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Regional inequalities, fiscal decentralization and government quality

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APPENDIX A

Table A1 Cross country empirical work focusing on the relationship between fiscal decentralization, regional disparities and government quality

Dependent variable	Article	Relevant explanatory variable	Controlling for third key variable	Method used to control for reverse causality in relation to relevant explanatory variable
Regional inequalities	Gil et al. (2004) Ezcurra and Pascual (2008) Lessmann (2009) Rodríguez-Pose and Ezcurra (2010) Lessmann (2012)	Fiscal decentralization	No No No No No	None Lagging of explanatory variables IV: lagged values of endogenous variables IV: lagged values of endogenous variables IV: share of the population that speaks a major European language, experience and level of democracy, common law legal tradition and share of protestants in the population
	Kyriacou et al. (2015)		Yes	IV: lagged values of endogenous variables
	Ezcurra and Rodríguez-Pose (2014)	Government quality	No	IV: index of press freedom
Fiscal decentralization	Beramendi (2007) Stegarescu (2009) Saachi and Salotti (2014a, b)	Regional inequalities	No No No	IV: oil prices, regional differences in unemployment, labor mobility None Lagging of explanatory variables
Government quality	Fisman and Gatti (2002) Enikolopov and Zhuravskaya (2007) Fan et al. (2009) Kyriacou and Roca-Sagalés (2011a) Kyriacou and Roca-Sagalés (2011b)	Fiscal decentralization	No No No No No	IV: legal origins IV: country area and lagged values of endogenous variables None IV; country area and lagged values of endogenous variables IV: lagged values of endogenous variables
	Kyriacou (2012) Kyriacou and Roca-Sagalés (2014)		Regional inequalities	No Yes

Notes: IV refers to instrumental variables.

Table A2 List of countries

Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Mexico, the Netherlands, Norway, Portugal, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom, and the United States.

Table A3 Data definitions and sources

<i>Variable</i>	<i>Definition</i>	<i>Source</i>
<i>Government quality</i>	<i>Aggregate of corruption, law and order and bureaucratic quality dimensions each normalized between 0 and 1.</i>	<i>International Country Risk Guide (ICRG) as developed by the Political Risk Services Group</i>
<i>Regional inequalities</i>	<i>The population-weighted standard deviation of GDP per capita level within a country, divided by the country's GDP per capital level. It ranges between 0 (equality) and 1 (maximum disparities).</i>	<i>Cambridge Econometrics and national statistics (courtesy of A. Rodríguez-Pose)</i>
<i>Revenue decentralization</i>	<i>Sub-national revenue as a percentage of consolidated general government revenue, after subtracting from state and local revenues, grants from other governments.</i>	<i>OECD General Government Accounts (courtesy of I. Sanz)</i>
<i>GDP per capita</i>	<i>Real GDP per capita.</i>	<i>World Penn tables</i>
<i>Current public spending</i>	<i>Current expenditure of general government (on goods and services and current transfers) as a share of GDP.</i>	<i>IMF Government Finance Statistics</i>
<i>Public investment</i>	<i>Public investment of general government as a share of GDP.</i>	<i>IMF Government Finance Statistics</i>
<i>Government size</i>	<i>Current expenditure of general government as a share of GDP plus public investment of general government as a share of GDP.</i>	<i>IMF Government Finance Statistics</i>
<i>Private investment</i>	<i>Total investment (PWT 8.0) minus public investment (GFS-IMF), as a share of GDP.</i>	<i>Penn World Tables 8.0 and Government Finance Statistics of International Monetary Fund (GFS-IMF)</i>
<i>Trade openness</i>	<i>Percentage of exports plus imports divided by Real GDP.</i>	<i>World Penn tables</i>
<i>Human capital</i>	<i>Average years of schooling of the population aged 25 and over.</i>	<i>Barro and Lee (2001)</i>
<i>Transition economies</i>	<i>Dummy variable which takes the value of 1 if the country has undergone transition from a socialist to a capitalist system.</i>	<i>La Porta et al (1999)</i>
<i>Inequality</i>	<i>Gini coefficient based on net income inequality.</i>	<i>Solt (2009)</i>
<i>Legal origin</i>	<i>Legal traditions being 1 Soviet, 2 civil law (French, German or Scandinavian) and 3 British common law.</i>	<i>Seldayo et al. (2010)</i>
<i>Protestants</i>	<i>Protestants as a percentage of population in 1980.</i>	<i>La Porta et al (1999)</i>
<i>Federal</i>	<i>Dummy which takes the value of 1 if the country has been described a federal by Elazar (1995) and 0 otherwise.</i>	<i>Elazar (1995)</i>
<i>Number of regions</i>	<i>Number of regions defined at the NUTS 2 level for the EU countries level or equivalent.</i>	<i>National Statistical Offices</i>
<i>Surface</i>	<i>Country area in square kilometers.</i>	<i>CIA World Factbook</i>
<i>Ethnic segregation</i>	<i>Population weighted coefficient of variation which ranges from a value of 0 if each region has the same ethnic or linguistic composition as the country as a whole and 1 if a country's regions are inhabited by different ethnic or linguistic groups (and therefore each region is fully homogeneous).</i>	<i>Alesina and Zhuravskaya (2011)</i>
<i>Urban population</i>	<i>Population living in urban areas as a percentage of the total population.</i>	<i>World Development Indicators. World Bank</i>
<i>Population under 14 years of age</i>	<i>Population between the ages of 0 and 14 as a percentage of the total population.</i>	<i>World Development Indicators. World Bank</i>

Table A4 Summary statistics

		Mean	Standard deviation	Minimum	Maximum	Observations
Regional inequalities	Overall	0.2138	0.1006	0.0481	0.6035	N = 414
	Between		0.1212	0.0567	0.5868	n = 23
	Within		0.0250	0.0886	0.3354	T = 18
Revenue decentralization (FD)	Overall	0.2239	0.1293	0.0321	0.5454	N = 414
	Between		0.1317	0.0348	0.5269	n = 23
	Within		0.0226	0.1460	0.3426	T = 18
Government quality	Overall	2.6268	0.3749	1.4167	3	N = 414
	Between		0.3960	1.5061	2.9938	n = 23
	Within		0.1594	2.0228	3.0778	T = 18
Log of GDP per capita	Overall	10.1433	0.3171	9.0617	10.7935	N = 414
	Between		0.3430	9.1576	10.5371	n = 23
	Within		0.1465	9.7036	10.6592	T = 18
Private investment	Overall	0.2129	0.0345	0.1514	0.3574	N = 414
	Between		0.0304	0.1761	0.2878	n = 23
	Within		0.0208	0.1624	0.2888	T = 18
Current public spending	Overall	0.1961	0.0395	0.0963	0.2880	N = 414
	Between		0.0433	0.1017	0.2688	n = 23
	Within		0.0115	0.1565	0.2372	T = 18
Public investment	Overall	0.0281	0.0084	0.0066	0.0604	N = 414
	Between		0.0071	0.0170	0.0423	n = 23
	Within		0.0052	0.0146	0.0507	T = 18
Openness	Overall	0.6456	0.3172	0.1418	1.7732	N = 414
	Between		0.3021	0.2066	1.3489	n = 23
	Within		0.1157	0.2206	1.1901	T = 18
Human capital	Overall	3.1142	1.0937	0.8670	5.0880	N = 414
	Between		1.0713	1.3419	4.8585	n = 23
	Within		0.3731	1.8873	4.0537	T = 18
Dummy for transition economies	Overall	0.0700	0.2553	0	1	N = 414
	Between					n = 23
	Within					T = 18
Ethnic segregation	Overall	0.0411	0.0653	0.0010	0.2440	N = 414
	Between					n = 23
	Within					T = 18
Number of regions	Overall	11.8599	11.1616	2	50	N = 414
	Between					n = 23
	Within					T = 18
Legal origin	Overall	2.1642	0.5273	1	3	N = 414
	Between					n = 23
	Within					T = 18
Protestants	Overall	0.3133	0.3140	0.0110	0.9260	N = 414
	Between					n = 23
	Within					T = 18
Inequality	Overall	28.7816	5.1848	20.7372	49.5000	N = 414
	Between		5.7590	22.2260	48.7348	n = 23
	Within		1.7046	23.5622	38.7098	T = 18
Log of surface	Overall	5.5282	1.6893	3.4965	9.2074	N = 414
	Between					n = 23
	Within					T = 18
Federal	Overall	0.3695	0.4833	0	1	N = 414
	Between					n = 23
	Within					T = 18
Urban population	Overall	22.7624	11.8380	6	49	N = 414
	Between					n = 23
	Within					T = 18
Population under 14 years of age	Overall	19.1570	3.5447	13.9834	36.8727	N = 414
	Between		4.0790	15.6778	34.9815	n = 23
	Within		1.5595	13.8182	26.1140	T = 18

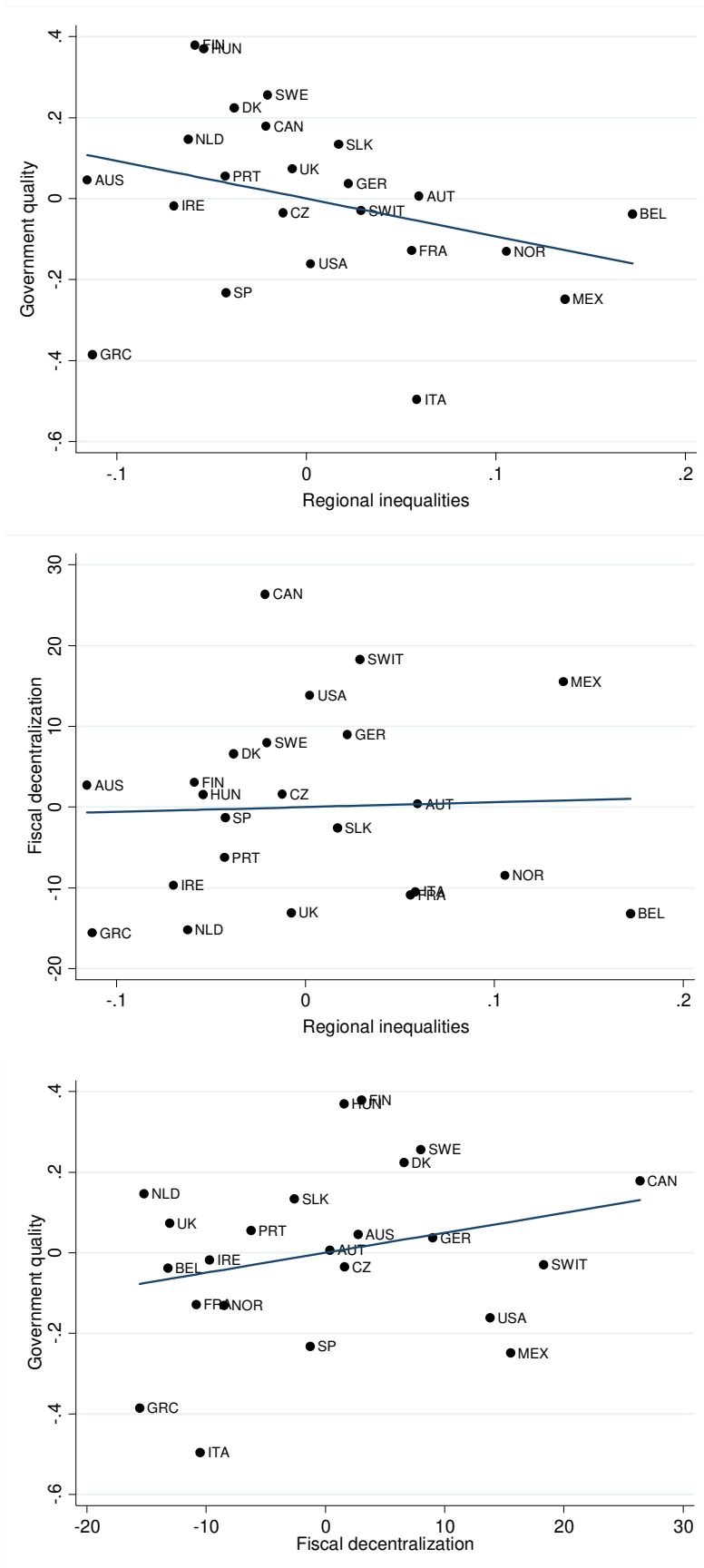


Figure A2 Government quality, regional inequalities and revenue decentralization conditional on GDP per capita (mean values over the period 1984-2005)

Table A5 SEM model - 4-year means

	GMM-3SLS			GMM- HAC		
	Eq 1: RI	Eq 2: FD	Eq 3: GQ	Eq 1: RI	Eq 2: FD	Eq 3: GQ
Regional inequalities (RI)		0.017 (0.106)	-0.847*** (0.261)		0.023 (0.168)	-0.804** (0.363)
Fiscal decentralization (FD)	-0.152** (0.070)		0.549*** (0.164)	-0.152* (0.088)		0.537*** (0.171)
Government quality (GQ)	-0.102*** (0.023)	0.123*** (0.029)		-0.102*** (0.033)	0.122*** (0.041)	
Log of GDP per capita	-0.141*** (0.026)	0.043 (0.031)	0.095 (0.072)	-0.138*** (0.048)	0.048 (0.031)	0.101 (0.081)
Openness	0.216*** (0.046)	0.016 (0.055)	0.193* (0.106)	0.227*** (0.082)	0.011 (0.079)	0.169 (0.124)
Ethnic segregation	0.469*** (0.092)	-0.391*** (0.139)	0.138 (0.270)	0.458*** (0.182)	-0.387** (0.154)	0.128 (0.305)
Dummy for transition economies	0.046 (0.030)	0.055* (0.034)		0.038 (0.051)	0.058* (0.035)	
Current public spending	0.110 (0.154)			0.137 (0.194)		
Public investment	-1.817*** (0.654)			-1.958** (0.905)		
Human capital	0.035*** (0.010)			0.034** (0.015)		
Private investment	-0.024 (0.204)			0.089 (0.301)		
Number of regions	0.003*** (0.001)			0.003** (0.001)		
Federal		0.141*** (0.020)			0.140*** (0.037)	
Log of surface		0.023*** (0.006)			0.023 (0.014)	
Legal origin			0.218*** (0.051)			0.225*** (0.068)
Government size			0.376 (0.612)			0.270 (0.706)
Protestants			0.258*** (0.073)			0.251*** (0.081)
Inequality			-0.029*** (0.007)			-0.032*** (0.010)
<i>Adjusted R²</i>				<i>0.681</i>	<i>0.735</i>	<i>0.608</i>
<i>J-test</i>		<i>0.000</i>				
Observations	122	122	122	122	122	122

Notes: Robust and HAC standard errors are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. J-test: Hansen test of over-identifying restrictions indicating the validity of the chosen instruments. Included instruments: lagged values of log of GDP per capita, openness, private investment and inequality.

Table A6 SEM model - Regression results excluding government quality

	Annual				4-year means			
	GMM-3SLS		GMM- HAC		GMM-3SLS		GMM- HAC	
	Eq 1: RI	Eq 2: FD	Eq 1: RI	Eq 2: FD	Eq 1: RI	Eq 2: FD	Eq 1: RI	Eq 2: FD
Regional inequalities (RI)		-0.330*** (0.052)		-0.300** (0.129)		-0.212*** (0.099)		-0.301*** (0.173)
Fiscal decentralization (FD)	-0.294*** (0.036)		-0.295*** (0.069)		-0.252*** (0.072)		-0.249*** (0.097)	
<i>Adjusted R²</i>			<i>0.618</i>	<i>0.583</i>			<i>0.631</i>	<i>0.548</i>
<i>J-test</i>	<i>0.000</i>				<i>0.000</i>			
<i>Observations</i>	<i>414</i>	<i>414</i>	<i>414</i>	<i>414</i>	<i>122</i>	<i>122</i>	<i>122</i>	<i>122</i>

Notes: Robust and HAC standard errors are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. J-test: Hansen test of overidentifying restrictions indicating the validity of the chosen instruments. Each regression includes the corresponding set of control variables (not shown). Included instruments: lagged values of log of GDP per capita, openness and private investment.

Table A7 SEM model – 3SLS with country fixed effects.

	Annual			4 years means		
	Eq 1: RI	Eq 2: FD	Eq 3: GQ	Eq 1: RI	Eq 2: FD	Eq 3: GQ
Regional inequalities (RI)		0.071 (0.486)	-1.701*** (0.134)		0.179 (0.189)	-0.993*** (0.216)
Fiscal decentralization (FD)	-0.139*** (0.032)		0.710*** (0.100)	-0.240*** (0.058)		0.657*** (0.148)
Government quality (GQ)	-0.245*** (0.010)	0.173*** (0.042)		-0.177*** (0.027)	0.134*** (0.053)	
Log of GDP per capita	-0.936*** (0.011)	0.056* (0.033)	0.449*** (0.042)	-0.147*** (0.026)	0.207*** (0.057)	0.439*** (0.077)
Openness	-0.035 (0.035)	-0.348*** (0.029)	0.433*** (0.055)	-0.041 (0.044)	-0.114** (0.059)	0.432*** (0.050)
Ethnic segregation	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted
Dummy for transition economies	Omitted	Omitted		Omitted	Omitted	
Current public spending	-0.060 (0.251)			-0.032 (0.152)		
Public investment	-0.407*** (0.134)			-0.766* (0.515)		
Human capital	0.051*** (0.005)			0.055*** (0.008)		
Private investment	0.048 (0.076)			0.048 (0.076)		
Number of regions	Omitted			Omitted		
Federal		Omitted			Omitted	
Log of surface		Omitted			Omitted	
Urban population		-0.001*** (0.000)			-0.001*** (0.000)	
Population under 14 years of age		-0.005** (0.002)			-0.002** (0.001)	
Legal origin			Omitted			Omitted
Government size			0.608** (0.300)			1.051** (0.568)
Protestants			Omitted			Omitted
Inequality			-0.013*** (0.003)			-0.017*** (0.004)
<i>Adjusted R²</i>	<i>0.745</i>	<i>0.915</i>	<i>0.631</i>	<i>0.845</i>	<i>0.957</i>	<i>0.774</i>
<i>Country effects</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	414	414	414	122	122	122

Notes: Robust standard errors are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. Included instruments: lagged values of log of GDP per capita, openness, private investment and inequality. The inclusion of fixed effects implies the omission of all time invariant explanatory variables. To allow for the identification of equation 2 (FD) we add two new variables: urban population (Arzaghi and Henderson 2005) and population under 14 years of age (Sacchi and Salotti 2014).