars support that there are two main sources of growth: (1) the addition of more inputs (physical capital and labor), and (2) innovation, technological change, or, in technical economic terms, total factor productivity. The former source of economic growth is also known as brute-force and the later was labeled smart-growth by Robert Solow who defended that smart-growth is more important than brute-force (more inputs) in generating additions to output over time (Solow, 1956, 1957; Denison, 1962, 1967; Easterly and Levine, 2001).

Currently, there are institutional variables that have captured the attention and approach of development economists. A large body of literature suggests that such as variables have a positive and significant impact on economic growth (Acemoglu, Laibson and List, 2018). For example, the geography, the latitude and altitude of a country play a fundamental role in the economic development, showing that as northern the country is the more developed it could be (Gallup, Sachs, and Mellinger, 1999)[2]. Other authors support that culture and institutions can explain why some countries grow faster than others (Acemoglu et al., 2019)[3]. The literature also shows that other factors could affect the economic growth. Corruption and military violence

2   See also Krugman (1999), Boschma and Ron (2006), Yeung, Kelly and Phillip (2007), Combes, Mayer and Thisse (2008), Dicken (2003), Lee and Wills (1997), Carvalho and Barros (2018), Chen (2019), De Oliveira (2019), Kaneko, et al. (2019)

3   See also Ghardallou, Wafa, and Dorsaf Sridi (2019), Acemoglu, Robinson, and Verdier (2017), Bennett et al. (2017), Faria et al. (2016), Alesina and Guiliano (2015), Fernandez (2011), Guiso, Sapienza, and Zingales (2006),

affects negatively the economic growth, and democracy is essential for growth (Halperin et al., 2005). Political freedom has been also studied and scholars argue that it is a factor of economic growth (Bueno de Mesquita and Downs, 2005). Finally, economic freedom—an institutional variable that measures the non-interventionism of state in the economy and the capacity of private individuals to take their own economic decisions and establish transactions without the intervention of governments—has a positive and significant effect on growth (Gwartney et al. 2019)[4]. Notwithstanding, many authors have argued that there are not reliable results to support the relation between these institutional variables and economic growth (Sturm and De Haan 2001; Doucouliagos and Ulubasoglu 2006; Sturm, Leertouwer, and De Haan 2003; Ram 2000).

On the other hand, Latin American region has had an average economic growth rate around 3.31 percent in the first seventeen years of the XXI century (Penn World Table 9.1). This is not a poor result at all because if we look at the same statistic, the last 6 years (from 2012 to 2017) the average economic growth rate decreased to 1.40 percent. In addition, these countries seem to have more common characteristics than just being in the same region, such as high degree of collectivism (Hofstede, 2001), economies that are highly intervened by governments, and high dependency on a specific commodity as crude oil and natural gas (Mora and Acevedo, 2019). Furthermore, countries of this region have experienced many social, political and economic shocks in the 21st century. Ecuador dollarized the economy in 2000 while El Salvador did it in 2001. Between 2002-2003 Venezuela, in that moment the largest oil exporter of the region, suffered a coup and an oil-workers strike. The increment of oil price, that started

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Bueno de Mesquita and Downs (2005), DiTella and Schargrodsky (2005), Glaeser, La Porta and Lopez-de-Silane (2004), Acemoglu, Johnson and Robinson (2002), Hofstede (2001), Landes (1999).

4   See also Bergh and Bjornskov (2019), Erdal (2019), Williamson and Mathers (2011), Saurabh (2007), Faria and Montesinos (2009), Pitlik (2002)

around 2005-2006 marking its highest between 2011-2012, also affected the social-economic-political performance of this region if you consider that six of these countries are among the larger exporters of oil in the world.

Considering the specific uniqueness of each of these countries and the geopolitical relevance that the Latin American region has within the Americas, our research is aimed to find a reliable evidence to establish the causality of economic freedom, and other variables such as oil production and collectivism, on economic growth during the first seventeen years of the XXI century. For this, we try to determine if those countries in Latin America that reduced economic freedom—oil-producers, and/or more collectivists—have enjoyed less economic growth than countries that did not weakened their economic freedom—non-oil-producers and less collectivists.

We divided this research in progress report in four sections. First, we present a general overview of the intent of our research, introduce the literature review, and outline the relevance and objective of our research. Second, we detail the experimental design that we are following to achieve the objective. Third, we report the results we have at this moment. Finally, we conclude and present some future research directions.

1. METHODOLOGICAL ASPECTS

This research is trying to establish the causality between some institutional variables and economic growth in the Latin American countries. Glennester and Takavarasha (2013) explain, "Measuring causal impact requires us to compare what happened with the program with what would have happened without the program" (p. 24). For this research, the *program* is having the characteristic that we are interested to study (diminishing economic freedom, oil-producer, and more collectivism). Then, following the cited authors we

developed an experimental design that allowed us to measure the difference of the economic growth rates between countries that have and that do not have those characteristics.

Data

The data used in this research is the expenditure side of real GDP at chained purchasing power parity in US dollars (2011) and the population size from the Penn World Table 9.1 of 18 countries for 17 years beginning in 2001. The countries analyzed are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Paraguay, El Salvador, Uruguay, and Venezuela. We also used data from the Economic Freedom of the World Index (*EFW*) published by the Fraser Institute and, from the Economic Commission for Latin America and the Caribbean (ECLAC), we obtained the information to determine whether a country is considered an oil-producer country. Finally, using Hofstede (2001) we could classify countries as "more collectivists" or "less collectivists". In **table 1**, we report a brief description and the summary statistics of the data.

Table 1. Description and Summary Statistics

Variable	Name & Estimation	Source	Obs.	Mean	S.D.	Min.	Max
				Summary Statistics			
GDP	Real GDP growth rate: $[\text{Ln}(\text{GDP}_{\text{year}(j)}) - \text{Ln}(\text{GDP}_{\text{year}(j-1)})]$	Penn World Table 9.1	306	0.033	0.059	-0.556	0.239
EFW	Dummy variable that indicates if the country decreased its economic freedom index of the world score. $EFW=1$ if: $\text{ScoreEFW}_{\text{year}(j)} < \text{ScoreEFW}_{\text{year}(j-1)}$	The Fraser Institute	306	0.509	0.501	0	1
Oil-prod	Dummy variable that indicates if the country an oil-producer. $Oil\text{-}prod=1$ if the country has the enough production capacity to export.	CEPAL	306	0.333	0.472	0	1
Collect	Dummy variable that indicates if the country is more-collectivist. $Collec=1$ if the score of the country divided by the maximum of our sample is lesser than 0.5	Hofstede	221	0.615	0.488	0	1
Ed. Attain	Dummy variable related with educational attainment, measured as years of schooling. $Ed.\ Attaint=1$ if the score of years of schooling of the country is lesser than the average of the region.	World Bank	289	0.471	0.5	0	1

Treatments

In a research with this experimental design, the definition of the *treatment* is very important. First, we must consider that *treatment* indicates that an individual was included in the program which, in this research, means that the country has the characteristic that we want to analyze. Secondly, the success of this kind of research design depends on how researchers define if an individual is considered *treated* or *not treated* (control group), (Glennester and Takavarasha, 2013).

Our research presents a straightforward definition of the *treatments*. We have three institutional variables of interest, then, we defined our *treatments* as follows:

a) Economic freedom (*EFW*): we consider that the decrement of the score is the result of applying at least one policy that undermined the property rights and/or the possibility of making your own economic decisions. Then, if the country is a treated unit. We classified countries in the control group if they had an economic freedom score higher or equal than the previous year.

b) Oil-Producer (*Oil-prod*): we defined a country as treated if it exports oil; otherwise, the country classifies in the control group. The quantity of oil exported is not considered, as well if the country produces but does not export, for example Chile produces but just covers barely 3% of its internal consumption, then it classifies in the control group.

c) Collectivism (*Collect*): firstly, we classified countries as "More Collectivists" (treated) or "Less Collectivists" (control). Hofstede (2001) scores each country with a number between 0 to 100, countries closest to 0 are more collectivists. Argentina has the highest score of

the region, 46, and the lowest is Guatemala with 6. If the country's value divided by Argentina's value was less than 0.5 then it classified as treated unit, otherwise it classified in the control group[5].

Identification Strategy

The first methodology we used was the basic statistical analysis of economic growth. For this we estimated the annual growth rate of the real GDP per capita for each country and calculated the average for the full sample and each group (treated and control). Finally, we estimate the difference between groups using OLS and following equation (1)

$$\Delta GDP_{ij} = \alpha + \beta_1 T_{ij} + \mu \quad (1)$$

where is the economic growth rate of country in year , is a dummy indicating whether the country is treated or no in year . Then, is the parameter that indicates us the difference in the average growth rates between treated and control groups.

The second methodology we used was the difference-in-differences (diff-in-diff). Gertler, et al (2016) explain that "the difference-in-differences method compares the changes in outcomes over time between a population that is enrolled in a program (the treatment group) and a population that is not (the comparison group)" (p.139). It has been used in research to analyze the impact of a policy (or treatment) between individuals affected and not affected by that policy (the treated and control groups). It is widely used in political science research to analyze the impact of a public policy as in Nykiforuk, et al (2019)[6]. Other authors have used this methodology to analyze economic and/or decision-making issues, as Mukhopadhyay (2019)[7]. This method

5　Given Hofstede's database does not include all countries of the main sample, when we controlled by collectivism our analysis includes 13 countries, 5 of them classified as less collectivists and 8 as more collectivists.

6　See also Saeed et al. (2019); Enos (2015); De Janvry, Finan, and Sadoulet (2011); Di Tella and Schargrodsky (2004); and Duflo (2001).

7　See also Rosa (2019); Kaneko, Nakagawa, and Phun (2019); Steinmeir, and Stich (2019); Grier, Hicks, and Yuan (2016); and Slaughter (2001).

has been used in papers analyzing the impact of an event or policy on economic growth as in Chen (2019)[8].

Gertler, et al. (2016) explain that for an analysis of difference-in-differences the researcher should measure the outcome before and after the program in both groups the treated and control. Then we should have a dummy for the period, pre-treatment (value 0) and post-treatment (value 1). However, and following the methodology proposed by Grier, Hicks, and Yuan (2015), it is possible analyze a difference-in-differences considering other characteristic(s) in the analysis even if the sample does not have a period dummy variable. We estimated the diff-in-diff model using OLS, and the generated instruments proposed by Lewbel (2012 and 2018) to analyze the reliability of our results. The specification model estimated is represented in equation (2):

$$\Delta GDP_{ij} = \alpha + \beta_1 \, EFW_{ij} + \beta_2 \, SC_{ij} + \beta_3 \left(EFW_{ij} * SC_{ij} \right) + \beta_z \, Z + \mu \qquad (2)$$

Now, is the same dummy variable we used in equation (1) for classifying the country if is treated (decreased economic freedom) or no in year . stands for the "second characteristic" and is the dummy variable for oil-producer or more-collectivist. is a vector of control variables, and the error. We used our variables *Oil-prod*, *Collect*, and for human capital the educational attainment[9], as the control variables. is the diff-in-diff parameter and shows the effect of those countries that diminished their economic freedom and with the other characteristic (oil-producer or more collectivist) on the growth rate.

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8   See also Heger and Neumayer (2019); Pham, Katsuhiro, and Pham (2019); Carvalho and Barros (2018); and Miles (2008).

9   Published by the World Bank. If the average score of the country is lesser than the average of the region we classified it in the treated group, otherwise in the control group.

2. RESULTS AND EMPIRICAL THOUGHTS

Basic Statistical Results

T**able 2** presents the basic statistical results on economic growth. The region, represented by the *full sample,* had an average of the annual growth rate of around 3.31 percent. When we break our timeframe in short periods, we can see that the best performance was between 2004 and 2008, with an average annual rate of around 5.77 percent. The second-best performing period was between 2008 and 2012 with an economic growth of around 4.63 percent. These two periods correspond to the beginning and the end of the last oil price increase. Between 2012 and 2017, the region experienced its worst economic growth, not surprisingly during these years the price of oil plummeted and political-social and economic problems were experienced in Latin America. The region seemed to be richer, at the end of the period the final average income represents around 178.25 percent of the initial average income, which could be interpreted as an improvement in the quality of living.

Table 2. Basic Statistics on Economic Growth.

2001 - 2017		Economic Growth Rate (%)							GDP per capita (2011 US$)	
		2001 – 2008	2008 - 2017	2001 – 2004	2004 -2008	2008 -2012	2012 – 2017	2001 - 2017	Initial	Final
Full Sample		3.31	4.01	2.91	2.17	5.77	4.63	1.40	7139.98	12726.36
		(0.003)	(0.004)	(0.005)	(0.006)	(0.005)	(0.005)	(0.006)	(758.49)	(1428.86)
EFW	Control	4.25	4.51	4.26	2.48	6.38	6.31	2.37	6815.24	14903.54
		(0.004)	(0.004)	(0.004)	(0.008)	(0.006)	(0.006)	(0.004)	(815.66)	(1999.97)
	Treated	2.40	3.49	1.77	1.88	5.11	3.23	2.37	7399.78	10549.17
		(0.006)	(0.007)	(0.008)	(0.009)	(0.007)	(0.008)	(0.004)	(1234.98)	(1868.7)
	Difference (T-C)	-1.85***	-1.02	-2.49***	-0.6	-1.27	-3.08***	-1.73	584.53	-4354.37
		(0.007)	(0.009)	(0.009)	(0.013)	(0.009)	(0.009)	(0.013)	(1566.59)	(2737.14)
Oil-Prod	Control	3.69	3.75	3.63	2.46	4.86	4.64	2.68	7134.37	13479.2
		(0.005)	(0.005)	(0.003)	(0.007)	(0.005)	(0.005)	(0.003)	(1010.42)	(1976.92)
	Treated	2.55	4.53	1.46	1.59	7.61	4.63	2.68	7151.21	11220
		(0.009)	(0.009)	(0.013)	(0.013)	(0.009)	(0.012)	(0.003)	(1172.97)	(1717.09)
	Difference (T-C)	-1.14	0.78	-2.17**	-0.86	2.75***	-0.01	-3.83***	16.82	-2258.52
		(0.007)	(0.009)	(0.009)	(0.13)	(0.009)	(0.011)	(0.013)	(1658.50)	(3072.91)
Collect	Control	2.92	2.89	3.09	-1.74	5.96	5.20	1.16	10958.28	18774.52
		(0.006)	(0.009)	(0.007)	(0.012)	(0.008)	(0.011)	(0.005)	(776.86)	(1686.31)
	Treated	3.39	4.97	2.41	3.20	6.73	4.71	1.16	6567.79	12018.86
		(0.006)	(0.006)	(0.009)	(0.009)	(0.008)	(0.008)	(0.005)	(726.73)	(1857.49)
	Difference (T-C)	0.48	2.08*	-0.68	3.38**	0.77	-4.96	-0.59	-4390.5***	-6755.66**
		(0.009)	(0.011)	(0.013)	(0.014)	(0.012)	(0.014)	(0.017)	(1109.25)	(2718.26)

Notes: Standard errors are in parentheses. *p<0.1, **p<0.05, ***p<0.001. The Differences was estimated with OLS

The *EFW* data suggests that those countries that reduced economic freedom experienced a lower economic growth than those which did not reduce economic freedom. If we look at the entire timeframe from 2001 to 2017, it is possible to conclude, with a 1% of significance level, that countries that reduced economic freedom had an economic growth of at least 1.85 percentage points less than those that did not hurt their freedom. When we analyzed the economic growth rates in shorter periods, this relation remains the same and our findings suggest that there is evidence that suggests that, even at 1% significance level, a reduction in economic freedom leads to a lower economic growth rate.

The average on initial and final income also seems to sign the causality that economic freedom has on the economic performance of this region. Treated units had a greater initial income than the control group, for instance, in 2001 while individuals from a country of the treated group earned $1, individuals from countries of the control group earned $0.92. Nevertheless, the final income of the control group offset the initial difference and is even larger. In 2017 while an individual from any country of the treated group earned an average of $1 individuals in the control group earned an average of $1.41.

As we stated before, this region is characterized for having six of the larger exporters of oil in the world. For this reason, any analysis of economic growth for these countries must account for the heterogeneity caused by this condition. Furthermore, another main characteristic is that all oil-producer countries in Latin American have the condition that oil enterprises are state-owned, which could hurt the potential benefits of having this scarce natural resource as public sector implements managerial decisions based more on the political benefit than in the economic utility. During the entire timeframe analyzed (2001-2017), results showed that non-oil producers enjoyed an economic growth rate at least 1.14% higher than oil-producers.

During 2004-2008, oil-producers enjoyed the highest rate of economic growth of around 7.61 percent, surpassing by 2.75 percentage points the average economic growth rate enjoyed by the non-producers (control group) at 1 percent of statistically significance. This was the result of the oil price surge experienced during those years. Nevertheless, the dependency on oil prices to promote economic growth is evident between 2012 and 2017 when oil-producers experienced a lower economic growth rate of around 3.83 percentage points, at 1% level of significance, than the non-oil-producers. The average incomes are also suggestive, individuals living in oil-producers impoverished in comparison with their peers in non-oil-producers (from almost 1:1 to almost 1:1.2).

When we turn to the last panel *Collect (*collectivism*)*, we noticed that more collectivists countries (treated group) grew around 0.48 percentage points faster than the control group, but non-statistically significant, for the whole period. This relation remains in most of the short periods, with the 2001-2004 timeframe showing the higher difference of around 3.38 percentage points at 5% level of significance. Nevertheless, if we look at the differences of incomes between groups, the gap was closed from 1:1.67 to 1:1.56, meaning that, despite individuals in less collectivist countries earn much than in more collectivists, the latest had a greater proportionally improvement.

Diff-in-Diff OLS Results

In **table 3,** we report the results obtained when we estimated equation (2) using OLS. The coefficient of interest, (from now, diff-in-diff), is negative and statistically significant at the 10% level, as we expected, when the variable production is included in the interaction (columns 1 to 4). These results support that in average countries that suffered a decrement in their economic freedom score and are oil-producers grew around 3.4 percentage points less than those non-oil-producers and/or that keep at the same level or increased their score of the

economic freedom index. The *EFW* is statistically significant at 5% level and suggests that if a country decreased its economic freedom score it grew around 1.34 percentage points less than those that did not diminished their economic freedom.

Table 3. Results of the Difference-in-Differences Model: OLS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EFW	-0.0339*	-0.0341*	-0.0346*	-0.0351*	0.0122	0.0125	0.0120	0.0123
	(0.020)	(0.020)	(0.019)	(0.019)	(0.016)	(0.016)	(0.016)	(0.016)
	-0.0133**	-0.0135**	-0.0134**	-0.0137**	-0.0345***	-0.0342***	-0.0349***	-0.0346***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.010)	(0.010)	(0.010)	(0.010)
Oil-prod	0.0079	0.0082	0.0091	0.0098	-	-	-	-
	(0.010)	(0.010)	(0.011)	(0.011)				
Collect	-	-	-	-	-0.0000	-0.0004	0.0013	0.0006
					(0.010)	(0.010)	(0.010)	(0.010)
Controls:								
Production	N/A	N/A	N/A	N/A	N	Y	N	Y
Collectivism	N	Y	N	Y	N/A	N/A	N/A	N/A
Ed. Attain.	N	N	Y	Y	N	N	Y	Y
Obs.	221	221	221	221	221	221	221	221
R^2	0.0636	0.0657	0.0649	0.0678	0.0464	0.0517	0.0486	0.0529

Notes: *p<0.1, **p<0.05, ***p<0.001. Robust standard errors reported in parenthesis. N/A reported when that variable is interacting with the treatment. N: variable is not included as control. Y: variable is included as control.

When we turn to columns 5 to 8, using collectivism as the interacting term in the model, results changed. Now, the diff-in-diff shows a positive but non-statistically significant coefficient, but interestingly the dummy that captures the impact of the change in the economic freedom score (*EFW*) in these specifications is negative, as we expected, and improved its significance at 1% level. Despite the diff-in-diff is not significant we can assume that those countries that suffered a decrement in their score of the economic freedom grew at least 3.4 percentage points less than those that keep the same level or improved their scores. Despite results are not significant, they also seem to suggest that countries with decrements in their score and more collectivists grew at least 1.2 percentage points faster than those less collectivists, and those that maintained the same level or increased their *EFW*. At this point, we should highlight that Argentina, Brazil, and Mexico are in the group of the less collectivist countries, in addition, those countries are oil-producers. Furthermore, in the more collectivist group, there are four of the six highest economic growth rates of this sample, Peru, Panama, Colombia, and Ecuador[10], and then these arguments justify the results obtained.

Diff-in-Diff Generated-IV Results

In **table 4**, we report results of estimations of the equation (2) but using the generated instrumental variables methodology proposed by Lewbel (2018 and 2012). From columns 1 to 4, **table 4**, we estimated the model in column 4, **table 3**. Using a variety of estimators, we obtain that the diff-in-diff is negative and statistically significant at 10% level, suggesting that losing economic freedom and being an oil-producer country impacts in at least around 2.5 percentage points less in economic growth rate that those countries that do not decreased their freedom. The *EFW* is still negative and statistically significant at 5%

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10   Paraguay and Bolivia had a higher average of economic growth rate during the period than Colombia and Ecuador, but those two countries have no a measure of collectivism, then they are out of this consideration.

level suggesting that those countries that decreased their *EFW* grew around 1.1 percentage points less than those that did not decrease their economic freedom.

Table 4. Results of the Difference-in-Differences Model: Generated –IV (Country Fixed Effects)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	-0.0321*	-0.0321*	-0.0247*	-0.0248*	0.0126	0.0126	0.0281**	0.0279**
	(0.018)	(0.018)	(0.013)	(0.013)	(0.016)	(0.016)	(0.012)	(0.012)
EFW	-0.0148**	-0.0148**	-0.0106**	-0.0107**	-0.0348***	-0.0348***	-0.0339***	-0.0342***
	(0.006)	(0.006)	(0.005)	(0.005)	(0.010)	(0.010)	(0.010)	(0.010)
Oil-prod	0.0082	0.0082	0.0126	0.0125	-0.0089	-0.0089	0.0030	0.0016
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.009)	(0.009)
Collect	0.0073	0.0073	0.0132*	0.0132*	0.0004	0.0004	-0.0015	-0.0020
	(0.009)	(0.009)	(0.008)	(0.008)	(0.010)	(0.010)	(0.010)	(0.010)
Ed. Attain	-0.0066	-0.0066	-0.0117	-0.0117	-0.0051	-0.0051	-0.0137*	-0.0125
	(0.009)	(0.009)	(0.008)	(0.008)	(0.009)	(0.009)	(0.008)	(0.008)
Obs	221	221	221	221	221	221	221	221
p(UID)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
p(OID)	0.3752	0.3753	0.3548	0.3752	0.3120	0.3120	0.3244	0.3120

Notes: *p<0.1, **p<0.05, ***p<0.001. Robust standard errors reported in parenthesis. Models (2) and (6): Limited Information Likelihood; Models (3) and (7): continuously-updated GMM estimator; Models (4) and (8): two-step efficient GMM estimator. p(UID): p-value of under-identification test (Kleibergen and Paap). p(OID): p-value of over-identification test (Hansen-J) of all instruments.

When the specification included collectivism as the interacting term with *EFW*, columns 5 to 8 in **table 4**, and used the continuously-updated GMM and the two-step efficient GMM estimator, columns 7 and 8 respectively, the diff-in-diff was positive and statistically significant at 5% level. These results suggest that more collectivist countries that diminished *EFW* grew faster at least 2.8 percentage points more than the rest of the countries. Notwithstanding, all estimations also reported at 1% level of significance that without considering the more collectivist characteristic, the fact of losing *EFW* means that countries grew around 3.4 percentage points less than those that do not lose freedom. All results are robust for the tests of under and over identification performed in this methodology.

3. CONCLUSIONS

The early results of our on-going research suggest and signal a potential causality between the institutional variables, that we are using, on the economic growth in Latin America. However, further research must analyze other characteristics of economic growth in these economies, such as volatility and instability.

The results that we provide in this research in progress report coincides with the available literature which stresses the positive and significant effect of economic freedom on economic growth. In addition, our statistical analysis has help us to show evidence that oil-producer countries in Latin America did not have the economic performance enjoyed by non-oil producers; perhaps the higher dependency on this commodity makes them more susceptible to shocks. However, our results differ from the empirical corpus reviewed in the collectivism characteristic. Latin America is a region where collectivism plays a fundamental role in the culture however it seems to be that this characteristic does no harm to the growth potential in these countries, but further research is needed to draw a more robust and reliable conclusion.

We used methodologies that are robust and allowed us to estimate the effect of the institutional variables of interest (economic freedom, oil-producer, collectivism), and to measure the effect of decreasing economic freedom on economic growth (while accounted for other characteristic). However, a caveat that we should make regarding our research is that there could be limitations related with our sample size. Ideally, we could include other countries, years, and variables as well as use other causal effect methodologies to establish the causation. Even thought this would help to draw a more general conclusion, a wider region or worldwide sample is not the geographical and political research interest of our investigation and such as researches have been addressed by other scholars (for example, Grier and Grier, 2018). Given this caveat, our research will continue addressing these nuances and analyzing the data following an experimental design that seems to be the path for strongly establish the causality.

REFERENCES

Acemoglu, D., Johnson, S., & Robinson, J. A. (2002). Reversal of fortune: Geography and institutions in the making of the modern world income distribution. *The Quarterly journal of economics*, *117*(4), pp. 1231-1294.

Acemoglu, Daron, et al. (2019). Democracy Does Cause Growth. *Journal of Political Economy,* 127(1), pp. 47-100.

Acemoglu, D., Robinson, J. A., & Verdier, T. (2017). Asymmetric growth and institutions in an interdependent world. *Journal of Political Economy*, 125(5), pp. 1245-1305.

Robinson, J. A., & Acemoglu, D. (2012). *Why nations fail: The origins of power, prosperity and poverty*. London: Profile.

Alesina, A., Glaeser, E., & Sacerdote, B. (2005). Work and leisure in the United States and Europe: why so different? *NBER macroeconomics annual*, 20, pp. 1-64.

Alesina, A., & Giuliano, P. (2015). Culture and institutions. *Journal of Economic Literature*, 53(4), pp. 898-944.

Barro, R. J. and Sala Martin, X. (2004). *Economic Growth*, 2nd ed. Cambridge: MIT Press.

Baumol, W. J. (1961). *What Price Economic Growth? Englewood Cliffs*. New Jersey: Prentice-Hall.

Bennet, D. et al. (2017). Economic Institutions and Comparative Economic Development: A Post-Colonial Perspective. *World Development,* 96(C), pp. 503-519.

Bergh, A. and Bjornskov, C. (2019). Does Economic Freedom Boost Growth for Everyone? *IFN Working Paper No. 1276. Research Institute of Industrial Economics.*

Boschma, R. and Frenken, K. (2006). Why is economic geography not an evolutionary science? Towards an evolutionary economic geography. *Journal of Economic Geography*, 6(3), pp. 273–302.

Boyd, C., Epstein, L., and Martin, A. (2010). Untangling the Causal Effects of Sex on Judging. *American Journal of Political Science,* 54(2), pp. 389-411.

Bueno de Mesquita, B. and Downs, G. W. (2005). Development and Democracy. *Foreign Affairs,* 84(5), pp. 77–86.

Carvalho, R. and Barros, A. (2018). Natural Disasters, Economic Growth and Spatial Spillovers: Evidence from a flash flood in Brazil. *Papers in Regional Science,* 98(2), pp. 905-924.

Chen, Y. (2019). High-speed railway and regional economic growth: a case of Beijing-Shanghai high-speed railway. *Holistica – Journal of Business and Public Administration*, 10(2), pp. 95-104.

Combes, P. P., Mayer, T., Thisse, J.T. (2008). *Economic Geography: The Integration of Regions and Nations.* Princeton: Princeton University Press

Comisión Económica para América Latina y el Caribe (CEPAL). (2000-2020). *Estadísticas e Indicadores.* Retrieved from: https://estadisticas.cepal.org/cepalstat/web_cepalstat/estadisticasIndicadores.asp?idioma=e

De Janvry, A.; Finan, F. and Sadoulet, E. (2011). Local Electoral Incentives and Decentralized Program Performance. *Review of Economics and Statistics,* 94(3), pp. 672–85.

De Oliveira, V. (2019). Natural disasters and economic growth in Northeast Brazil: evidence from municipal economies of the Ceará State. *Environment and Development Economics,* 24(3), pp. 271-293.

Dicken, P. (2003). *Global Shift: Reshaping the Global Economic Map in the 21st Century*. New York: Guilford.

DiTella, R. and Schargrodsky, E. (2005). Do Police Reduce Crime? Estimates Using the Allocation of Police Forces after a Terrorist Attack. *American Economic Review,* 94(1), pp. 115–33.

DiTella, R. and MacCulloch, R. (2006). Some Uses of Happiness Data in Economics. *Journal of Economic Perspectives,* 20(1), pp. 25–46.

Doucouliagos, C. and Ulubasoglu, M. (2006). Economic Freedom and Economic Growth: Does specification make a difference? *European Journal of Political Economy,* 22, pp. 66-81.

Duflo, E. (2001). Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence from an Unusual Policy Experiment. *American Economic Revie,* 91(4), pp. 795–813.

Enos, R. (2015). What the demolition of Public Housing Teaches Us about the Impact of Racial Threat on Political Behavior. *American Journal of Political Science,* 60(1), pp. 132-142.

Erdal, F. (2004). Economic Freedom and Economic Growth: A Time Series Evidence From the Italian Economy. *Working Paper, Adnan Menderes University & International Centre for Economic Research.*

Faria, H. and Montesinos, H. (2009). Does economic freedom cause prosperity? An IV approach. *Public Choice,* 141(2), pp. 103-127.

Feenstra, R., Inklaar, R. and Timmer, M. (2015). The Next Generation of the Penn World Table. *American Economic Review,* 105(10), pp. 3150-3182.

Fernández, R. (2011). Does Culture Matter? In J. Benhabib, M. O. Jackson and A. Bisin (eds.). *Handbook of Social Economics,* volume 1A, pp. 481–510. Amsterdam and San Diego: Elsevier, North-Holland.

Fukuyama, F. (1996). *Trust: The Social Virtues and the Creation of Prosperity.* New York: Free Press.

Gallup, J. L., Sachs, J. D. and Mellinger, A. D. (1999). Geography and Economic Development. *International Regional Science*, 22(2), pp. 179–232. Retrieved from: https://doi.org/10.1177/016001799761012334.

Gertler, P. et al. (2016). *Impact Evaluation in Practice*, 2nd edition. World Bank Group. Washington DC.

Ghardallou, W. and Sridi, D. (2019). Democracy and Economic Growth: a Literature Review. *Journal of the Knowledge Economy,* 10(1), pp. 1-21.

Glaeser, E. L., La Porta, R., Lopez-de-Silane, F. and Shleifer, A. (2004). Do Institutions Cause Growth? *NBER Working Paper 10568.* Cambridge, Mass.: National Bureau of Economic Research.

Glennester, R. and Takavarasha, K. (2013). *Running Randomized Evaluations.* Princeton University Press.

Guilligan, M. and Sergenti, E. (2008). Do UN Interventions Cause Peace? Using Matching to improve causal inference. *Quarterly Journal of Political Science,* 3, pp. 89-122.

Guiso, L., Sapienza, P. and Zingales, L. (2006). Does Culture Affect Economic Outcomes? *Journal of Economic Perspectives,* 20(2), pp. 23–48.

Grier, K., Hicks, D. and Yuan, W. (2016). Marriage Market Matching and Conspicuous Consumption in China. *Economic Inquiry,* 54(2), pp. 1251-1262.

Grier, K. and Grier, R. (2018). The Causal Effect of Jumps in Economic Freedom on Economic Growth. *Working Paper.*

Gwartney et al. (2019). *The Economic Freedom of the World Report.* The Fraser Institute.

Hall, R. E. and Jones, C. I. (1999). Why Do Some Countries Produce So Much More Output Per Worker Than Others? *Quarterly Journal of Economics,* 114(1), pp. 83–116.

Harvie, D. et al. (2009). Economic Well-being and British Regions: The Problem with GDP Per Capita. *Review of Social Economy,* 67(4), pp. 483-505.

Helpman, E. (2004). *The Mystery of Economic Growth.* Cambridge: Harvard University Press.

Ho, D. et al. (2007). Matching as a nonparametric processing for reducing model dependence in parametric causal inference. *Political Analysis,* 15, pp. 199-236.

Hofstede, G. (2001). *Culture's Consequences: Comparing Values, Behavior, and Organizations Across Nations*, 2nd edition. Sage Publications.

Kaneko, Y. et al. (2019). Impacts of Urban Railway Investment on Regional Economies: Evidence from Tokyo Using Spatial Difference-in-Differences Analysis. *Transportation Research Record: Journal of the Transportation Research Board.*

Krugman, P. (1999). The Spatial Economy – Cities, Regions and International Trade with Masahisa Fujita and Anthony Venables. MIT Press.

Kuczynski, P. and Williamson, J. (2003). *After the Washington Consensus: Restarting Growth and Reform in Latin America.* Washington, D.C.: Institute for International Economics.

Landes, D. (1999). *The Wealth and Poverty of Nations: Why some are so rich and some so poor*. New York: W.W. Norton.

Lee, R. and Wills, J. (1997). *Geographies of Economies*. London: Arnold.

Lewbel, A. (2012). Using heteroscedasticity to identify and estimate mismeasured and endogenous regressor models. *Journal of Business & Economic Statistics*, 30(1), pp. 67-80.

Lewbel, A. (2018). Identification and estimation using heteroscedasticity without instruments: The binary endogenous regressor case. *Economics Letters*, 165, pp. 10-12.

Steinmeier, M. and Stich, M. (2019). Does Sustainability Assurance Improve Managerial Investment Decisions? *European Accounting Review,* 28(1), pp. 177-209. DOI: 10.1080/09638180.2017.1412337

Masood, E. (2016). *The Great Invention: The Story of GDP and the Making and Unmaking of the Modern World*. Pegasus Books. New York.

Mebane, W. and Sekhon, J. (2011). Genetic Optimization Using Derivatives: The rgenoud package for R. *Journal of Statistical Software,* 42(11), pp. 1-26.

Miles, W. (2008). Exchange rates, inflation and growth in small, open economies: a difference-in-differences approach. *Journal of Applied Economics,* 40(3), p. 341-348.

Mora, J. U. and Acevedo, R. A. (2019). Fiscal policy effects and capital mobility in Latin American countries. *Journal of Economic Integration,* 34(1), pp. 159-188.

Mukhopadhyay, S. (2019). Legal status and immigrants' educational investment decisions. *Review of Economics of the Household,* 17(1), pp. 1-29. DOI: 10.1007/s11150-017-9361-5

Nordhaus, W. and Tobin, J. (1972). Is growth obsolete? In W. Nordhaus and J. Tobin (eds.). *Economic research: retrospect and prospect,* volume 5, *Economic Growth*, pp. 1-80. New York: National Bureau of Economic Research.

Nykiforuk, C/. et al. (2019). Advocacy coalition impacts on healthy public policy-oriented learning in Alberta, Canada (2009-2016): A difference-in-differences analysis. *Social Science & Medicine,* 220, pp. 31-40.

Olson, M. (1982). *The Rise and Fall of Nations*. New Haven: Yale University Press.

Philipp, M. and Neumayer, E. (2019). The Impact of the Indian Ocean tsunami on Aceh's long-term economic growth. *Journal of Development Economics,* 141. DOI: 10.1016/j.jdeveco.2019.06.008

Pham, T., Katsuhiro, S. and Pham, S. (2019). Impact of microcredit on rural household welfare and economic growth in Vietnam. *Journal of Policy Modeling,* 41(1), pp. 120-139.

Phelps, E. S. (2006). The Economic Performance of Nations: Prosperity Depends on Dynamism, Dynamism on Institutions. In W. Baumol, E. Sheshinski, and R. J. Strom (eds.). *Entrepreneurship, Innovation, and the Growth Mechanism of the Free-Enterprise Economies.* Princeton: Princeton University Press.

Pitlik, H. (2002). The Path of Liberalization and Economic Growth. *Kyklos,* 55(1), pp. 57-79.

Pritchett, L. (2000). Understanding Patterns of Economic Growth: Searching for Hills among Plateaus, Mountains, and Plains. *The World Bank Economic Review,* 14(2), pp. 221-250.

Ram, R. (2000). Private Investment, Freedom, Openness, and Economic Growth: Evidence from Recent Cross-Country Data. *Economia Internazionale / International Economics, Camera di Commercio Industria Artigianato Agricoltura di Genova,* 53(3), pp. 371-388.

Rosa, L. (2019). Subsidies for public high schools and students' educational decisions. *Working Paper. Stanford University.*

Saeed, S. et al. (2019). Evaluating the impact of health policies: using a difference-in-differences approach. *International Journal of Public Health,* 64(637), pp. 637-642.

Saurabh, S. (2006). *The Effect of Political Regime and Freedom on Economic Growth.* Retrieved from: https://ssrn.com/abstract=1044201

Slaughter, M. (2001). Trade liberalization and per capita income convergence: a difference-in-differences analysis. *Journal of International Economics,* 55, pp. 203-228.

Solow, R. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics,* 70, pp. 65–94.

Sturm, J. and De Haan, J. (2001). How Robust is the Relationship between Economic Freedom and Economic Growth? *Journal Applied Economics,* 33(7), pp. 839-844.

Sturm, J., Leertouwer, E. and De Haan, J. (2002). Which Economic Freedoms Contribute to Growth? A Comment. *Kyklos,* 55(3), pp. 403-416.

Széll, G. (2011). Beyond GDP. *Indian Journal of Industrial Relations*, 46(4), pp. 545–552.

The World Bank. (2019). *Education Statistics.* Retrieved from: https://datatopics.worldbank.org/education/wQueries/qprojections

Yeung, H. W. C. and Phillip, K. (2007). *Economic Geography*: A Contemporary Introduction. John Wiley & Sons.

Williamson, C. and Mathers, R. (2011). Economic Freedom, Culture, and Growth. *Public Choice* 148(4), pp. 313-335.

Williamson, J. (ed.). (2004). *The Washington Consensus as Policy Prescription for Development.* Lecture given at the World Bank, January 13. Available through the Institute for International Economics.

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