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Fiscal Decentralization Improves Social Outcomes When Countries Have Good Governance

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ABSTRACT: Does fiscal decentralization improve health and educational outcomes? Does this improvement depend on the quality of governance? How do fiscal decentralization and governance interact? We answer these questions through an instrumental variable Tobit analysis of cross-country panel data. We find negative effects of fiscal decentralization on health outcomes, which however are more than offset by better governance. Education expenditure decentralization to subnational governments enhances educational outcomes. We conclude that countries can only reap the benefits from decentralization when the quality of their governance arrangements exceeds a certain threshold. We also find that sequencing and staging of decentralization matter. Countries should improve government effectiveness and control of corruption first to maximize benefits of fiscal decentralization.

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Introduction

How does governance affect social outcomes when many countries provide public services at the local level? About half of public health services have been decentralized on average across 75 countries from 1972 to 2019 (IMF's Fiscal Decentralization Dataset 2020). During the COVID-19 pandemic, local governments' role in providing healthcare services has become more visible/important amid more attention to governance/corruption issues. Although fiscal decentralization could potentially improve national health and educational outcomes through better public services based on local needs, it is necessary to study whether this holds empirically, whether this depends on the quality of governance, and how fiscal decentralization and governance interact.

We focus on the effects of fiscal decentralization and governance on health and education outcomes for three reasons. First, extant literature has studied the association between fiscal decentralization/governance and health outcomes, making it easy for us to design our empirical methodology and add our contributions clearly. Second, in the midst of the COVID pandemic all over the world, citizens are now paying more attention to governments' quality of governance when they deliver healthcare services in the decentralized fiscal systems. Third, health and education are very essential, human capital-building areas of public services, which countries often do not cut even when undergoing fiscal consolidation.

Figure 1. Triangular Relationship among Fiscal Decentralization, Governance, and Social Outcomes
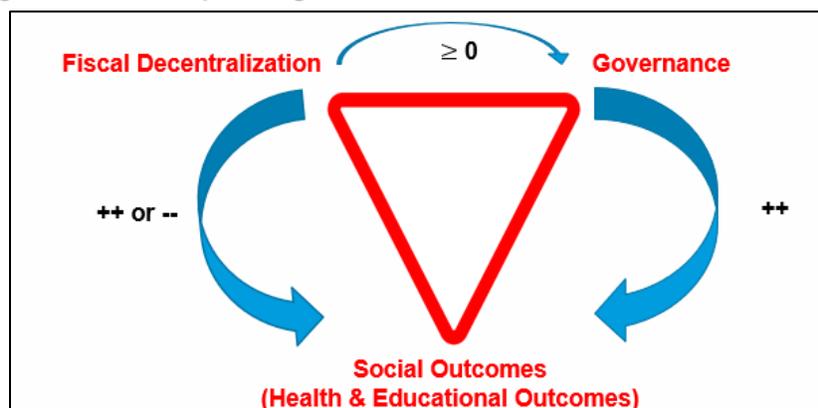
Source: IMF staff.

Fiscal decentralization and governance do interact, and this interaction shapes social outcomes (Figure 1). Fiscal decentralization can improve social outcomes via better preference matching (Oates 1972), yardstick competition[1] (Besley and Case 1995), or minimizing monopolistic power of Leviathan government (Brennan and Buchanan 1977; Edwards and Keen 1996), which is indicated by the left blue arrow. There are also negative aspects of fiscal decentralization, such as common pool problem[2] (Berry 2008), flypaper effect[3]

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[1] Yardstick competition refers to the situation in which taxpayers compare the performance of their local government with that of neighboring governments as a yardstick, enhancing competition among local governments to improve delivery of public goods.

[2] When only government expenditure is decentralized but revenue is not, the common pool problem arises from not-fully internalized cost of local fiscal actions owing to the local government's tendency to overuse common revenue sources.

[3] Flypaper effect occurs when an intergovernmental grant from central government increases local government spending more than the increase in local income.

(Fisher 1982), and diseconomies of scale. Moreover, better governance of government operations enhances social outcomes (Ciccone et al 2014). Fiscal decentralization could also enhance governance (Altunbas and Thornton 2012) and improve perceptions of accountability (Escobar-Lemmon and Ross 2014), as shown by the upper blue arrow.

We hypothesize that, the effects of fiscal decentralization on social outcomes are positive only if countries have better governance. Namely, social gains from decentralizing public health/education services depend on governance quality. In our study, governance quality at the local government is postulated to be the same as, or better than that at the central government. This assumption is supported by the findings of Azfar et al (2000, 2001, 2006) that there is less perceived corruption at the local government level than at the central one because community leaders are concerned about local corruption/elections more than national ones, and corrupt local government officials face a higher probability of being prosecuted.

Governance plays a catalytic role in enhancing positive effects of fiscal decentralization and mitigating its negative ones. On the one hand, fiscal decentralization triggers fair competition among local governments if countries have better governance, and citizens can move to the areas where local governments provide better medical or educational services (Tiebout 1956). On the other hand, it is crucial to have good governance and accountability framework to avoid inefficient populist policies by corrupt local government officials. For instance, a strong accountability framework avoids corruption in procurement of medical equipment or hiring health workers.

Regarding health outcomes, the existing literature focuses on OECD countries (Jiménez-Rubio 2011a) or on a single country to analyze the effects of fiscal decentralization (Asfaw et al 2007; Costa-Font and Pons-Novell 2007; Cantarero and Pascual 2008; Jiménez-Rubio 2011b; Soto et al 2012; Cavalieri and Ferrante 2016; Jiménez-Rubio and García-Gómez 2017; Di Novi et al 2019). Most of these studies find that fiscal decentralization to local governments plays a positive role in improving health outcomes in advanced or emerging economies, although the effects depend on regional socioeconomic or political conditions. However, Antón et al (2014) and Lago-Peñas et al (2022) find negative effects of fiscal decentralization on health outcomes.

With respect to educational outcomes, empirical studies show mixed findings on decentralization. Falch and Fischer (2012), Letelier and Ormeño (2018), and Diaz-Serrano and Meix-Llop (2019) find that the impact of fiscal decentralization on school outcomes is positive. Elacqua et al (2021) finds that municipal autonomy in the administrative decentralization of education improved student achievement in Colombia. In contrast, Kameshwara et al (2020) and Leer (2016) find that decentralization has no significant effect on student achievement. One study of particular relevance is that Heredia-Ortiz (2007) uses governance as an instrument for fiscal decentralization, finding that fiscal decentralization improves educational outcomes, but there are questions whether the instrument she uses is truly exogenous.

Our contributions are five-fold. First, we have a wide coverage of data, including non-OECD and low-income countries, whilst most of the literature analyzed only OECD or emerging ones. Inclusion of a broader country range enables us to control for different governance quality of governments. Thus, the second contribution is to decipher how these institutional arrangements regarding governance and control of corruption affect the efficacy of fiscal decentralization. Third, we address an endogeneity problem stemming from the reverse causality between health outcomes and public health services, employing a panel instrumental variable (IV)

Tobit model. Fourth, Tobit models also improve the accuracy of measuring impacts on health outcomes. Fifth, we compare fiscal decentralization in subnational (e.g., regional) and local governments.

Empirical Method

We construct an annual country panel dataset from 1996 to 2018 that includes variables from four data sources (Annex Table 1). Governance indicators (government effectiveness; control of corruption; regulatory quality; and accountability) are taken from Worldwide Governance Indicators (2020). We use the health and education spending decentralization variables from IMF's Fiscal Decentralization Dataset (2020). We include health, education, macroeconomic, and demographic variables (infant mortality rate, life expectancy, etc.) from World Development Indicators (2020). From World Bank Education Statistics (EdStats) (2020), we include the Program for International Student Assessment (PISA) scores and government education expenditure.

We use two dependent variables for health outcomes: infant mortality rate per thousand live births and life expectancy at birth. Control variables for health regressions include hospital beds and the number of physicians per 1000 people to control for medical supply capacity, health expenditures as a proxy for medical demand, domestic private health expenditure to control for the share of private health services, and tertiary school enrollment as a proxy for medical knowledge. For educational outcome, we use PISA score as a dependent variable. This variable is calculated as the average score of 15 years old students on science, reading, and mathematics. The control variable used in the education regressions is the government education expenditure as a proxy for education demand.

We employ the panel IV Tobit model, using a lagged variable as an instrument, to address endogeneity and truncated dependent variables.[4] An endogeneity concern arises if the government changes public health policy in response to health outcomes. For instance, higher infant mortality rates in rural areas may induce governments to authorize more public health service—such as immunization—through local clinical centers. As evidenced by the first-stage regressions in the tables in the next section, the degree of fiscal decentralization in the current year is highly correlated with that in the previous year, satisfying the validity of the instrument. In addition, current year's social outcomes cannot retrospectively influence the past degree of decentralization, which secures the exogeneity of instrument. Ditto for governance variables. Since our dependent variables cannot take negative values, and most of them have upper limits, we use the Tobit method to allow unequal sampling probability. Our model is given by

$$Social_{i,t} = \alpha + \beta \cdot FD_{i,t} + \gamma \cdot FD_{i,t} \times Gov_{i,t} + \boldsymbol{\delta} \cdot \boldsymbol{X}_{i,t} + v_i + \mu_t + \varepsilon_{i,t}$$

where the subscripts i and t represent the country and time period, respectively; $Social_{i,t}$ is the health or educational outcome; $FD_{i,t}$ is local or subnational fiscal decentralization; $Gov_{i,t}$ is governance variable; $\boldsymbol{X}_{i,t}$ is a

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[4] Our regressions include following countries: Afghanistan, Albania, Australia, Austria, Azerbaijan, Belarus, Belgium, Bulgaria, China, Croatia, Cyprus, Czech Republic, Denmark, El Salvador, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Indonesia, Iran, Ireland, Israel, Italy, Kazakhstan, Korea, Latvia, Lithuania, Luxembourg, Malta, Mauritius, Moldova, Mongolia, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, and Ukraine.

vector of control variables; v_i represents the country fixed effects; μ_t represents the time fixed effects; and $\varepsilon_{i,t}$ is the error term. The observed $Social_{i,t}$ in a Tobit model is defined by

$$Social_{i,t} = \begin{cases} y^* \ if \ |y^*>\tau \\ \tau \ if \ |y^*\leq\tau \end{cases} \left(and \ Social_{i,t} = \begin{cases} \theta \ if \ |y^*\geq\theta \\ y^* \ if \ |y^*<\theta \end{cases} \right)$$

where τ and θ are the censoring points; and y^* is a latent variable. For example, life expectancy cannot take negative values, so we set $\tau = 0$. By contrast, infant mortality rates and PISA scores have both upper and lower censoring points: $\tau = 0$ and $\theta = 100$ for infant mortality rates, and $\tau = 300$ and $\theta = 600$ for PISA scores.

Results

We find that fiscal decentralization by itself could actually increase infant mortality rates and shorten life expectancy. This is shown by the statistically significant, blue-colored coefficients in the first row of Tables 1 and 2. Our finding on negative effects of fiscal decentralization on health outcomes is consistent with the recent empirical literature (Antón et al 2014; Lago-Peñas et al 2022). For example, Lago-Peñas et al (2022) find that centralized fiscal systems are associated with better health outcomes during COVID-19 pandemic. Moreover, Kyriacou and Roca-Sagalés (2021) argues that decentralization of procurement facilitates rent-seeking by special interests (in the absence of good accountability framework) and forgoes economies of scale.

Table 1. Results for Infant Mortality Rate, Local Governments

Governance Indicator	Government Effectiveness	Control of Corruption	Regulatory Quality	Accountability
Fiscal Decentralization (FD)	3.91*** (0.78)	3.31*** (0.76)	4.98*** (0.95)	3.89*** (0.90)
FD × Governance Indicator	-3.13*** (0.59)	-3.22*** (0.57)	-3.41*** (0.66)	-3.20*** (0.84)
Hospital beds	-0.33*** (0.10)	-0.29*** (0.10)	-0.35*** (0.10)	-0.26** (0.11)
Physicians	-0.06 (0.14)	-0.04 (0.14)	-0.02 (0.14)	-0.07 (0.14)
Health expenditure	-0.06 (0.09)	-0.02 (0.09)	0.03 (0.09)	-0.02 (0.09)
Real GDP per capita	-42.20* (25.55)	-27.68 (25.61)	-22.93 (26.12)	-42.16 (26.08)
Private health expenditure	0.87*** (0.23)	0.84*** (0.23)	0.87*** (0.23)	0.90*** (0.24)
Tertiary school enrollment	0.01* (0.01)	0.01* (0.01)	0.01 (0.01)	0.02** (0.01)
Population (age 0-14)	0.15** (0.07)	0.12 (0.08)	0.14* (0.08)	0.15* (0.08)
Population (age >65)	0.61*** (0.09)	0.63*** (0.09)	0.64*** (0.09)	0.65*** (0.09)
Constant	-3.72 (2.57)	-4.64* (2.53)	-5.58** (2.54)	-5.24** (2.59)
First-stage regression:				
Lagged FD	*0.60*** (0.03)*	*0.59*** (0.03)*	*0.54*** (0.03)*	*0.57*** (0.03)*
Lagged FD × Governance Indicator	*0.66*** (0.03)*	*0.67*** (0.02)*	*0.69** (0.03)*	*0.50*** (0.03)*
Country Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	562	562	562	562
Log Likelihood	795.4	819.5	829.7	619.8

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Second, our results show that decentralization of health spending to local governments could lower infant mortality rate and lengthen life expectancy in countries with stronger governance. This is our new finding and main contribution in our analysis, which is shown by the highly statistically significant, red-colored coefficients of interaction terms in the second row of Tables 1-2. Intuitively, higher government effectiveness, stronger control of corruption, better quality of regulations, and stronger accountability imply more efficient health spending use of available government resources through fiscal decentralization and less leakages due to corruption. Bear in mind that the coefficients of interaction terms might include both direct and indirect effects from governance (e.g., corruption) on health outcomes (Dincer and Toeman 2019) because we cannot include governance variable separately in our regressions to avoid a multicollinearity problem due to the high correlation between the interaction terms and governance.

Table 2. Results for Life Expectancy, Local Governments

Governance Indicator	Government Effectiveness	Control of Corruption	Regulatory Quality	Accountability
Fiscal Decentralization (FD)	**-0.94*** (0.30)**	**-0.84*** (0.29)**	**-1.00*** (0.36)**	**-1.04*** (0.35)**
FD × *Governance Indicator*	**0.76*** (0.23)**	**1.02*** (0.22)**	**0.54** (0.25)**	**1.04*** (0.33)**
Hospital beds	-0.07* (0.04)	-0.08** (0.04)	-0.06 (0.04)	-0.09** (0.04)
Physicians	0.27*** (0.05)	0.26*** (0.05)	0.26*** (0.05)	0.27*** (0.06)
Health expenditure	-0.05 (0.05)	-0.06* (0.03)	-0.06* (0.04)	-0.06* (0.04)
Real GDP per capita	25.72*** (9.84)	21.50** (9.82)	22.22** (10.00)	26.12*** (10.07)
Private health expenditure	-0.35*** (0.09)	-0.33*** (0.09)	-0.36*** (0.09)	-0.35*** (0.09)
Tertiary school enrollment	-0.01** (0.00)	-0.01** (0.00)	-0.01* (0.00)	-0.01*** (0.00)
Population (age 0-14)	0.17*** (0.03)	0.18*** (0.03)	0.16*** (0.03)	0.17*** (0.03)
Population (age >65)	-0.07* (0.04)	-0.06* (0.03)	-0.08** (0.04)	-0.07* (0.04)
Constant	75.62*** (0.99)	75.67*** (0.97)	76.20*** (0.97)	75.84*** (1.00)
First-stage regression:				
Lagged FD	*0.60*** (0.03)*	*0.59*** (0.03)*	*0.54*** (0.03)*	*0.57*** (0.03)*
Lagged FD × Governance Indicator	*0.66*** (0.03)*	*0.67*** (0.02)*	*0.69*** (0.03)*	*0.50*** (0.03)*
Country Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	562	562	562	562
Log Likelihood	1315.2	1344.2	1348.5	1141.4

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3. Results for Infant Mortality Rate, Subnational Governments

Governance Indicator	Government Effectiveness	Control of Corruption	Regulatory Quality	Accountability
Fiscal Decentralization (FD)	**4.39*** (0.90)**	**4.03*** (0.90)**	**5.56*** (1.17)**	**4.80*** (1.25)**
FD × Governance Indicator	**-3.53*** (0.64)**	**-3.67*** (0.59)**	**-3.63*** (0.72)**	**-4.11*** (1.14)**
Hospital beds	-0.25** (0.10)	-0.20* (0.10)	-0.26*** (0.10)	-0.10 (0.12)
Physicians	-0.18 (0.14)	-0.20 (0.14)	-0.12 (0.14)	-0.24 (0.15)
Health expenditure	-0.03 (0.09)	-0.02 (0.09)	0.07 (0.09)	0.04 (0.10)
Real GDP per capita	-40.92 (25.40)	-17.57 (25.89)	-17.06 (26.46)	-40.72 (26.70)
Private health expenditure	0.93*** (0.22)	0.92*** (0.22)	1.06*** (0.22)	0.94*** (0.23)
Tertiary school enrollment	0.01** (0.01)	0.01 (0.01)	0.01 (0.01)	0.02** (0.01)
Population (age 0-14)	0.05 (0.08)	-0.00 (0.08)	0.03 (0.08)	0.01 (0.09)
Population (age >65)	0.62*** (0.09)	0.67*** (0.09)	0.67*** (0.09)	0.69*** (0.09)
Constant	-0.95 (3.02)	-2.08 (2.94)	-4.76 (2.93)	-3.54 (3.06)
First-stage regression:				
Lagged FD	*0.57*** (0.03)*	*0.56*** (0.03)*	*0.49*** (0.04)*	*0.54*** (0.03)*
Lagged FD × Governance Indicator	*0.61*** (0.03)*	*0.70*** (0.03)*	*0.69** (0.03)*	*0.46*** (0.04)*
Country Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	571	571	571	571
Log Likelihood	768.8	845.8	848.9	663.7

Note: Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Control variables show that better supply of medical equipment, such as larger number of hospital beds, is associated with better health outcomes in Table 1. We also find that a higher share of private health expenditure (and, by implication, a lower share of public expenditure) is associated with worse health outcomes, underscoring the importance of public health service for infant mortality. Furthermore, a higher number of physicians per capita is also associated with longer life expectancy in Table 2. Also, high per-capita income countries (a catchall for other relevant factors, for which we cannot control directly) tend to have longer life expectancy as indicated by the positive and statistically significant coefficients of real GDP per capita.

As a robustness check, we examined the health spending share of subnational (regional) governments to measure the fiscal decentralization (Table 3).[5] Results for infant mortality are similar, in terms of statistical significance and the signs of estimated coefficients.

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[5] Throughout the paper, we use the term "subnational government" to denote regional or provincial governments as opposed to local (e.g., municipal) governments.

Table 4. Results for Life Expectancy, Subnational Governments

Governance Indicator	Government Effectiveness	Control of Corruption	Regulatory Quality	Accountability
Fiscal Decentralization (FD)	**0.07 (0.34)**	**-0.00 (0.34)**	**0.35 (0.44)**	**0.14 (0.45)**
FD × Governance Indicator	**0.15 (0.24)**	**0.34 (0.23)**	**-0.19 (0.27)**	**0.04 (0.41)**
Hospital beds	-0.05 (0.04)	-0.06 (0.04)	-0.04 (0.04)	-0.05 (0.04)
Physicians	0.23*** (0.05)	0.24*** (0.05)	0.23*** (0.05)	0.23*** (0.05)
Health expenditure	-0.03 (0.03)	-0.04 (0.03)	-0.02 (0.04)	-0.03 (0.04)
Real GDP per capita	27.12*** (9.69)	25.01** (9.82)	28.27*** (9.95)	27.08*** (9.69)
Private health expenditure	-0.45*** (0.08)	-0.45*** (0.08)	-0.45*** (0.08)	-0.46*** (0.08)
Tertiary school enrollment	-0.01** (0.00)	-0.01** (0.00)	-0.01** (0.00)	-0.01** (0.00)
Population (age 0-14)	0.17*** (0.03)	0.18*** (0.03)	0.15*** (0.03)	0.16*** (0.03)
Population (age >65)	-0.05 (0.03)	-0.05 (0.03)	-0.06 (0.03)	-0.05 (0.03)
Constant	74.22*** (1.15)	74.07*** (1.11)	74.51*** (1.10)	74.42*** (1.11)
First-stage regression:				
Lagged FD	*0.57*** (0.03)*	*0.56*** (0.03)*	*0.49*** (0.04)*	*0.54*** (0.03)*
Lagged FD × Governance Indicator	*0.61*** (0.03)*	*0.70*** (0.03)*	*0.69*** (0.03)*	*0.46*** (0.04)*
Country Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	571	571	571	571
Log Likelihood	1297.8	1373.4	1381.0	1195.3

Note: Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

In contrast, when we used subnational (regional) decentralization for life expectancy in Table 4, we found both the blue and red coefficients to be statistically insignificant. Thus, health expenditure decentralization from central government to subnational governments does not matter for life expectancy, in contrast to the finding for local governments. This finding is consistent with the literature based on single country analysis that uses fiscal decentralization to the local level.

Table 5 shows the education results for decentralization to local governments. In contrast to health results, the coefficients of fiscal decentralization are statistically insignificant, implying that decentralization of educational expenditure to local governments per se is not associated with better educational outcomes. However, the coefficients of the interaction terms are positive and statistically significant for governance effectiveness and control of corruption (the red-colored coefficients). Thus, decentralization of educational expenditure to local governments can improve educational outcomes if countries have stronger government effectiveness and better control of corruption.

When we conduct similar exercise for educational outcomes, using subnational decentralization in Table 6, the positive and statistical coefficients of interaction terms in the first two columns are the same, while the blue coefficient in the third column is positive and statistically significant at the five percent level. This finding is consistent with Kyriacou and Roca-Sagalés (2019) who find the positive effect of fiscal decentralization on education (and the negative one on health outcomes).

Table 5. Results for PISA Score, Local Governments

Governance Indicator	Government Effectiveness	Control of Corruption	Regulatory Quality	Accountability
Fiscal Decentralization (FD)	-1.77 (24.67)	10.55 (23.02)	31.30 (31.09)	13.89 (47.27)
FD × Governance Indicator	35.10*** (12.74)	32.88*** (11.78)	9.29 (15.54)	23.45 (29.05)
Government education expenditure	-12.10*** (4.68)	-8.74* (4.58)	-10.11** (4.78)	-10.32** (4.85)
Real GDP per capita	-777.0** (373.8)	-717.0* (371.1)	-627.6* (376.8)	-643.9* (382.4)
Population (age 0-14)	3.66*** (1.37)	3.83*** (1.37)	3.89*** (1.38)	4.16*** (1.43)
Population (age >65)	-1.98 (1.46)	-2.95** (1.48)	-2.06 (1.49)	-2.27 (1.49)
Constant	477.4*** (39.56)	473.5*** (39.55)	473.0*** (39.89)	473.7*** (40.17)
First-stage regression:				
Lagged FD	*0.64*** (0.07)*	*0.59*** (0.05)*	*0.53*** (0.07)*	*0.28*** (0.09)*
Lagged FD × Governance Indicator	*0.81*** (0.08)*	*0.78*** (0.06)*	*0.73*** (0.08)*	*0.99*** (0.09)*
Country Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	133	133	133	133
Log Likelihood	87.1	118.0	91.6	172.6

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Results for PISA Score, Subnational Governments

Governance Indicator	Government Effectiveness	Control of Corruption	Regulatory Quality	Accountability
Fiscal Decentralization (FD)	20.86 (21.66)	32.28 (20.46)	51.73** (25.57)	23.58 (38.96)
FD × Governance Indicator	22.55** (9.59)	18.69** (8.42)	-2.25 (10.99)	19.79 (23.00)
Government education expenditure	-11.56** (4.54)	-9.81** (4.54)	-9.80** (4.72)	-10.67** (4.73)
Real GDP per capita	-735.7** (369.5)	-736.1**(374.8)	-526.8 (383.3)	-654.7* (394.0)
Population (age 0-14)	4.66*** (1.37)	4.51*** (1.38)	4.01*** (1.42)	4.63*** (1.51)
Population (age >65)	-2.11 (1.47)	-2.64* (1.50)	-2.06 (1.50)	-2.16 (1.51)
Constant	418.5*** (43.16)	421.0*** (43.48)	425.0*** (43.74)	423.9*** (44.22)
First-stage regression:				
Lagged FD	*0.70*** (0.08)*	*0.60*** (0.05)*	*0.55*** (0.06)*	*0.36*** (0.07)*
Lagged FD × Governance Indicator	*0.62*** (0.05)*	*0.83*** (0.05)*	*0.74*** (0.06)*	*0.90*** (0.08)*
Country Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	131	131	131	131
Log Likelihood	30.1	99.9	87.6	165.4

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

We found a contrast between health and educational outcomes. Namely, all governance indicators are statistically significant for health outcomes in Tables 1-3, while only half of governance indicators are significant for educational outcomes in Tables 5-6. Therefore, governance seems more important for the health sector than the education one. This can be attributed to the fact that information asymmetry is higher in the health

sector, such as physician-induced demand for medical services, meaning that there is more room for health industries to experience governance problems than education ones.
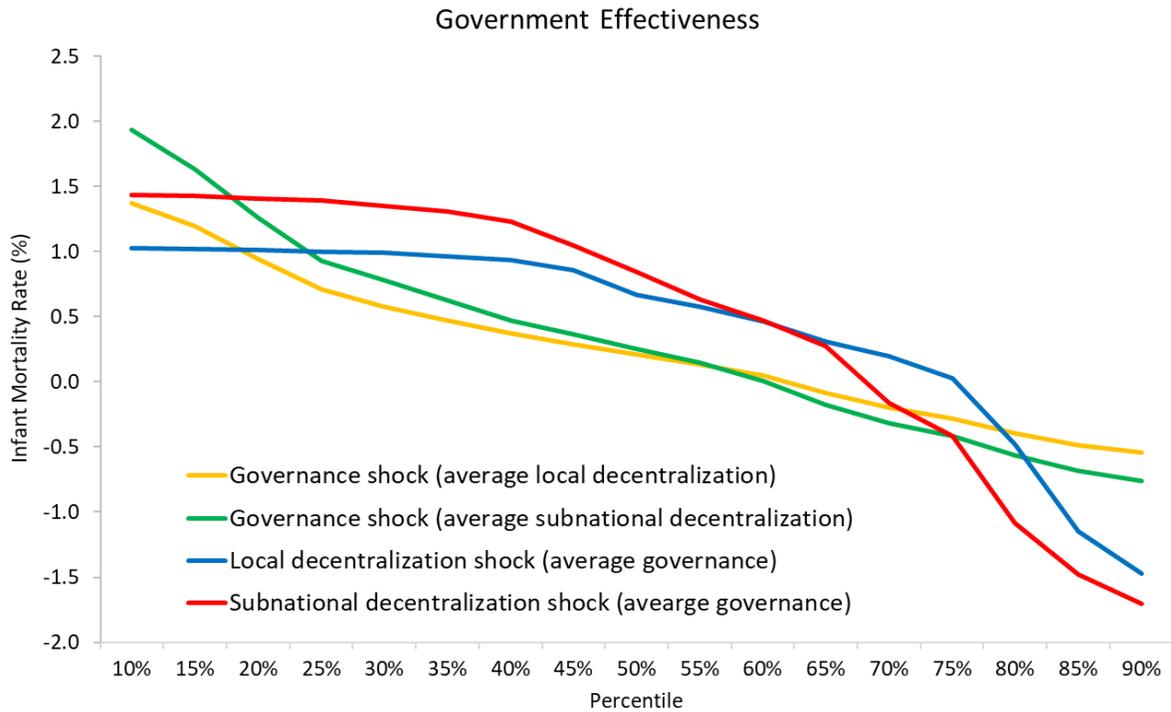
Next, we conduct simulations using estimated coefficients and observed data on decentralization and governance to quantify the marginal impact of movements in these two variables on the health and education variables. Here we use the coefficients in the first two rows in Tables 1–6 and data on distribution of governance and decentralization to simulate the effects of these two variables. Namely, in one simulation, we keep the degree of fiscal decentralization at its average level and vary the governance variable. The yellow line in Figure 2 is when the governance variable varies on the horizontal axis, keeping the degree of local decentralization at its average level. Note that we only change the relevant variable (fiscal decentralization or governance) when calculating the marginal impacts. The green line does the same thing with subnational decentralization. Figure 2 shows that the green and yellow lines are convex functions, meaning that for both local and subnational governments, the marginal effects of governance on infant mortality are larger for countries with fairly low levels of governance. However, when their governance quality is already at a higher level, the relative impact from improving governance on reducing infant mortality rate fades out.

By contrast, the blue line is the case in which we keep the governance variable at the average level, while we change the degree of local decentralization. A red line is the same exercise using subnational decentralization. The marginal positive effect of decentralization on health outcomes becomes larger when countries decentralize health expenditure more because Figure 2 shows that the red and blue lines are concave functions. Moreover, health expenditure decentralization to subnational governments can improve health outcomes more than to local governments, as evidenced by the steeper slope of red line compared to the blue one.

Similarly, countries with very low governance can increase life expectancy by improving governance (Figure 3). Among the four governance indicators, control of corruption has the steepest slope of yellow line, which is relatively straight, indicating that a reduction in corruption could improve life expectancy for countries with all levels of corruption. By contrast, countries with high degree of decentralization to local governments can lengthen life expectancy through decentralizing more health expenditures (the blue lines). Put differently, the positive effects of fiscal decentralization materialize only when countries decentralize to local governments to a certain degree—approximately above 40 percent of decentralization distribution. Finally, we note that the magnitude of the effects on life expectancy is relatively small. This is not surprising since other factors apart from government activities influence people's lives significantly.

For educational outcomes, we only show the two governance indicators that are statistically significant: government effectiveness and control of corruption in Figure 4. We find that education expenditure decentralization could increase PISA scores with an average level of governance quality, while improving governance quality could also increase PISA scores with average decentralization. Both correlations do not show concave or convex patterns.

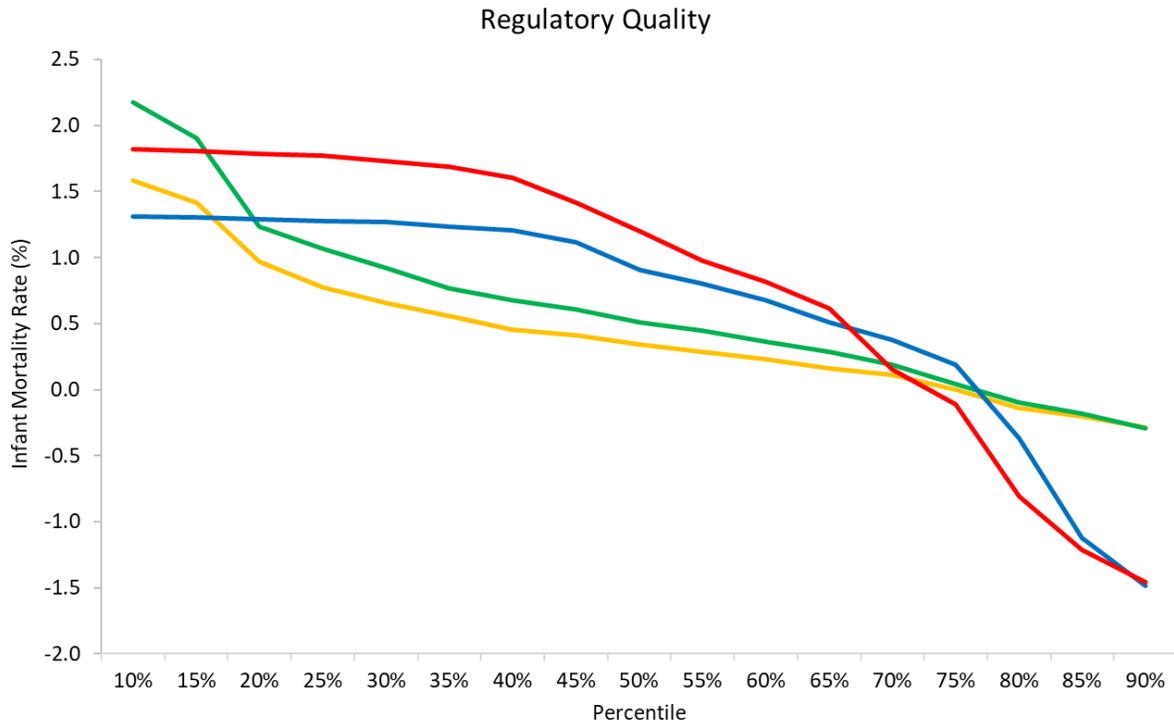**Figure 2. Marginal Effects on Infant Mortality Rate (Continued)**

Government Effectiveness
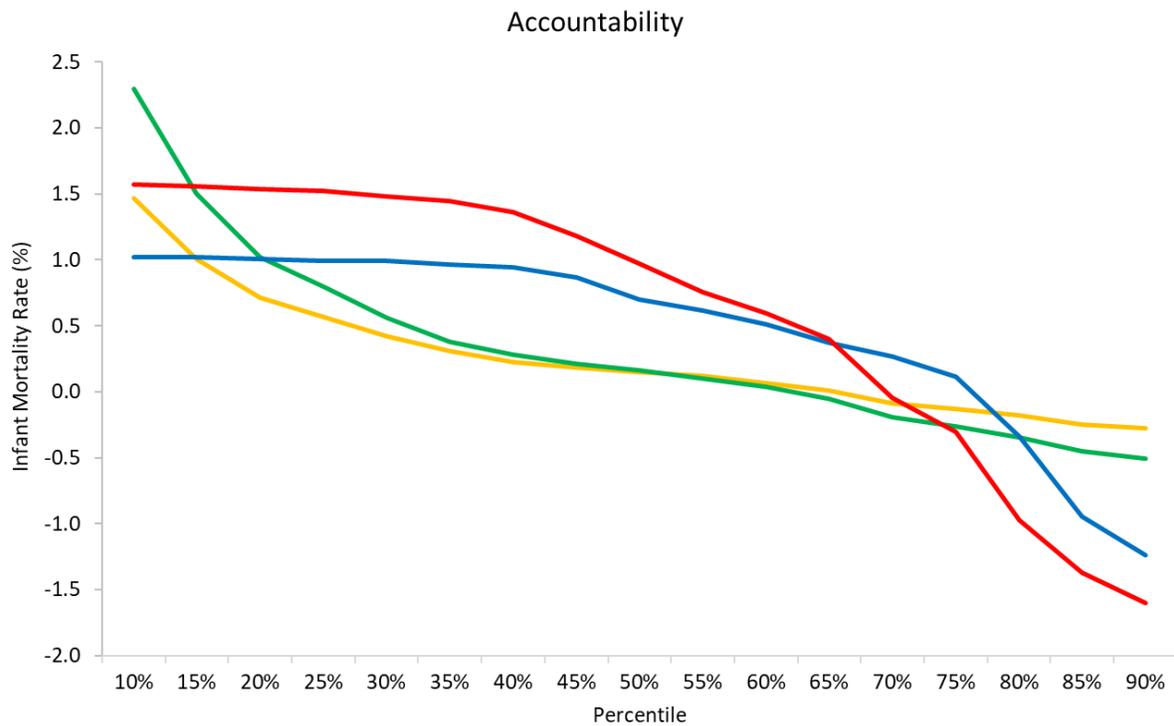

Source: IMF staff calculations.

Control of Corruption
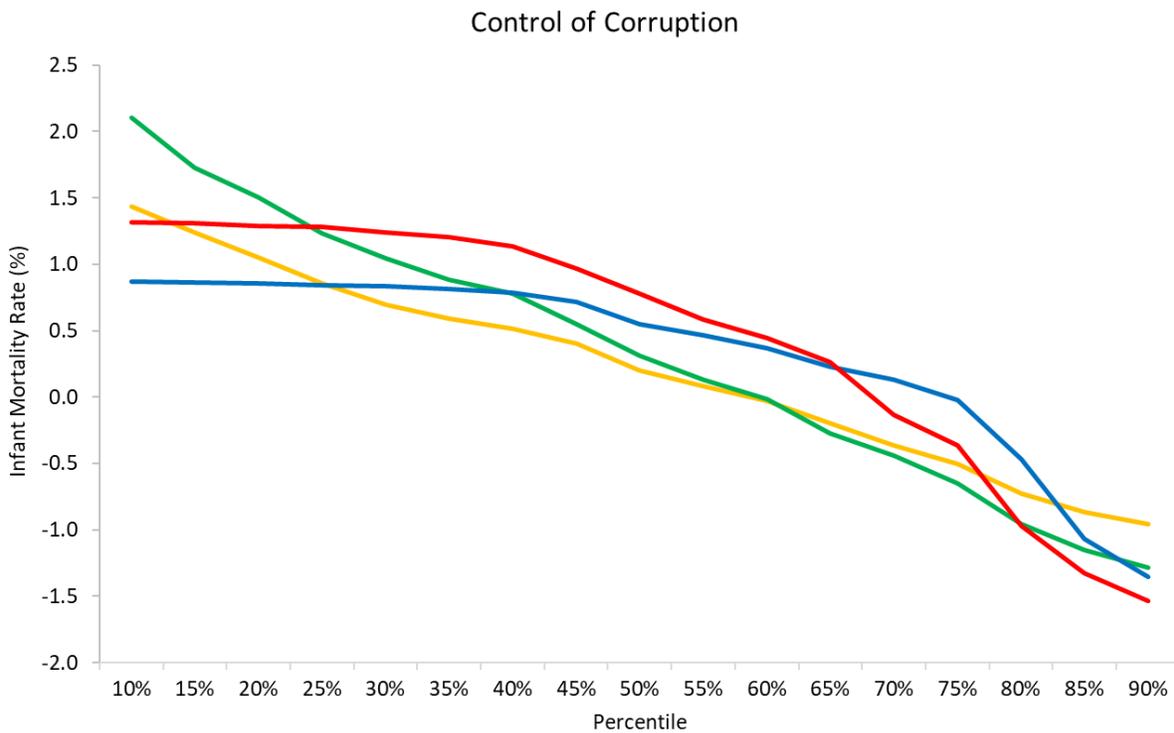
Source: IMF staff calculations.

Figure 2. Marginal Effects on Infant Mortality Rate (Concluded)

Regulatory Quality

Source: IMF staff calculations.

Accountability

Source: IMF staff calculations.

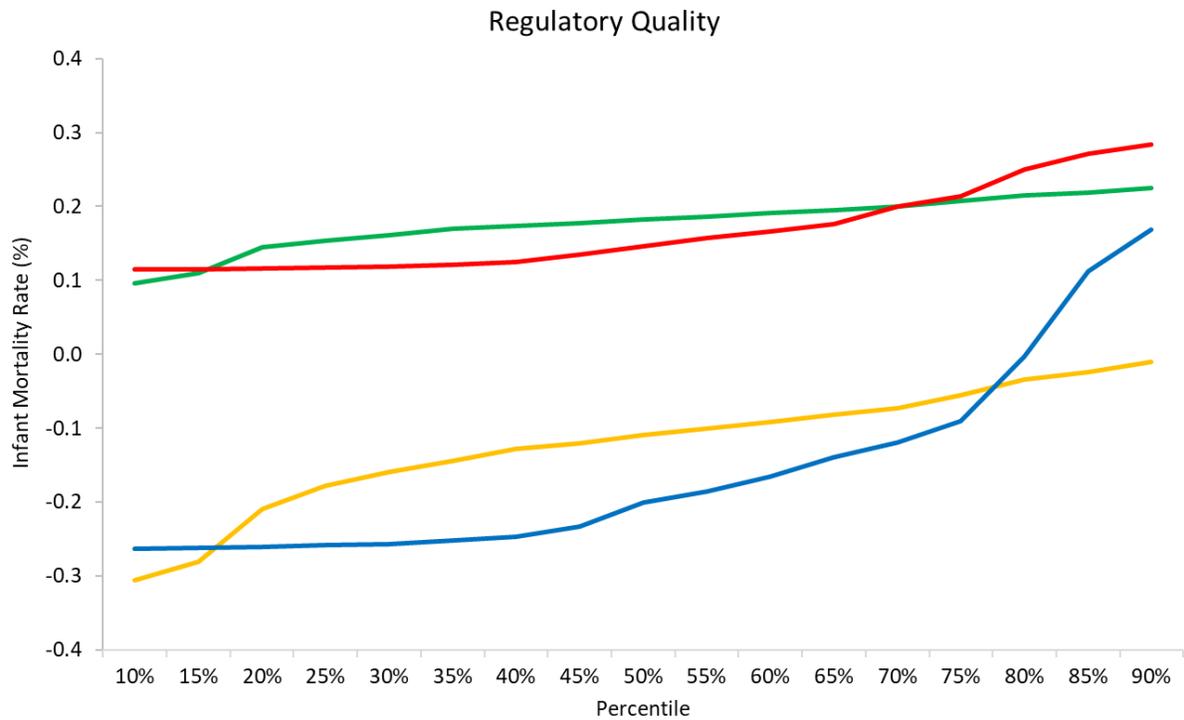**Figure 3. Marginal Effects on Life Expectancy (Continued)**

Government Effectiveness

Source: IMF staff calculations.

Control of Corruption
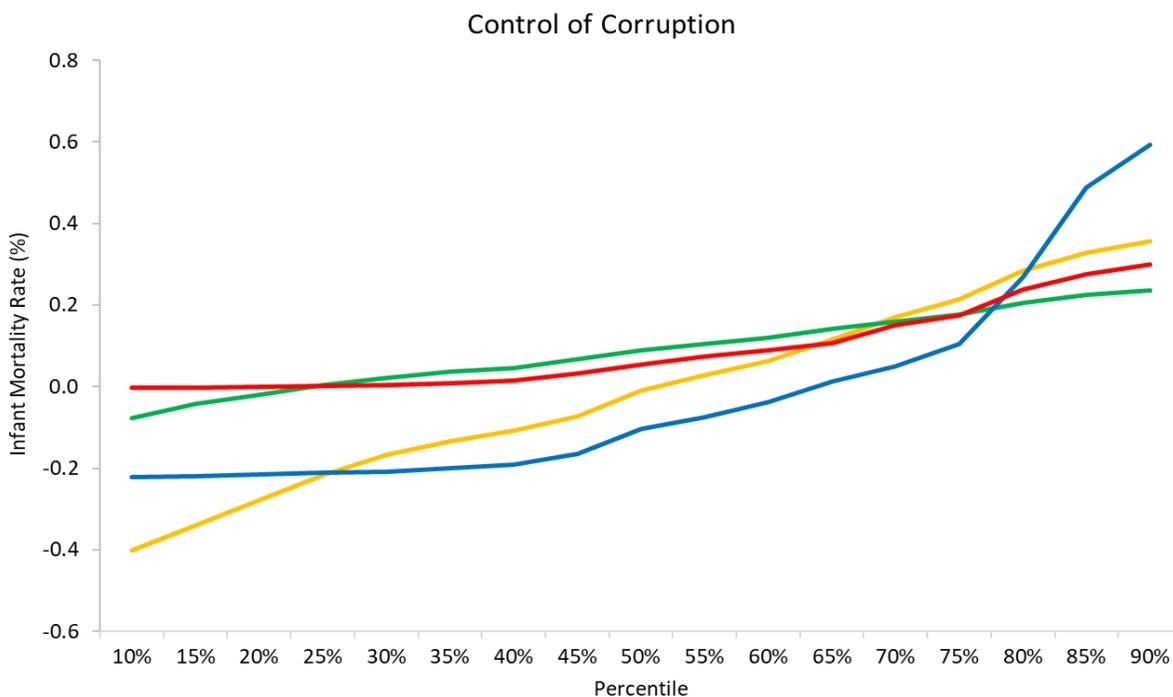
Source: IMF staff calculations.

Figure 3. Marginal Effects on Life Expectancy (Concluded)

Regulatory Quality

Source: IMF staff calculations.

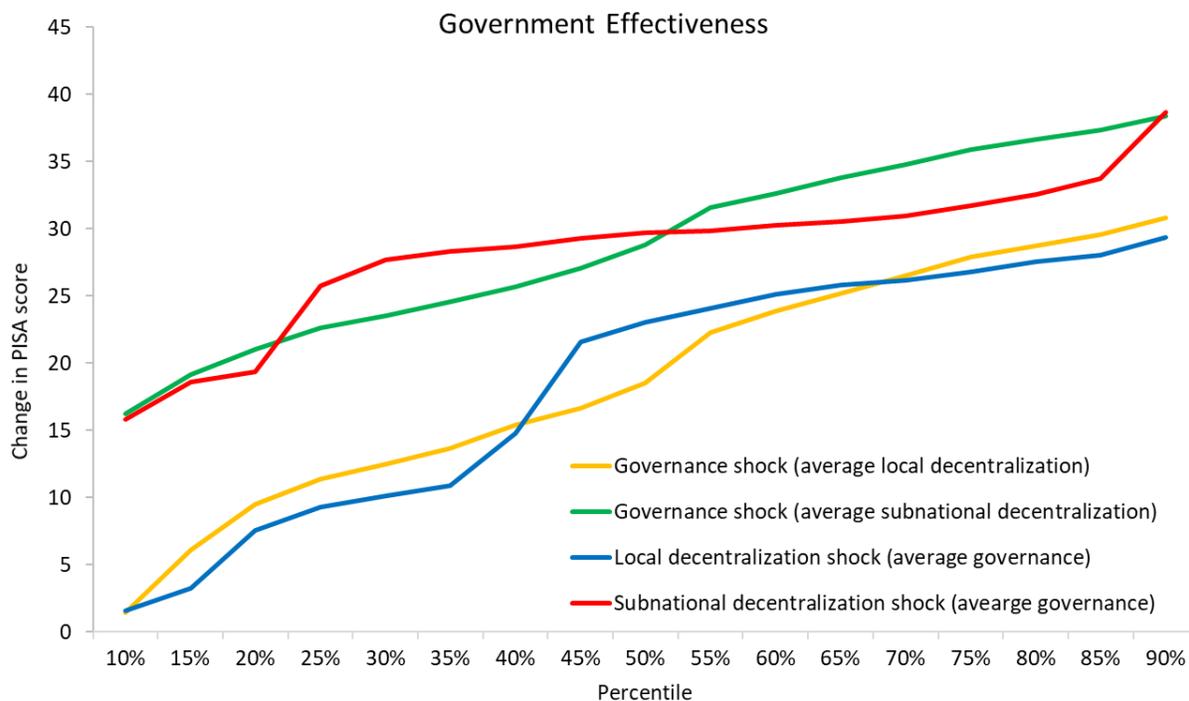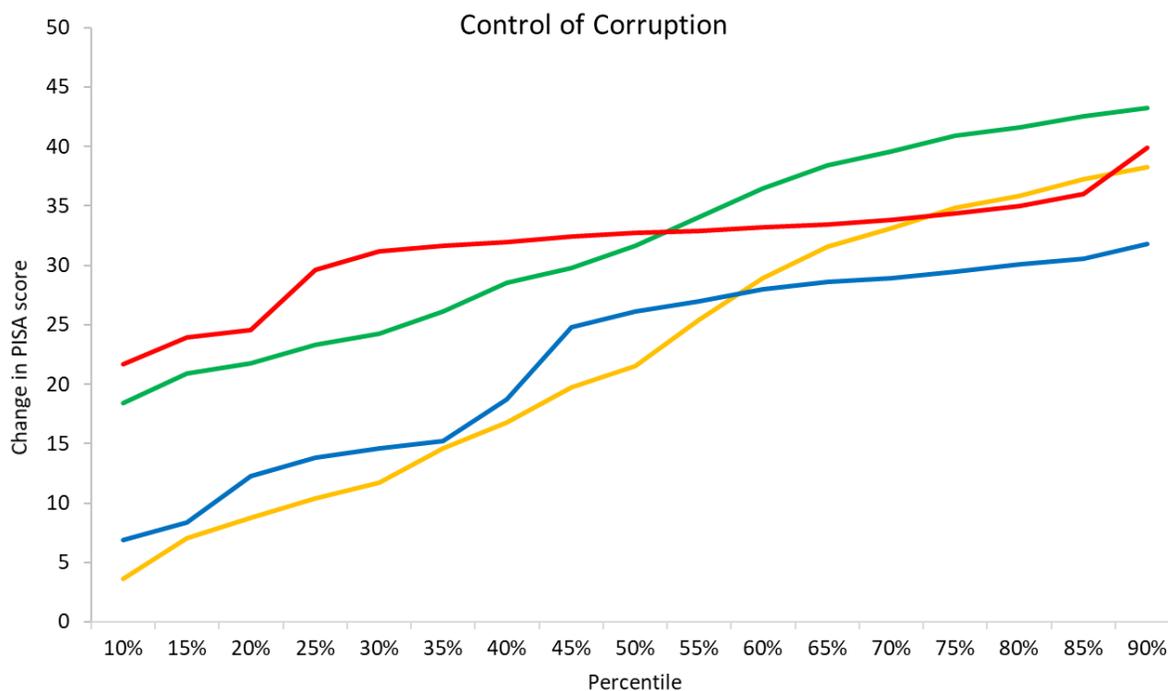### Accountability
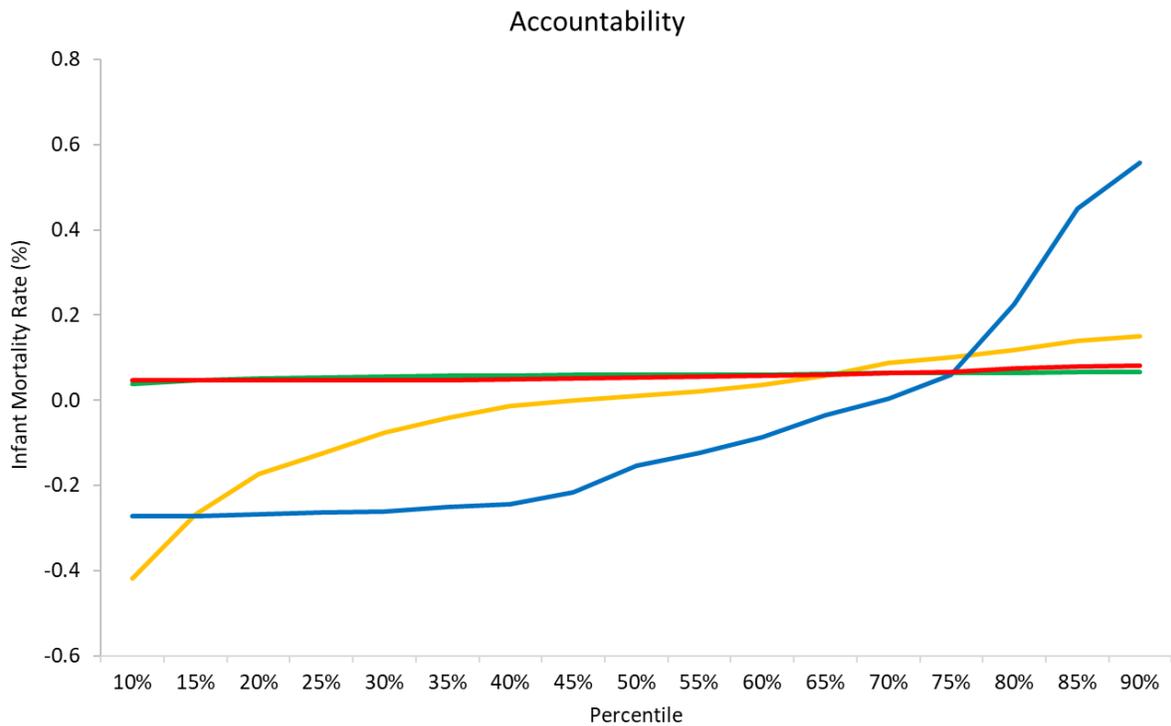
Source: IMF staff calculations.

Figure 4. Marginal Effects on PISA Score

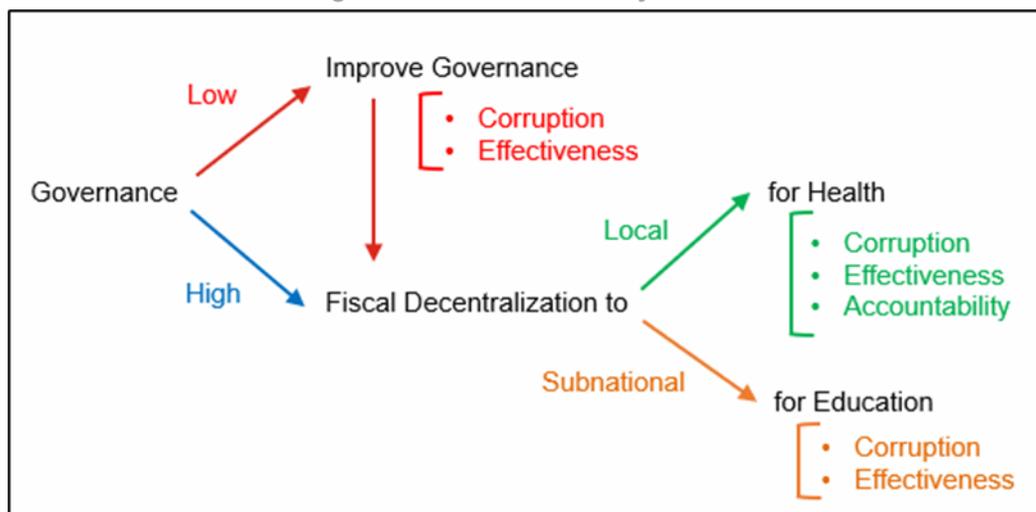
Source: IMF staff calculations.

Source: IMF staff calculations.

Interestingly, education decentralization to subnational governments always yields higher PISA scores than for local decentralization, as the green (red) lines being on top of the yellow (blue) ones in Figure 4. This is probably because state/cantonal/provincial governments have higher administrative capacity in delivering public education services (Loayza et al 2014) and given the less diversified preference on public education service across communities, economies of scale prevail if the education system is operated by state or cantonal governments rather than municipalities. This is consistent with the recent finding about increasing returns to scale in the provision of local education services (Gómez-Reino et al 2021). Subnational governments are better equipped in educational infrastructure and know-how than local ones, and they work better in spending efficiency of providing educational resources.

From the regression results and simulation analyses, we thus find that sequencing matters for benefitting from fiscal decentralization. If the quality of governance is low, countries need to improve governance first (Figure 5). In particular, they should control corruption and improve government effectiveness as these governance factors affect both health and educational outcomes. Once countries achieve higher quality of governance, they can start to reap benefits from fiscal decentralization. Fiscal decentralization to local governments could improve both infant mortality rates and life expectancy by better matching local medical needs/preferences. To further improve health outcomes, countries should strive to reduce corruption at the local level, improve the quality of health infrastructure, and strengthen accountability through reporting of financial statement of public hospitals. In fact, Fung and Owen (2020) find that audits by municipalities improve performance of health, sanitation, and other municipal systems. In contrast, fiscal decentralization to subnational (not local) governments can improve educational outcomes through relative economies of scale, and by controlling corruption better. They should also improve the quality of education infrastructure to raise citizens' satisfaction with education systems and its effectiveness.

Figure 5. Flowchart of Policy Actions

Source: IMF staff.

In addition to governance and fiscal policies, the following health policy implications are derived from our results of medical control variables. Medical supplies—hospital beds and physicians—unambiguously improve health outcomes—i.e., infant mortality and life expectancy, respectively (Figure 6). If countries increase these medical supplies from the sample mean to the 75th percentile of the respective distributions, infant mortality

rates can be further reduced by 0.4 percentage points and life expectancy lengthened by 1.7 months additionally.

Figure 6. Effects of Medical Supplies
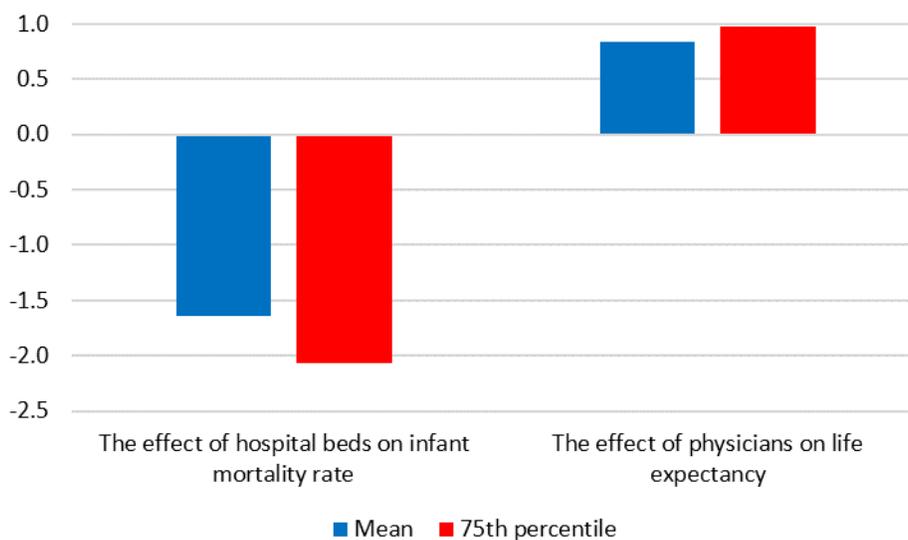
Source: IMF staff calculations.

Health policy advice differs across country situations. If low-income countries want to reduce infant mortality, more hospital beds should be built. This demand is manifested by higher infant mortality rates in low-income countries, compared to those in the other countries (Figure 7).
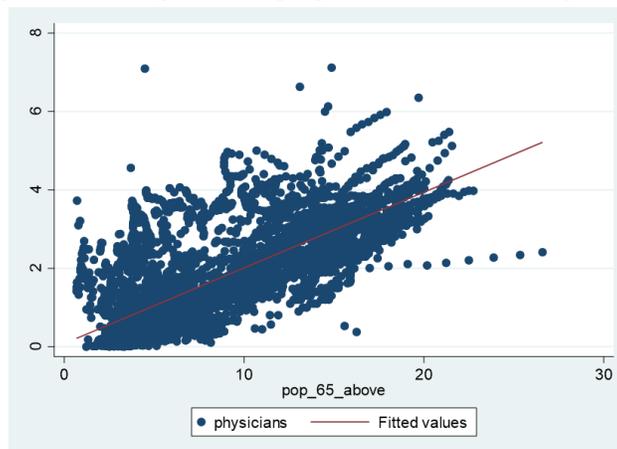
Figure 7. Effects of Hospital Beds on Infant Mortality Rates
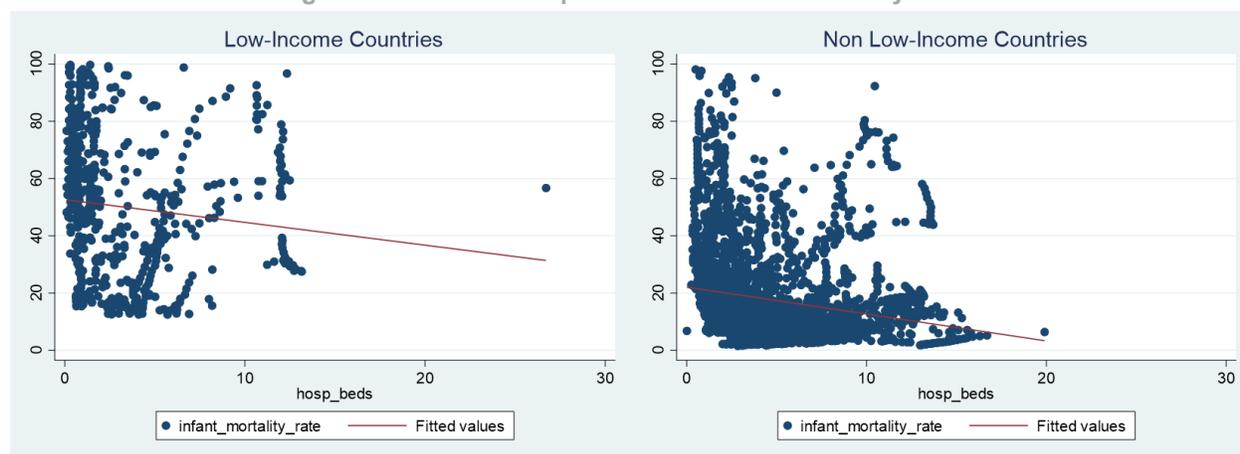
Source: IMF staff calculations.

Moreover, countries with aging society need more physicians. Figure 8 exhibits the positive association between the share of population above 65 years old and the number of physicians per a thousand people.

Figure 8. Demographic Aging and Numbers of Physicians

Source: IMF staff calculations.

Conclusion

Fiscal decentralization is ubiquitous these days. Many public services, including health and education, are provided at the subnational and local government levels. Such decentralization has pros and cons—e.g., decentralization of health expenditure could meet local needs better, while a vaccination campaign would benefit from a centralized system. Motivated by the heightened role of control over corruption in public health service delivery in the decentralized fiscal system during the COVID-19 pandemic, our research gauged the effect of fiscal decentralization on social outcomes, deciphering their relationship with governance and institutional quality. Using a wide coverage of cross-country panel data, our panel IV Tobit approach improve the quantification of decentralization impacts on social outcomes.

Our results show that fiscal decentralization by itself does not necessarily improve social outcomes and could even worsen them. However, countries reap the benefits from decentralization when the quality of their governance arrangements exceeds a certain threshold. We also find that sequencing and staging of decentralization matter when countries with different levels of governance quality intend to decentralize more fiscal operations. Thus, our results underscore the importance of strong institutional arrangements and oversight mechanisms being in place prior to fiscal decentralization.

Our simulations showed that the marginal effects of governance on infant mortality are larger for countries with low governance levels. Moreover, the favorable effects of fiscal decentralization on health outcomes—for a given level of governance— becomes larger when countries decentralize health expenditure more. Furthermore, we find that health expenditure decentralization to local governments can improve health outcomes more than to subnational governments. This is mainly manifested in the results from life expectancy; governance does not seem to significantly improve fiscal decentralization's effect on increasing life expectancy for subnational governments (Table 4). The life expectancy simulation charts also show that lines for subnational governments are relatively flat (Figure 3). In contrast, education expenditure decentralization to subnational governments is found to bring more benefits compared to that of local governments. In Figure 4, we see that education decentralization to subnational governments always yield higher results for PISA scores than for local decentralization.

Other than governance quality, we found, unsurprisingly, that better health infrastructure is associated with lower infant mortality rates. We also found more medical supplies are associated with longer life expectancy. Therefore, *ceteris paribus*, building hospital beds or increasing the number of physicians—from the average levels observed in countries in our sample—could improve health outcomes, up to a point. Low-income countries with increasing population may wish to increase hospital beds to reduce infant mortality, while medical supplies may not be urgently needed for advanced countries with aging population.

In sum, fiscal decentralization works well to improve social outcomes when governance works well. The relationship is found to be nonlinear. Our study shows that improving government effectiveness and controlling corruption help improve both health and education outcomes. To benefit from fiscal decentralization, sequencing also matters; countries should improve government effectiveness and reduce corruption so that their institutional quality is strong enough to reap the positive effects from health/educational expenditure decentralization.

Annex I. Data Source and Description

Annex Table 1. Sources and Descriptions of Data

Variable	Source	Description
Government Effectiveness	Worldwide Governance Indicators http://info.worldbank.org/governance/wgi/	Perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. The index ranges from -2.5 to 2.5 (worst and best possible outcome, respectively).
Control of Corruption	Worldwide Governance Indicators http://info.worldbank.org/governance/wgi/	Perception of extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. The index ranges from -2.5 to 2.5 (worst and best possible outcome, respectively).
Regulatory Quality	Worldwide Governance Indicators http://info.worldbank.org/governance/wgi/	Perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. The index ranges from -2.5 to 2.5 (worst and best possible outcome, respectively).
Accountability	Worldwide Governance Indicators http://info.worldbank.org/governance/wgi/	Perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. The index ranges from -2.5 to 2.5 (worst and best possible outcome, respectively).
Health spending decentralization	Fiscal Decentralization Dataset https://data.imf.org/?sk=1C28EBFB-62B3-4B0C-AED3-048EEEBB684F	Share of health spending of local governments (or subnational governments) as a proportion of general government spending.
Education spending decentralization	Fiscal Decentralization Dataset https://data.imf.org/?sk=1C28EBFB-62B3-4B0C-AED3-048EEEBB684F	Share of education spending of local governments (or subnational governments) as a proportion of general government spending.
PISA score	World Bank EdStats https://databank.worldbank.org/source/education-statistics-%5e-all-indicators	Average score of 15-year-old students on the PISA scores on science, reading and mathematics.

Government education expenditure (% of GDP)	World Bank EdStats https://databank.worldbank.org/source/education-statistics-%5e-all-indicators	Total general government expenditure on primary education (current, capital, and transfers), expressed as a percentage of GDP. It includes expenditure funded by transfers from international sources to government. Divide total government expenditure for a given level of education by the GDP and multiply by 100.
Life expectancy at birth, total (years)	World Development Indicators https://databank.worldbank.org/source/world-development-indicators	The number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.
Infant mortality rate (per 1,000 live births)	World Development Indicators https://databank.worldbank.org/source/world-development-indicators	The number of infants dying before reaching one year of age in a given year.
Hospital beds (per 1,000 people)	World Development Indicators https://databank.worldbank.org/source/world-development-indicators	Hospital beds include inpatient beds available in public, private, general, and specialized hospitals and rehabilitation centers. Beds for both acute and chronic care are included.
Physicians (per 1,000 people)	World Development Indicators https://databank.worldbank.org/source/world-development-indicators	Physicians include generalist and specialist medical practitioners.
Current health expenditure (% of GDP)	World Development Indicators https://databank.worldbank.org/source/world-development-indicators	Current health expenditures include healthcare goods and services consumed during each year. This indicator does not include capital health expenditures such as buildings, machinery, IT and stocks of vaccines for emergency or outbreaks.
Domestic private health expenditure per capita (current U.S. thousand dollars)	World Development Indicators https://databank.worldbank.org/source/world-development-indicators	Domestic private sources include funds from households, corporations and NPOs. Such expenditures can be either prepaid to voluntary health insurance or paid directly to healthcare providers.
Tertiary school enrollment (% gross)	World Development Indicators https://databank.worldbank.org/source/world-development-indicators	The ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown
GDP per capita	World Development Indicators https://databank.worldbank.org/	Constant 2010 U.S. million dollars

	source/world-development-indicators	
Population ages 0-14 (% of total population)	World Development Indicators https://databank.worldbank.org/source/world-development-indicators	Population between the ages 0 to 14 as a percentage of the total population. Population counts all residents regardless of legal status or citizenship.
Population ages 65 and above (% of total population)	World Development Indicators https://databank.worldbank.org/source/world-development-indicators	Population ages 65 and above as a percentage of the total population. Population counts all residents regardless of legal status or citizenship.

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