

objective. The traditional meta-regression, an extension of meta-analysis, involves regressing coefficients found in several studies on certain characteristics of these studies. It also has weights, usually the number of observations in each study, and the standard error of the coefficients were considered (Harbord and Higgins, 2008; Thompson and Higgins, 2002).

In the quasi meta-regression used for this study, the dependent variable is an ordered variable whose values depend on whether the study found a positive, a negative, or a mixed or no relationship between decentralization and development outcomes. The reason for not using the actual regression coefficients found in the articles reviewed was because it makes little sense to compare them when the dependent variable in some studies is economic growth and governance in another. The same problem occurs when decentralization is measured by the number of local governments in one study, and the expenditure share of local governments in another.

The dependent variable takes on a value of 0 if the study found a negative relationship between decentralization and the development outcome being studied, 1 if there is mixed or no relationship, and 2 if the study found a ‘positive’ or a ‘positive with condition’ relationship. The regressors were a set of dummy variables representing the decentralization type studied, the outcome variable used, and the income level of the countries included in the study. The independent variables are detailed in Table 7.

Table 7. Independent variables description and summary statistics

Name	Description	Obs.	Mean	SD
outcome: governance	Dummy = 1 if the outcome variable is a measure of governance quality	162	0.23	0.42
outcome: econ growth	Dummy = 1 if the outcome variable is a measure of economic growth	162	0.55	0.50
outcome: others ^a	Dummy =1 if the study used other development outcomes	162	0.22	0.42
decent: expenditure	Dummy = 1 if the decentralization indicator is a measure of expenditure decentralization	162	0.35	0.48
decent: revenue	Dummy = 1 if the decentralization indicator is a measure of revenue decentralization	162	0.23	0.43
decent: fiscal indep	Dummy = 1 if the decentralization indicator is a measure of fiscal independence	162	0.12	0.33
decent: others ^a	Dummy = 1 if the study used other indicators of decentralization	162	0.29	0.46
income: high	Dummy = 1 if the study used high income countries	162	0.31	0.47
income: non-high	Dummy = 1 if the study used non-high-income countries	162	0.43	0.50
income: high and non-high ^a	Dummy =1 if the study used data from both high and non-high-income countries	162	0.26	0.44

Source: Author’s calculation. ^a Base variable. Not included in the regression.

The dependent variable was regressed on the variables in Table 7 using ordered logit regression. The ordered logit coefficients, the marginal effects on the dependent variable taking on a value of 0, and the marginal effects on the dependent variable taking on a value of 2 are reported in Table 8. What do these figures mean? A positive and significant logit coefficient means that the variable makes it more likely to have a positive relationship between decentralization and development outcomes. However, the marginal effects show more nuances in the relationship between decentralization and development outcomes. For instance, good governance has a 32 percentage points greater likelihood of showing a positive relationship with decentralization compared to other development outcomes; and economic growth has a 11.8 percentage points higher likelihood of showing a negative relationship with decentralization compared to other development outcomes. These results suggest that the relationship is more likely to be positive when the outcome being tested is governance quality and more likely to be negative when the outcome is economic growth.

In addition, the relationship is more likely to be positive when the decentralization indicator is revenue decentralization or fiscal independence, with average marginal effects of 31.5 and 30.1 percentage points, respectively. Expenditure decentralization turned insignificant. The results in column 3 are consistent with the results in column 2.

Table 8. Ordered logit coefficients and average marginal effects

	(1)	(2)	(3)
	Ordered Logit coefficient	Marginal effect ^a on Y=2 (decentralization having positive effect)	Marginal effect ^a on Y=0 (decentralization having negative effect)
outcome: governance	1.476** (0.632)	0.320** (0.125)	-0.203*** (0.0692)
outcome: econ growth	-0.721* (0.405)	-0.157* (0.0899)	0.118* (0.0650)
decent: expenditure	0.499 (0.399)	0.101 (0.0772)	-0.0793 (0.0607)

decent: revenue	1.521*** (0.461)	0.315*** (0.0847)	-0.211*** (0.0524)
decent: fiscal indep	1.457** (0.592)	0.301*** (0.109)	-0.188*** (0.0574)
income: high	0.506 (0.506)	0.104 (0.101)	-0.0795 (0.0752)
income: non-high	0.478 (0.505)	0.0985 (0.102)	-0.0784 (0.0815)
Observations	162	162	162

Standard errors in parentheses; ***significant at 1%; **significant at 5%; *significant at 10%;

^aMarginal effect is the discrete change from the base level

The results in Table 8 are largely consistent with the results in Tables 4 and 5. The value of performing this quasi meta-regression analysis is to complement the earlier sub-sections comparing the results of studies depending on type of decentralization, on development outcomes, and on income level of countries. Because it controls for other factors, it provides a stronger analysis on which of these characteristics are more likely to produce a positive relationship between decentralization and development outcomes. Although causality cannot be inferred using this methodology, it helps isolate *ceteris paribus* relationships between the result of the studies and the decentralization type, development outcome tested, and country income groups.

3.6.2. Analysis of Different Outcome Indicators

The previous sub-section looked at two things. First, for which development outcomes is decentralization in general more effective; and second, which forms of decentralization are most effective for development outcomes in general. The next analysis looks at which forms of decentralization are most effective for each of the three specific development outcomes – economic growth, governance, and others.

To do this, the regression in Table 8 was replicated for each of the development outcomes. The results for governance, economic growth, and others are reported in Tables 9, 10, and 11, respectively. For governance (Table 9), both revenue and expenditure decentralization are

positively associated with it, although the former has a stronger marginal effect. For other development outcomes (Table 11), expenditure decentralization turned insignificant, while both revenue decentralization and fiscal independence have positive and significant marginal effects. There is less clear evidence on economic growth (Table 10). While expenditure decentralization has no significant effect, results suggest that revenue decentralization and fiscal independence are at least less harmful to economic growth than expenditure decentralization.

Table 9. Ordered logit coefficients and average marginal effects: Governance

	(1)	(2)	(3)
	Ordered Logit coefficient	Marginal effect ^a on Y=2 (decentralization having positive effect)	Marginal effect ^a on Y=0 (decentralization having negative effect)
decent: expenditure	1.538* (0.929)	0.260* (0.133)	-0.175* (0.0901)
decent: revenue	17.79 (2,409)	0.423*** (0.0844)	-0.250*** (0.0779)
income: high	-1.211 (0.964)	-0.218 (0.164)	0.191 (0.162)
income: non-high	-0.692 (1.529)	-0.125 (0.277)	0.104 (0.253)
Observations	37	37	37

Standard errors in parentheses; ***significant at 1%; **significant at 5%; *significant at 10%;

^aMarginal effect is the discrete change from the base level; *decent: fiscal indep* was dropped due to lack of observation

Table 10. Ordered logit coefficients and average marginal effects: Economic Growth

	(1)	(2)	(3)
	Ordered Logit coefficient	Marginal effect ^a on Y=2 (decentralization having positive effect)	Marginal effect ^a on Y=0 (decentralization having negative effect)
decent: expenditure	-0.188 (0.583)	-0.0330 (0.102)	0.0343 (0.108)
decent: revenue	1.026* (0.615)	0.197 (0.124)	-0.172* (0.0938)
decent: fiscal indep	1.197 (0.872)	0.242 (0.186)	-0.175* (0.0981)
income: high	1.263* (0.737)	0.218* (0.118)	-0.213* (0.109)

income: non-high	1.278* (0.701)	0.219* (0.113)	-0.228** (0.116)
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Observations	89	89	89
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Standard errors in parentheses; ***significant at 1%; **significant at 5%; *significant at 10%;

^aMarginal effect is the discrete change from the base level

**Table 11. Ordered logit coefficients and average marginal effects:
Other Development Outcomes**

	(1)	(2)	(3)
	Ordered Logit coefficient	Marginal effect ^a on Y=2 (decentralization having positive effect)	Marginal effect ^a on Y=0 (decentralization having negative effect)
decent: expenditure	1.074 (1.065)	0.218 (0.185)	-0.167 (0.143)
decent: revenue	1.985 (1.316)	0.374** (0.169)	-0.251** (0.115)
decent: fiscal indep	1.391 (0.900)	0.305* (0.172)	-0.219* (0.126)
income: high	0.992 (1.252)	0.207 (0.231)	-0.154 (0.172)
income: non-high	1.344 (1.449)	0.284 (0.258)	-0.240 (0.256)
Observations	89	89	89

Standard errors in parentheses; ***significant at 1%; **significant at 5%; *significant at 10%;

^aMarginal effect is the discrete change from the base level

3.7. Discussions and Implications

The analysis herein suggests several implications on empirical studies on the relationship between decentralization and development outcomes. First is which development outcomes are positively associated with decentralization. The analysis suggests that governance is much more likely to be positively associated with decentralization; while the evidence for economic growth is much less clear. Decentralization can promote good governance because it is easier to monitor and hold officials accountable if they are nearer to their constituents (Faguet, 2009; Von Braun and Grote, 2002; Persson and Tabellini, 2000). On the other hand, the conceptual and theoretical literature is much less clear on the link between decentralization and economic growth; thus, the

result herein is not really surprising. The most cited benefit of decentralization is the improved public service provision because of the information advantage of local officials on local preferences (Faguet, 2009; Kubal, 2006; Shah, 2006). The most cited disadvantage is loss of production efficiency due to the economies of scale of the national government (Bahl, 1999; Faguet, 2004; Prud'homme, 1995). None of these directly point to a positive relationship between decentralization and economic growth. If at all, the loss of production efficiency can even lead to slower economic growth.

Second, the analysis suggests that some types of decentralization can be more effective than others. Fiscal independence and revenue decentralization – indicators that pertain to the ability of local governments to generate their own revenue – are positively associated with most development outcomes. Expenditure decentralization has no significant relationship with development outcomes in general and is positively associated only with governance. A word of caution, though; decentralizing revenue generation should involve not just transferring collection responsibilities, but equally important is giving local governments the capacity to actually collect revenues. Decentralizing collection functions to local governments with weak capacity to enforce it could adversely affect collection efficiency and effectiveness. In fact, some studies point out that the lack of revenue generating capacity of local governments has caused some decentralization programs to be less effective than they should have been (Capuno, 2017; Shen et al., 2012). Third, there is unclear evidence on whether high-income or low- and middle-income countries benefit more from decentralization.

Third, the mixed results of the empirical literature on decentralization can be reconciled by the few studies that found evidence of an inverted U-shaped or a U-shaped relationship between decentralization and development outcomes (Akai et al., 2007; Thieben, 2003; Carniti et al., 2019).

An inverted U-shaped relationship suggests that there is an optimal level of decentralization. At low levels of decentralization, its relationship with development outcomes is positive. The marginal effect is increasing at a decreasing rate, until the relationship becomes negative at high levels of decentralization. On the other hand, a U-shaped relationship suggests that benefits of decentralization will only be felt either at very low or very high levels of decentralization. In between, decentralization could have an adverse effect on development.

Fourth, different types of decentralization can affect different development outcomes differently. Both revenue and expenditure decentralization appear associated with good governance, but the former has a stronger marginal effect. Revenue decentralization and fiscal independence are positively associated with other development outcomes, but expenditure decentralization has no significant effect. The evidence for economic growth is less clear for all three forms of decentralization.

These findings can guide future decentralization studies moving forward. Although there is a large body of empirical literature on this topic, there are still gaps that, if filled, can help policy makers and scholars in understanding decentralization and making it more effective. First, studies should increasingly look at other types of decentralization, particularly administrative and political decentralization. These forms of decentralization are rarely studied, mostly due to measurement difficulties. Studying them will fill a huge gap in the empirical decentralization literature. Analyzing the different forms of decentralization in conjunction with each other will also be a useful contribution. Some of the research questions that such studies could address include which combination of decentralization types will be most effective and will the presence of another form of decentralization enhance or hinder the effectiveness of another. Another good addition to the

literature is the construction of a decentralization index using different decentralization indicators that will include fiscal, administrative, and political decentralization.

Second, a few studies found a non-linear relationship between decentralization and development outcomes. A good extension of these studies is to identify the optimal level of decentralization depending on the country's characteristics. The third gap in the empirical decentralization literature is the effect of decentralization on the efficiency of provision and quality of public services. The foremost argument for decentralization is better public goods provision due to the proximity advantage of the local government; and this remains to be extensively tested empirically.

Finally, there are still few empirical studies that apply rigorous econometric methods in determining the effect of decentralization on indicators of actual human welfare such as poverty, per capita income, and the human development index. While most empirical studies looked at economic growth and governance, it is interesting to note that there have been few studies on how decentralization correlates with indicators of actual human welfare. This will be a useful addition to the literature because the eventual objective of most decentralization programs is to improve human welfare and development.

4. Summary, Conclusion, and Recommendations

This article critically reviewed the empirical literature on decentralization and its relationship with development outcomes. Although there is a rich body of empirical studies on this topic, results are heterogenous and the effectiveness of decentralization remains a subject of debate. Specifically, the focus of this study is to look for trends on which decentralization types, which development outcomes, and which country income level is decentralization more likely to be effective.

The analysis suggests that revenue decentralization and fiscal independence, or the ability of local governments to raise their own revenue rather than relying on transfers from the national government, are the decentralization types most positively associated with development outcomes. The evidence on expenditure decentralization suggests that its effectiveness depends on the development outcome. In terms of development outcomes, most of the studies reviewed found evidence that good governance is positively associated with decentralization. On the other hand, the evidence is mixed on the relationship of decentralization with economic growth.

These findings suggest that the effectiveness of decentralization depends on what its development objectives are; and there can be tradeoffs. Nonetheless, evidence from a few studies can reconcile the mixed results of most empirical studies as they found evidence of a U-shaped or an inverted U-shaped relationship between decentralization and development outcomes.

Following the analysis, some suggestions were made for future decentralization studies. For one, there is a gap in the empirical literature on the effects of political and administrative decentralization on development outcomes. Furthermore, future empirical studies should focus more on the effect of decentralization on actual measures of human welfare such as poverty, per capita income, and the human development index.

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Appendix 1. Articles included in the review.

Study	Decentralization Indicator	Outcome of Interest	Data Type	Covered Economies	Result
Akai and Sakata (2002)	Ratio of local govt expenditure to combined local plus state spending	Economic growth	Cross-section	United States (state-level)	Positive
	Ratio of local govt revenue to combined local plus state revenue				Positive
	Ratio of own-sourced local govt revenue to total local govt revenue				None
	Average of first two indicators				Positive
Davoodi and Zou (1998)	Share of local government spending to total government spending	Growth rate of per capita output	Panel	Cross-country	Negative for developing countries; None for developed
Hammond and Tosun (2011)	Single-purpose government per square mile	Employment	Cross-section	United States (county-level)	Positive for metropolitan counties; None on non-metropolitan
		Real Income Growth			None
	General-purpose government per capita	Employment			Negative for metropolitan counties;

					None on non-metropolitan
		Real Income Growth			None
Jin and Zou (2005)	Provincial budgetary expenditure as a share of total budgetary expenditure	Economic Growth	Panel	China (province-level; 1979-1993)	Negative
	Provincial extra-budgetary expenditure as a share of total extra-budgetary expenditure				None
	Provincial budgetary revenue as a share of total budgetary revenue				Positive
	Provincial extra-budgetary revenue as a share in total extra-budgetary revenue				None
	Provincial budgetary expenditure as a share of total budgetary expenditure			None	
	Provincial extra-budgetary expenditure as a share of total extra-budgetary expenditure			None	
	Provincial budgetary revenue as a share of total budgetary revenue			Negative	
	Provincial extra-budgetary revenue as a share in total extra-budgetary revenue			None	
Lin and Liu (2000)	Marginal retention rate of locally collected budgetary revenues by provincial governments	Growth rate of per capita GDP	Panel	China (province-level)	Positive
Stansel (2005)	Number of general-purpose governments per 100,000 residents	Per capita money income growth	Cross-section	United States (metropolitan areas)	Positive
	Number of public school systems per 100,000 residents				None
Tosun and Yilmaz (2010)	Number of municipalities per capita	Provincial GDP per capita	Panel	Turkey (province-level)	Negative
		Provincial GDP per capita growth rate			None
	Number of municipalities per square kilometer	Provincial GDP per capita			Negative
		Provincial GDP per capita growth rate			None
	Number of municipalities per capita	Provincial GDP per capita	Cross-Section		None
		Provincial Development Index			Negative
Number of municipalities per square kilometer	Provincial GDP per capita	None			

		Provincial Development Index			Positive
Xie et al (1999)	Share of state and local government spending to total government spending	Per capita output growth rate	Cross-section (averaged from panel)	United States (state-level)	None
	Share of local government spending to total government spending				None
Zhang and Zou (1998)	Ratio of provincial budgetary spending to central budgetary spending, expressed in per capita terms	Real provincial income growth rate	Panel	China (province-level)	Negative
	Ratio of provincial extra-budgetary spending to central extra-budgetary spending, expressed relative to the income size				Negative
	Ratio of consolidated provincial spending to consolidated central spending, expressed in per capita terms				None
Baskaran and Feld (2013)	Sub-federal tax revenue as share of total government tax revenue	Growth rate of labor productivity	Panel	Cross-country (23 OECD countries)	None
	Tax revenue from shared taxes as share of total government tax revenue				None
Bodman 2010	Six different measures of sub-national tax revenue as share of total government tax revenue	Growth of real per capita GDP	Cross-section	Cross-country (OECD countries)	None
	Two measures of sub-national government expenditures as share of total government expenditures				None
	Number of elected sub-national tiers of government				Negative
	Federalism dummy				Negative
	Sub-national to central government employee ratio		None		
	Number of sub-national government units		None		
	Six different measures of sub-national tax revenue as share of total government tax revenue		Panel		None
	Two measures of sub-national government expenditures as share of total government expenditures				None
Carniti et al 2019	Expenditure share of sub-central government to central government	Per capita GDP growth rate	Panel	Cross-country (25 European)	Positive initially; negative at high levels of decentralization
	Investment share of sub-central government to central government				Negative initially; positive at high levels of decentralization

Gemmell et al 2013	Two measures of sub-national government expenditures as share of total government expenditures	Economic growth rate	Panel	Cross-country (23 OECD Countries)	Negative
	Three measures of sub-national government revenue as share of total government revenue				Positive
Iqbal et al 2012	Ratio of sub-national government expenditure to total government expenditure (ED)	Per capita output growth rate	Time series	Pakistan	Negative
	Ratio of sub-national government revenue to total government revenue (RD)				Positive
	Composite Decentralization (RD/(1-ED))				Positive
Rodriguez-Pose and Ezcurra 2011	Sub-national government expenditure as share of total government expenditure	Growth rate of real GDP per capita	Cross-section	Cross-country (21 OECD Countries)	Negative
	Political decentralization score				Negative
	Administrative decentralization score				Negative
Thieben 2003	Sub-national government expenditure as share of total government expenditure	Per capita GDP annual growth rate	Panel	Cross-country (High-income OECD Countries)	Positive initially; negative at high levels of decentralization
		Capital stock growth			Positive initially; negative at high levels of decentralization
		Total factor productivity			Negative initially; positive at high levels of decentralization
Yushkov 2015	Self-generated municipal revenue as share of regional budget	Growth rate of gross regional product per capita	Panel	Russia (cross-region)	None
	Municipal expenditure as share of total regional expenditure				Negative
	Share of self-generated revenues of all municipalities in consolidated municipal revenues of the region				None
	Dependence of a region on intergovernmental transfers from the federal budget (Note: Measure of reverse decentralization)				Positive (Decentralization associated with lower growth)
Nguyen and Anwar 2011	Provincial budgetary revenue as percentage of total budgetary revenue	Provincial GDP growth rate	Panel	Vietnam (cross-province)	Positive
	Provincial budgetary expenditure as a percentage of total budgetary expenditure				Negative
Woller and Phillips 1998	Ratio of local government revenues to total government revenues	Per capita real GDP growth rate		Cross-country (23 LDCs)	None

	Ratio of local government revenues less grants-in-aid to total government revenues		Panel / Cross-section		None
	Ratio of local government expenditures to total government expenditures				None
	Ratio of local government expenditures to total government expenditures less defense and social security expenditures				None
Blochliger and Akgun (2018)	Spending decentralization	Economic Growth	Panel	Cross-country (OECD)	Mixed (positive and negative depending on empirical equation)
	Revenue decentralization				None
	Tax decentralization				Positive
	Spending decentralization	Investments			Positive
	Revenue decentralization				Positive
	Tax decentralization				Positive
Desai et al 2005	Tax retention rate (Share of locally-generated revenues retained within the regional government)	Regional Economic Growth	Panel	Russia (cross-section)	Positive
		Foreign Direct Investments			Positive
Feltenstein and Iwata (2005)	Local government expenditure as share of total government expenditure	GNP growth rate	Time-series	China	Positive
	Local government revenue as share of total government revenue				
	Total extrabudgetary revenue as share total government budgetary revenue				
	Local government expenditure as share of total government expenditure	Inflation			Positive (decentralization is associated with higher inflation)
	Local government revenue as share of total government revenue				
	Total extrabudgetary revenue as share total government budgetary revenue				
Qiao et al. (2008)	Per capita provincial government spending as share of per capita total government spending	Provincial GDP growth rate	Panel	China (cross-province)	Positive
		Inequality			Positive (decentralization is associated with higher inequality)
Enikolopov and Zhuravskaya (2007)	Share of sub-national revenues to total government revenues	Economic growth	Panel	Cross-country (developing and transition)	Positive (if party system is stable and government parties have low fractionalization)
		Government quality			
		Quality of public goods provision			

Akai et al. (2007)	Local revenue as share of combined local and state revenue	Annual growth rate of gross state product	Panel	United States (state-level)	Positive initially; negative at high levels of decentralization
	Local expenditure as share of combined local and state expenditure				
Iimi (2005)	Local government expenditure as share of total government expenditure	Per capita GDP growth	Cross-section (year averaged 1997 to 2001)	Cross-country	Positive
	Political decentralization score				Negative
Martinez-Vasquez and McNab (2006)	Ratio of total sub-national government revenues to general government revenues	Inflation rate	Panel	Cross-country	Negative for developed countries (more decentralized countries have lower inflation); positive for developing
		Economic growth			Negative
	Ratio of total sub-national government expenditures to general government expenditures	Inflation rate			Negative for developed countries; positive for developing
		Economic growth			Negative
Rodriguez-Pose and Kroijer (2009)	Sub-national expenditures as percentage of total expenditures	GDP per capita growth rate	Panel	Cross-country (eastern and central Europe)	Negative
	Local tax revenue as percentage of total sub-national revenues and grants				Negative initially but becomes positive through time
	Transfers to sub-national governments from other levels of government as percentage of total sub-national revenues and grants				Negative
Zhang and Zou (2001)	Ratio of consolidated provincial budgetary spending to central budgetary spending	Provincial GDP growth rate	Panel	China (cross-province)	Negative
	Ratio of total state public spending to total central spending	Per capita real income growth rate		India (cross-state)	None
	Ratio of per capita state public spending to per capita central spending				Positive
	Ratio of total state own revenue to total central revenue				Positive
	Ratio of per capita state own revenue to per capita central revenue				Positive
Jin et al. (2005)	Marginal retention rate of locally collected revenues	Growth of Employment in Rural Businesses	Panel	China (cross-province)	Positive
		Growth of Employment in Non-State, Non-			Positive

		Agricultural Businesses			
Kalirajan and Otsuka (2012)	Ratio of per capita expenditure of Panchayati Raj (rural) institutions to per capita expenditure of urban local bodies	State Agricultural GDP	Panel	India (state-level)	Positive
Nguyen (2008)	Ratio of expenditures of districts and communes in a province to the total provincial expenditures	Average monthly income of lowest quintile	Panel	Vietnam (province-level)	Negative
Wallis and Oates (1988)	Share of state spending to combined state and local spending (centralization indicator; dependent variable)	Per capita income	Panel	United States (state-level)	Positive (higher per capita income is associated with less decentralization)
	Share of state revenues to combined state and local revenues (centralization indicator; dependent variable)				None
	Share of state spending to combined state and local spending (centralization indicator; dependent variable)		Cross-section		None
Qian and Zhang (2017)	Net fiscal revenue left over after a county has delivered revenues to the central government	Welfare spending growth	Panel	China (county-level)	Negative
		Education spending growth			Positive
		Number of doctors growth			None
		Number of hospital beds growth			None
		Length of roads growth			None
		Student-teacher ratio			Negative (decentralization is associated with lower student-teacher ratio)
Abdur et al (2017)	Ratio of provincial expenditures to total state expenditures	Gross primary school enrollment	Time series	Pakistan	Positive
Faguet and Sanchez (2008)	Before-after analysis of implementation of a decentralization law	Public Investment in Education	Panel	Bolivia (municipality-level)	Positive
	Own-sourced revenue of local government as a share of total local government expenditure	Year-on-year increase in student enrollment in state schools		Colombia (municipality-level)	Positive
	Interaction between dummy variable for 'certified' municipalities and transfers from central government				Positive

	Share of total educational expenditure accounted for by central transfers for the period 1994-2001 (Centralization measure)				Negative (decentralization is associated with higher enrollment increase)
	Central transfers as a share of total expenditure for the period 2002-04 (Centralization measure)				Negative (decentralization is associated with higher enrollment increase)
Arikan (2004)	Number of local jurisdictions per population	Corruption	Cross-section	Cross-country	Negative (decentralization is associated with lower corruption)
	Share of local government employment to total government employment				
	Share of local government spending to total government spending				
Faguet (2004)	Before-after analysis of implementation of a decentralization law	Responsiveness to local needs (Change in public investment patterns after decentralization)	Panel	Bolivia (state-level)	Positive (decentralization diverted key public investments to where they are most needed)
Fisman and Gatti (2002)	Share of local government spending to total government spending	Corruption	Cross-section	Cross-country	Negative (decentralization is associated with lower corruption)
Goel et al (2017)	Local government expenditure as share of total government expenditure	Tax Administration Indicator in WBES	Pooled cross section of individual businesses	Cross-country	Positive
		Business Permit and Licensing Indicator in WBES			Positive
		Corruption Indicator in WBES			Positive
	Federalism binary variable	Tax Administration Indicator in WBES			Negative
		Business Permit and Licensing Indicator in WBES			Negative
		Corruption Indicator in WBES			Negative
	Aggregate decentralization index	Tax Administration Indicator in WBES			None
		Business Permit and Licensing Indicator in WBES			Positive
		Corruption Indicator in WBES			Positive
	Administrative decentralization index	Tax Administration Indicator in WBES			Positive

		Business Permit and Licensing Indicator in WBES			Positive
		Corruption Indicator in WBES			Positive
Goel and Nelson (2011)	Number of total local governments per 100,000 people	Corruption (number of convictions for abuse of public office per 100K people)	Panel	United States (state-level)	Positive (decentralization is associated with greater corruption)
	Number of general-purpose local governments per 100,000 people				Positive (decentralization is associated with greater corruption)
	Number of special-purpose local governments per 100,000 people				Mixed none and negative
	Local government expenditure as share of state government spending				Negative (decentralization is associated with less corruption)
Goel and Saunoris (2017)	Virtual decentralization (Provision of government services through Internet)	Size of shadow economy	Cross-section	Cross-country	Negative (decentralization is associated with smaller shadow economy)
	Physical decentralization (Number of tiers of government)				Negative
	Sub-national government expenditures as share of total government expenditures				None
	Virtual decentralization (Provision of government services through Internet)	Corruption			Negative (decentralization is associated with less corruption)
	Physical decentralization (Number of tiers of government)				None
	Sub-national government expenditures as share of total government expenditures				None
Kyriacou and Roca-Sagales 2009	Expenditure of sub-national government as share of total government expenditure	Government quality (International Country Risk Guide)	Panel	Cross-country (29 multiple income-class)	Positive (effect weaker for richer countries)
	Revenue of sub-national government as share of total government revenue				Positive (effect weaker for richer countries)
Kyriacou et al 2017	Sub-national government revenue (less grants) as share of total government revenue	Inequality	Panel	Cross-country (23 OECD Countries)	Negative (Decentralization associated with lower inequality) if accompanied by high-quality government

		Governance (International Country Risk Guide)			Positive
Kyriacou and Roca-Sagales 2011a	Share of sub-central government spending to total government spending	Governance	Panel	Cross-country (OECD)	Positive (but moderated by political decentralization)
	Share of sub-central government revenue to total government revenue				
Kyriacou and Roca-Sagales 2011b	Share of sub-central government revenue to total government revenue	Governance	Cross- section	Cross-country	Positive (but moderated by political decentralization)
	Political decentralization score				Negative
	Share of sub-central government revenue to total government revenue		Panel		Positive
Sadanandan (2012)	Number of government functions devolved to local councils by 2001 (out of the 29 functions required to be devolved by a constitutional amendment)	Distribution of excess Below Poverty Line (BPL) cards (measure of political patronage)	Cross- section	India (state- level)	Positive (decentralization advances patronage politics)