COUNTRY PERFORMANCE DURING THE COVID-19 PANDEMIC:

EXTERNALITIES, COORDINATION AND THE ROLE OF

INSTITUTIONS

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Country performance during the Covid-19 pandemic:
Externalities, coordination and the role of institutions

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Abstract

The Covid-19 pandemic is one of the most powerful examples of negative externalities across the globe. We focus on the role played by institutions at the country level in fighting the spread of Covid-19 by making policy coordination more difficult or, on the contrary, more effective. Specifically, we consider the type of political regimes, political fragmentation and decentralization settings. We use the most recent available information on Covid-19 performance for up to 115 countries around the world. Our main results show that having either democracies or autocracies does not represent a crucial issue for successfully addressing the pandemic. Most significantly, countries with centralized political parties, which fundamentally allow for better coordination at the national level, perform significantly better than those with decentralized ones. However, the assignment of policy responsibilities to sub-national governments is an impediment in fighting the Covid-19 emergency.

Keywords: Covid-19; policy coordination; externalities; decentralization; democratic institutions; political fractionalization.

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"In a pandemic, the thing has to be about 'we' not 'I.'"

(Dr. Krutika Kuppalli, *Stateline* 8 August 2020)

1. Introduction

The Covid-19 pandemic represents an unprecedented social and economic disruption in the modern history of the world. Its impact has been devastating with over 1 million deaths so far around the world and severe economic losses in many countries – some losing over one-fourth of their GDP in 2020. One of the most striking observations during these difficult times has been the extremely diverse performance across countries in containing the pandemic and the economic outcomes that have ensued.

Our main research question is devoted to explaining what might be behind those large differences in performance across countries. In doing that, we rely on the economic theory of (negative) externalities and how coordination at the highest level is needed to address or "internalize" those externalities.[1] The Covid-19 pandemic is, indeed, one of the most powerful examples of negative externalities in local communities, entire countries and also across the globe, that one can possibly come up with.

During 2020, we have seen that local actions in Wuhan (China) did not only affect the city of Wuhan, but also the province of Hubei, the entire country of China and, actually, the rest of the world. Fighting or addressing this powerful externality, as for any other type of negative

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[1] In economic theory, externalities refer to the effects (negative or positive) that some actions by economic agents may have on third party groups without any compensation or payments for receiving those effects, and opening room for the market of incomplete contracts. In an intergovernmental framework, addressing negative externalities (e.g., related do pollution and climate change) generally require strong national-state-local coordination (Lin 2010; Hankla et al. 2019)

externality, requires policy coordination such that agents are made to recognize or internalize in their decisions not only the self-costs and benefits of their actions, but also those imposed on the others.

Looking at single country experiences, intergovernmental coordination practices used in Germany, Denmark and Australia have received international attention for their success in controlling the first wave of Covid-19, by implementing nationwide policies and exerting a strong national leadership. On the other hand, as highlighted by Legido-Quigley et al. (2020), in other countries like Italy and Spain, the Covid-19 crisis placed pressure on all building blocks of the health systems starting from their governance and the coordination between the national and regional authorities, since responsibility for health is devolved to many and very diverse territories. In large federations, like the United States, Brazil, India or Pakistan, many sub-national governments took action, but those actions were not coordinated at the federal level (Dzau and Balatbat 2020).

Looking beyond single country situations, the World Health Organization (WHO) can be interpreted as a supranational institution in charge of coordinating this emergency situation (and many other health issues at the international level), by helping countries recognize the importance of their actions as affecting other citizens of the world. Likewise, we can interpret the actions and advise of supranational organizations, such as the European Union to their member countries, in the same fashion, that is as coordination policies addressing cross-country (negative) externalities within its geographical boundaries.

Of course, the advice and recommendations of the WHO and other supranational organization may affect the behavior and, ultimately, the public health performance of countries during the pandemic. However, our main hypothesis is that once one controls for "external" or predetermined

circumstances for each country (e.g., previous experience with respiratory diseases such as SARS or MERS, external exposure via tourism flows, or different levels of urbanization proximity), the success or failure of such performance depends critically on their institutional setup. More specifically, on how the latter facilitates the coordination for the necessary preventive policies to face and contain the pandemic. Thus, our focus is on the type of institutions at the country level that may make it more difficult or, on the contrary, enhance policy coordination to fighting the spread of Covid-19.

Three types of institutions affecting policy coordination are highlighted in our analysis: the political regime (whether countries are more or less democratic); the geographical political fragmentation (how integrated or centralized national political parties are); the fiscal and administrative decentralization (how policy decisions and spending authority are allocated among different levels of government). Even though democratic institutions are very desirable and have all kinds of beneficial effects, it is possible that in addressing this type of strong externality, the strict coordination facilitated by autocratic regimes may provide them with the upper hand to perform more effectively.

But within democratic regimes, the ability to coordinate policies is also affected by other institutional dimensions. In the case of political fractionalization, countries with centralized or integrated political parties are likely to be able to coordinate policies regarding issues with considerable externalities as in the case of the Covid-19 pandemic because of electoral incentives and discipline (as discussed in Hankla et al. 2019). Finally, in the case of policy decentralization, the sub-national assignment of responsibilities can have many advantages, including higher responsiveness to local needs and greater accountability (Uchimura and Jütting 2009; Channa and Faguet 2016). However, in the presence of large externalities, as in the case of such pandemic,

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higher levels of decentralization can make policy coordination much harder, leading to inefficient outcomes (as classically argued by Oates 1972). Finally, the whole institutional effectiveness may be mediated by other country's characteristics such as the extent of informality, the level of human development, and so on, which need to be controlled for in the empirical analysis. The full list of control variables is discussed below.

To empirically test these hypotheses, we assembled several cross-country datasets with the most recent available information on Covid-19 performance for up to 115 countries around the world. Our main results, which are robust to several specifications and different variable definitions, show that having either democracies or autocracies does not represent a crucial issue in facing the pandemic. However, countries with centralized political parties perform better than those with decentralized political parties. In addition, assigning fiscal responsibility to sub-national governments appears to be an impediment in successfully fighting the Covid-19 emergency, but this result is not robust to the exclusion of outliers in our sample of countries.

The rest of the paper is organized as follows. In Section 2 we review the relevant literature. Section 3 describes the data and the empirical methodology. Section 4 presents the estimation results. Section 5 provides some robustness checks and Section 6 briefly concludes.

2. Literature review: How have governments coordinated their responses to Covid-19?

Given the recentness and contingent nature of the process, there is not much published scientific evidence on how country governments coordinate responses to the emergency of Covid-19. But undoubtedly, national and sub-national governments have adopted a wide range of policies and targeted actions to cope with this public health emergency and its economic impact (Hale et al. 2020).

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In some cases, the effectiveness of sub-national actions to control the Covid-19 appeared to be undermined by the absence of a national policy (Iverson and Barbier 2020). At the same time, in countries where regional autonomy has been politically and fiscally important, the adoption of new national measures and laws to fight the pandemic have become controversial, especially when these new powers related to health services have been taken back by the central governments (Legido-Quigley et al. 2020).

In addition, some common trends can be observed across counties. The impact of Covid-19 on sub-national governments' spending consisted in higher costs for specific public services, such as social protection and assistance, cleaning, sanitation, and disinfection; the impact of Covid-19 has been described as "a heat-seeking missile speeding toward the most vulnerable in society" (Schellekens and Sourrouille 2020). However, strikingly, the mortality rate from Covid-19 remains highly concentrated in more developed and high-income countries, which are generally also characterized by an extensive presence of democratic institutions and well-structured intergovernmental systems. This would suggest that among the main lessons from the Covid-19 pandemic experience, one of the most relevant is represented by the need for better cooperation and coordination of efforts by policy-makers at the sub-national and national levels (Snower 2020).

While the role of democratic institutions on economic development have been extensively studied by economists (e.g., de Haan et al. 1996; Acemoglu et al. 2014), little is known about the role of political regime in powering better coordination in the presence of very large externalities like those associated with the Covid-19. On the other hand, there is a literature in economics and political science arguing that the type of political decentralization institutions plays an important role in democratic decentralized countries. It is argued that centralized political parties with power to nominate local candidates and run and enforce national policy platforms are generally more

effective – and have much more interest in – addressing (negative) externalities, than decentralized or non-integrated parties (Hankla et al. 2019).

The decentralization of expenditure responsibilities for health services around the world has been generally shown to yield positive outcomes on health indicators and metrics (Martinez-Vazquez et al., 2017). However, it is generally accepted among decentralization experts that for health issues with large externalities, like vaccinations or contagious infectious diseases, the assignment of responsibilities should be at the central level, but in practice country policies vary.

In an interesting and related study, González-Bustamante (2021) investigates the role of several dimensions of states' administrative capacity, including coordination, to manage the Covid-19 crisis but only for a sample of eight South American countries. Apart from the heterogeneity in the evolution of the epidemic, he finds that analytical capacity associated with the adequate evaluation of pressure on the health system are significant factors for the rapid implementation of governments' suppression strategies.

In summary, little has been written or known about how different institutional arrangements may help or hinder policy coordination and cooperation in the face of a pandemic like the world has been experiencing in 2020. Our paper contributes to fill that void in the literature.

3. The empirical analysis

3.1 Model specification and methodology

Our base econometric specification for the empirical testing is the following:

$$DEATHS_i = \alpha + \beta \cdot \boldsymbol{DISEASE} + \delta \cdot \boldsymbol{SOCIO\_ECONOMIC} + \gamma \cdot \boldsymbol{INSTITUTIONS} + \varepsilon_i \quad (1)$$

We run regressions with data for a large sample of countries (at maximum 115, as listed in the Appendix) including developed, developing and transition economies, and the variables are based on the most recent year available for each country. Estimates with cross-section data are performed using Ordinary Least Squares (OLS). Heteroskedasticity was detected using the White test. Hence, standard errors are replaced by robust Hober-White errors. Maximum Variance Inflation Factor (VIF) values are reported for each estimate to detect multicollinearity problems. The lack of data for some variables explain the change in the number of observations across estimates.

3.2 The dependent variable

As our dependent variable, we use the number of accumulated deaths due to the Covid-19 over population in millions reported until September 30th, 2020 ($DEATHS_i$). We discarded the use of Covid-19 reported cases because measurement errors are larger, especially in the first months of the pandemic.[2]

3.3. The explanatory variables: political and fiscal institutions

In order to test the role of political and fiscal institutions (*INSTITUTIONS*), we focus on three dimensions. First, we consider the extent of political rights, which accounts for how easily public authorities may impose restrictions on their population (*POLITICAL RIGHTS*).[3] Hence, we would expect a negative association between this variable and $DEATHS_i$.

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[2] Moreover, we also explored relying upon the excess of mortality statistics computed by several private and public institutions as an alternate dependent variable. However, these data are only available for a small number of countries, between 20 and 30, depending on the source. In our case, data for only 18 countries were available when 14 we set aside outliers. Given the small number of degrees of freedom we discarded using this variable.

[3] Results hold when we replace this variable by civil liberties also provided by the World Bank, or the quality of democracy by Hankla et al. (2019). Correlations among those three variables are very high.

Second, the degree of the nationalization of party systems (*PSNS*) is employed to account for spatial fractionalization of politics in addressing the Covid-19 emergency. This variable measures the homogeneity of parties' vote shares across districts and the ability of central party institutions to control a national level policy agenda and nominations to electoral by subnational candidates. (Lago-Peñas and Lago-Peñas, 2011; Hankla et al 2019). This indicator goes from 0 to 1: the higher the score, the higher the nationalization of electoral politics. Hence, we expect a negative coefficient for *PSNS* on *DEATHS*.

Third, in order to capture the potential role played by policy decentralization, which is expected to contribute to coordination failure, we employ a set of three variables. Federal countries are identified using a dummy variable (*FEDERAL*). The advantage of this variable is its availability for all countries and its straightforwardness in relaying size and coordination challenges. We expect federal regimes to be positively associated with $DEATHS_i$. In turn, we use the Regional Authority Index (*RAI*) provided by Hooghe et al. (2016), which is a precise measure of the influence of decentralization in public policies, including both the extent of self-rule over decentralized powers and the influence of regional governments on national choices. Unfortunately, this variable is available for only 80 countries. We expect a positive association between the *RAI* with $DEATHS_i$, because higher levels of fiscal and administrative decentralization are expected to hamper national policy coordination. Last, in order to capture the potential role played by the actual decentralization of health services, we consider the share of public health expenditure in the hands of sub-national governments (*HEALTH DEC*). However, the number of available observations regarding this variable is very low, and therefore we only explore it in the robustness analysis (see Section 4).

3.3 The control variables

The control variables are organized in two vectors. The vector *DISEASE* includes two variables: first, a dummy (*SARS*) to identify those countries previously shocked in recent times by other health viruses provoking respiratory diseases (e.g., SARS, MERS or H7NP); we anticipate that those previous experiences would facilitate combating the Covid-19. Second, the average incidence of the Covid-19 pandemic in border countries using the same definition of the dependent variable (*NGB*); in this case the rationale is of external geographical exposure.

The vector *SOCIO-ECONOMICS* includes four variables: first, tourism flows received, which accounts for the potential easier and earlier exposure to the virus (*TOURISM*); second, the country's Human Development Index (*HDI*), as computed by the United Nations, and which accounts for the general level of education, health and income of the country's population. Third, we explore the potential role played by informality in the overall economy (*INFORMAL*) since a wide informal sector could moderate the role of formal institutions and adversely affect the government's ability to effectively coordinate policies against the pandemic. Last, we also include the share of urban population over total population (*URBAN*) to account for the fact that in higher population density settings, the contagion is easier.[4]

Table 1 reports the variable definitions and data sources, and Table 2 shows the basic descriptive statistics for each variable used in the empirical analysis.

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[4] This variable is highly correlated with population density and therefore we opted for using only one of two. In preliminary estimations, we included additional regressors. But they were discarded due high multicollinearity issue. These include per capita GDP, education indicators, health expenditure per capita and the share of population over 65 and over 80 years of age. Instead we decided to use a composite indicator (*HDI)* of many of those dimensions. In addition, in preliminary estimations we also included several indicators of quality of governance provided by the QoG Institute (https://www.gu.se/en/quality-government/qog-data). In particular, the ICRG indicator and the Government Effectiveness Estimate. However, their statistical significance was very low and they were excluded from the final list of regressors.

[Tables 1 and 2]

4. Results

The estimation results are reported in Table 3. Concerning our explanatory variables of interest, i.e. *INSTITUTIONS*, we start with *POLITICAL RIGHTS*, whose coefficient tends to be negative but never statistically significant across specifications. Hence, the extent of political rights (or the kind of political regime meaning more or less democracy) does not seem to play a significant role in combating the Covid-19 pandemic. The same holds for the coefficient on the dummy *FEDERAL*, which is never statistically significant; therefore, the federal nature of countries has not been a detrimental nor a beneficial factor in addressing the Covid-19 emergency.

[Table 3]

On the other hand, the coefficient on our measure of geographical political fragmentation, *PSNS,* is negative and statistically significant across all specifications: the higher the nationalization of the political party system in a country, the lower the number of Covid-19 deaths. Hence, the nationalization of party systems appears to be a key institutional feature to successfully addressing the pandemic. As hypothesized, countries with centralized political parties have been able to better coordinate national level policies leading to lower mortality rates from the Covid-19. In addition, the results in column (2) reveal that the degree of administrative and fiscal decentralization, measured by the *RAI* variable, is positively associated with the incidence of the Covid-19 deaths. This is not surprising since the superiority of decentralized governance systems,

as first enunciated by Oates (1972) in the decentralization theorem, assumes the absence of externalities to work successfully.

In summary, putting these results for the role of *INSTITUTIONS* all together, it emerges that the most relevant institutional feature leading to allowing for countries' good performance during the Covid-19 emergency is their form of political fractionalization as measured by political party integration or centralization, which does not only allow but also incentivizes policy coordination at the national level.

Regarding the control variables, most of them are highly significant and exhibit the expected sign across columns. Previous country experience with respiratory diseases (*SARS*) does reduce the number of deaths due to the Covid-19. In addition, the incidence of the pandemic is significantly higher when border countries are also highly affected by the Covid-19 (*NGB*); this is also the case for countries with higher tourism flows (*TOURISM*) as also recently highlighted by Han et al. (2020).

The coefficient on the *HDI* is negative but weakly significant across columns. This seems to indicate that the Covid-19 shock has not been stronger in terms of fatalities in less developed countries, expected to have weaker public health systems. However, we need to bear in mind that life expectancy and therefore aged populations are substantially higher in high-income countries and that there is a well-established strong correlation between the ages of infected patients and the probability of dying from the Covid-19. Hence, the sign of the *HDI* could be capturing the net effect of these two opposite mechanisms.

Somewhat surprisingly, given for example the experience of Latin-American and other developing countries, the extent of the informal economy does not systematically affect the number of Covid-19 deaths as the coefficient on *INFORMAL* is consistently not statistically

significant. Finally, as expected, a larger share of urban population (*URBAN*) worsens the effects of the pandemic by increasing the number of Covid-19 deaths.

5. Robustness checks

Table 4 reports several robustness checks. First, we test for the presence of outliers in our sample. In particular, using three complementary influence statistics (*RStudent*, *DRResid* and *DFFITS*) over column (1) of Table 3 revealed the existence of 10 outliers: Belgium, Bolivia, Brazil, Chile, Ecuador, UK, Peru, Sweden (all positive) and Uruguay and Venezuela (both negative). Once the analysis is replicated excluding those countries, the R^2 increased from 0.510 to 0.633, and the main base results hold as shown in column (3). In column (4), we replicate the specification (2) of Table 3, excluding the identified outliers. The main change is the lack of statistical significance of the *RAI*, our measure of decentralization. Hence, the degree of fiscal and administrative decentralization appears to be relevant, but its role is not robust to controlling for the influence of outliers.

[Table 4]

Second, we address the potential multicollinearity issue. Specifically, we re-estimate column (2) of Table 3 by excluding one control variable (*HDI*) so to reduce the maximum VIF below 5. The main results still hold as shown in column (5).

Third, we try to explore more complex relationships between political and fiscal institutions. Accordingly, we include the interaction term between the dummy *FEDERAL* and the nationalization of party systems (*PSNS*) as reported in column (6). However, the coefficient on the

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interaction is not significant either. This suggests that complementarity effects between those dimensions are not relevant in affecting the Covid-19 mortality incidence. However, and more importantly, the coefficient on *PSNS* remains negative and statistically significant, confirming the crucial role of the spatial fragmentation of politics in effectively addressing the pandemic.

Last, column (7) reports the results from using the sub-national share of health care expenditures managed by sub-national governments (*HEALTH DEC*) as part of our *INSTITUTIONS* set of variables. The coefficient on *HEALTH DEC* is positive - as for the case of other decentralization variables - but not statistically significant. As anticipated above, the lack of data for a high number of countries explains the reduction of the sample size to only 54 observations.

6. Conclusion

The main goal of this paper has been to explain the extremely diverse performance across countries in containing the Covid-19 pandemic, as observed in recent times. Our approach relies on the economic theory of how coordination at the highest level is needed to address the presence of very large and pervasive negative externalities. Accordingly, once controlling for external or past and predetermined circumstances for each country (such as previous country experience with respiratory diseases), countries' performance depends critically on their institutional setup that may facilitate or, rather, hinder coordination for the necessary preventive policies to face and contain the pandemic.

Our main results, which are based on data for up to 115 countries around the world, show that democracies do not systematically perform worse than autocracies and that, within democracies, countries with a centralized political party system perform better than those with poorly

nationalized politics. Last, the role played by fiscal and administrative decentralization is not robust to the exclusion of several countries exhibiting extreme values; probably, further research efforts on this relationship are required before providing a definitive answer. Moreover, we find that possible complementarity effects between fiscal and political institutions are not significant in affecting the Covid-19 mortality, while the crucial role of the spatial fragmentation of politics in effectively addressing the pandemic is always confirmed.

This research has been subject to some limitations, the most significant being data availability for many countries. Since the situation in the field is rapidly changing, our empirical analysis needs to be replicated once data for a longer period and more countries become available. Most importantly, open data and countries' experiences should continuously be shared in order to compare and, eventually, effectively coordinate public policies and responses in times of pandemics.

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Table 1 – Variable definitions and data sources

Variable	Definition	Source
DEATHS	Accumulated Covid-19 deaths per mill. inhabitants from 24/02/2020 to 30/09/2020	Own elaborations on World Health Organization (WHO) and World Bank (WB) dataset
SARS	Country previously affected in a significant way by SARS, MERS and/or H7Np • 0: any of them • 1: one of them • 2: two of them • 3: all of them	Own elaborations on WHO dataset
NGB	Accumulated Covid-19 cases from border countries per millions of inhabitants from 24/02/2020 to 30/09/2020	Own elaboration on WHO and WB dataset
TOURISM	Number of international arrivals, in millions (2016)	WB - World Development Indicators (WDI)
HDI	Human Development Index (2016)	–United Nations (UN)
INFORMAL	Estimates of informal economy over official GDP (2016)	Elgin & Oztunali (2012) - courtesy of the authors data up to 2016
URBAN	Urban population over total population (2016)	WB - WDI
POLITICAL RIGHTS	Measured on a 1-7 scale: 1 for the highest degree of freedom; 7 for the lowest (2016 – 2017)	World Value Survey
FEDERAL	Dummy: 1 if the country is a federal country according to the Forum of Federations classification; 0 otherwise (2020)	Forum of Federations
PSNS	Standardized and weighted party system nationalization score (last year available for each country)	Constituency-Level Elections Archive (CLEA)
RAI	Regional Authority Index (2010)	Hooghe et al. (2016)
HEALTH DEC	Sub-national government health public expenditure over total health public expenditure (2016)	International Monetary Fund (IMF)

Table 2: Summary statistics

	Mean	Median	St. Dev.	Minimum	Maximum	Observations
Dependent variable						
DEATHS	154.2	53.8	222.8	0	1045.2	115
Control variables						
SARS	0.17	0.00	0.39	0.00	2.00	115
NGB	178.6	98.4	224.8	0.00	732.8	115
TOURISM	8.80	2.80	14.90	0.03	82.7	115
HDI	0.75	0.76	0.15	0.37	0.95	115
INFORMAL	0.29	0.28	0.12	0.08	0.62	115
URBAN	61.20	64.1	21.8	16.3	100.0	115
Political & fiscal institutions						
POLITICAL RIGHTS	2.70	2.00	1.80	1.00	7.00	115
FEDERAL	0.17	0.00	0.38	0.00	1.00	115
PSNS	0.71	0.76	0.19	0.01	0.93	115
RAI	10.7	8.60	10.0	0.00	37.0	70
HEALTH DEC	0.31	0.15	0.36	0.00	1.00	54

Table 3 – Baseline results

	[1]	[2]
SARS	-79.1	-91.7
	(2.24)**	(2.51)**
NGB	0.46	0.38
	(4.48)***	(3.81)***
TOURISM	4.39	3.56
	(4.73)***	(3.18)***
HDI	-89.6	-324.6
	(0.76)	(0.97)
INFORMAL	110.2	418.9
	(0.54)	(0.84)
URBAN	2.55	3.93
	(2.55)**	(2.25)**
POLITICAL RIGHTS	-11.0	-30.1
	(1.00)	(1.47)
FEDERAL	34.1	
	(0.69)	
PSNS	-180.3	-263.8
	(1.99)**	(1.97)**
RAI		6.31
		(2.06)**
Maximum value for VIF	3.39	6.86
Mean dependent variable	154	225
R^2	0.510	0.509
Number of countries	115	70

Notes: Robust t-statistics in parenthesis. ***, **, * indicates significant at 1%, 5% and 10% respectively.

Table 4 – Robustness checks

	[3]	[4]	[5]	[6]	[7]
SARS	-71.2	-85.3	-96.8	-81.7	-73.3
	(2.39)**	(2.61)**	(2.65)***	(2.29)**	(1.67)*
NGB	0.33	0.31	0.40	0.46	0.51
	(6.14)***	(4.37)***	(3.94)***	(4.58)***	(3.05)***
TOURISM	5.00	5.38	3.51	4.68	4.31
	(6.06)***	(5.49)***	(3.17)***	(4.88)***	(3.33)***
HDI	-87.6	-594.1		-97.8	-670.2
	(0.73)	(2.25)*		(0.73)	(1.85)*
INFORMAL	-66.9	-184.6	550.0	88.2	51.2
	(0.54)	(0.73)	(1.31)	(0.44)	(0.25)
URBAN	1.59	2.25	3.51	2.57	4.13
	(2.22)**	(2.00)**	(1.94)*	(2.54)**	(1.72)*
POLITICAL RIGHTS	2.31	-4.25	-25.0	-10.3	-16.7
	(0.31)	(0.32)	(1.13)	(0.96)	(1.37)
FEDERAL	26.4				
	(0.91)				
PSNS	-111.1	-190.6	-268.7	-181.1	
	(2.04)**	(2.19)**	(2.00)**	(1.96)**	
FEDERAL*PSNS				10.3	
				(0.16)	
RAI		1.57	6.10		
		(0.86)	(1.95)*		
HEALTH DEC					58.9
					(0.87)
Maximum VIF	3.51	5.35	4.70	3.62	4.15
Mean dependent variable	112	163	225	154	166
R^2	0.633	0.662	0.506	0.507	0.446
Number of countries	105	60	70	115	54

Notes: Robust t-statistics in parenthesis. ***, **, * indicates significant at 1%, 5% and 10% respectively. Estimates [3] and [4] exclude the following outliers detected analyzing residuals in column 1 (Table 3): Belgium, Bolivia, Brazil, Chile, Ecuador, UK, Peru, Sweden, Uruguay and Venezuela.

APPENDIX

List of countries included in the analysis (* means included in the sample for estimates with 70 observations)

Angola, Albania*, Argentina*, Armenia, Australia*, Austria*, Azerbaijan, Belgium*, Benin, Burkina Faso, Bangladesh, Bulgaria*, Bahrain, Bahamas, The*, Bosnia and Herzegovina*, Belarus, Belize*, Bolivia*, Brazil*, Barbados*, Bhutan, Botswana, Canada*, Switzerland*, Chile*, Cote d'Ivoire, Cameroon, Colombia*, Comoros, Cabo Verde, Costa Rica*, Cyprus*, Czech Republic*, Germany*, Denmark*, Dominican Republic*, Ecuador*, Spain*, Estonia*, Ethiopia, Finland*, France*, United Kingdom*, Georgia, Guinea, Guinea-Bissau, Greece*, Guatemala*, Honduras*, Croatia*, Hungary*, Indonesia*, India, Ireland*, Iran, Islamic Rep., Iceland*, Italy*, Jamaica*, Japan*, Kenya, Cambodia, Korea, Rep.*, Lebanon, St. Lucia, Sri Lanka, Lesotho, Lithuania*, Luxembourg*, Latvia*, Maldives, Mexico*, North Macedonia*, Malta*, Myanmar, Mongolia, Mozambique, Mauritius, Malawi, Malaysia*, Niger, Nigeria, Nicaragua*, Netherlands*, Norway*, Nepal, New Zealand*, Peru*, Philippines*, Poland*, Portugal*, Paraguay*, Romania*, Russian Federation*, Senegal, Singapore*, Sierra Leone, El Salvador*, Suriname*, Slovak Republic*, Slovenia*, Sweden*, Togo, Thailand*, Trinidad and Tobago*, Turkey*, Tanzania, Uganda, Ukraine, Uruguay*, United States*, St. Vincent and the Grenadines, Venezuela, RB*, South Africa, Zambia, Zimbabwe.