Econ 5700 slides
Aid

October 31, 2021

How can rich countries help poor countries out of poverty? By giving them money?

Burnside and Dollar (2000) investigate the effects of aid on growth using (at the time new) World Bank data on aid

Data include:

- Direct grants, and grant components of loans

- Both bilateral aid (between two countries), and multilateral aid (probably meaning via international organizations)

Up until BD's paper, most studies showed aid having little effect on growth

Novel idea in BD: aid may have different effects in environments with good and bad policies

Data and regression equation

Panel with 56 countries, 6 periods

- 4 years in each period

- Earliest period 1970-1973, latest 1990-1993

- Total 275 observations (unbalanced panel: $275 < 6 \times 56 = 336$)

Regression equation similar to Barro; cf. eq. (4) in the paper:

$$\begin{aligned} g_{i,t} \;=\;& \beta_y \ln y_{i,t} + \beta_a a_{i,tz} + \theta_p p_{i,t} \\ & +\theta_1 p_{i,t} a_{i,t} + \theta_2 p_{i,t} a_{i,t}^2 + \mathbf{z}_{i,t}' \boldsymbol{\beta} + f_t + \varepsilon_{i,t}^g \end{aligned} \qquad (1)$$

$g_{i,t}$ = growth rate over 4 years in country i, period t

$\ln y_{i,t}$ = initial log GDP/capita

$a_{i,t}$ = aid received as fraction of GDP (referred to as just "aid" below)

$p_{i,t}$ = index of (good) "policies" (explained below)

$\mathbf{z}_{i,t}$ = vector of control variables (see Table 4)

f_t = time fixed effects, i.e., a set of dummy variables, one per period, taking the value one for that period and zero for the others

- Time FE's control for any period-specific growth variation affecting all countries the same way; means we can drop constant term

Note 1: different from eq. (4) in the paper, (1) includes an explicit quadratic interaction term $(\theta_2 p_{i,t} a_{i,t}^2)$; enters BD's regressions (see Table 4)

Note 2: different notation of period fixed effects, f_t instead of g_t; avoids confusion with the growth variable

Interpreting the interaction terms:

- Linear interaction ($g_{i,t} = ...\beta_a a_{i,tz} + \theta_p p_{i,t} + \theta_1 p_{i,t} a_{i,t} + ... + \varepsilon_{i,t}^g$) enough to allow aid to have different growth effects with different policies

- Why quadratic term? According to BD: theoretically sensible if there are diminishing returns to capital; also "appeared to improve the fit of the regression" (Footnote 9)

  - My question: Why not quadratic terms on policy index and/or aid? If aid and/or good policies affect investment directly should there not be terms involving $p_{i,t}^2$ and/or $a_{i,t}^2$?

  - Good example of when it may be useful to use an explicit model as guide

The policy index

The policy index is a weighted combination of variables that are known from earlier work to have robust and significant effects on growth:

- A trade openness dummy

    - Indicator of whether there are very large tariffs on capital goods, large black markets premiums, government controls on imports (from paper by Sachs and Warner)

- Budget surplus (or government consumption)

- Inflation

The weights are derived from a regression similar to (1), but without aid:

$$g_{i,t} = \beta_y \ln y_{i,t} + \mathbf{p}'_{i,t}\boldsymbol{\beta}_p + \mathbf{z}'_{i,t}\boldsymbol{\beta}_z + f_t + \varepsilon^g_{i,t}$$

where $\mathbf{p}_{i,t}$ is a vector containing inflation, budget surplus, openness dummy; see Table 3

Define the scalar $p_{i,t}$ as $\mathbf{p}'_{i,t}\widehat{\boldsymbol{\beta}}_p$ (plus constant); cf. eq. (7) in paper

Coefficients change little when adding aid and aid-policy interactions; this is BD's reason for using the same weighted policy index in all regressions

This implies that $\widehat{\theta}_p$ should equal roughly one when estimating (1)

Results

See Table 4: here focus on OLS columns

Column (3): no significant direct effect of aid

Column (4): coefficient on the linear interaction term is positive and significant, and that on the quadratic term is negative and significant.

Interpretation:

- Suppose aid increases from *low enough levels* (from below the level where the effect peaks)...

- ...*and in a good enough policy environment* (where $p_{i,t}$ is large enough)

- ...*then* there are significant positive effects from aid on growth

Does this hold for the average country in the data set?

Table 6, Panel C: effect of aid increases when increasing policy index from mean to one std above mean (from 1.2 to 2.4)

Table 4, Column (5): drop five outliers

- Gambia 1986-89, 1990-93; Guyana 1990-93; Nicaragua 1986-89, 1990-93

- These individually exert large impacts on the estimated coefficient on the aid-policy interaction term (cf. Figure 1)

- When dropping these: quadratic effects become insignificant

- No need to worry about being above the peak

Other questions addressed in the paper

What determines which countries receive more aid?

- Table 8: regress aid on country characteristics

    – Poorer and smaller countries get more aid

    – Big effect of Egypt dummy (seemingly due to US strategic interests)

Is aid allocated to investment or consumption?

- Table 9 regresses government consumption on aid

- Two measures: bilateral and multilateral aid

- Strong effect from bilateral aid on government consumption; no similar effect of multilateral aid

  - Former could be aid meant to serve donor country's strategic interests (cf. more recent work on Chinese aid to African countries)

  - Latter could be from international agencies, like the IMF; better control over how funds are spent?

Taking stock

BD's paper is one in a larger literature assessing effects on growth from aid

Important, controversial topic, with big policy implications

BD's idea seems plausible, but many questions about the econometrics, specifications

Easterly, Levine and Roodman (2004) different from others who have commented on BD

- Apply the same specifications as BD, but update the data

  - Increase number of countries from 56 to 62 (because more data has become available)

  - Increase temporal range from 1970-93 to 1970-97 (one more 4-year period)

- Total 356 observations, up from 275 (before outliers excluded)

- Also: apply specific procedure for excluding outliers in updated dataset (Hadi method); picks same outliers as BD dropped

Results

Columns (1) and (2) of ELR's Table 1:

- ELR replicate and update BD's Table 4, Column (5); linear aid-policy interaction + dropping outliers

- BD's data vs. ELR's full new data; outliers dropped using Hadi method or as in BD

- Result: linear aid-policy interaction becomes insignificant with ELR's data

[Columns (3) and (4) in ELR's Table 1 do the same for BD's Table 5, Column (8); disregard for now]

First column in ELR's Table 2:

- Here ELR again replicate and update BD's Table 4, Column (5); outliers dropped

- But rather than full new ELR dataset, try various intermediate combinations of old/new (e.g, same countries or same years)

- Table only reports estimated coefficients on linear aid-policy interaction variable

- Mostly insignificant results

First column of Table 3

- ELR replicate and update BD's Table 4, Column (5); non-linear aid-policy interaction

- Again, BD's results go away

What do BD reply? Here focus on their Table 1

Keeping years and set of countries as in BD, little changes

- See first two rows in each panel of Table 1 (a vs. b; e vs. f; i vs. j; m vs. n)

- Numerical revisions to BD's original data do not matter

- In particular, after already adding new countries, extended the data temporally does not change much

- Discussion about whether those eight countries which were added were particular in some ways

In non-linear specifications, the coefficient on the quadratic terms becomes *positive* and (marginally) significant

- See bottom panel, Table 1

- "...for good policy countries, aid becomes increasingly productive. We do not take this result too seriously, but we do think it indicates a positive, though nonlinear, relationship between aid and growth for countries with good policies." (BD's reply p. 783)

- Opposite of what their original "diminishing returns" argument proposed

Concluding remarks

Data compilation exercises like that of ELR require lots of work; setting up data from scratch. But, in principle, it is an exercise that you can try with many old empirical papers

Note collegial, measured tone; good guide for how two write comments/notes:

- "We believe that BD should be a seminal paper that stimulates additional work on aid effectiveness, but not yet the final answer on this critical issue." (ELR, p. 780)

- "[O]ne would conclude from [ELR's] evidence that aid has no effect on growth in all environments. Given our own findings using their data, we think that this is too negative a conclusion to draw." (BD's reply, p. 783).

Food aid: Nunn and Qian (2014)

When aid is given as food in conflict zone it can inadvertently prolong/promote conflict

Rebels may target convoys; steal food, vehicles, equipment

Long-known concern in the aid community

Anecdotal/suggestive evidence from Ethiopia, Somalia, Rwanda, former Yoguslavia, Sri Lanka

Positive correlation need not imply that food aid causes conflict:

- Conflict could cause increase in food aid

- Political/economic crises could cause both more food aid and more conflict

- Donors may reduce food aid in response to conflict (bias in opposite direction)

Makes identification a challenge

Nunn and Qian's solution: find instrumental variable (IV) for US food aid

The IV should affect food aid only, and not conflict (other than through food aid)

Idea:

- US food aid depends on production in the US, due to a price stabilization policy

- When harvests are good the Department of Agriculture purchases wheat from farmers to prevent prices from falling

- Used as food aid to developing countries

Constructing the IV

The IV is an interaction between

- (1) lagged US wheat production; and

- (2) a cross-country measure of how likely a country is to receive food aid

(2) measured as mean food aid (in millions of metric tons) received 1971-2006

Among regular food recipients, years with more food aid associated with more conflict following year (Figure 4)

No such patterns for irregular receipents (Figure 3)

Regression equations

$$
\begin{aligned}
C_{irt} &= \beta F_{irt} + \mathbf{X}_{irt}\Gamma + \varphi_{rt} + \psi_{ir} + \upsilon_{irt} \\
F_{irt} &= \alpha \underbrace{(P_{t-1} \times \overline{D}_{ir})}_{\text{IV}} + \mathbf{X}_{irt}\Gamma + \varphi_{rt} + \psi_{ir} + \varepsilon_{irt}
\end{aligned}
$$

i, r, t index country, region, year, respectively

Regions are: South Asia; East Asia and Pacific; Europe and Central Asia; Latin America and Caribbean; Middle East and North Africa; and sub-Saharan Africa

$\mathbf{X}_{irt}$ set of controls

φ_{rt} is a region-year fixed effect

ψ_{ir} is a country fixed effect

Main regression results in Table 2

Dependent variables and regression specifications vary across columns

Dependent variables: any conflict; intrastate conflict (civil war); interstate conflict (between states). All 0-1 dummies

Different estimations across panels:

- Panel A: OLS

- Panel B: Reduced form (IV replacing food aid as independent variable)

- Panel C+D: IV regressions (instrumented food aid is independent variable)

Findings from Table 2

- Panel A (OLS): negative and insignificant correlation between food aid and all conflict measures

- Panel B (reduced form): positive and significant effect on any conflict and intrastate conflict; but not for interstate conflict

- Panel C+D: IV regressions

  - 1st stage (Panel D): positive and significant correlation between IV and food aid

  - 2nd stage (Panel C): positive and significant correlation between (instrumented) food aid and any/intrastate conflict (but not interstate)

Practice problems:

- How can we see from Table 2 if a coefficient estimate is significantly different from zero at the 5% level?

- Explain how the region-year FE's are constructed.