Foreign Aid Effectiveness and Institutional Risks: Evidence from the Health and Education sectors

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Abstract: This paper takes a disaggregated approach to analyse the effect of foreign aid in the health and education sectors. Using bilateral aid data for 74 aid-receiving countries, we find that the level of institutional risk strongly influences sectoral aid effectiveness. Foreign aid flows improve both education and health outcomes when political and economic risks are lower. Education aid is effective in increasing the enrolment rate in the primary and tertiary education sectors and reproductive health aid is effective in reducing the child mortality rate in the health sector. Comparing across regions, while South American countries appear to be more efficient in using education aid, Asian countries are more efficient in channelling health aids. All our findings have significant policy implications, suggesting that good governance of aid spending is essential for aid effectiveness. Higher disbursement of aid in the primary and tertiary education sectors and reproductive health activities in the health sector are beneficial to the recipient countries.

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1. Introduction

The effect of foreign aid on economic development is highly debated in the literature. Whilst some studies show that foreign aid has beneficial effect on economic performances of the aid-receiving countries (Burnside and Dollar 2000; Collier and Dollar 2003), others argue inefficient use of foreign aid may intensify corruption, civil conflicts and dependency syndrome (e.g. Easterly 2003; Djankov et al. 2008). An important limitation of the existing studies and a possible reason behind these conflicting results is that all types of foreign aid, such as, humanitarian, military, education, health, agriculture, are aggregated into a single amount (Dreher et al. 2008). If the definition of foreign aid is too broad, the analysis inaccurately captures the marginal effect of aid on a particular outcome variable. The same is true when aid effectiveness is analysed within a specific aid-receiving sector. For example, in the education sector, aid is measured as a sum of all aid flows in primary, secondary and tertiary levels. If the share of primary education aid is the largest component in total education aid, but the principal objective is to improve tertiary education, a study that aggregates all types of education aid into a single figure may reveal an insignificant effect on tertiary student enrolment rate. Similarly, an aid provided to basic health activities such as controlling infectious diseases, may not improve health employment or administrative policies as a primary objective. Thus, the main objective to evaluating the basic schooling or health employment remain unaccountable.

To overcome this limitation, this paper takes a disaggregated approach to analyse the effect of sector-specific bilateral aid flows on sectoral outcomes pertaining to education and health. We examine and compare the effects of three different types of education aid, viz. primary, secondary and tertiary education aids, on enrolment rates in each educational sector. Similarly, we consider the effects of three different categories of health aids, viz. basic, general and reproductive health aids, on child mortality rate. We consider these enquiries using a sample consisting 74 aid-receiving countries from Africa, Asia and Latin America in the period 1980-

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2015. We use panel instrumental variable approach (panel two-stage least squares) to tackle endogeneity issue between foreign aid and development outcomes in health and education sectors.

The study contributes to the literature in three important ways. First, the study offers a fresh understanding of the foreign aid effectiveness at the sectoral level by showing the effect of particular types of aid on development outcomes that would have been otherwise masked at the aggregate level. Second, we examine the conditional effect of foreign aid on health and education outcomes with respect to economic, financial and political risk ratings of the aid-recipient countries. These risks represent the various types of institutional quality that a country experiences at a given point of time. Aid provided to a specific sector can be diverted towards unintended purposes, if the recipient countries have weak institutions (Jones and Tarp, 2016). While political risk captures uncertainties related to government stability, internal conflict, corruption, religious tensions and many other political attributes, economic risk measures the economic strengths and weaknesses based on a country's economic policies and performances at the global stage. On the other hand, financial risk captures a country's ability to repay debt on trade and commercial borrowings. Thus, the conditional effect of sectoral foreign aid could vary for different types of institutional risk within a sector. For instance, the conditional effect of health aid and economic risk on child mortality rate is different when compared to political or financial risks and these conditional effects could again vary across sectors. Consequently, we interact sectoral foreign aids with each type of institutional risks within a sector and then compare them across sectors. We consider this to be an influential contribution of our study from a policy perspective.

Finally, we consider regional variation within our sample and compare the effects of sectoral foreign aid and institutional risks across three regions: Africa, Asia and Latin America. This is important since there are wide variations in factors, such as, policy environment, types of

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government and geographical location across these regions. Regions are also significantly different in sectoral developments, such as East-Asian countries are more successful in achieving higher level of basic education than South America (Zhang, 2001). Similarly, South American countries show better health outcomes than East-Asian and African countries (World Bank, 2016).

Our main finding is that the effects of sectoral foreign aid on development outcomes is conditional on the level of institutional risk, which vary across health and education sectors. We find that primary, secondary and tertiary education aids have insignificant effects on the level of enrolment rate in their corresponding educational levels. However, the effects are statistically significant, when they are interacted with economic and political risks. Similarly, basic, general and reproductive health aid flows have insignificant impact on child mortality rate. But when they are interacted with economic, financial and political risk ratings, the effects are significant and reproductive health aid is relatively more effective in reducing child mortality rate as compared to general health aid. Comparing across regions, we find that South American countries appear more effective in using education aid as compared to African and Asian countries. However, Asian countries are more effective in channelling health aid as compared to other regions. These results hold over a large battery of robustness checks, including using alternative sectoral outcome variables and after implementing an instrumental variable (IV) approach to tackle the endogeneity problem between sectoral outcomes and foreign aids. All our findings have significant policy implications for donor countries, suggesting prior assessment of institutional risk is necessary before disbursement of foreign aid. Also, higher disbursement of aid in the primary and tertiary education sectors and reproductive health activities in the health sector are beneficial to the recipient countries.

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The rest of this paper is organised as follows: Section 2 provides the related literature. Section 3 discusses data and methodology. Section 4 presents the empirical findings and their policy implications. Finally, Section 5 concludes this discussion.

2. Sectoral aid flows and related literature

The literature on foreign aid effectiveness is voluminous. A comprehensive survey about the empirical debate of the effects of foreign aid could be found in Roodman (2007) and Rajan and Subramanian (2008). Furthermore, the importance of disaggregated aid flows to examine the effect on economic development outcomes is succinctly presented in Mishra and Newhouse (2009). The literature on sectoral aid flows primarily show that the effect of foreign aid on sectoral outcomes in aid-receiving countries is positive. For example, in the education sector, Dreher et al. (2008) examine the effect of total education aid on primary school enrolment rate in more than 100 countries for the period 1970-2004 and find that higher per capita aid for education increases primary school enrolment. Until now, there is little evidence of aid effectiveness on secondary and tertiary education outcomes. Exceptions include d'Aiglepierre et al. (2013) and Birchler et al. (2016). They examine the effect of education aid on gross enrolment rate in secondary and post-secondary education levels and find that overall education aid significantly improves enrolment rate in both levels of education. A recent study by Riddell et al. (2016) suggests that while education aid increases school enrolment rate, it reduces the quality of education as donors often emphasise the number of students enrolled rather than how the education is being delivered to students in developing countries.

In the health sector, among prominent studies, Mishra and Newhouse (2009) examine the impact of overall health aid on infant mortality rate and find that health aid significantly reduces infant mortality. Similarly, other studies show that overall health aid in developing countries reduces adult mortality rate (Afridi and Ventelou, 2013), improves child immunization rate (Feeny and Ouattara, 2013), improves life expectancy and under five mortality rates, increases

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maternal and reproductive health outcomes and augments overall public health delivery (Bendavid and Bhattacharya 2014; Wolf 2007). However, some studies have found that health sector specific foreign aid is largely ineffective to promote human development (Williamson, 2008) and to reduce other health related outcome variables, such as mortality rate (Wilson, 2011) and new infections on HIV/Aids related diseases (Nunnenkamp and Öhler, 2011). The general argument that emerges out of this discussion is health aid effectiveness is contingent on some threshold conditions of the aid-receiving country, such as government stability, sound institutional characteristics and policies, without which aid flows are largely misallocated and subject to higher corruption (Gomanee et al., 2005).

In this context, the importance of institutional quality and policy infrastructure on economic growth and development is well-established (La Porta et al., 1998; Dollar and Kraay, 2003; Acemoglu et al., 2005). The aggregate aid-growth nexus literature also suggests that the effect of total aid is conditional on the policy environments and aggregate aid enhances economic growth if the recipient countries have better fiscal, trade and monetary policies (Burnside and Dollar, 2000; Collier and Dollar, 2003). Weak institutional quality causes higher corruption and insecurity of property rights (Levin and Satarov, 2000) and give rise to black markets (Friedman et al., 2000). Similarly, Birdsall et al. (1996) argue that for higher economic growth of poor countries, it is essential that governments spend more money on improving public infrastructure in developing sectors, such as education, and health. Better institutional quality also encourages investments in these sectors, which provide higher human and physical capital stocks, thereby augmenting long run economic growth (Glaeser et al. 2004).

Although the extant literature on sectoral foreign aid effectiveness is very insightful in understanding the role of disaggregated channels of foreign aid, it has two main limitations. First, the aid flows for different channels within the health or education sector are aggregated into a single figure. For instance, health aid could be disbursed to improve basic health outcomes (basic

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health aid), such as access to basic health care, basic health infrastructure, basic nutrition, health education or for controlling infectious diseases like malaria and tuberculosis. On the other hand, general health aid is different from basic health aid and is disbursed to improve health policy and admin management, medical education and training, or medical research and services. Second, the extant aid literature is almost silent about the conditional effect of different types of aid on sectoral outcomes based on the level of institutional risks of the recipient countries. Hence, findings from the existing studies are inadequate to show clearly the most productive aid channel in fostering health and education outcomes.

3. Data description

3.1. Sectoral outcomes

For the education sector, following d'Aiglepierre and Wagner (2013), we use enrolment rates in primary, secondary and tertiary education sectors as educational outcomes. In the health sector, based on the work of Mishra and Newhouse (2009) and Mukherjee and Kizhakethalackal (2013), we use child mortality rate as the outcome variable.[2] As a robustness test, we use effective transition rate from primary to secondary education and prevalence of stunting of children under 5 as additional outcome variables in education and health sectors, respectively. The sources and description of all outcome variables are provided in Appendix 1.

3.2. Sectoral aid

We obtain sectoral foreign aid from AidData database, which is developed by researchers at the College of William and Mary and at Brigham Young University spanning 1980-2015 (Tierney et al., 2011). This is a unique database that combines the commonly used data from bilateral donors publicised by the OECD's Creditor Reporting Service with many non-OECD

[2] In our empirical models, we also consider infant mortality rate and life expectancy as additional health outcome variables, and the results are qualitatively similar. We do not present these results here due to paucity of space, however, they are available upon request.

bilateral donors and a variety of multilateral financial institutions including regional development banks, International Monetary Fund and the World Bank. It also includes aid provided from philanthropic institutions such as Bill and Melinda Gates Foundation and from the Global Alliance for Aids and Vaccinations. Much of the aid literature employs data exclusively from Official Development Assistance (ODA), however, AidData database comprises sectoral, sub-sectoral and activity-level aid with concessional loans and grants that include both ODA and non-ODA.

To examine and compare the effect of different types of aid on development outcomes[3], we consider three types education aid flows, viz. primary, secondary and post-secondary education aids. The main objectives of primary education aid as described by the database are to improve basic life skills for youth and adults, increase early childhood education and ensure primary education for all children. Likewise, donors allocate secondary education aid for promoting accessibility of secondary education and vocational trainings. Finally, post-secondary education aid is provided to advance technical and managerial training, higher education and covering imputed student costs.

Similarly, we consider three types of health aid flows, viz. basic, general and reproductive health aids. Basic health aid is allocated for ensuring access to basic health care, basic health infrastructure, basic nutrition, health education, health personnel development, and for controlling infectious disease, malaria and tuberculosis. General health aid is provided for health policy and admin management, medical education and training, and medical research and services. Reproductive health aid is used for promoting family planning, developing population policy and admin management, providing reproductive health care, and controlling STDs including HIV/AIDS.

[3] We measure each type of aid in per capita terms in which each of them is divided by the total population of the recipient countries. This procedure is commonly used in the aid effectiveness literature (e.g. Wilson, 2011; d'Aiglepierre and Wagner, 2013).

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3.3. Institutional risk ratings

We use the International Country Risk Guide (ICRG) Index to measure the institutional risks (Chong et al. 2009; Knack, 2001). This index includes more than 22 variables in three subcategories: economic, financial and political. The political risk rating provides a means of assessing the political stability of the countries. Certain risk points are assigned to a pre-set group of factors, based on 12 weighted variables. They are government stability (12 points), socioeconomic conditions (12 points), investment profile (12 points), internal conflict (12 points), external conflict (12 points), corruption (6 points), military in politics (6 points), religious tensions (6 points), law and order (6 points), ethnic tensions (6 points), democratic accountability (6 points) and bureaucracy (4 points). The index is based on 100 points in total. Points are awarded to each risk component on a scale from zero up to a pre-set maximum point depending upon a fixed weight that component is given in the overall political risk assessment.

Next, based on a country's economic strengths and weaknesses, the economic risk rating is calculated on 5 weighted components: GDP per head, real GDP growth, inflation rate, budget balance as a share of GDP and current account as a share of GDP. Similarly, financial risk ratings are also calculated based on 5 weighted components, which are primarily focused on a country's ability to finance its official, commercial and trade debt obligations. These are: foreign debt as a percentage of GDP, foreign debt service as a percentage of exports of goods and services, current account as a percentage of exports of goods and services, net international liquidity as months of import cover and exchange rate stability. Similar to political risk rating calculation, points are awarded to each risk component on a scale from zero up to a pre-set maximum point depending upon the fixed weight that component is given in the overall economic or financial risk assessment. Economic and political risk ratings take a value between zero (highest risk) and 15 (lowest risk) and political risk rating takes values between zero (highest risk) and 12 (lowest risk). Based on the points awarded to each risk ratings, if the points are less than 50% of the total,

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that component can be considered as very high risk. Similarly, 50-60% range is defined as high risk, 60-70% range as moderate risk, 70-80% range as low risk and 80-100% range as very low risk. The data on each component of ICRG index are obtained from the Political Risk Services (PRS) group.[4]

Our hypothesis is that at the disaggregated level, each type of risk, can influence the sectoral outcome very differently. For example, lower financial risk can potentially imply stable financial market, higher credit ratings and lower financial constraints for local firms and better access to credit availability. Thus, countries with higher financial risk ratings may experience improved financial deepening, which increases their financial stability. Claessens and Feijen (2007), for instance, show that financial sector development contributes to development of eight Millennium Development Goals, which includes education and health outcomes. Increased financial stability can influence better health outcomes by providing credit, savings, and insurance. This may also support financing health care and in smoothing income in the face of health shocks. Similarly, financial development through increased credit availability and savings encourages parents in developing countries to invest in human capital, such as in better-quality schooling, tertiary education, healthy children and greater investment in education infrastructures.

Next, political risk ratings can also influence various development outcomes differently. For instance, if the state of governance is poor, the effect of public spending on health and education outcomes is often insignificant (Rajkumar and Swaroop, 2008). Corruption can significantly drive up the price and reduce the level of government services in education and health (Shleifer and Vishny, 1993). Gupta et al (2001) show that higher corruption and bureaucracy reduce government revenue through tax evasion, which in turn reduces the level of

[4] For detailed methodology of the calculation of each component of the ICRG index, please consult the following link: https://www.prsgroup.com/about-us/our-two-methodologies/icrg

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human capital investment and government services in health. Similarly, Justino et al. (2013) show that civil war deteriorates educational systems by declining government expenditures in the education sector and reduced enrolments in all educational levels. Also, Akresh et al. (2012) show that civil war significantly reduces the health status of children in poor countries.

Finally, economic risks, such as higher GDP growth volatility, poor fiscal and monetary policies and higher inflation cause lower economic development, increase poverty and can influence health and education outcomes. For example, Ferreira and Schandy (2009) show that macroeconomic crises and droughts significantly affect education and health outcomes in both rich and poor countries. During recessions, infant mortality rises and school enrolment and nutrition fall in poor countries. Similarly, higher inflation decreases economic activity, lowers financial development and increases the cost of health and education services (Hung, 2003; Rousseau and Yilmazkuday, 2009).

3.4. Other control variables

While our empirical models are parsimonious, they incorporate other potential determinants of sectoral outcomes following the aid literature. For the education sector, we include pupil-teacher ratio to measure better learning and teaching environments, which significantly advances education attainment (Dearden et al. 2002). Similarly, public education expenditure provides an assessment of government's priority in education and a commitment to invest in human capital (Jung and Thorbecke, 2003). We also include real per capita income and public expenditure in health (excluding aid) as controls.[5]

For the health sector, we include adult female literacy, prevalence of undernourishment, births attended by skilled health staffs, access to improved sanitation, prevalence of HIV and

[5] Baldacci et al. (2008) find that health spending has significantly positive impact on education outcomes.

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access to immunization.[6] All these variables have significant effect on child health and nourishment in presence of foreign aid (Galiani et al., 2005).

4. Empirical methodology

4.1. Baseline model

Our sample contains 2,294 country-year observations from 74 recipient countries from Africa, Asia and South America, and covering the period 1980-2015. Detailed data description and measurement issues of our key variables are discussed in Appendix 1. The list of countries examined is given in Appendix 2. Following Mishra and Newhouse (2009), d'Aiglepierre and Wagner (2013) and Hansen and Tarp (2001) we estimate the following empirical models to capture the effects of sectoral aid on development outcomes of the aid-receiving sector.[7]

Education sector:

$$lnEN_{it} = \mathrm{C}_0 + \mathrm{C}_1 EA_{it-4} + \mathrm{C}_2(EA_{it-4} \times IQ_{it-1}) + \mathrm{C}_3(EA^2_{it-4} \times IQ_{it-1}) + \mathrm{C}_4 \sum IQ_{it-1} + \mathrm{C}_5 X_{it-1} + \lambda_t + \mu_i + \varepsilon_{it} \quad (1)$$

Health sector:

$$CM_{it} = \cap_0 + \cap_1 BA_{it-1} + \cap_2 GA_{it-1} + \cap_3 RA_{it-1} + \cap_4 (BA_{it-1} \times IQ_{it-1}) + \cap_5 (GA_{it-1} \times IQ_{it-1}) + \cap_6 (RA_{it-1} \times IQ_{it-1}) + \cap_7 (BA^2_{it-4} \times IQ_{it-1}) + \cap_8 (GA^2_{it-4} \times IQ_{it-1}) + \cap_9 (RA^2_{it-4} \times IQ_{it-1}) + \cap_{10} \sum IQ_{it-1} + \cap_{11} X_{it-1} + \lambda_t + \mu_i + \varepsilon_{it} \quad (2)$$

where i denotes the country (i =1, …, 74) and t denotes the time (t =1980, …, 2015). In eq. (1), EN_{it} indicates enrolment rate in either primary, secondary or tertiary education and EA_{it-4} is primary, secondary or tertiary education aids. These variables are lagged by four years since

[6] We have checked the correlation between these variables as some of them seemingly measure the same situation. However, the correlation matrix shows that the variables are weakly correlated.

[7] We follow Mishra and Newhouse (2009) and d'Aiglepierre and Wagner (2013) to measure sectoral outcomes. Following the arguments of Hansen and Tarp (2001) that aid may have decreasing returns on outcome variables, we include the squared forms of each type of sectoral aid in our specifications.

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education aid by nature takes a longer time to influence development outcomes relative to other sectors (Clemens et al, 2012). The aid money is initially targeted towards promoting education in the developing countries by attracting more students to enrol in schools. The returns from education is positive only after these students successfully complete their education degrees and get absorbed in the labour force (Savvides and Stengos, 2008).[8] In eq. (2), CM_{it} shows child mortality rate. BA_{it-1}, GA_{it-1} and RA_{it-1} show the amount of basic, general and reproductive health aids, respectively. Moreover, the aid literature suggests that there are diminishing returns to foreign aid due to absorptive capacity constraints. For example, Chenery and Strout (1966) state that in developing countries the absorptive capacity for additional investment in any period is significantly constrained by the supply of complementary inputs (such as skilled labours), which can only be increased as a result of the development process. Hence, to control such non-linear relationship between aid and development variables, we include the squared terms of each type of sectoral aid in our specifications.

IQ_{it-1}, refers to the level of institutional risk in all three equations, which is measured by either economic risk (ER_{it-1}), financial risk (FR_{it-1}) or political risk (PR_{it-1}) ratings of an aid-receiving country. All three ratings are included separately in equations (1) and (2) to control for their individual effects on development outcomes. We expect better economic, financial and political risk ratings would enhance the effect of sectoral aids on the sectoral outcomes.[9] X_{it-1} shows a vector of control variables, λ_t shows time fixed effect, μ_i denotes unobserved time invariant country fixed effects and ε_{it} represents the idiosyncratic error term. We expect the coefficients of economic, political and financial risk ratings to be significantly positive as better

[8] For robustness checks, we also tried different lag lengths for the education aid variables, ranging between 1 and 5 lags. We also include different lags in a single specification to check their joint effect. We find that the effect of foreign aid on education outcomes reduces as we lower the number of lags on the aid variable, however, the results are qualitatively similar. We do not present the results here, but available on request from the authors.

[9] We run correlation between the three types of risk ratings and the correlations coefficient is high. Thus, we do not include all three types of risk in one specification as there is high probability of multicollinearity in the regression estimates.

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institutional quality is expected to enhance sectoral outcomes. Following Mishra and Newhouse (2009) we use the logarithmic forms of sectoral outcomes, aid terms and control variables in all our specifications. This procedure helps to smoothen the data and allows for the interpretation of the coefficients as elasticities.[10]

We generate the marginal effects of each type of aid based on the estimated coefficients. For example, following equation (1), the marginal effects of primary education aid on education outcome at each level of economic, financial and political risk ratings are calculated as below:

$$\frac{\partial lnEN_{it}}{\partial EA_{it-4}} = \mathsf{C}_1 + \mathsf{C}_2 * IQ_{it-1} + \mathsf{C}_3 * 2(EA_{it-4} \times IQ_{it-1}) \quad (3)$$

where IQ_{it-1} takes the value of the economic risk (ER_{it-1}), financial risk (FR_{it-1}) or political risk (PR_{it-1}), respectively. Similarly, we can calculate the marginal effects of secondary and tertiary education aids on education outcomes at different levels of institutional risk, holding all other variables constant. The same methodology is again adopted to calculate the marginal effects of basic, general, and reproductive health aids in the health sector. It is important to note that we use the average values of each type of sectoral aid in calculating the marginal effects.

4.2. Instrumental variable approach

We control for potential endogenous relationship between the aid variables and the development outcomes of the aid-receiving sector. This is particularly important if *aid is procyclical.* In other words, better and faster reforming countries may receive more aid than other countries and generate an upward bias in the aid coefficients. On the other hand, if *aid is countercyclical,* donors would provide more aid to countries, which have lower economic growth. Further, there could be measurement error that are strongly correlated to the time varying

[10] We also run regressions specifying all variables in levels (instead of logs), and the results are qualitatively similar. These results are available upon request.

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unobserved characteristics of recipient countries and produce biased aid coefficients (Cali and Velde, 2011).

To control for the potential endogeneity problems, we consider panel two-stage least square estimation technique (2SLS). The instrument used is *the affinity of nations index* proposed by Gartzke (2009). The *affinity index* measures the political proximity between donor and recipient countries by reflecting on the similarity of state preferences based on voting positions in the United Nations General Assembly. The argument behind using this instrument is that the political proximity is a plausible exogenous driver of a donor country to provide aid to the recipient countries, which is unlikely to be correlated with the recipient countries' sectoral outcomes except through the aid flows. Political proximity is also an important means of donors' foreign policy, which maintains a stable relationship with the recipient country (Alesina and Dollar, 2000).[11] We use the affinity index between each recipient and the four largest bilateral donors, namely, United States, Canada, United Kingdom and France.[12] The main hypothesis is that, all else equal, donors would provide large amount of aid targeted to education, health and agriculture sectors to countries, which have strong political affiliation with them. Our data shows that countries listed in the United Nations General Assembly (UNGA) votes do not change their voting preferences on important issues very frequently over time.[13] This condition indicates that most of the variability in our instruments comes from cross-country variations. Hence, to address

[11] As an additional instrument, we also use cultural relationships between donor and recipient countries. The idea is that the greater the extent of historic relationship between a donor and a recipient, the more likely that a donor will want to provide aid (Burnside and Dollar, 2002). Similarly, donors provide more aid to countries, which shares the same official language with them (Boone, 1996). In both cases, we find the empirical results to be qualitatively similar to the results presented here. To save space, the results are not presented here, however, available upon request.

[12] We also run regressions using the affinity index of other bilateral donors including Australia, Germany, Italy, Japan, Korea, Netherlands, Norway, Spain and Sweden as instrumental variables of the aid variable and the results are qualitatively similar. However, it is worth noting that these donors have many missing data on affinity index, as compared to USA, Canada, UK and France, which may potentially lead to ambiguous conclusions. Therefore, our analysis mainly focuses on the findings obtained from the use of the affinity indices of USA, Canada, UK and France as instruments of the aid variable.

[13] To check this, we calculate the annual percentage change of the affinity of nations index for all countries and find that all countries in our sample have less than 30% annual variation in their voting positions in the UNGA.

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this issue, we include country fixed effects in the first stage of the IV regressions. Formally, the affinity index is calculated as follows:

$$affinity_{ijt} = 1 - (2d(V_i, V_j)/d_{MAX}) \quad (4)$$

where i and j denote the countries dyadic, and t denotes the time (t =1980, …, 2015). $d(V_i, V_j)$ is the *sum* of metric distances between votes by dyad members in terms of UNGA votes (1 = approval; 2 = abstain; 3 = disapproval) in each year. d_{MAX} is the largest possible metric distance for those votes for a given year. For example, if there have been 100 determinations in a year, d_{MAX}= 200. Thus, the index ranges from -1 (minimum affinity) to $+1$ (maximum affinity). In each year t, we calculate three variables for each recipient country i by using the three-major bilateral donors of aid targeted to education, health and agriculture sectors as counterpart countries j, which are United States, Canada, United Kingdom and France. For example, USA (donor) and Senegal (recipient) have the *total* vote distance of 200 in three UNGA determinations, their affinity index will be calculated as 1-((2*200)/200) = -1, showing that USA and Senegal have dissimilar preferences which may result small amount of aid delivered from USA to Senegal, and *vice versa* if these countries have higher affinity index.

5. Empirical findings

5.1. Baseline findings

While the findings from panel fixed effects estimations are presented in Table 1, the results of panel 2SLS estimations are presented in Table 2. The panel fixed effect estimations in specifications 1 to 4 of Table 1 show that per capita primary, secondary and tertiary education aids have insignificant effect on the level of enrolment rate in primary, secondary and tertiary education levels. However, per capita primary education aid significantly promotes the level of enrolment in primary education when interacted with economic and political risk ratings (specifications 2 and 4). Similarly, per capita secondary and tertiary education aid have

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significantly positive effects on secondary and tertiary education enrolment rates, respectively, when interacted with economic and political risk ratings (specifications 6, 8, 10 and 12). Further, we find that the coefficient of economic risk rating is consistently higher as compared to political risk rating for primary, secondary and tertiary education aid effectiveness in all specifications.

[Insert Tables 1 and 2 here]

In Table 2, we use panel 2SLS and introduce affinity index as an instrument for different types of education aids. Four different instruments are considered based on the donor country – the US, France, the UK and Canada. For all specifications, the *p*-values associated with the Hansen *J*-test and the Wald *F*-statistics are well beyond the conventional thresholds. From this perspective, our instrumentation strategies appear suitable as the instruments exhibit satisfactory predictive power.[14] Consistent with the results reported in Table 1, the results presented in Table 2 show that per capita primary, secondary and tertiary education aids have insignificant effect on enrolment rate in primary, secondary and tertiary education, respectively. However, per capita primary and tertiary education aids significantly increase enrolment rate after interacted with economic and political risk ratings of the recipient countries.[15] For example, in specification 2 of Table 2, a 1% increase in per capita of aid for primary education, interacted with economic risk ratings, contributes an average enhancement of 0.061 percentage point increase in the enrolment rate in primary education. This effect is even stronger than what is documented in the previous studies. For example, Dreher et al. (2008) find that an increase of US$1 per capita aid

[14] We have also checked the validity of the IVs by checking the correlation between the IVs and sectoral foreign aids and sectoral outcomes, as well as between IVs and the residuals. We find that the affinity indices have higher correlation with the sectoral foreign aids than the sectoral outcomes. In addition, the affinity indices have relatively weaker correlations with the residuals as compared to the sectoral aids. These findings make our IVs plausible.

[15] The coefficients of secondary education aid, interacted with the three risk ratings, turned out to be insignificant in our panel 2SLS specifications (specifications 5-8 in Table 2). The significance of these coefficients in fixed effects specification (specifications 5-8 in Table 1) may not be reliable due to the underlying endogeneity issues in the fixed effects models. Hence, our discussions mainly focus on the results from panel 2SLS estimations wherein we try to address the endogeneity issues using the affinity of nations index.

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for primary education improves primary school enrolment by 0.027%. d'Aiglepierre and Wagner (2013) show that an increase of US$1 per capita of aid for primary education promotes primary net enrolment by 0.014%. More importantly, the estimated coefficients of the interaction of per capita primary and tertiary education aids with economic and political risk ratings are higher in panel 2SLS as compared to fixed effects estimation procedures. The findings suggest that after controlling for endogeneity in the 2SLS estimation technique, the conditional effect of sectoral foreign aid is higher on development outcomes. In contrast, consistent with Claessens and Feijen (2007)[16], the coefficients of the interaction terms with financial risk ratings is insignificant in all specifications.

[Insert Table 3 here]

In Table 3, we report the effect of per capita basic, general and reproductive health aid on child mortality rate generated from panel fixed effect and 2SLS estimations. Specifications 1 to 4 of Table 3 show that per capita basic, general and reproductive health aids exert insignificant effect on child mortality rate. However, per capita basic and reproductive health aids significantly reduce child mortality rate when they are interacted with economic, financial and political risk ratings. Compared to per capita basic health aid, reproductive health aid is more effective in reducing child mortality rate when they are interacted with the three types of risk ratings. Political risk ratings have higher role in improving the effect of per capita basic and reproductive health aids relative to economic and financial risk ratings. A possible reason is that health sector policies are very dependent on political environment of countries (Rajkumar and Swaroop, 2012). Thus, political risk ratings are more important for effective health aid than other two types of risk ratings. This finding is also consistent with Weldeegzie (2017) suggesting that

[16] Claessens and Feijen (2007) argue that although financial sector development provides access to credit and savings to pay for schooling expenses, however, has weak association with educational outcomes including enrollment rates.

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stable political environment promotes human capital development by providing improved health cares and infrastructural development and thereby reduce child mortality. Moreover, specifications 5 to 8 of Table 3 shows that the size of the coefficients of per capita basic and reproductive health aids is higher when we instrument them by affinity index between donors and recipient countries. For example, per capita basic health aid, interacted with economic risk ratings, reduces child mortality rate by 0.068% (specification 6) which is greater than 0.010% (specification 2).

All specifications in Table 1 to 3 show that the risk ratings increase the effectiveness of different types of aid in improving outcomes of the aid-receiving sectors. Individually, they have significantly positive effects on all sectoral outcome variables considered in our analysis. Further, the control variables have significant impact on sectoral outcomes with the expected sign. For example, per capita income enhances enrolment rate in primary, secondary and tertiary educational levels. It also significantly reduces child mortality rate in the recipient countries.

5.2. Regional differences

In Table 4, we generate the panel 2SLS estimation results for the three regions separately. The individual effects show that per capita primary, secondary and tertiary education aids have insignificant impact on the respective enrolment rate in Africa, Asia and South America. However, per capita primary education aid significantly improves, interacted with economic and political risk ratings, enrolment rate in primary education in Asia and South America. For example, a 1%increase in per capita primary education aid, interacted with economic risk ratings, increases primary school enrolment rate by 0.581% in South America and 0.016% in Asia (specification 6 and 10).

[Insert Table 4 here]

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In contrast with our results of full sample, per capita secondary education aid has significantly positive effect on enrolment rate when it is interacted with economic and political risk ratings in South America. Moreover, per capita tertiary education aid, interacted with economic and political risk ratings, has a significantly positive effect on enrolment rate in tertiary education in Asia and South America (Panel C of Table 5). Consistent with the results reported in Table 1 and 3, financial risk ratings play insignificant roles in augmenting the effect of per capita primary, secondary and tertiary education aids on the respective enrolment rates. In general, South American countries appear more effective in using education aid in promoting education outcomes.

In Africa, per capita education aids have insignificant impact on enrolment rates after interacted with all three types of risk ratings. This result is consistent with the findings of Mehrotra and Vandemoortele, (1997) and Schultz (1999) suggesting that Africa is the only region in the world where the rate of enrolment at the primary education declined over time. Samoff (1999) argues that deterioration of educational policies, misallocation of funds, poor management and inefficient administrations are the greatest bottlenecks which hinder the efforts of enhancing the quality of education in most of African countries.

[Insert Table 5 here]

Table 5 presents the regional variation in the health sector. The results show that per capita basic, general and reproductive health aids after interacted with the three types of risk ratings, significantly reduces child mortality rate in Asia and South America. The effects are larger in Asian countries as compared to South America. For example, a 1%increase in per capita basic health aid, interacted with economic risk ratings, reduces child mortality rate by 0.796% in Asia, which is greater than 0.135% in South America. This may reflect that basic health supports Asian countries in their efforts of achieving higher success in improving numerous health services, such as lower prevalence of malaria, diarrhoeal diseases, respiratory infections,

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nutritional deficiencies, perinatal causes and other diseases as compared to African and South American countries (Lawn et al., 2008).

[Insert Table 6 here]

Overall, our results show that economic and political risk ratings play an important role in promoting the effectiveness of different types of aid in education and health sectors, and thereby improving outcome variables of the aid-receiving countries. Moreover, we observe that each type of aid in education, health and agriculture sectors has an insignificant effect on outcomes of the aid-receiving sectors if it is not interacted with different types of risk ratings. In Table 6, following eq. (4), using continuous values of different types of risk ratings, we calculate the marginal values of sectoral aids on sectoral outcomes based on the 2SLS estimates in Tables 2-3. We calculate the marginal values only when the regression coefficient of the interaction term is statistically significant. Consistent with our main findings, we find the marginal effect of sectoral aids on development outcomes of the aid-receiving sectors increases when institutional quality of the recipient countries increases from 25th to 50th to 75th percentiles, respectively. Thus, higher the level of institutional quality, the better is the aid effectiveness in that sector.

5.3. Robustness checks

We conduct numerous robustness checks and regress each type of aid on alternative development outcomes of the aid-receiving sector to check the sensitivity of our results. In Table 7, we use effective transition rate from primary to secondary education as an alternative education outcome. This variable shows the number of students admitted to the first grade of a higher level of education in a given year, which is expressed as a percentage of the number of students enrolled in the final grade of the lower level of education in the previous year. High transition rate indicates a high level of access or transition from one level of education to the next. It also reflects the intake capacity of the next level of education. On the other hand, low

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transition rate potentially signals problems in the bridging between two cycles or levels of education, due to either deficiency in the examination system, inadequate admission capacity in the higher level of education or other socio-economic factors (Evangelou et al. 2008). Consistent with our earlier findings, specification 2 of Table 7 shows that per capita primary education aid significantly increases the effective transition rate to secondary education level when it is interacted with economic and political risk ratings. On the other hand, per capita secondary education aid plays insignificant effect on effective transition to secondary education even after interacted with all types of risk ratings.

[Insert Table 7 here]

In Table 8, we use the prevalence of stunting of children under 5 as an alternative health outcome variable following Bloss et al. (2004). This variable indicates the percentage of children under the age of 5 whose height-for-age is more than two standard deviations below the median for the international reference population ages 0-59 months (Grantham et al. 2007). Table 10 shows that per capita basic and reproductive health aids interacted with all risk ratings significantly reduce the prevalence of children stunting in the recipient countries. However, per capita general health aid plays insignificant role in reducing the prevalence of children stunting. Our results are qualitatively in harmony with the results reported in Table 3 earlier. [17]

[Insert Table 8 here]

6. Conclusion

The paper uses a unique dataset at the sectoral level from 74 developing countries from Asia, Africa and South America, spanning 1980-2015 and addresses two important questions. First, does sectoral foreign aid, conditional on the level of institutional risk, improve health and

[17] In other unreported results, we also conduct robustness checks for the three regions separately, in Africa, Asia and South America. The results are qualitatively similar with our regional baseline findings presented in Tables 4-5.

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education outcomes of the recipient countries? Second, which region is more efficient in using certain types of aid, and thereby improving a development outcome in a sector?

Our main finding is that types of institutional risk strongly influence sectoral aid effectiveness. Results show that the individual effect of sectoral aids on development outcomes is insignificant unless interacted with the type of institutional risk. Moreover, in the education sector, primary and tertiary education aid effectiveness depends on the level of economic and political risk ratings of a country, but not on the financial risk rating. In the health sector, political risk ratings have higher role in improving the effect of per capita reproductive health aid relative to economic and financial risk ratings.

Comparing across regions, a common finding is that political and economic risk ratings are very important for both education and health outcomes in South American and Asian countries. Thus, in absence of good political governance, higher public spending in the form of foreign aid may result in insignificant effect on health and education outcomes (Rajkumar and Swaroop, 2008). We find that South American countries are more effective in using education aid than other channels of aids, which is conditional on economic and political risk ratings. For the Asian countries, the basic and reproductive health aids, contingent on the level of political risk rating, is more effective than education aid channels. Better political risk rating reflects proper implementation of public policy in which most of these countries formulate and implement public health intervention programs aiming at better utilisation of health-targeted resources (Arunanondchai and Fink, 2007). The finding that African countries are less effective in utilising all three types of aid is consistent with the results of Burnside and Dollar (2000) suggesting aid fails to augment economic development in absence of better institutional quality and good policy environments in the recipient countries.

Our results have important policy implications for donor countries and international aid organisations. To achieve aid effectiveness, a scrutiny of the level of institutional risks is required

before disbursing aids to the recipient countries. A key finding is economic and political risk ratings are important for both education and health outcomes, which shows that the difference in the quality of public governance can largely explain the effectiveness of foreign aid. Proper measures to reduce bureaucracy, corruption and red tape in the aid recipient countries can significantly improve health and education outcomes. In the education sector, contingent on the level of economic and political risks, primary and tertiary education aids are more effective than secondary education aids in the developing region. Thus, aid-financing institutions require enforcing the recipient's government to undertake educational policy reforms at primary and tertiary levels. One way to achieve this is to encourage the recipient's government to decentralise the administration of education, which significantly enhances the provision of educational services and effective consumption of educational resources (Coudouel and Paternostro, 2006). For the health sector, results suggest that aid-financing institutions need to allocate more aid for reproductive health activities in the recipient countries. Along with the allocation of more aid to reproductive health activities, the enforcement of health sector reforms, such as setting standards to measure both allocative and operational efficiency of health targeted resources and implementing accountability and transparency in the health sector would enhance health sector outcomes (Gilson and Mills, 1995).

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Table 1: The impact of education aids and economic, financial and political risk ratings on education outcomes (*Fixed effects estimates*)

Variables	Enrolment rate in primary Edu				Enrolment rate in secondary Edu				Enrolment rate in tertiary Edu			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Primary education aid	0.002	-0.001	-0.001	-0.001	0.008	0.004	0.005	0.005	0.015	0.016	0.016	0.011
	(0.74)	(-1.02)	(-1.11)	(-0.89)	(1.43)	(0.73)	(0.74)	(0.74)	(1.47)	(1.57)	(1.56)	(1.02)
Secondary education aid	0.001	0.004	0.002	0.003	-0.001	-0.040	0.011	-0.001	-0.014	-0.006	-0.006	-0.003
	(0.17)	(1.26)	(0.71)	(0.94)	(-0.14)	(-0.14)	(0.65)	(-0.17)	(-1.08)	(-0.47)	(-0.46)	(-0.23)
Tertiary education aid	0.002	0.001	0.001	-0.001	-0.010	-0.011	-0.009	-0.009	-0.014	0.001	0.001	-0.005
	(0.47)	(0.40)	(0.32)	(-0.08)	(1.60)	(-0.76)	(-1.17)	(-1.17)	(-0.30)	(-0.01)	(-0.01)	(-0.43)
Primary Edu aid x Economic risk ratings		**0.061****										
		(2.57)										
Primary Edu aid x Financial risk ratings			0.001									
			(0.04)									
Primary Edu aid x Political risk ratings				**0.024***								
				(1.92)								
Secondary Edu aid x Economic risk ratings						**0.054***						
						(1.69)						
Secondary Edu aid x Financial risk ratings							0.056					
							(0.66)					
Secondary Edu aid x Political risk ratings								**0.005****				
								(2.50)				
Tertiary Edu aid x Economic risk ratings										**0.052***		
										(2.80)		
Tertiary Edu aid x Financial risk ratings											0.006	
											(0.30)	
Tertiary Edu aid x Political risk ratings												**0.004****
												(2.19)
Economic risk ratings	0.023*	0.042*	0.036*	0.041*	0.002**	0.026	0.054*	0.026**	0.301**	0.211**	0.211**	0.215**
	(1. 86)	(1.65)	(1.73)	(1.75)	(2.03)	(2.42)	(1.94)	(2.36)	(2.97)	(2.06)	(2.07)	(2.17)
Financial risk ratings	-0.017	-0.051	0.003	-0.037	-0.033	-0.015	-0.016	-0.015	0.112	0.076	0.077	0.053
	(-0.50)	(-1.50)	(0.24)	(-1.09)	(-0.51)	(.22)	(-0.18)	(-0.17)	(0.81)	(0.54)	(0.55)	(0.38)
Political risk ratings	0.006*	0.006*	0.035*	0.001**	0.060*	0.067**	0.072**	0.053*	0.091**	0.092	0.093*	0.098*
	(1.74)	(1.74)	(1.92)	(2.04)	(1.83)	(2.01)	(2.20)	(1.91)	(2.44)	(1.47)	(1.85)	(1.68)
Pupil-teacher ratio in primary education	-0.018**	-0.016**	-0.015*	-0.015*								
	(-2.27)	(-2.03)	(-1.96)	(-1.90)								
Pupil-teacher ratio in secondary education					-0.001**	0.002	0.027	0.027				
					(-2.01)	(0.05)	(0.53)	(0.53)				
Pupil-teacher ratio in tertiary education									-0.024	-0.018	-0.017	-0.020
									(-0.58)	(-0.42)	(-0.41)	(-0.50)
Per capita income	0.026***	0.020**	0.022**	0.021**	0.030	0.005	-0.019	-0.019	0.030	0.043	0.043	0.037
	(2.73)	(2.23)	(2.40)	(2.29)	(1.54)	(0.23)	(-0.70)	(-0.70)	(0.68)	(0.98)	(0.98)	(0.83)
Population under 15	-0.048	-0.002	-0.003	-0.003	0.001	-0.003	-0.003	-0.003	0.031**	0.029*	0.029*	0.029*
	(-1.25)	(-0.35)	(-0.78)	(-0.60)	(0.01)	(-0.28)	(-0.25)	(-0.25)	(2.13)	(1.92)	(1.92)	(1.94)
Government expenditure in education	-0.001**	0.002	0.003*	0.003	0.016	0.056**	0.080**	0.080**	-0.032	-0.032	-0.032	-0.055
	(2.06)	(0.22)	(1.93)	(0.36)	(0.82)	(2.19)	(2.52)	(2.52)	(-0.88)	(-0.87)	(-0.88)	(-1.49)
Government expenditure in health	-0.007	-0.007	-0.006	0.008*	0.014*	0.001	0.053	0.053**	-0.008	-0.025	-0.026	-0.014
	(-1.10)	(-1.02)	(-0.85)	(1.71)	(1.89)	(0.06)	(2.43)	(2.43)	(-0.20)	(-0.64)	(-0.65)	(-0.36)
Observations	1, 900	1, 900	1, 900	1, 900	1, 238	1, 892	1, 892	1, 892	1, 194	1, 194	1, 194	1, 194

Notes: All aid variables are given in per capita terms. The squared terms of each type of sectoral aid, a constant, time and country dummies are included but coefficients are not reported (results are available upon request). Heteroscedasticity and autocorrelation robust *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively. In all specifications, reasonable explanatory power is generated as the adjusted *R*-squared ranges between 42.4% and 49.4%. We include 74 countries in all specifications. We use one-year lagged values of the control variables.

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Table 2: **The impact of educational aids and economic, financial and political risk rating on education outcomes (*Panel 2SLS estimates*)**

Variables	Enrolment rate in primary Edu				Enrolment rate in secondary Edu				Enrolment rate in tertiary Edu			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Primary education aid	-0.059 (-0.50)	0.006 (0.23)	-0.011 (-0.43)	0.013 (-0.48)	-0.245 (-0.46)	0.004 (0.49)	-0.024 (-0.92)	-0.022 (-0.92)	-0.222 (-0.42)	-0.051 (-0.36)	0.155 (0.23)	0.171 (0.27)
Secondary Edu aid	0.226 (0.77)	-0.124 (-0.02)	0.008 (0.37)	0.002 (0.29)	0.054 (0.13)	-0.006 (-0.01)	-0.106 (-1.16)	-0.201 (-1.18)	0.211 (0.25)	-0.002 (-0.19)	-0.003 (-0.20)	0.051 (0.54)
Tertiary Edu aid	-0.050 (-0.37)	-0.006 (-0.02)	0.001 (0.10)	0.001 (0.31)	0.495 (0.69)	0.014 (0.36)	0.001 (0.05)	-0.001 (-0.06)	0.044 (0. 12)	-0.037 (-0.12)	-0.022 (-0.07)	-0.235 (-0.54)
Primary Edu aid x Economic risk ratings		**0.576***** **(2.73)**										
Primary Edu aid x Financial risk ratings			0.363 (1.21)									
Primary Edu aid x Political risk ratings				**0.502**** **(2.51)**								
Secondary Edu aid x Economic risk ratings						-0.906 (-0.12)						
Secondary Edu aid x Financial risk ratings							0. 605 (0.73)					
Secondary Edu aid x Political risk ratings								0.159 (0.05)				
Tertiary Edu aid x Economic risk ratings										**0.205*** **(1.92)**		
Tertiary Edu aid x Financial risk ratings											0.119 (0.47)	
Tertiary Edu aid x Political risk ratings												**0.148**** **(2.48)**
Economic risk ratings	0.192* (1.83)	0.120** (2.34)	0.013** (2.05)	0.263* (1.74)	0.235* (1.73)	0.322** (2.14)	0.023** (2.17)	0.039** (2.34)	0.511** (2.27)	0.183** (2.33)	0.176** (2.20)	0.218** (2.29)
Financial risk ratings	0.045 (0.82)	0.101 (0.01)	-0.048 (-0.25)	-0.181 (-0.38)	-0.342 (-0.62)	0.515 (0.11)	-0.055 (-0.35)	-0.049 (-0.03)	0.149 (0.20)	0.014 (0.07)	0.022 (0.11)	-0.198 (-0.46)
Political risk ratings	0.208* (1.84)	0.034*** (2.05)	0.043 (0.62)	0.067* (1.65)	0.148* (1.75)	0.293** (2.15)	0.043** (2.63)	0.019** (2.21)	0.180** (2.22)	0.092 (1.44)	0.090* (1.93)	0.029** (2.15)
Pupil-teacher ratio in primary education	-0.066* (-1.91)	-0.030** (-2.13)	-0.024* (-1.72)	-0.014 (-0.43)								
Pupil-teacher ratio in secondary education					-0.170** (-2.51)	-0.217** (-2.11)	-0.05*** (-3.39)	-0.06*** (-2.46)				
Pupil-teacher ratio in tertiary education									-0.259 (-0.10)	-0.022 (-0.31)	-0.026 (-0.35)	0.073 (0.37)
Per capita income	0.062 (1.06)	0.069** (2.03)	0.062* (1.73)	0.037* (1.70)	0.127* (1.95)	0.053** (2.16)	0.016** (2.19)	0.009 (0.12)	0.074** (2.15)	0.045* (1.94)	0.046* (1.97)	0.196 (0.65)
Population under 15	0.002 (0.15)	0.991*** (3.55)	0.001 (0.04)	-0.004 (-0.42)	-0.014 (-0.34)	-0.042 (-0.11)	-0.011*** (-.3.50)	0.009** (2.50)	-0.019 (-0.03)	0.032** (2.03)	0.031 (0.95)	0.028 (1.31)
Government expenditure in Edu	-0.018 (-0.45)	0.002** (2.01)	-0.029 (-0.64)	-0.025 (-0.35)	-0.051 (-0.40)	-0.063 (-0.41)	0.151** (2.05)	0.149** (2.13)	0.023** (2.05)	-0.035 (-0.87)	0.035* (1.88)	-0.005 (-0.05)
Government expenditure in health	-0.044 (-0.82)	-0.064** (-2.24)	-0.001 (-0.01)	-0.020 (-0.57)	-0.086 (-0.60)	-0.052 (-0.11)	0.045 (1.01)	0.048 (1.10)	-0.022 (-0.09)	-0.032 (-0.39)	-0.036 (-0.45)	0.005 (0.07)
Observations	1513	1188	1470	1297	1269	1597	1597	1592	1545	1603	1603	1633
Hansen J test (p-value)	0.258	0.020	0. 905	0.289	0.021	0.700 9	0.669	0.604	0.061	0.278	0.279	0.207
Wald F statistic	13.73	21.02	10.02	10.5 2	19.09	10.49	10.36	10.53	10.87	10.22	10.22	10.24

Notes: All aid variables are given in per capita terms. The squared terms of each type of sectoral aid, a constant, time and country dummies are included but coefficients are not reported (results are available upon request). The instrument used is the 'affinity of nations index'. Heteroscedasticity and autocorrelation robust t-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively. We include 74 countries in all specifications. We use one-year lagged values of the control variables. In all specifications, we use four-year lagged values of each type of education aid.

Table 3: The impact of health aids and economic, financial and political risk ratings on child mortality rate

Variables	Fixed effects				Panel 2SLS			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Basic health aid	-0.001	0.012	0.007	-0.001	0.172	0.132	-0.164	0.182
	(-0.09)	(1.11)	(1.22)	(-0.09)	(0.35)	(0.75)	(-0.50)	(0.26)
General health aid	-0.002	-0.022	-0.025	-0.026	0.426	-0.208	-0.084	0.633
	(-0.35)	(-1.08)	(-0.09)	(-0.07)	(0.88)	(-0.73)	(-0.23)	(0.93)
Reproductive health aid	0.010	0.028	0.027	0.013	-0.081	0.022	0.462	-0.060
	(1.64)	(0.86)	(0.67)	(1.20)	(-0.39)	(0.25)	(1.18)	(-0.21)
Basic health aid x Economic risk ratings		**-0.010****				**-0.068****		
		(-2.44)				**(-2.15)**		
General health aid x Economic risk ratings		0.044				-0. 105		
		(0.85)				(-0.60)		
Reproductive health aid x Economic risk ratings		**-0.019****				**-0.310***		
		(-2.04)				**(-2.60)**		
Basic health aid x Financial risk ratings			**-0.010****				**-0.024****	
			(-2.10)				**(-2.26)**	
General health aid x Financial risk ratings			0.051				0.278	
			(0.12)				(0.43)	
Reproductive health aid x Financial risk ratings			**-0.017***				**-0.468****	
			(-1.95)				**(-2.33)**	
Basic health aid x Political risk ratings				**-0.007****				**-0.183***
				(-2.45)				**(-2.12)**
General health aid x Political risk ratings				0.065				-0.140
				(0.32)				(-0.15)
Reproductive health aid x Political risk ratings				**-0.008***				**-0.733****
				(-1.73)				**(-2.16)**
Economic risk ratings	0.011	-0.025*	-0.022**	0.009	-0.383**	-0.350*	0.021	-0.534**
	(0.22)	(-1.75)	(-2.53)	(0.17)	(-2.63)	(-1.75)	(0.05)	(-2.50)
Financial risk ratings	-0.112	-0.084	-0.117*	-0.109*	0.967	0.203	-0.061**	0.124
	(-1.42)	(-1.33)	(-1.78)	(-1.73)	(0.66)	(0.58)	(-2.11)	(0.71)
Political risk ratings	0.042*	0.041	0.034	0.016	-0.047	0.014	0.052	-0.063
	(1.74)	(1.47)	(1.20)	(0.47)	(-0.42)	(0.28)	(0.39)	(-2.70)
Per capita income	0.023*	-0.054**	-0.056***	-0.025*	-0.019	-0.005**	0.001	0.139
	(1.83)	(-2.66)	(-2.73)	(-1.93)	(-0.15)	(-2.01)	(0.02)	(0.29)
Adult female literacy	0.014	-0.030	-0.031	0.014	-0.354***	-0.347***	-0.355***	-0.252
	(0.51)	(-1.30)	(-1.33)	(0.51)	(-5.36)	(-4.54)	(-6.26)	(-0.84)
Prevalence undernourishment	0.038*	0.100***	0.101***	0.024*	0.088**	0.078***	0.081*	0.129
	(1.84)	(6.58)	(6.67)	(1.94)	(2.17)	(3.30)	(1.84)	(0.83)
Births attended by health staff	-0.195***	-0.217***	-0.217***	-0.190***	-0.019	0.005	-0.061	-0.073
	(-4.54)	(-11.72)	(-11.72)	(-4.47)	(-0.35)	(0.09)	(-1.25)	(-0.41)
Access to improved sanitation	-0.201**	-0.435***	-0.425***	-0.193	-0.001	-0.169*	0.100	-0.046
	(-2.41)	(-17.43)	(-17.11)	(-2.37)	(-0.10)	(-1.75)	(0.24)	(-0.07)
Gov. expenditure in health	-0.009	-0.031**	-0.031**	-0.009*	-0.031	-0.032	0.014	-0.069
	(-0.45)	(-2.03)	(-2.04)	(-1.84)	(-0.23)	(-0.63)	(0.20)	(-0.35)

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…Continued from Table 3

Prevalence of HIV	0.006* (1.89)	0.023*** (3.35)	0.026*** (3.82)	0.005* (1.69)	-0.041 (-0.64)	-0.018 (-0.52)	0.642*** (3.65)	0.69*** (7.34)
Access to immunization	-0.005** (-2.32)	-0.013*** (-0.71)	-0.014 (-0.77)	-0.007* (-1.74)	-0.159 (-0.63)	-0.055 (-0.86)	0. 02*** (0.03)	-0.209** (-2.55)
Observations	2, 495	2, 286	2, 356	2, 213	2, 495	2, 082	2, 0145	2, 048
Hansen J test (p-value)	-	-	-	-	0.889	0.390	0.452	0.852
Wald F statistic	-	-	-	-	15.50	14.95	13.72	14.36

Notes: All aid variables are given in per capita terms. The squared terms of each type of sectoral aid, a constant, time and country dummies are included but coefficients are not reported (results are available upon request). In the panel 2SLS estimation, the instrument used is the 'affinity of nations index'. Heteroscedasticity and autocorrelation robust t-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively. We include 74 countries in each specification. In all specifications reasonable explanatory power is generated as the adjusted *R*-squared ranges between 42.4% and 49.4%. We use one-year lagged values of the control variables. In all specifications, we use one-year lagged values of each type of health aid.

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Table 4: The impact of education aids and economic, financial and political risk ratings on the level of enrolment in three regions *(Panel 2SLS estimate)*

Variables	***Panel A*:** Enrolment rate in primary education (dependent variable)											
	Africa				Asia				South America			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Primary education aid	-0.147 (-0.44)	0.008 (-0.31)	-0.008 (-0.17)	-0.009 (-0.32)	0.027 (0.46)	-0.051 (-0.81)	-0.139 (-0.36)	0.025 (0.22)	-0.022 (-0.32)	0.020 (0.32)	0.042 (0.71)	0.033 (0.12)
Secondary Edu aid	0.128 (0.47)	0.002 (0.21)	0.019 (0.69)	0.003 (0.39)	0..033 (0.40)	0.023 (0.89)	0.020 (0.28)	0.005 (0.28)	0.001 (0.01)	-0.003 (-0.38)	0.005 (1.46)	0.025 (0.25)
Tertiary Edu aid	0.156 (0.32)	0.017 (0.58)	-0.001 (-0.15)	0.002 (0.47)	-0.012 (-0.25)	0.039 (0.33)	-0.006 (-0.60)	-0.001 (-0.36)	0.073 (1.19)	-0.006 (-0.59)	-0.005 (-0.68)	0.027 (0.20)
Primary Edu aid x Economic risk ratings		0.0113 (0.11)				**0.016**** **(2.40)**				**0.581**** **(2.29)**		
Primary Edu aid x Financial risk ratings			0.192 (0.05)				0.128 (0.34)				0.093 (0.16)	
Primary Edu aid x Political risk ratings				0.013 (0.02)				**0.009**** **(2.10)**				**0.113**** **(2.20)**
Economic risk ratings	0.095** (2.36)	0.0860** (2.17)	0.025** (2.04)	0.093 (0.17)	0.057** (1.84)	0.051* (1.76)	0.075* (1.82)	0.321* (2.43)	0.010** (2.32)	0.003** (2.10)	0.013* (1.96)	0.217* (1.71)
Financial risk ratings	-0.018 (-0.22)	0.010 (0.26)	0.002 (0.03)	-0.005 (-0.31)	0.01 (-0.15)	0.045 (0.12)	-0.005 (-0.01)	-0.005 (-0.46)	-0.156 (0.24)	0.013 (0.53)	0.020 (1.57)	0.128 (0.28)
Political risk ratings	0.032** (2.28)	0.002** (2.02)	0.009* (2.03)	0.002* (1.84)	0.018** (2.44)	0.022 (0.13)	-0.120 (-0.42)	0.344** (2.46)	0.026** (2.60)	-0.003 (-0.86)	-0.003 (-0.47)	-0.059 (-0.29)
Observations	732	868	787	771	327	381	345	336	166	191	195	190
Hansen J-test (p-value)	0.085	0.142	0.219	0.410	0.601	0.210	0.421	0.629	0.410	0.156	0.419	0.159
Wald F statistic	10.29	18.15	11.05	13.58	11.38	11.68	14.98	12.80	10.89	15.20	15.77	19.25

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…Continued from Table 4

	Panel B: Enrolment rate in secondary education (dependent variable)											
Primary education aid	0.058 (0.35)	-0.298 (-0.38)	-0.034 (-0.37)	-0.434 (-0.46)	0.017 (0.13)	-0.054 (-0.51)	-0.191 (-0.46)	-0.005 (-0.21)	-0.20 (-0.10)	-0.013 (-1.20)	-0.013 (-1.17)	-0.013 (-1.10)
Secondary Edu aid	0.025 (0.14)	-0.001 (-0.42)	-0.111 (-0.02)	-0.426 (-0.56)	0.042 (0.14)	0.142 (0.21)	-0.038 (-0.36)	0.119 (0.13)	0.050 (0.23)	-0.242 (-0.60)	0.306 (-0.54)	0.341 (0.27)
Tertiary Edu aid	0.125 (0.54)	-0.024 (-0.62)	-0.021 (-0.61)	-0.021 (-0.63)	0.145 (0.35)	0.024 (1.07)	0.022 (0.99)	0.023 (0.92)	-0.107 (-0.36)	-0.033 (-0.29)	-0.030 (-0.81)	-0.033 (-0.93)
Secondary Edu aid x Economic risk ratings		0.343 (0.31)				0.681 (1.59)				**0.545**** **(2.55)**		
Secondary Edu aid x Financial risk ratings			0.109 (0.02)				0.206 (0.46)				0.585 (0.56)	
Secondary Edu aid x Political risk ratings				0.258 (0.43)				0.762 (0.09)				**0.068**** **(2.32)**
Economic risk ratings	0.276** (2.42)	0.191** (2.40)	0.192** (2.06)	0.447* (1.77)	0.072** (1.91)	0.301** (2.48)	0.26** (2.01)	0.106* (2.04)	0.016** (2.10)	0.2 30* (1.74)	0.166** (2.44)	0.239* (1.81)
Financial risk ratings	-.074(- 0.26)	0.048 (0.08)	0.056 (0.10)	0.268 (0.39)	0.019 (0.07)	0.278 (1.25)	0.289 (1.29)	0.181 (0.12)	0.318 (0.51)	0.103 (1.22)	0.33 9 (1.10)	0.162 (1.22)
Political risk ratings	0.006** (2.48)	0.531 (0.29)	0.630 (0.20)	-0.10 (-0.44)	0.031 (0.16)	0.055 (0.21)	0.162* (1.74)	-0.015 (-0.12)	0.020** (2.19)	0.326 (0.53)	0.004 (0.01)	0.010 (0.20)
Observations	354	333	333	333	190	185	185	185	93	179	179	179
Hansen J-test (p-value)	0.024	0.415	0.479	0.499	0.652	0.417	0.540	0.188	0.250	0.185	0.145	0.488
Wald F statistic	18.99	15.99	13.55	16.90	14.99	13.01	15.70	19.08	10.68	14.07	12.55	18.04

…Continued from Table 4

	Panel C: Enrolment rate in tertiary education (dependent variable)											
Primary education aid	-0.066 (-0.30)	0.020 (1.00)	0.027 (1.18)	-0.103 (-0.58)	-0.122 (-0.30)	0.081 (1.37)	0.082 (1.40)	0.001 (0.12)	-0.035 (-0.64)	-0.303 (-0.24)	-0.022 (-0.40)	-0.031 (-0.55)
Secondary Edu aid	-0.118 (-0.25)	0.002 (0.09)	0.002 (0.07)	-0.062 (-0.37)	0.167 (0.33)	-0.028 (-0.59)	-0.030 (-0.63)	0.065 (0.49)	-0.048 (-0.54)	-0.054 (-0.60)	-0.049 (-0.59)	-0.037 (-0.38)
Tertiary Edu aid	0.275 (0.36)	-0.063 (-0.29)	0.054 (0.25)	0.048 (0.21)	0.316 (1.18)	-0.956 (-0.04)	0.426 (1.05)	0.159 (0.33)	0.041 (0.50)	-0.438 (-0.91)	0.339 (0.13)	0.018 (0.10)
Tertiary Edu aid x Economic risk ratings		0.314 (0.85)				**0.009**** **(2.004)**				**0.560**** **(2.34)**		
Tertiary Edu aid x Financial risk ratings			0.244 (0.67)				0.496 (0.80)				0.516 (0.52)	
Tertiary Edu aid x Political risk ratings				0.330 (0.65)				**0.035**** **(2.45)**				**0.376*** **(1.80)**
Economic risk ratings	0.207** (2.06)	0.0124** (2.60)	0.009** (2.06)	0.041** (2.22)	0.125** (2.04)	0.027** (2.06)	0.034** (2.08)	0.042* (2.10)	0.136** (2.31)	0.613** (2.13)	0.675** (2.40)	0.065* (2.02)
Financial risk ratings	0.207 (0.33)	-0.131 (-0.66)	0.028 (0.12)	-0.245 (-0.41)	-0.319 (-0.42)	0.084 (0.98)	0.721 (0.97)	0.217 (0.21)	-0.300 (-0.50)	0.308 (0.13)	0.784 (0.24)	0.136 (0.12)
Political risk ratings	0.086 (0.42)	0.082 (1.04)	-0.248 (-0.45)	0.159* (1.88)	0.275 (1.04)	0.100* (1.74)	0.115* (1.94)	0.005** (2.01)	0.074 (0.42)	-0.660 (-0.27)	0.235* (2.12)	-0.717 (-0.15)
Observations	295	323	323	340	192	219	219	227	158	161	161	166
Hansen J test (p-value)	0.957	0.388	0.551	0.227	0.443	0.245	0.257	0.152	0.561	0.524	0.254	0.521
Wald F statistic	20.12	12.58	15.21	10.88	17.22	10.57	15.97	12.74	21.33	13.20	12.45	17.49

Notes: The aid variables are provided in per capita term. The squared terms of each type of sectoral aid, a constant, control variables, time and country dummies are included but coefficients are not reported (results are available upon request). In the panel 2SLS estimation, the instrument used is the 'affinity of nations index'. Heteroscedasticity and autocorrelation robust *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively. In all specifications, reasonable explanatory power is generated as the adjusted *R*-squared ranges between 42.4% and 49.4%. We include 74 countries in each specification. In all specifications, we use four-year lagged values of each type of education aid. Similarly, we use one-year lagged values of the control variables.

Table 5: The impact of health aids and economic, financial and political risk ratings on child mortality rate in three regions (*Panel 2SLS estimates*)

Variables	Africa				Asia				South America			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Basic health aid	0.094 (-0.75)	-0.526 (-0.53)	-0.128 (-0.22)	-0.062 (-0.16)	-0.241 (-0.65)	-0.080 (-0.14)	-0.001 (-0.01)	-0.486 (-1.19)	-0.002 (-0.01)	0.024 (0.04)	0.281 (0.62)	-0.054 (-0.07)
General health aid	0.454 (0.77)	-0.096 (-0.25)	-0.086 (-0.12)	-0.316 (-0.64)	-0.153 (-0.52)	-0.516 (-0.93)	0.195 (0.63)	-0.207 (-0.08)	-0.113 (-0.70)	-0.062 (-0.23)	0.020 (0.11)	0.091 (0.20)
Reproductive health aid	.930 (0.55)	-0.173 (-0.29)	-0.253 (-0.16)	-0.511 (-0.15)	-0.023 (-0.11)	-0.123 (-1.24)	-0.037 (-0.45)	-0.184 (-0.27)	0.047 (0.79)	0.094 (0.17)	-0.084 (-0.28)	0.103 (0.35)
Basic health aid x Economic risk ratings		-0.470 (-0.38)				**-0.796**** **(-2.44)**				**-0.135*** **(-1.92)**		
General health aid x Economic risk ratings		-0.260 (-0.17)				**--0.521**** (-2.42)				**-0.135**** **(-2.25)**		
Reproductive health aid x Economic risk ratings		-0.369 (-0.32)				-0.296** (-2.33)				**-0.199*** **(-1.93)**		
Basic health aid x Financial risk ratings			-0.059 (-0.12)				**-0.227**** **(-2.59)**				**-0.032**** **(-2.08)**	
General health aid x Financial risk ratings			-0.109 (-0.16)				**-0.181**** **(-2.05)**				**-0.059*** **(-1.65)**	
Reproductive health aid x Financial risk ratings			-0.114 (-0.19)				**-0.082**** **(-2.25)**				**-0.050**** **(-2.05)**	
Basic health aid x Political risk ratings				-0.247 (-0.21)				**-0.885*** **(-1.82)**				**-0.021**** **(-2.02)**
General health aid x Political risk ratings				-0.205 (-0.22)				**-0.306*** **(-1.70)**				**-0.062*** **(-1.95)**
Reproductive health aid x Political risk ratings				-0.774 (-0.19)				**-0.384**** **(-2.33)**				**-0.069*** **(-1.18)**
Economic risk ratings	-0.242 * (-1.75)	-0.094* (-1.81)	-0.336* (-1.81)	-0.167** (-2.51)	-0.208** (-2.51)	-0.077* (-1.81)	-0.082** (-2.12)	-0.534** (-2.22)	-0.159** (-2.23)	-0.014* (-1.82)	-0.258* (-1.82)	-0.393* (-1.70)
Financial risk ratings	-0.712*** (-3.02)	-0.262* (-1.73)	-0.223 (-0.08)	-0.837 (-0.37)	-0.027** (-2.03)	-0.320** (-2.52)	-0.183 (-0.11)	0.567 (0.18)	-0.376 (-0.75)	-0.083 (-0.13)	-0.247* (-1.91)	0.771 (0.18)
Political risk ratings	-0.059** (-2.54)	-0.110 (-2.54)	-0.251** (-2.23)	-0.784** (-2.22)	-0.057* (-1.83)	0.131 (0.61)	-0.036** (-2.13)	-0.100** (-2.05)	-0.188* (-1.74)	0.057 (0.45)	-0.037* (-1.71)	-0.272** (-2.12)
Observations	1, 472	1, 470	1, 389	1, 408	610	608	601	593	350	348	344	345
Hansen J test (p-value)	0.155	0.159	0.251	0.142	0.479	0.364	0.158	0.241	0.885	0.712	0.154	0.552
Wald F statistic	12.29	12.08	11.98	14.25	12.39	11.25	12.98	10.87	10.21	15.02	13.20	14.44

Notes: The aid variables are provided in per capita term. The squared terms of each type of sectoral aid, a constant, control variables, time and country dummies are included but coefficients are not reported (results are available upon request). In the panel 2SLS estimation, the instrument used is the 'affinity of nations index'. Heteroscedasticity and autocorrelation robust *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively. In all specifications, reasonable explanatory power is generated as the adjusted *R*-squared ranges between 42.4% and 49.4%. We include 74 countries in each specification. In all specifications, we use one-year lagged values of each type of health aid. Similarly, we use one-year lagged values of the control variables.

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Table 6: The marginal effect of each type of aid at different levels of economic, financial and political risk ratings

		Derivative of enrolment rate in primary Edu with respect to:	Derivative of enrolment rate in secondary Edu with respect to:	Derivative of enrolment rate in tertiary Edu with respect to:	Derivative of child mortality rate with respect to		
Percentile	At economic risk rating	Primary Edu aid	Secondary Edu aid	Tertiary Edu aid	Basic health aid	General health aid	Reproductive health aid
25	3.074	1.205	-	0.368	-0.175	-	-0.335
50	4.195	1.645	-	0.502	-0.239	-	-0.457
75	5.040	1.980	-	0.603	-0.287	-	-0.548
Percentile	At financial risk rating	Primary Edu aid	Secondary Edu aid	Tertiary Edu aid	Basic health aid	General health aid	Reproductive health aid
25	4.710	-	-	-	-1.135	-	-1.964
50	5.631	-	-	-	-1.357	-	-2.347
75	6.600	-	-	-	-1.591	-	-2.751
Percentile	At political risk rating	Primary Edu aid	Secondary Edu aid	Tertiary Edu aid	Basic health aid	General health aid	Reproductive health aid
25	4.860	1.039	-	0.216	-0.822	-	-3.314
50	5.667	1.914	-	0.243	-0.959	-	-3.864
75	6.890	2.327	-	0.295	-1.166	-	-4.698

Notes: We calculate the marginal effect of different categories of aid on outcomes of the aid-receiving sectors at 25th, 50th and 75th percentile levels of economic, financial and political risk ratings by using our models discussed in section 4.4. We use panel 2SLS estimated coefficients from Table 2 to generate the marginal effects of the three types of education aid. Next, we use panel 2SLS estimated coefficient from Table 3 to generate the marginal effects of the three categories of health aid. Finally, we use panel 2SLS estimated coefficients from Table 4 to generate the marginal effects of the two types of agriculture aid. For example, the value of economic risk rating at 25 percentile level and the average value of per capita primary education aid are 3.074 and 3.286, respectively, in the full sample, calculating the derivative of enrolment rate in primary education with respect to primary education aid using results in column 2 of Table 2 provides 1.205 (i.e. 0.576 * 3.074) + 2 * -0.028 * 3.074 * 3.286 = 1.205) percentage point increase in enrolment rate in primary education. It is important to note that the coefficients of the squared terms are not reported in the tables. However, they are available upon request. We put (-) when the coefficients of the interaction terms are insignificant. We also calculate the marginal effects of different types of aid in education, health and agricultural sectors at different values of economic, financial and political risk rating in three regions: Africa, Asia and South America (results are available upon request).

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Table 7: **The impact of primary and secondary education aid and economic, financial and political risk ratings on effective progression rate from primary to secondary education (*Panel 2SLS estimation*)**

Variables	[1]	[2]	[3]	[4]
Primary education aid	-0.004 (-0.05)	0.001 (0.10)	0.001 (0.06)	0.004 (0.34)
Secondary education aid	0.134 (0.15)	0.105 (0.20)	0.201 (0.29)	0.212 (0.63)
Tertiary education aid	-0.001 (-0.01)	0.149 (0.32)	-0.051 (-0.06)	-0.098 (-0.40)
Primary education aid x economic risk ratings		**0.510**** **(2.28)**		
Secondary education aid x economic risk ratings		0.057 (0.09)		
Tertiary education aid x economic risk ratings		0.267 (0.38)		
Primary education aid x financial risk rating			0.256 (0.18)	
Secondary education aid x financial risk ratings			-0.118 (-0.09)	
Tertiary education aid x financial risk rating			0.086 (0.06)	
Primary education aid x political risk ratings				0.036 (0.35)
Secondary education aid x political risk ratings				-0.105 (-0.18)
Tertiary education aid x political risk ratings				0.072 (0.21)
Economic risk ratings	0.165** (2.25)	0.024* (1.90)	0.015** (2.05)	0.145* (1.71)
Financial risk ratings	-0.084 (-0.12)	0.036 (0.15)	0.042 (0.15)	-0.062 (-0.37)
Political risk ratings	0.012* (1.75)	0.010** (2.13)	0.002** (2.01)	0.041* (1.68)
Observations	1,990	1, 988	1, 982	1, 980
Hansen J test (p-value)	0.111	0.211	0.521	0.256
Wald F statistic	10.90	10.58	12.90	14.07

Notes: The aid variables are provided in per capita term. The squared terms of each type of sectoral aid, a constant, control variables, time and country dummies and are included but coefficients are not reported (results are available upon request). In the panel 2SLS estimation, the instrument used is the 'affinity of nations index'. Heteroscedasticity and autocorrelation robust *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively. We include 74 countries in each specification. In all specifications, we use four-year lagged values of each type of education aid. Similarly, we use one-year lagged values of the control variables.

Table 8: **The impact of health aids and economic, financial and political risk ratings on prevalence of children stunting (*Panel 2SLS estimation*)**

Variables	[1]	[2]	[3]	[4]
Basic health aid	-0.322 (-0.67)	-0.184 (-0.30)	-0.192 (-0.50)	0.02 1 (0.11)
General health aid	-0.164 (-0.34)	-0.652 (-0.64)	-0.253 (-0.11)	0.224 (0.23)
Reproductive health aid	-0.063 (-0.32)	-0.062 (-0.10)	0.176 (0.46)	-0.239 (-0.52)
Basic health aid x economic risk ratings		**-0.202*** **(-1.72)**		
General health aid x economic risk ratings		-0.520 (-0.41)		
Reproductive health aid x economic risk ratings		**-0.371**** **(-2.33)**		
Basic health aid x financial risk ratings			**-0.104*** **(-1.91)**	
General health aid x financial risk ratings			-0.907 (-0.70)	
Reproductive health aid x financial risk ratings			**-0.429*** **(-1.71)**	
Basic health aid x political risk ratings				**-0.558**** **(-2.26)**
General health aid x political risk ratings				-0.310 (-0.23)
Reproductive health aid x political risk ratings				**-0.162**** **(-2.50)**
Economic risk ratings	-0.359* (-1.95)	-0.234** (-2.38)	-0.046* (-1.92)	-0.130* (-1.80)
Financial risk ratings	-0.817 (-1.65)	0.191 (0.42)	-0.665** (-2.40)	-0.157 ** (-2.52)
Political risk ratings	-0.068** (-2.62)	-0.096** (-2.45)	-0.066** (-2.12)	-0.183* (-1.68)
Observations	2, 087	2, 081	2, 069	2, 078
Hansen J test (p-value)	0.347	0.412	0.244	0.522
Wald F statistic	15.02	16.32	18.71	13.37

Notes: The aid variables are provided in per capita term. The squared terms of each type of sectoral aid, a constant, control variables, time and country dummies and are included but coefficients are not reported (results are available upon request). In the panel 2SLS estimation, the instrument used is the 'affinity of nations index'. Heteroscedasticity and autocorrelation robust *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively. We include 74 countries in each specification. In all specifications, we use one-year lagged values of each type of health aid. Similarly, we use one-year lagged values of the control variables.

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Appendix 1: Description of variables

Variables name	Variables description	Source
Sectoral Aid	Aid is defined as the commitments of concessional loans and grants from all bilateral donors for a specific purpose.[18]	AidData database
School enrolment rates	Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.	UNESCO and WDI
Child mortality rate	It is the probability per 1,000 that a newborn baby will die before reaching age five.	WHO and WDI
Per capita income	Per capita income is gross domestic product divided by midyear population. It is measured based on the constant $US 2010.	WDI
Pupil-teacher ratio	Pupil-teacher ratio is the average number of pupils per teacher in each educational level.	UNESCO and WDI
Prevalence of undernourishment	Population below minimum level of dietary energy consumption (also referred to as prevalence of undernourishment) shows the percentage of the population whose food intake is insufficient to meet dietary energy requirements continuously. Data showing as 5 may signify a prevalence of undernourishment below 5%.	WHO and WDI
Health expenditure per capita	It is the sum of public and private health expenditures, excluding health aid, as a ratio of total population. It is measured based on the constant $US 2010.	WHO

Appendix 2: Sample of countries

Africa		Asia	South America
Algeria	Malawi	Azerbaijan	Argentina
Angola	Mali	Bangladesh	Bolivia
Benin	Mauritania	Bhutan	Brazil
Botswana	Mauritius	Cambodia	Chile
Burkina Faso	Morocco	India	Colombia
Burundi	Mozambique	Indonesia	Ecuador
Cameroon	Namibia	Iran	Paraguay
Cape Verde	Niger	Iraq	Peru
Central African Rep.	Nigeria	Jordan	Uruguay
Chad	Rwanda	Kyrgyz Republic	Venezuela
Cote D'Ivoire	Senegal	Malaysia	
Egypt	Seychelles	Nepal	
Equatorial Guinea	Sierra Leone	Pakistan	
Ethiopia	South Africa	Philippines	
Gabon	Sudan	Sri Lanka	
Gambia	Swaziland	Syria	
Ghana	Tanzania	Thailand	
Guinea	Togo	Viet Nam	
Guinea-Bissau	Tunisia	Yemen	
Kenya	Uganda		
Lesotho	Zambia		
Liberia	Zimbabwe		
Madagascar			

Note: China is excluded from the sample as it has aid data both in the donor and recipient side.

[18] No distinction is made between loans and grants. Since most concessional loans are provided with low interest rates and extended maturity dates they are assumed to have similar effects, at least in the medium-term, with grants.