# The short-run consequences of the erosion of economic freedom for growth and institutions in Latin America: an unorthodox experimental review of the twenty-first century

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## Abstract

How economic growth can be improved is a question that has always divided researchers, but it is one of the utmost importance, bearing directly on prosperity, quality of life and human well-being. The research presented here is an experimental review whose purpose is to evaluate the causal effects that the erosion of economic freedom has had on the economic growth rate, corruption, democracy, the transparency of laws, media censorship and judicial constraints in 19 Latin American countries during the twenty-first century. The results show that for each percentage point erosion of economic freedom, the economic growth rate is between 0.3 and 1.6 percentage points lower the following year, while institutions deteriorate in comparison with those of countries where economic freedom has not been eroded. These findings confirm that a freer economic environment not only benefits these countries economically in the short run but improves other regional variables in the long run.

## Keywords

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# I.    Introduction

The question of how economic growth can be improved has always divided researchers. Finding ways and means to increase economic growth is of the utmost importance, as it is directly related to prosperity, quality of life and human well-being (Pritchett, 2000). This study aims to contribute to the vast literature on the subject with a new approach oriented towards identifying the short-run consequences of the erosion of economic freedom for the economic growth rates and institutions of 19 countries in Latin America in the twenty-first century.

Development and institutional economists have long argued that increased State interventionism, understood as a decrease in economic freedom, would negatively affect economic growth rates and institutions. Nevertheless, understanding and analysing economic growth is a thorny and sensitive matter, owing to the many endogenous and exogenous factors that affect countries' performance.

This research paper uses the differences-in-differences statistical method to measure the short-run causal effects of high- and low-intensity erosion of economic freedom on economic growth and six specific institutions in 19 Latin American countries. The data are from the Fraser Institute (2021), Feenstra, Inklaar and Timmer (2015) (now the Penn World Table) and Coppedge and others (2021) (now the V-Democracy Dataset) and cover the period from 2000 to 2019. The results demonstrate that the erosion of economic freedom hurts economic growth and the institutions analysed in the short run.

The evidence suggests that the more intensively economic freedom was eroded, the worse the effect on institutions and the greater the loss of economic growth at a statistically significant level different to zero the following year. However, when the intensity with which economic freedom was eroded was low, the results were not significant. Thus, it was necessary to use a specification that allowed us to measure the effects of changes in economic freedom on economic growth and institutions.

The results demonstrate that our identification strategy is appropriate and the differences found are the causal effect of the erosion of economic freedom. The evidence is that the greater the erosion of economic freedom, the greater the damage to economic growth and institutions.

Some researchers explain the differences in living standards between countries by small but prolonged differences in economic growth, defined by Pritchett (2000, p. 221) as "the power of compound interest, over long periods". This interpretation considers only the results of economic performance and not other characteristics that could affect the economic growth rate (Acevedo and Lorca, 2021).

Understanding what factors may positively or negatively affect the economic growth rate of a country is a concern for development economists, who have not agreed on a universal answer.

There are two main sources of growth: (i) the addition of inputs (physical capital and labour) and (ii) innovation, technological change or, in technical economic terms, total factor productivity. The former is termed brute force and the latter smart growth by Robert Solow, who argued that smart growth was more important than brute force (more inputs) in generating additional output over time (Solow, 1956; among others). Acemoglu and Robinson (2019) argue that institutions have a positive and significant impact on economic growth. Gallup, Sachs and Mellinger (1999) show that a country's geography plays a fundamental role in economic development (see also Fujita, Krugman and Venables, 1999; Boschma and Frenken, 2006; Coe, Kelly and Yeung, 2019; Combes, Mayer and Thisse, 2008; Dicken, 2003; Lee and Wills, 1997; Carvalho and Barros, 2019; Chen, 2019; De Oliveira, 2019; Kaneko and others, 2019). Others have demonstrated that culture and institutions explain why some countries grow faster than others (Acemoglu and others, 2019; Ghardallou and Sridi, 2020; Acemoglu, Robinson and Verdier, 2017; Bennett and others, 2017; Faría and others, 2016; Alesina and Guiliano, 2015; Fernández, 2011; Guiso, Sapienza and Zingales, 2006; Bueno de Mesquita and Downs, 2005; Di Tella and Schargrodsky, 2004; Glaeser and others, 2004; Acemoglu, Johnson and Robinson, 2002; Hofstede, 2001; Landes, 1999;

among others). There are other factors affecting economic growth. Halperin, Siegle and Weinstein (2005) find that corruption and military violence negatively affect it, while democracy is essential to it. Bueno de Mesquita and Downs (2005) argue that political freedom is a factor in economic growth. Lastly, Gwartney and others (2019) identify a strong positive relationship between economic freedom and economic growth (see also Bergh and Bjørnskov, 2019; Erdal, 2004; Williamson and Mathers, 2011; Saurabh, 2007; Faría and Montesinos, 2009; Pitlik, 2002).

However, there is no generally accepted position on these conclusions in the literature, and there are no reliable findings to support the relationship between the variables mentioned and economic growth (Sturm and De Haan, 2001; Doucouliagos and Ulubaşoğlu, 2006; Sturm, Leertouwer and De Haan, 2002; Ram, 2000). Acevedo and Lorca (2021) explain that the Latin American countries had a difficult turn of the century, with numerous social, political and economic shocks that have impacted the economic development of the region. Ecuador dollarized its economy in 2000, while El Salvador did so in 2001. Between 2002 and 2003, the Bolivarian Republic of Venezuela, the largest oil exporter in the region, suffered a political crisis and strikes by oil workers. The increase in oil prices between 2005 and 2006, with a peak in 2011–2012, also affected the social, economic and political performance of the region. The uniqueness of each of the countries analysed and the geopolitical importance of the region within the Americas guided our search for reliable evidence to establish a short-run causality connecting economic freedom to economic growth rates and institutional characteristics such as corruption, democracy, transparent laws, media censorship and judicial constraints in the first 19 years of the twenty-first century. To this end, we sought to determine whether countries had less economic growth and worse institutions in the year after a reduction in their economic freedom.

This research paper is organized as follows. Following this introductory section, section II sets out the programme of analysis, describing the data and presenting a brief historical background for the erosion of economic freedom in the region, an overview of the identification strategy, and the assumptions we followed. Section III uses three different specifications to estimate the effects of the erosion of economic freedom, obtaining results which confirm that our identification strategy is appropriate. Section IV provides the results of the robustness tests. Lastly, section V summarizes our findings and conclusions.

# II.   The programme of analysis

This study conducts an experimental review to evaluate the causal effects of the erosion of economic freedom on economic growth rates, corruption, democracy, the transparency of laws, media censorship and judicial constraints in a sample of 19 Latin American countries. Its methodology follows Duflo (2001), Qian (2008) and Miguel and Kremer (2004), among others. Our study differs from theirs in that our programme of analysis centres on the erosion of economic freedom, which may be repeated in different or consecutive years during the period of analysis. Our experimental design allows us to measure short-run differences in economic growth rates and certain institutions between countries where economic freedom was eroded and those where it was not.

## 1.   The data

We created a panel data set for the period 2000–2019 using information from the Penn World Table (version 10) for Argentina, the Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the Plurinational State of Bolivia and Uruguay. We extended this data set with variables from the Fraser Institute (2021) for economic freedom, the International Country Risk

Guide (ICRG) for corruption produced by PRS Group (ICRG Researchers, 2020), and the V-Democracy Dataset (Coppedge and others, 2021) and the Polity5 Project (Center for Systemic Peace, 2020) for institutional variables. Other sources were Hofstede (2001), ECLAC (n.d.) and the *Human Development Report* of the United Nations Development Programme (UNDP, 2020) for our control variables. Table 1 summarizes the statistics and sources of the main variables.

### Table 1
#### Description and summary statistics

| Variable | Source | Summary statistics | | | | |
|---|---|---|---|---|---|---|
| | | Observations | Mean | Standard deviation | Minimum | Maximum |
| Economic growth | Penn World Table 10 | 361 | 0.02734 | 0.0875 | -0.8097 | 0.2705 |
| Corruption | PRS Group International Country Risk Guide (ICRG) | 342 | 3.6380 | 0.8637 | 1 | 5 |
| Democracy | Polity5 Project | 360 | 7.6360 | 2.5231 | -3 | 10 |
| Transparent laws | V-Dem Project | 380 | 0.5085 | 1.0597 | -2.524 | 2.647 |
| Censorship effort (media) | V-Dem Project | 380 | 1.2442 | 0.9144 | -2.379 | 3.222 |
| Judicial constraints | V-Dem Project | 380 | 0.5928 | 0.2713 | 0.007 | 0.969 |
| Intensity | Fraser Institute | 361 | -0.0209 | 3.2684 | -22.617 | 22.794 |
| Erosion | Fraser Institute | 167 | -1.9745 | 2.9087 | -22.617 | -0.128 |
| Economic freedom | Fraser Institute | 380 | 6.8851 | 0.9237 | 2.720 | 7.970 |

**Source:** Prepared by the authors on the basis of estimations drawn from Stata 17.

The variables are:

- Economic growth: the growth rate of expenditure-side real gross domestic product (GDP) per capita at chained purchasing power parity in 2017 dollars, taken from version 10 of the Penn World Table.

- Corruption: the scale of corruption within the political system as measured by the ICRG. To analyse the results, we inverted the original scale, allowing us to expect a negative relationship.[2] For the purposes of this research, the corruption index ranges from 0 to 6, with 0 being least corrupt and 6 most corrupt.

- Democracy: we used the revised combined polity score (Polity2) from the Polity5 Project as a proxy for democracy. This score has been widely used in research that involves analysis of democracy, such as Rhaman, Anbarci and Ulubaşoğlu (2022) and Janus (2022). The advantage of using Polity[2] is that it converts all the standardized authority scores into conventional polity scores. This is done by subtracting the level of institutionalized autocracy from the level of institutionalized democracy, with scores ranging between -10 and +10, where +10 is strongly democratic and -10 strongly autocratic.

- Transparent laws: we used the values for transparency and predictable enforcement of laws provided by the Varieties of Democracy (V-Dem) Project. The lower the index value, the more arbitrary the way laws are applied and created and the lower the level of legal transparency and predictability in the country. The highest value is 4, denoting a situation of transparency and predictability.

- Censorship effort (media): a proxy for direct or indirect government attempts to censor print or broadcast media, provided by the V-Dem Project. A low index value indicates that censorship attempts are more direct and routine. The highest value is 4, which indicates that efforts to censor the media are rare and not routine.

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[2]  The ICRG measures corruption on a scale of 0 to 6, with 0 being a very low level of corruption and 6 a very high level. Reversing the original scale does not affect the size of the coefficients obtained in our estimations, only their sign.

- Judicial constraints: this index value, provided by the V-Dem Project, measures the extent to which the executive branch of the government respects the constitution and complies with court rulings and to which the judiciary can act independently. The lowest score is 0 and the highest is 1.

- Intensity: percentage point change in the economic freedom score published by the Fraser Institute (2021).

- Erosion: this is the programme variable. It equals intensity that is negative and means that the country has suffered a diminution of its economic freedom score in a specific year. If "erosion" is zero, the country's economic freedom score either increased or did not change from the previous year.

- Oil exporter: a control dummy taking the value 1 if the country is an oil exporter and 0 otherwise. We did not consider the quantity of oil exported because this dummy suffices to classify Latin American countries as oil exporters or non-oil exporters. Oil rents as a share of GDP were considered in our robustness tests.

- Individualism: Hofstede (2001) ranks countries on an individualism index. The highest-scoring country is Argentina (most individualistic), and since this research is focused on Latin America, we took Argentina as the benchmark. For this study, we are interested not in determining the absolute level of individualism in the countries but in classifying them as more or less individualistic. Accordingly, we used the following procedure to create a dummy for each country $i$, with 0 signifying less individualistic and 1 more individualistic:

$$Dummy_{ind_i} = 0 \text{ if } \frac{indv_{score_i}}{indv_{score_{ARG}}} < 0.5 \tag{1}$$

$$Dummy_{ind_i} = 1 \text{ if } \frac{indv_{score_i}}{indv_{score_{ARG}}} \geq 0.5 \tag{2}$$

- Education: mean years of education for adults and expected years of education for children as published by UNDP (2020).

## 2. The programme: erosion of economic freedom

Historically, the degree of economic freedom in Latin American countries has varied in a cycle reflecting the tension between public policies to strengthen State interventionism, thereby reducing economic freedom, and to liberalize, thereby restoring it (Packenham, 1992). An individualized analysis shows that some countries, namely Argentina, the Bolivarian Republic of Venezuela and Nicaragua, have undermined economic freedom more than others. Nevertheless, the rest of the countries in the region have also experienced policies damaging to economic freedom.

Figure 1 shows both the pattern of changes in the economic freedom scores of each country and the average for the region. The left panel shows that most observations range within an interval of -3 to 3 percentage points of change. It is also possible to see the outliers, countries that have suffered some shock to their economic freedom score that falls outside that range. The most significant cases are the Bolivarian Republic of Venezuela, with the largest trough and peak (around -22 in 2002 and 22 in 2017), and Argentina, whose scores fell outside the range in 13 of the 19 years covered by the chart (only in 2003, 2004, 2006, 2007, 2008 and 2011 were they within the range). Other countries experienced outlier changes in their economic freedom scores in certain years. This is an important finding that will be analysed in the subsequent sections.

**Figure 1**
Latin America: changes in economic freedom scores, 2000–2020
*(Percentage points)*
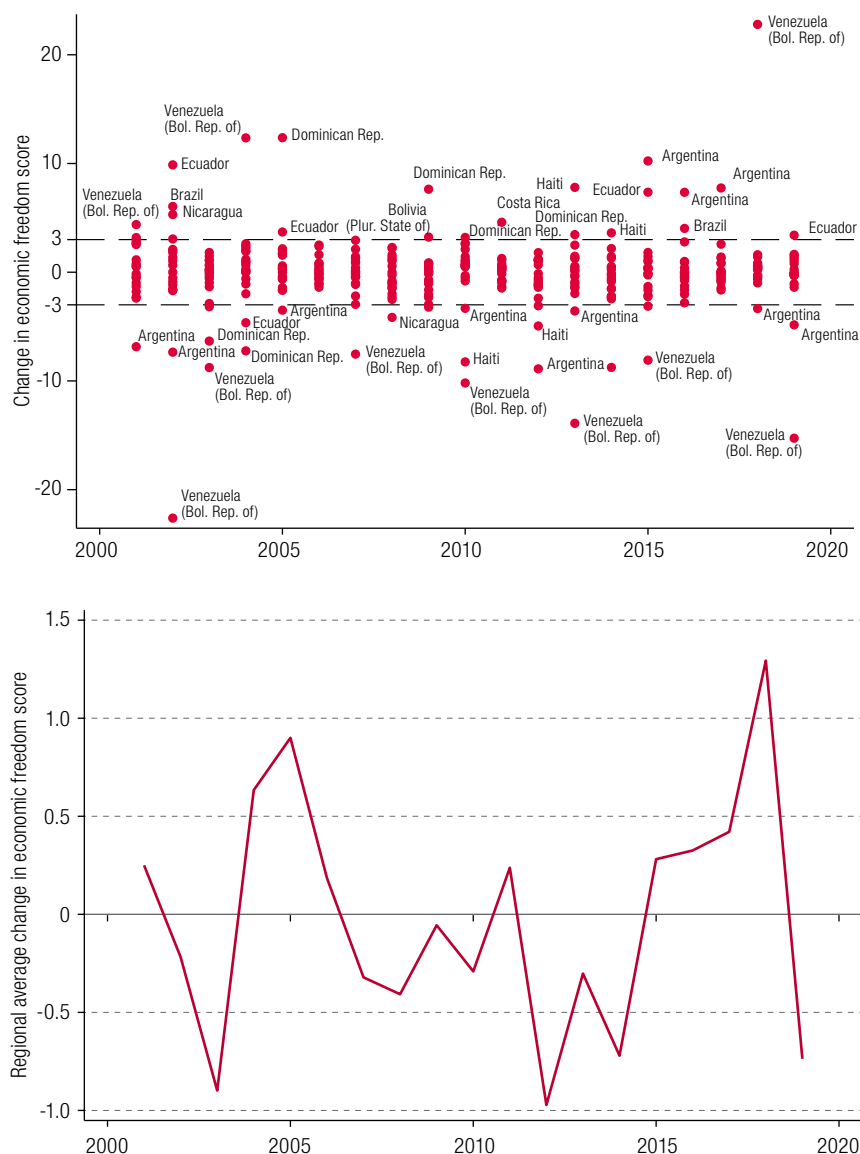


**Source:** Prepared by the authors on the basis of information from the Fraser Institute.

In 2002, the Bolivarian Republic of Venezuela experienced a major strike in the oil sector, and President Chávez was temporarily overthrown, but returned to power and implemented policies that began the largest nationalization process in the region. Between 2005 and 2006, rising oil prices allowed President Chávez to fund his political project and launch the largest left-wing movement in the region. In Argentina, President Kirchner had a similar agenda. Thus, economic freedom in Argentina and the Bolivarian Republic of Venezuela was attacked by these presidents, while similar policies were pursued (Forero, 2005) in countries such as Brazil, Ecuador, Nicaragua and the Plurinational State of Bolivia (Bhojwani, 2021). As Anselmi (2017, p. 411) points out, this period is known for "the great rise of Pan-South American leadership with the spread of 'Left turn' in all of the countries of the area".

The spread of these ideas meant that the countries of the region experienced various degrees of reduction in economic freedom. The countries with the fewest years of erosion in their economic freedom were Colombia (three years) and Chile (four years), while the rest of the countries experienced an erosion of economic freedom lasting six or more years. This came to the attention of scholars, some of whom have contributed research to the literature dealing with the effects of economic freedom on economic growth. While some have found evidence of a positive effect (Gwartney and others, 2019, among others), others have found support for the hypothesis that there is a negative relationship or none (Doucouliagos and Ulubaşoğlu, 2006). Santiago, Fuinhas and Marques (2020) argue that this negative relationship could be possible, given specific characteristics, such as ageing or non-existent infrastructure.

The recent literature on economic growth in Latin American countries has explained that the fiscal multiplier is negatively affected by economic freedom (Acevedo, Mora and Young, 2021), while pointing out that certain countries maintained an aggressive fiscal policy during the years in which economic freedom was restored. It could also be the case that while some of the countries have experienced a gradual or dramatic increase in economic freedom, conditions had been so badly undermined beforehand that the private sector has never been able to operate freely. The Bolivarian Republic of Venezuela increased its economic freedom score by about 22 percentage points between 2017 and 2018 but still had a score of 3.34 in 2018 and remained the most unfree country in the world. A similar shock raised Argentina's score to 5.17 in 2015 from 4.69 in 2014 but left it among the 10 most unfree countries in the world.

An important characteristic of the region is that it includes some of the world's largest exporters of oil and other commodities, which gives governments a high degree of fiscal independence. Acevedo and others (2022) find that the higher the degree of such independence, the greater the damage to countries' political development. They also discuss a potential confounding factor: specific political and institutional conditions. They determine that the liberalization of specific areas of the economy, including through tax cuts, open trade and sound money, could help revive the economy. However, they conclude that if those economic reforms are not accompanied by institutional reforms, or if governments are fiscally independent from citizens, liberalization of the economy will not have the same positive effect as in countries with good institutions, low fiscal independence or both.

## 3.   Identification strategy

The literature suggests that economic freedom has an impact on economic growth and institutions (Bennett and others, 2017; Faría and others, 2016; Faría and Montesinos, 2009; Glaeser and others, 2004; among others). Some authors have included lagged changes in the Fraser Institute index of economic freedom as an independent variable, and there is a large empirical and theoretical body of literature contending that the data from the *Economic Freedom of the World* (EFW) survey are statistically significant as explanatory variables for economic growth and other institutions (Lawson, Murphy and Powell, 2020). Following the literature, the identification strategy in this research goes by whether a country's EFW index score has fallen in the last year to determine whether it is a treated or a control unit.

Following Hall and Lawson (2014), who explain that some researchers use percentage changes in the EFW index instead of raw scores to avoid any possibility of endogeneity and selection bias, we used percentage changes, because to do otherwise would mean assuming that a country losing or gaining 1 point when its score was high (e.g., 10) would experience the same effect as one losing or gaining 1 point when its score was very low (e.g., 1). By using percentage changes, we assume that the effect is an increasing function.

For the whole sample, the EFW score shows a growth rate of 0.021%, but mean erosion (negative intensity only) is -1.97%. The intensity of the treatment is an increasing function of the change in the EFW score. The effect of the erosion of economic freedom should decrease for countries with low-intensity erosion. High-intensity erosion occurs when there is a negative change in the EFW score larger than the average of the negative growth rates.[3]

Table 2 shows the differences in means of our set of variables for the treated and control groups. The table also illustrates different panels to analyse the effects by intensity. The differences observed in this table can be interpreted as the short-run causal effects on these specific variables of the erosion of economic freedom in Latin American countries. For this, we assume that if countries had not experienced an erosion of their economic freedom, there would be no systematic differences between treated and control units.[4]

### Table 2
### Differences in means for treated and control groups, by intensity

| | Economic growth (1) | Corruption (2) | Democracy (3) | Transparent laws (4) | Censorship effort (media) (5) | Judicial constraints (6) |
|---|---|---|---|---|---|---|
| **Panel A: whole sample** | | | | | | |
| Difference | -0.0204** (0.01) | 0.1843* (0.094) | -0.5805** (0.278) | -0.2122* (0.115) | -0.2577** (0.101) | -0.0746** (0.028) |
| | 0.64 | 0.50 | 0.65 | 0.58 | 0.80 | 0.80 |
| **Panel B: high-intensity versus untreated** | | | | | | |
| Difference | -0.0566*** (0.017) | 0.4249*** (0.136) | -1.7138*** (0.4015) | -0.4715*** (0.169) | -0.6635*** (0.148) | -0.1745*** (0.044) |
| | 0.59 | 0.97 | 0.90 | 0.79 | 0.98 | 0.97 |
| **Panel C: low-intensity versus untreated** | | | | | | |
| Difference | -0.0051 (0.007) | 0.0716 (0.108) | -0.0947 (0.269) | -0.1037 (0.124) | -0.0879 (0.105) | -0.0328 (0.032) |
| | 0.20 | 0.16 | 0.10 | 0.20 | 0.21 | 0.26 |
| **Panel D: high-intensity versus low-intensity** | | | | | | |
| Difference | -0.0514** (0.02) | 0.3533** (0.142) | -1.6190*** (0.523) | -0.3678* (0.197) | -0.5755*** (0.177) | -0.1417*** (0.049) |
| | 0.53 | 0.85 | 0.84 | 0.56 | 0.91 | 0.85 |

**Source:** Prepared by the authors on the basis of estimations drawn from Stata 17.
**Note:**    * Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses. Power $(1-\beta)$ is the statistical power estimated using the means, standard deviations and observations of each group at a significance level of 5%; the alternative hypothesis of the statistical power test is $H_A = m_2 < m_1$ for all variables and, for corruption only, $H_A = m_2 > m_1$, where $m_2$ is the experimental group and $m_1$ is the control group.

The results in table 2 show that the economic growth rate and institutions were negatively impacted in countries where economic freedom was eroded (see panel A). In the year following the erosion of economic freedom, the economic growth rate was around 2.04 percentage points lower on average than in countries where economic freedom was not eroded, at a 5% level of statistical significance. Institutions in those countries were also affected, with corruption increasing by around 0.18 points on the original scale (out of 6). The results for democracy, transparent laws, judicial constraints and censorship effort (media) all worsened. However, only in the analysis of censorship effort (media) and judicial constraints was statistical power found to be as high as 0.8, meaning that the experimental groups for the other variables might be too small for a general conclusion to be drawn.

As Duflo (2001, p. 798) explains, "the identification assumption should not be taken for granted". Duflo used an experimental control group to prove that there was no systematic difference from her

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[3]   If erosion < -1.97%, the unit is classified as high-intensity.

[4]   A unit means a country, which can be a treated unit in one year and a control or untreated unit in another year.

control group. Nevertheless, Duflo took her experimental control group from the very regions she was analysing. As our experiment lacks a specific treatment period, any country may or may not be treated during the period of study. In fact, there is no country in our sample that did not experience a reduction in economic freedom at some point during the years analysed.[5][6] Thus, we do not have an experimental control group like Duflo (2001).

However, our unorthodox experimental design classifies countries by the intensity with which economic freedom is eroded, and this provides us with an experimental test for our results. Thus, our identification assumption can be tested via the study. When countries are classified as experiencing a high-intensity erosion of economic freedom, the negative effects on the variables analysed should be greater. Then, countries experiencing low-intensity erosion should evince a smaller difference from the control group than those experiencing high-intensity erosion. Lastly, differences between the high- and low-intensity groups should be smaller than those between the high-intensity and control groups but greater than those between the low-intensity and control groups.

Moving on to panel B, the differences between countries with high-intensity erosion of economic freedom and countries with no erosion of economic freedom are more marked and are statistically significant at the 1% level, with statistical power increasing to at least 0.8. The short-run causal effect of high-intensity erosion of economic freedom is to reduce economic growth by some 5.7 percentage points; although this is significant at the 1% level, statistical power is below 0.8. In addition, these countries experienced a level of corruption 0.43 points higher on average than the untreated group along with a deterioration in the other institutions, with all these results being statistically significant at the 1% level.

In panel C, we failed to obtain statistically significant and statistically powered results for the differences between countries with low-intensity erosion of economic freedom and those with no erosion. Lastly, panel D reports the differences between countries where economic freedom was eroded with different levels of intensity. The results show the expected outcomes: the greater the erosion, the greater the deterioration of institutions and loss of economic growth, with all results being statistically significant and different from zero.

All the results obtained in our analysis are evidence that our experimental design using differences-in-differences to measure short-run causal effects is not built on an inappropriate identification assumption. However, improving the estimation requires the use of techniques that permit the inclusion of more covariates to control for confounding effects. The following sections show results more convincingly arrived at via more advanced methodologies based on the assumption of this strategy.

# III. The effects of the erosion of economic freedom

## 1. Basic results

Our design can be generalized in a linear regression to encompass different levels of intensity. It is assumed that a higher-intensity erosion of economic freedom yields a deterioration of institutions and a lower economic growth rate. The following equation shows the regression estimated for our model (table 3) and allows us to measure the difference:

$$v_{ij} = c_1 + \alpha_{1j} + \beta_1(T_{i(j-1)}) + \delta_1(X_i) + \varepsilon_{ij} \tag{3}$$

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[5]  The countries with the fewest years of exposure to erosion of economic freedom were Colombia (three years) and Chile (four years), with the rest of the countries analysed experiencing erosion for six or more years.

[6]  Including an experimental control group from other regions of the world is not within the scope of this research and would not provide a reliable measure of identification bias.

where $v_{ij}$ is a variable for country $i$ in year $j$ (letting $v$ be the economic growth rate, corruption, democracy or any of the other dependent variables we are using in this study), $c_1$ is a constant and $\alpha_{1j}$ is a period fixed effect. $T_{i(j-1)}$ is the treatment variable that allows us to obtain results by groups, taking a value of 1 if economic freedom in country $i$ was eroded in year $(j-1)$ or the country is considered high-intensity or low-intensity,[7] and a value of 0 if the country is in the comparison group (untreated or with low-intensity erosion of economic freedom, depending on the specification). $X_i$ is a vector of country-specific variables. Our coefficient of interest is $\beta_1$, which shows the average difference in the dependent variable between countries where economic freedom was eroded or which experienced high-intensity or low-intensity erosion[8] and the comparison group.

<div align="center">

**Table 3**
Basic results: effects of the erosion of economic freedom on growth and institutions

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| | Economic growth (1) | Corruption (2) | Democracy (3) | Transparent laws (4) | Censorship effort (media) (5) | Judicial constraints (6) |
|---|---|---|---|---|---|---|
| **Panel A: whole sample** | | | | | | |
| Differences | -0.016* (-0.009) | 0.263*** (-0.08) | -0.731*** (-0.227) | -0.291** (-0.114) | -0.275*** (-0.092) | -0.092*** (-0.028) |
| F-statistic | 3.397 | 8.975 | 10.236 | 2.236 | 5.821 | 3.539 |
| $R^2$ | 0.182 | 0.375 | 0.416 | 0.128 | 0.276 | 0.188 |
| Observations | 342 | 304 | 324 | 342 | 342 | 342 |
| **Panel B: high-intensity versus untreated** | | | | | | |
| Differences | -0.054*** (-0.017) | 0.547*** (-0.125) | -1.729*** (-0.349) | -0.623*** (-0.182) | -0.567*** (-0.142) | -0.218*** (-0.045) |
| F-statistic | 2.717 | 6.099 | 8.622 | 2.042 | 5.759 | 3.686 |
| $R^2$ | 0.214 | 0.381 | 0.479 | 0.17 | 0.365 | 0.269 |
| Observations | 232 | 208 | 219 | 232 | 232 | 232 |
| **Panel C: low-intensity versus untreated** | | | | | | |
| Differences | -0.004 (-0.006) | 0.138 (-0.087) | -0.322 (-0.212) | -0.14 (-0.12) | -0.147 (-0.096) | -0.039 (-0.03) |
| F-statistic | 4.624 | 9.461 | 10.313 | 2.842 | 4.8 | 3.805 |
| $R^2$ | 0.262 | 0.429 | 0.457 | 0.179 | 0.269 | 0.226 |
| Observations | 296 | 259 | 279 | 296 | 296 | 296 |
| **Panel D: high-intensity versus low-intensity** | | | | | | |
| Differences | -0.042* (-0.022) | 0.365*** (-0.129) | -1.013** (-0.486) | -0.466** (-0.226) | -0.419** (-0.18) | -0.154*** (-0.054) |
| F-statistic | 2.307 | 5.759 | 5.757 | 1.318 | 3.897 | 2.426 |
| $R^2$ | 0.266 | 0.475 | 0.472 | 0.171 | 0.379 | 0.275 |
| Observations | 156 | 141 | 150 | 156 | 156 | 156 |

**Source:** Prepared by the authors on the basis of estimations drawn from Stata 17.
**Note:** Reported $\beta_1$ (see equation (3)). * Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses. All specifications include period fixed effects and control for oil resources, educational attainment and individualism. Estimations including separate figures for the educational attainment and individualism variables are available upon request to the authors.

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[7]   Equation (3) was estimated four times: (i) using the whole sample; in this case, $T=1$ for all units in which economic freedom was eroded, irrespective of the intensity; (ii) high-intensity vs. untreated; in this case, $T=1$ for all units in which economic freedom was intensely eroded, and $T=0$ for all untreated units; units for which erosion was low are not included in this estimation; (iii) low-intensity vs. untreated, where $T=1$ if erosion of economic freedom in the unit was low-intensity, and $T=0$ if the unit is untreated; units for which erosion of economic freedom was high-intensity are not included in this estimation; and (iv) high-intensity vs low-intensity; in this case, $T=1$ if units experienced high-intensity erosion, and $T=0$ if units experienced low-intensity erosion; untreated units are not included in this estimation.

[8]   $\beta_1$ shows the average difference in the values of the dependent variable between the units for which $T=1$ and $T=0$, following the same model of estimating the equation four times.

Table 3 shows the results obtained. As expected, they are similar to those in table 2. Panel A compares the values for the dependent variables between countries that experienced an erosion of economic freedom and those that did not, regardless of intensity. The expected outcome is confirmed: countries where economic freedom was eroded exhibited an average annual economic growth rate around 1.6 percentage points lower than countries where this did not occur. This result is statistically significant at the 10% level. If we look at the overall institutional variables, the results suggest that countries in which economic freedom was eroded had worse institutions the following year, with corruption higher by an average of 0.26 points at a 1% level of statistical significance. Not only did these countries have to deal with the consequences of high corruption, but it was also observed that democracy was weaker, with a score 0.73 points lower at the 1% level of statistical significance. The importance of judicial constraints on the executive branch is precisely that there should be an institution with enough power and autonomy to shackle the Leviathan, as explained by Acemoglu and Robinson (2019). Here, the results show that countries scored 0.09 points lower for this institution following the erosion of economic freedom. Lastly, repression of the media (a proxy for free speech) seems to have increased following a deterioration of economic freedom, and laws seem to have been created and applied more arbitrarily and less transparently. Our results include oil resources, individualism and educational attainment as control variables, allowing us to check that our estimates have not been affected by omitted characteristics or mean reversion.

Looking at Panel B, which sets a situation of high-intensity erosion of economic freedom against one without erosion, all the estimates are statistically significant at the 1% level and have the expected sign. The results suggest that countries where there was an intensive erosion of economic freedom had an economic growth rate about 5 to 5.4 percentage points lower than countries where there was not. All institutional variables were also affected. For example, corruption was around 0.55 points higher, democracy was 1.73 points weaker, there were more media restraints and fewer judicial constraints, and laws were more arbitrary and less clear.

Lastly, panel C compares a situation of low-intensity erosion of economic freedom with one of no erosion, and panel D compares a situation of high-intensity erosion with one of low-intensity erosion. The results are not statistically significant when the low-intensity group is compared with the untreated group (panel C). However, panel D shows that our identification strategy is appropriate, since the effect reflects an increasing function (the difference between the high-intensity group and the untreated group is greater than the difference between the high-intensity group and the low-intensity group).

Although the results show that our assumption is satisfied, the coefficient could be slightly overestimating or underestimating the effect of the erosion of economic freedom on the variables studied or failing to capture the true effect when all observations are used owing to the specification of the model. In other words, the results suggest that the erosion of economic freedom hurts institutional variables and economic growth. However, at low-intensity levels of erosion of economic freedom, the results obtained are not statistically significant. It is therefore necessary to use a specification that captures the effect of intensity.

## 2. Measuring the causal effect of intensity: fixed effect evidence

Duflo (2001) and Qian (2008) use a reduced form that consists of generalizing the identification strategy to an analysis of interaction terms. In our study, we cannot adopt a specification similar to the one used by these authors. Duflo (2001) studies the impact of the programme by considering individuals from different regions with different intensities in the specific year in which the programme began. However, our study has a very limited number of subjects (19 countries), and the programme is applied at different

times, which explains the need to conduct an unorthodox experimental review. It could be argued that we might increase our sample size. However, our study is focused specifically on 19 Latin American countries. It could also be argued that having different treatment periods might limit the experiment, but what we are analysing is the short-run impact. A wider sample and comparisons between different regions, or between developed and developing countries, might be options for further research.

Our results support our identification strategy and assumption that the causal effect is an increasing function of the intensity level. Nevertheless, our initial results failed to find a statistically significant effect from low-intensity erosion of economic freedom. For this reason, we used equation (4) to test the effect of intensity, defined as the percentage change in the EFW index:

$$v_{ij} = c_1 + \alpha_{1j} + \beta_1 Z_{i(j-1)} + \delta_1(X_i) + \varepsilon_{ij} \tag{4}$$

where $Z_{i(j-1)}$ is the change in the EFW score of country $i$ in the year $(j-1)$, and the rest of the terms remain the same as in equation (3). With this specification, the expected sign of our parameter of interest $\beta_1$ is negative when the dependent variable is corruption and positive otherwise.[9]

Table 4 reports the results of equation (4). These results show all expected signs and are statistically significant at the 10% level at least. For each percentage point that a country's economic freedom is eroded in the current year, economic growth the following year is expected to be 0.3 percentage points lower relative to another country where there was no erosion. This means that, on average, treated units, which is to say– countries in which economic freedom was eroded ordecreased, had an economic growth rate around 0.6 percentage points lower than countries with zero change in economic freedom (0.6 comes from multiplying 0.003 by the average erosion observed in our sample, -1.97). This result allows us to compare treated and control units, as defined for this experiment. The difference in economic growth rates between treated and untreated units would then be around 1.1 percentage points,[10] which is fairly close to our basic result.

**Table 4**
Ordinary least squares evidence for the effects of intensity

| Coefficient | Dependent variable | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Economic growth | Corruption | Democracy | Transparent laws | Censorship effort (media) | Judicial constraints |
| Intensity | 0.003* (0.001) | -0.043*** (0.013) | 0.126*** (0.037) | 0.040** (0.018) | 0.036** (0.014) | 0.040** (0.018) |
| Educational attainment | 0.069 (0.055) | -5.896*** (0.474) | 16.443*** (1.349) | 3.999*** (0.679) | 3.826*** (0.547) | 3.999*** (0.679) |
| Individualism | -0.001 (0.009) | -0.218*** (0.078) | 0.293 (0.221) | -0.178 (0.111) | 0.258*** (0.090) | -0.178 (0.111) |
| Oil resources | -0.032*** (0.010) | 0.390*** (0.087) | -2.533*** (0.248) | -0.286** (0.125) | -0.838*** (0.101) | -0.286** (0.125) |
| Constant | -0.056 (0.042) | 7.610*** (0.345) | -3.245 (2.150) | -2.421*** (0.516) | -1.686*** (0.417) | -2.421*** (0.516) |
| F-statistic | 3.400 | 9.036 | 10.347 | 2.159 | 5.658 | 2.159 |
| $R^2$ | 0.182 | 0.377 | 0.418 | 0.124 | 0.271 | 0.124 |
| Observations | 342 | 304 | 324 | 342 | 342 | 342 |

**Source:** Prepared by the authors on the basis of estimations drawn from Stata 17.
**Note:** All regressions include period fixed effects. * Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses. Estimations including separate figures for the educational attainment and individualism variables are available upon request to the authors.

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[9]  With this specification we are testing all changes in the sample, both positive and negative. The analysis for corruption, for example, if $\beta_1 < 0$, is that an erosion of 1 percentage point in the EFW score has the effect of increasing corruption by $\beta_1$ points of its scale (out of 6 points).

[10]  We obtained this number as the difference between the impact on the economic growth of treated units (0.6) and untreated units (obtained by multiplying 0.003 by 1.66, i.e., the average of all positive and zero changes in the economic freedom scores of our sample).

We defined high-intensity erosion as a situation in which countries' economic freedom was eroded by more than the average of all negative changes in economic freedom. The mean value of the high-intensity units is around 5. Plugging this average into the results of the specification, we find that these countries had an economic growth rate around 1.5 percentage points lower than those countries with zero change in their economic freedom score (we obtained this number by multiplying 0.003 by 5). Comparing this with all units that exhibited no erosion in their economic freedom, we estimate that countries with high-intensity erosion grew by around 2 percentage points less. The difference between our basic results and this new estimation is due to the correction of estimation bias and the potential heterogeneity of confounding factors by using a wider sample.[11]

Lastly, with low-intensity erosion,[12] countries grow 0.25 percentage points less than countries with zero change in economic freedom and 0.75 percentage points less than untreated units. The effect on corruption is statistically significant at the 1% level for each percentage point of erosion in a country's economic freedom. The result is an increase in corruption of 0.043 points on its scale (out of 6 points). Democracy is another institution that is affected in the short run. At 1% statistical significance, for each percentage point of erosion in a country's freedom, democracy deteriorates by 0.126 points. Transparent laws, censorship efforts (media) and judicial constraints are also negatively affected, at 5% statistical significance, when countries' economic freedom decreases. These results support the evidence previously found about the short-run causal effects of the erosion of economic freedom on these economic and institutional variables. Annex A3 presents a robustness test that controls for oil rents; the results are qualitatively similar, with statistical significance increasing for some coefficients and decreasing for others.

## 3. Measuring the causal effects of a pure exogenous intensity shock

The results shown in section B above can be interpreted as the short-run causal effects of changes in economic freedom scores on our set of dependent variables. Since this research aims to measure the causal effects of the programme, namely the erosion of economic freedom, our interpretation has focused on negative intensity or negative changes. However, our definition of the programme could be considered endogenous, and is less likely to be exogenous, because our treatment is defined for all those country-years in which there is a decline in the economic freedom score. For that reason, and considering the characteristics of our study, we built a vector autoregressive (VAR) model that includes the potential effects of our variables on changes in economic freedom. This model is more rigorous for the purposes of our experiment, as it corrects any possible endogeneity problem in our treatment and should show whether or not our findings are signalling the correct causality. The model is represented by the following equations:

$$Z_{i(j-1)} = \alpha_1 + b_{1j} + \gamma_1 Z_{i(j-2)} + \gamma_2 v_{i(j-2)} + \gamma_3(X_i) + \mu^z_{i(j-1)} \tag{5}$$

$$v_{ij} = c_1 + \alpha_{1j} + \beta_1 \widehat{\mu^z_{i(j-1)}} + \delta_1(X_i) + \varepsilon_{ij} \tag{6}$$

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[11] With the basic results model, we estimated the differences in means of the dependent variables for each group of interest, applying some controls. With these new specifications, however, our model measures the impact on our dependent variables of changes in economic freedom scores, be they positive, zero or negative, with a greater number of total observations included in the estimations.

[12] When we talk about "erosion", we are referring to negative changes. Mathematically, then, low intensity is: $-1.97 \leq$ low intensity $< 0$. In our sample, the average observation among those values is -0.80.

Equation (5) captures the potential effects of the overall relationship of our variables to changes in economic freedom. In this case, $\mu_{ij}^z$ could be interpreted as an exogenous shock to economic freedom. As we were seeking to measure the effect of a pure exogenous shock, we introduced $\widehat{\mu_{ij}^z}$ from equation (5) into equation (6), which is equivalent to equation (4).

Table 5 reports the results from equation (6). The evidence suggests that, at a 5% level of statistical significance, there is a short-run effect on corruption and democracy from the erosion of economic freedom. Corruption increases by 0.031 points for each percentage point that economic freedom is eroded, while democracy deteriorates by 0.086 points for each percentage point of erosion. Perhaps the most important finding, though, is that when erosion is considered as a pure exogenous shock, its effect on economic freedom is more significant at the 1% level. It further transpires that for each percentage point that a country's economic freedom score is eroded, its economic growth is around 0.41 percentage points lower than that of the countries in which there was no erosion. With these findings, we would expect treated countries to have grown around 0.81 percentage points less than those countries where economic freedom was not eroded. Considering these results, the difference between treated and untreated units is around 1.5 percentage points, while that between units with high-intensity erosion and untreated units is around 2.8 percentage points and that between units with low-intensity erosion and untreated units is 1.01 percentage points. For the rest of the variables, the results show the expected sign but are not statistically significant.

### Table 5
### Effects of intensity: vector autoregressive (VAR) model evidence

| Coefficient | Dependent variable | | | | | |
|---|---|---|---|---|---|---|
| | Economic growth | Corruption | Democracy | Transparent laws | Censorship effort (media) | Judicial constraints |
| Intensity | 0.0041*** (0.001) | -0.0313** (0.013) | 0.0863** (0.038) | 0.0143 (0.018) | 0.0170 (0.014) | 0.0015 (0.004) |
| Educational attainment | 0.0735 (0.057) | -5.7981*** (0.478) | 16.1874*** (1.364) | 3.9170*** (0.682) | 3.7516*** (0.551) | 1.3338*** (0.172) |
| Individualism | 0.0040 (0.009) | -0.2294*** (0.078) | 0.3423 (0.224) | -0.1686 (0.112) | 0.2665*** (0.090) | 0.0005 (0.028) |
| Oil resources | -0.0324*** (0.010) | 0.4025*** (0.088) | -2.5799*** (0.251) | -0.2948** (0.126) | -0.8456*** (0.101) | -0.0736** (0.032) |
| Constant | 0.0419 (0.041) | 7.5903*** (0.356) | -2.9780 (2.178) | -2.3154*** (0.518) | -1.5907*** (0.418) | -0.2989** (0.130) |
| F-statistic | 3.7724 | 8.5754 | 9.8129 | 1.9209 | 5.3369 | 2.9478 |
| $R^2$ | 0.1999 | 0.3646 | 0.4072 | 0.1119 | 0.2594 | 0.1621 |
| Observations | 323 | 304 | 322 | 342 | 342 | 342 |

**Source:** Prepared by the authors on the basis of estimations drawn from Stata 17.
**Note:**   All regressions include period fixed effects. * Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses. Estimations including separate figures for the educational attainment and individualism variables are available upon request to the authors. These results were obtained with the VAR model and are the estimations of equation (6).

## IV. Robustness

To test the robustness of our results, we removed from our sample all observations that were outliers with respect to our treatment, which allowed us to eliminate any potentially large influence from individual observations that could drive the results. If the individual influence of observations that produce a large shock for economic freedom scores was what made the results statistically significant (or not), our assumptions and identification strategy could be inappropriate. Annexes A1 and A2 show the descriptive

statistics and trend of our subsample (the original one without outliers) and are equivalent to table 1 and figure 1. In our experimental design, erosion is considered high-intensity for the purposes of the robustness tests in countries where it exceeded the average of negative changes or mean erosion (-1.027% for our subsample).

Table 6 is the equivalent of table 2, without outliers. The results are less statistically significant and coefficients are lower following correction of the individual influence of outliers. However, the negative difference of 1.9 percentage points in the average annual economic growth rate of treated relative to untreated countries is very close to that obtained in table 2 and is significant at the 5% level. If we look at panel B, the difference between high-intensity and untreated units decreases to 3.4 percentage points, a figure that is statistically significant at the 1% level. With this test, the difference between groups in their scores for transparent laws is not statistically significant, while the other institutional variables are significant in some of the panels. The results in this table are important because they support our initial findings and show that, while the difference on transparent laws loses significance, the rest of the differences are statistically significant and the estimates of the effects of the programme are not driven by individual influences.

### Table 6
#### Differences in means for treated and control groups, by intensity, without outliers

| | Economic growth (1) | Corruption (2) | Democracy (3) | Transparent laws (4) | Censorship effort (media) (5) | Judicial constraints (6) |
|---|---|---|---|---|---|---|
| Panel A: whole sample | | | | | | |
| Differences | -0.019** (0.009) | 0.155 (0.104) | -0.509* (0.286) | -0.147 (0.123) | -0.217** (0.106) | -0.076** (0.031) |
| Panel B: high-intensity versus untreated | | | | | | |
| Differences | -0.034*** (0.013) | 0.241* (0.133) | -1.225*** (0.366) | -0.146 (0.159) | -0.393*** (0.138) | -0.157*** (0.040) |
| Panel C: low-intensity versus untreated | | | | | | |
| Differences | -0.007 (0.007) | 0.076 (0.128) | 0.093 (0.282) | -0.148 (0.141) | -0.079 (0.116) | -0.013 (0.035) |
| Panel D: high-intensity versus low-intensity | | | | | | |
| Differences | -0.027 (0.018) | 0.165 (0.150) | -1.317** (0.514) | 0.002 (0.201) | -0.314* (0.179) | -0.144*** (0.049) |

**Source:** Prepared by the authors on the basis of estimations drawn from Stata 17.
**Note:**   * Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses. This table replicates the estimations of table 2 without outliers.

The second robustness test entailed replicating the results obtained in table 3 but eliminating outliers. Table 7 reports the results of the specifications, including all control variables. These results once again show a loss of statistical significance, with some being significant and others not. The comparison of units with high-intensity erosion and untreated units yields a difference of 2.8 percentage points in their average annual growth rates at the 5% level of significance. The difference between all the groups with regard to transparent laws once again becomes non-significant, despite keeping the expected sign. The rest of the differences between groups on the other variables are significant at the 10% level, depending on the panel.

As a final robustness test, we re-estimate the specifications reported in table 4 without outliers. Table 8 shows the results obtained. Some of our dependent variables (economic growth, corruption, democracy and transparent laws) gained potency in the intensity coefficient, greater statistical significance or both. The results of all these robustness tests prove that our assumptions and identification strategy are appropriate and provide reliable conclusions based on our findings.

## Table 7
### Basic results: effects of the erosion of economic freedom on growth and institutions, without outliers

|  | Economic growth (1) | Corruption (2) | Democracy (3) | Transparent laws (4) | Censorship effort (media) (5) | Judicial constraints (6) |
|---|---|---|---|---|---|---|
| **Panel A: whole sample** | | | | | | |
| Differences | -0.015 (0.009) | 0.207** (0.085) | -0.615** (0.239) | -0.189 (0.122) | -0.225** (0.099) | -0.083*** (0.030) |
| F-statistic | 3.025 | 9.990 | 8.389 | 2.350 | 4.344 | 3.165 |
| $R^2$ | 0.188 | 0.441 | 0.406 | 0.153 | 0.250 | 0.195 |
| Observations | 296 | 261 | 280 | 296 | 296 | 296 |
| **Panel B: high-intensity versus untreated** | | | | | | |
| Differences | -0.028** (0.013) | 0.260** (0.114) | -1.160*** (0.310) | -0.172 (0.162) | -0.354*** (0.130) | -0.170*** (0.040) |
| F-statistic | 2.447 | 6.876 | 7.251 | 1.816 | 4.274 | 3.213 |
| $R^2$ | 0.204 | 0.422 | 0.446 | 0.16 | 0.310 | 0.252 |
| Observations | 222 | 199 | 211 | 222 | 222 | 222 |
| **Panel C: low-intensity versus untreated** | | | | | | |
| Differences | -0.006 (0.006) | 0.141 (0.099) | -0.133 (0.222) | -0.160 (0.136) | -0.106 (0.108) | -0.006 (0.032) |
| F-statistic | 3.878 | 8.866 | 8.421 | 2.582 | 3.392 | 4.254 |
| $R^2$ | 0.274 | 0.477 | 0.469 | 0.201 | 0.248 | 0.293 |
| Observations | 238 | 205 | 222 | 238 | 238 | 238 |
| **Panel D: high-intensity versus low-intensity** | | | | | | |
| Differences | -0.018 (0.019) | 0.122 (0.119) | -0.779* (0.448) | -0.035 (0.214) | -0.256 (0.171) | -0.146*** (0.050) |
| F-statistic | 1.793 | 5.929 | 4.665 | 1.243 | 3.099 | 2.287 |
| $R^2$ | 0.255 | 0.535 | 0.468 | 0.192 | 0.372 | 0.304 |
| Observations | 132 | 118 | 127 | 132 | 132 | 132 |

**Source:** Prepared by the authors on the basis of estimations drawn from Stata 17.
**Note:**   Reported $\beta_1$ (see equation (3)). * Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses. All specifications include period fixed effects and control for oil resources, educational attainment and individualism. Estimations including separate figures for the educational attainment and individualism variables are available upon request to the authors. The results in this table were obtained using the same specifications and controls as the results in table 3.

## Table 8
### Effects of intensity: ordinary least squares (OLS) evidence, without outliers

| Coefficient | Dependent variable | | | | | |
|---|---|---|---|---|---|---|
|  | Economic growth | Corruption | Democracy | Transparent laws | Censorship effort (media) | Judicial constraints |
| Intensity | 0.010*** (0.003) | -0.082** (0.032) | 0.371*** (0.092) | 0.089* (0.048) | 0.138*** (0.039) | 0.051*** (0.012) |
| Educational attainment | 0.082 (0.054) | -6.813*** (0.520) | 14.827*** (1.452) | 4.692*** (0.747) | 4.065*** (0.604) | 1.382*** (0.182) |
| Individualism | -0.007 (0.009) | -0.289*** (0.082) | 0.274 (0.229) | -0.085 (0.118) | 0.169* (0.095) | -0.027 (0.029) |
| Oil resources | -0.031*** (0.010) | 0.340*** (0.094) | -2.551*** (0.261) | -0.199 (0.135) | -0.718*** (0.109) | -0.033 (0.033) |
| Constant | -0.020 (0.038) | 7.948*** (0.378) | -2.389 (2.095) | -1.991*** (0.518) | -0.924** (0.419) | -0.111 (0.126) |
| F-statistic | 3.348 | 10.023 | 9.153 | 2.408 | 4.803 | 3.796 |
| $R^2$ | 0.204 | 0.441 | 0.427 | 0.156 | 0.269 | 0.225 |
| Observations | 296 | 261 | 280 | 296 | 296 | 296 |

**Source:** Prepared by the authors on the basis of estimations drawn from Stata 17.
**Note:**   All regressions include period fixed effects. * Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses. Estimations including separate figures for the educational attainment and individualism variables are available upon request to the authors. The results in this table were obtained using the same specifications and controls as the results in table 4.

# V.  Conclusions

This paper shows evidence of the causal effects of the erosion of economic freedom in 19 Latin American countries. Its results demonstrate that an erosion of economic freedom results in lower economic growth, a weakening of democracy, an increase in corruption and a potential deterioration of other institutions, with consequences for transparent laws, censorship effort (media) and judicial constraints in the short run.

On average, the estimates indicate that for each percentage point of erosion in a country's economic freedom, its economic growth rate the following year is between 0.3 and 1.6 percentage points lower than that of the countries where it was not eroded. The results also suggest that there is statistically significant evidence that the erosion of economic freedom led to a worsening of institutions. Corruption increased by between 0.031 and 0.043 points (on a scale of 6 points), democracy deteriorated by between 0.0863 and 0.731 points (on a scale of -10 to +10 points), and there is evidence suggesting a potential deterioration in other institutions, with worsening scores for transparent laws (0.04 to 0.29 points) and censorship effort (media) (0.036 to 0.275 points), for which both scales rise to 4 points, and judicial constraints (0.04 to 0.08 points on a scale of 0 to 1).

The results were estimated by combining the differences in the percentage changes in economic freedom scores between countries, differences in economic growth rates and the other institutional variables. Our identification strategy was illustrated with a simple two-by-two table (see table 2), providing evidence that the differences-in-differences methodology and assumption were appropriate. Nevertheless, since these differences could be deemed to be imprecisely estimated given the lack of other covariates and confounding effects, we estimated an ordinary least squares (OLS) linear regression (see section II.1). We used different levels of intensity through the years studied, together with other relevant covariates that have been proven to be determinants of our dependent variables.

The results support our initial findings and suggest causality between the programme and the dependent variables. However, some of the estimates were not statistically significant when units with low-intensity erosion were compared with untreated or high-intensity units. Considering this evidence, we specified a model that allowed us to measure the short-run causal effects of changes in the economic freedom score on our dependent variables (see section II.2), which provided a larger sample size.

The results, which were very similar to the basic results, showed a lower growth rate and a deterioration of institutions the following year compared to countries whose economic freedom was not eroded.

However, we defined our treatment as endogenous and tested our experiment on this basis. We accordingly specified a VAR model, and the results showed that exogenous treatment had a statistically significant causal effect on economic growth, corruption and democracy as well as coefficients qualitatively close to those previously obtained.

In conclusion, these findings show that a freer economic environment would not only benefit Latin American countries in the short run with higher economic growth, lower corruption and a stronger and healthier democracy but could also impact other variables in the region over the long run. Subsequent analysis of the impact of a generalized positive economic freedom shock in the region will be carried out in future research.

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# Annex A1

Description and summary statistics, without outliers

| Variable | Source | Summary statistics | | | | |
|---|---|---|---|---|---|---|
| | | Observations | Mean | Standard deviation | Minimum | Maximum |
| Economic growth | Penn World Table 10 | 312 | 0.032 | 0.081 | -0.809 | 0.269 |
| Corruption | PRS Group International Country Risk Guide (ICRG) | 279 | 3.633 | 0.855 | 1.5 | 5 |
| Democracy | Polity5 Project | 296 | 7.851 | 2.330 | -3 | 10 |
| Transparent laws | V-Dem Project | 312 | 0.607 | 1.034 | -2.524 | 2.647 |
| Censorship effort (media) | V-Dem Project | 312 | 1.311 | 0.877 | -1.842 | 3.222 |
| Judicial constraints | V-Dem Project | 312 | 0.617 | 0.266 | 0.007 | 0.969 |
| Intensity | Fraser Institute | 312 | 0.066 | 1.250 | -2.964 | 2.957 |
| Erosion | Fraser Institute | 141 | -1.027 | 0.734 | -2.964 | -0.128 |
| Economic freedom | Fraser Institute | 312 | 7.041 | 0.779 | 2.720 | 7.970 |

**Source:** Prepared by the authors.

# Annex A2

**Figure A2.1**
Latin America: changes in economic freedom scores, without outliers, 2000–2020
*(Percentages)*



**Source:** Prepared by the authors on the basis of information from the Fraser Institute.

# Annex A3

| Coefficient | Dependent variable | | | | | |
|---|---|---|---|---|---|---|
| | Economic growth | Corruption | Democracy | Transparent laws | Censorship effort (media) | Judicial constraints |
| Intensity | 0.003*** (0.001) | -0.034*** (0.013) | 0.046 (0.034) | 0.046** (0.019) | 0.031** (0.014) | 0.007 (0.004) |
| Educational attainment | 0.044 (0.032) | -5.505*** (0.459) | 14.252*** (1.157) | 3.887*** (0.620) | 3.216*** (0.468) | 1.433*** (0.140) |
| Individualism | -0.011* (0.006) | -0.110 (0.083) | -0.639*** (0.209) | -0.339*** (0.112) | -0.085 (0.085) | -0.098*** (0.025) |
| Oil rents | -0.001** (0.001) | 0.028*** (0.009) | -0.257*** (0.022) | -0.025** (0.012) | -0.087*** (0.009) | -0.026*** (0.003) |
| Constant | -0.013 (0.025) | 7.376*** (0.350) | -0.952 (1.901) | -1.748*** (0.478) | -0.826** (0.361) | -0.283*** (0.108) |
| F-statistic | 5.816 | 8.473 | 13.137 | 2.679 | 7.083 | 8.700 |
| $R^2$ | 0.279 | 0.364 | 0.481 | 0.152 | 0.321 | 0.367 |
| Observations | 337 | 304 | 324 | 337 | 337 | 337 |

**Source:** Prepared by the authors on the basis of estimations drawn from Stata 17.
**Note:**  This table is similar to table 4, the sole difference being that oil rents as a percentage of GDP are taken as a control instead of the dummy variable used in table 4. All regressions include period fixed effects. * Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are in parentheses. Estimations including separate figures for the educational attainment and individualism variables are available upon request to the authors.