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Three essays on foreign aid and development economics

By

Shaomeng Jia

A Dissertation
Submitted to the Faculty of
Mississippi State University
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy
in Applied Economics
in the Department of Finance and Economics

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Three essays on foreign aid and development economics

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The first essay revisits the highly debated aid-policy-growth association with updated data. The results overturn Burnside and Dollar's original findings by simply using new data over the same countries and years. Additional tests indicate that the original results are mainly sample driven. Marginal effects from the extended sample (1962-2013) provide some evidence that aid can promote growth in the presence of good policies. Post-Cold War (1990-2013) analysis, however, reveals that aid may decrease growth at any level of policy. The overwhelming majority of the results suggest aid conditional on policy is ineffective. This essay illustrates why the debate continues by showing that the results are highly sensitive to country-year selection, choice of methodology, instrumental variable selection, measurement of institutional quality, and growth rate measurement. Depending on a number of factors, both sides of the debate can be right.

The second essay investigates if foreign aid promotes entrepreneurship. With a panel of 38 countries during 2005 to 2014, this paper examines aid and recipient countries' entrepreneurial activities. Aggregate aid tends to only boost necessity driven, early-stage entrepreneurship and benefit low-income entrepreneurs. In contrast, aid to infrastructure promotes both entrepreneurship driven by opportunity as well as entrepreneurship driven

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by necessity motivations. It also incentivizes more entrepreneurs to compete with homogeneous products. Evidence also suggests that both aggregate aid and infrastructural aid discourages adoption of state of the art technologies, raises business failure rates, and is associated more with necessity-driven, early-stage entrepreneurial activities for females.

The third research examines the cross-country effectiveness of Aid for Trade (AfT) policy during 2004 to 2013. This development policy has attracted much attention despite the doubts of effectiveness of foreign aid in general. Overall, this paper does not find evidence supporting AfT reducing trade costs or enlarging exports or imports. However, aid to economic infrastructure is positively related to service exports; it also connects aid recipient countries more closely with donor countries. At the same time, recipient countries import less from other low and middle-income neighboring countries. In terms of sectoral AfT, aid to industry sector decreases manufactured imports.

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DEDICATION

To my mentor, friends and family, this could not have been possible without you along the way!

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CHAPTER I

AID, POLICIES AND GROWTH: WHY SO MUCH CONFUSION?

Introduction

Foreign aid effectiveness is continuously debated in development economics with many scholars conceding that aid has not achieved its intended results. In order to improve aid effectiveness, recent works emphasize the necessity for donors to be more selective in aid allocations, providing aid to better governed countries most in need.

Burnside and Dollar (2000, henceforth BD), one of the most influential papers in the "conditional" aid effectiveness research agenda, concludes that aid can positively influence growth in healthy policy environments, sparking one of most debated topics in development economics and among policymakers. Easterly, Levine and Roodman (2004, henceforth ELR), using the exact methodology over a larger dataset, overturn BD's findings, weakening the significance of the aid-policy-growth association.

Why should aid's impact on growth depend on the policy environment? BD observed the importance of sound economic policies for growth in developing countries. In addition, empirical papers emerged documenting the lack of association between aid and growth in recipient countries (Boone 1996). BD argued that aid could boost growth by working through the recipient countries' policies in the same manner that policies influence growth in absence of aid (Burnside and Dollar 2000, p. 847). As summarized by Leeson (2008, p. 48), BD's "highly influential analysis has an intuitively appealing

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bottom line: aid can encourage economic growth in countries that pursue 'good' economic policies. Elsewhere, aid is essentially wasted dollars and has no impact on economic growth."

Since the release of both seminal articles, many scholars contribute to the aid-growth debate. For example, BD have accumulated over 4,700 citations and ELR are cited nearly 1,200 times.[1] After many studies, unfortunately, the impact of foreign aid remains inconclusive and the debate continues.

Most studies are in line with pro-ELR conclusions. For example, both Hansen and Tarp (2000) and Dalgaard and Hansen (2001) illustrate that BD's result relies on the exclusion of five outliers; thus, if the outliers are included, then BD's results do not hold. In addition, Brumm (2003) and Dalgaard et al. (2004) find that aid's impact on growth does not depend on a recipient's policy quality. In fact, aid can negatively impact growth under good policies or promote growth with bad policies. Furthermore, Dalgaard and Hansen (2001) conclude that aid and policies are "substitutes" where a healthy policy environment might reduce the effectiveness of foreign aid.

Moreover, additional works including Guillaumont and Chauvet (2001), Hudson and Mosley (2001), Hansen and Tarp (2001), Lensink and White (2001), Lu and Ram (2001), Easterly (2003), Islam (2005), Rajan and Subramanian (2008), Doucouliagos and Paldam (2010), Tashrifov (2012), Chatelain and Ralf (2014), and Dreher and Langlotz (2015) find no evidence supporting aid's positive impact on growth.

On the contrary, a number of articles support BD, concluding that aid does work effectively in a good policy environment (Collier and Dehn, 2001; Burnside and Dollar,

[1] The citation count numbers are collected as of April 15, 2017 from google scholar.

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2004; Ali and Isse, 2005; Verschoor and Kalwij, 2006; Alvi, Mukherjee, and Shukralla, 2008).[2] Contributing to the ambiguity of this debate, Dayton-Johnson and Hoddinott (2003) and Kohama et al. (2003) find mixed results. Ram (2003) finds positive and significant interactions of policy and bilateral aid but offsetting negative interactions with multilateral aid and policy.

With the exception of ELR, these follow-up studies carry out variations of BD's original framework using alternative approaches including different measures of foreign aid and policies, alternative model specifications, additional control variables and instruments, as well as different country samples and time periods. These changes in methodology may partly explain the ambiguity of the findings.

For instance, Lu and Ram (2001) find that policy has no significant influence of aid's effect on growth once country-fixed effects are included. Hansen and Tarp (2001) switch to a GMM model and find that aid increases growth via an investment channel but not through a policy channel. Rajan and Subramanian (2008) introduce a measure of bilateral aid and test for conditionality of both policy and geographical environments concluding that aid is ineffective.

In this paper, we attempt to shed light on the aid-policy-growth debate by empirically demonstrating how both sides can be 'right'. We do so by first revisiting the original works of BD and ELR with updated data. ELR overturn BD's findings with four additional years (1994-1997) and six additional countries stating that this debate suffers from "a long and inconclusive literature that was hampered by limited data availability"

[2] Burnside and Dollar (2004) and Dalgaard et al (2004) switch from a strict policy index and include measures of institutional quality.

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(Easterly et al. 2004, p.774). A concern is that missing data may generate biased results (Breitwieser and Wick 2016). Our dataset includes an additional 28 years (1962-1969 and 1994-2013) and six countries over BD, and 24 years (1962-1969 and 1998-2013) and nine countries over ELR, which almost doubles BD's number of observations, and increases ELR's sample by up to 70%.[3] With the additional expansion of the dataset, it is possible that ELR's results are overturned or new findings are discovered.

To test this possibility, we initially do not deviate from the specifications and methodology of BD and ELR. We replicate the findings from both BD and ELR with updated data using multiple country and year specifications. We find that BD's results are not robust to the updated data. Simply using new data over the same countries as BD from 1970-1993, we do not find any significant aid/policy interaction terms. Furthermore, we show that BD's findings are associated with observations unique to their sample but that are unavailable to the updated sample. Our ELR replications for 1970-1997 period, however, are highly consistent with ELR's results—no significant interactions of aid and policy are found.

We further test BD and ELR's specifications with two alternative samples: an extended sample from 1962 to 2013 and a post-Cold War subsample from 1990 to 2013. In the extended sample, we find 13 positive and significant interaction term coefficients, at the 5% significance level, out of a possible 32. Interestingly, the ELR specifications report more significant interaction terms, providing more support for BD's conclusion than the BD specifications. Out of 96 marginal effects calculated, we find 12 that are

[3] For detailed differences in observations and countries between our dataset and BD and ELR's 2SLS samples, see Appendix 1 and Appendix 2.

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positive and significant in high policy countries. Thus, we do find some support for BD's conclusion that aid may slightly increase growth when a recipient country has high policy scores. However, the overwhelming majority of the marginal effects are insignificant making it difficult to conclude that aid is effective at increasing growth.

The post-Cold War sample suggest that aid may decrease growth regardless of the type of policy environment. Of the 96 marginal effects estimates from both BD and ELR specifications, we find 10 negative and significant marginal effects and one positive and significant marginal effect. Negative marginal effects occur at all levels of the policy index.

In both the extended sample and the post-Cold War period, the majority of the interaction term coefficients and marginal effects are insignificant. Thus, we are unable to support BD's conclusion that a good policy environment increases aid effectiveness. However, we are also unable to strongly support ELR's finding as we do find some positive and significant interaction term coefficients and marginal effects.

In the remainder of the analysis, we engage in a variety of sensitivity checks to provide insight into why the aid-policy-growth results are inconsistent. With the post-Cold War sample, we show that switching to updated measures of institutional quality weakens the aid-policy association. In addition, in countries with low economic freedom scores, aid may decrease growth, but there is some evidence that aid may increase growth in economically free countries.

We also find that using Penn World Tables (PWT) measures of growth instead of World Development Indicators (WDI) growth rates results in more significant aid/policy interaction term coefficients. These results illustrate another reason why BD, using PWT,

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found significance and ELR, using WDI, did not. The measurement of aid, however, does not appear to matter as similar results are found using alternatively constructed aid measures.

Lastly, we test the sensitivity of model selection by switching from OLS and 2SLS models to using Fixed Effects (FE), First-difference (FD), and System Generalized Method of Moments (GMM). The evidence supporting aid contributing to growth in a good policy environment is minimal, suggesting that the results are associated with model selection.

Overall, we find that under certain scenarios, aid may promote growth in the presence of good policies, but the majority of results suggest aid is ineffective. There is additional evidence that aid may harm growth in poor policy environments. Thus, both BD and ELR can be right. These results are highly sensitive to country-year selection, choice of methodology, instrumental variable selection, measure of institutional quality, and use of PWT or WDI to measure growth. These findings reflect the sensitive feature of the aid-growth literature, making it difficult to compare across studies even when keeping the methodology unchanged.

Our work contributes to the long-standing aid-policy-growth academic debate and reminds policymakers that simply providing aid to countries identified as having 'good' policies may not create a 'quick' growth fix. In addition, our findings highlight the sensitive nature of empirical work, especially when data limits the sample. As ELR's results and our findings suggest, a few observations can overturn a previous conclusion. Thus, our work also supports the importance of replicating major findings as new data becomes available (McCullough et al. 2008; Burman et al. 2010; Easley et al. 2013;

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Evanschitzky and Armstrong 2013). Replication avoids measurement error and disagreement over model selection caused by "…usual limitation of choosing a specification without clear guidance from the theory" (Easterly et al. 2004, p.774).

Several recent and innovative papers analyzing the aid-growth association acknowledge the critical importance of BD and continue using the original BD specification (Clemens et al. 2012; Dreher, Eichenauer and Gehring 2014; Dreher and Langlotz 2015).[4] Thus, we contribute to this literature by providing an updated dataset, which can be utilized for additional future research in analyzing the aid-growth association.

Our work also relates to the emerging aid selectivity literature emphasizing that donors should be more selective in allocating aid to countries with better institutions (OECD Paris Declaration 2005; OECD High Level Forum 2008; Easterly and Pfutze 2008; Achta et al. 2015). Given our findings, even if donors become more selective and give aid to better governed countries, it is probable that aid will remain ineffective. This has important policy implications for the use of foreign aid in achieving the recently adopted United Nations Sustainable Development Goals.

Empirical Methodology

Initially, we follow both BD's and ELR's methodology and data sources to investigate the relation between aid, policy, and growth.[5] BD employ methods of Pooled Ordinary Least Squares (OLS) and Two-Stage Least Squares (2SLS) using a panel dataset

[4] These recent studies utilize updated data from Minasyan (2016).
[5] BD and ELR have slightly different model specifications as they define regional country dummies and low income countries differently. See Appendices 6 and 7.

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with four-year averages. We follow BD's growth regression with controls including aid/GDP, a policy index, an aid*policy interaction term, log initial GDP, ethnic fractionalization, political assassinations, a fractionalization*assassinations interaction term, institutional quality, financial depth (M2/GDP lagged), regional dummies, and time dummies. In some specifications, an aid^2*policy term is included.

The instruments include dummies for Egypt, Franc Zone and Central American countries, lagged arms imports and its interaction term with the policy index, population, two interaction terms using population and squared population with policy index, initial GDP per capita and its interaction with the policy index.

In order to reconstruct the database, we gather variables from original sources in BD and ELR and expand the dataset from 1962 to 2013 and up to 65 countries (ELR, OLS specification, before excluding outliers). Appendix 3 contains the specific source and method of construction for each variable, as well as the correlations between the new data, BD and ELR. Given the length of time between our study and BD and ELR, some of the variables are discontinued. For those variables, we extrapolate based on ELR's data and methodology by filling in the missing data with the closest observation. In a later section, we test the sensitivity of ELR's methodology for missing data by using alternative measurements of growth and aid.

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To measure aid, many current studies use OECD's official development assistance (ODA); however, BD measures aid in terms of Effective Development Assistance (EDA)[6] over GDP. To calculate EDA, BD regress EDA on ODA, retain the regression coefficient, and multiply it with new ODA data. To update this measure, we extrapolate EDA with the same methodology. The pair-wise correlations between our newly extrapolated EDA and BD/ELR's EDA are about 0.71/ 0.74. The list-wise correlation with BD increases to about 0.84. Refer to Appendix 3 for more details.

To reconstruct the policy index[7], we run the growth regression excluding aid and aid*policy but include inflation, budget surplus, and the Sachs-Warner openness index. These coefficients create a beta policy index. The constant is calculated by differencing the mean of the GDP growth rate and the mean of the beta policy index.[8] The constant is added to the beta policy index creating the new policy index. Appendix 4 describes the model specification in detail. Our newly constructed policy index is highly correlated with BD/ELR, with pair-wise correlation coefficients up to 0.92. Summary statistics are provided in Appendix 5.

According to BD, aid positively impacts growth in countries with good policy environments. Thus, to support BD, we should observe positive and significant aid*policy interaction terms. Furthermore, the marginal effects of aid should be positive and

[6] The EDA definition and data is originally from Chang et al. (1998). This paper does not intend to recalculate Chang et al. (1998)'s work, given that the data resources of Chang et al. (1998) have changed potentially during the 20 years, instead it follows ELR's indirect extrapolation method.

[7] See Jan Dehn (2000) for a clear explanation on the policy index procedure.

[8] BD state "the index can be interpreted as a country's predicted growth rate" (2000, p. 855).

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significant at least in high policy countries. If we find, however, insignificant aid*policy interaction terms and marginal effects, the results lend support to ELR. In addition, the results support ELR if aid*policy is significant but the marginal effects are insignificant or negative and significant in high policy countries. Lastly, it is possible that the marginal effects at low policy scores are negative and significant, indicating that aid is detrimental to growth in poor policy countries. This result indirectly supports both BD and ELR, although it is never explicitly stated.

Results

First, we test the findings from both BD and ELR with updated data using multiple specifications: 1) BD countries and BD years (1970-1993), full country sample and BD years; 2) ELR countries and ELR years (1970-1997), full country sample and ELR years; 3) extended years (1962-2013) with BD countries, ELR countries, and full country sample; 4) post-Cold war (1990-2013) with BD countries, ELR countries, and full country sample. We also report the original findings from both BD and ELR,[9] marginal effects of different policy levels, test different subsets of BD as well as long-run period averages. From the post-Cold War sample, we test the sensitivity of the findings by using alternative measures of institutional quality and alternative instrumental variables. Bootstrapped standard errors are reported in all models.

[9] We replicate both BD and ELR's works with their original datasets. Our replication matches their original results.

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Replicating BD and ELR, 1970-1993/97

BD and ELR test their specifications including and excluding outliers.[10] We follow ELR and use the HADI method to test for outliers and exclude those observations when indicated. Appendix 6 reports outliers for each sample. We follow ELR and report the results corresponding to the OLS and 2SLS specifications from BD regressions 4 (all countries) and 7 (lower-income countries), which includes the outliers and an aid^2*policy term. We also report the findings for OLS and 2SLS for BD regressions 5 (all countries) and 8 (lower-income countries) excluding the outliers and dropping the aid^2*policy term.[11]

Table 1.1 Replication with new data 1970-93/97, BD and ELR regressions 4, 7, 5, 8

		Outliers included				Hadi Method, outliers excluded			
		All countries		Lower income countries		All countries		Lower income countries	
		4/OLS	4/2SLS	7/OLS	7/2SLS	5/OLS	5/2SLS	8/OLS	8/2SLS
Panel A: BD 1970-1993, coefficients for aid*policy and aid^2*policy term									
Aid*policy	BD original	0.20**	0.37	0.27**	0.43	0.19**	0.18*	0.26**	0.25**
		(0.09)	(0.33)	(0.12)	(0.49)	(0.07)	(0.10)	(0.08)	(0.01)
	New data, BD countries	0.09	-0.11	0.08	-0.38	0.11	0.13	0.03	0.02
		(0.10)	(0.31)	(0.13)	(0.48)	(0.07)	(0.12)	(0.09)	(0.15)
	New data, full sample	0.09	-0.02	0.08	-0.34	0.11	0.13	0.02	0.01
		(0.10)	(0.31)	(0.12)	(0.52)	(0.07)	(0.11)	(0.10)	(0.15)
Aid^2*policy	BD original	-0.02*	-0.04	-0.02**	-0.04				
		(0.01)	(0.04)	(0.01)	(0.05)				
	New data, BD countries	-0.01	0.03	-0.01	0.06				
		(0.01)	(0.05)	(0.01)	(0.06)				
	New data, full sample	-0.01	0.02	-0.01	0.06				
		(0.01)	(0.05)	(0.01)	(0.07)				
Observation	BD original	275	275	189	189	270	270	182	184
	New data, BD countries	283	231	188	152	277	227	183	149
	New data, full sample	300	243	192	156	294	239	187	153

[10] When we apply the HADI method, some of the models have minor differences in the coefficient of Aid*Policy term compared with BD and ELR. However, ELR argue that outliers should not change the conclusion.

[11] We follow BD in defining lower income countries as a country with real GDP per capita below $1,900 constant (1985) U.S. dollars in year 1970.

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Table 1.1 (continued)

Panel B: ELR 1970-1997, coefficients for aid*policy and aid^2*policy term									
Aid*policy	ELR original	-0.14		-0.27		-0.15	0.01	-0.20	-0.20
		(1.31)		(1.89)		(1.09)	(0.05)	(1.26)	(0.65)
	New data, ELR countries	0.04	-0.19	0.09	-0.32	0.02	0.06	0.01	0.08
		(0.10)	(0.25)	(0.12)	(0.42)	(0.06)	(0.10)	(0.08)	(0.14)
	New data, full sample	0.05	0.12	0.09	0.05	0.08	0.15	0.12	0.17
		(0.08)	(0.28)	(0.10)	(0.40)	(0.07)	(0.12)	(0.08)	(0.17)
Aid^2*policy	ELR original	0.03**		0.03**					
		(2.25)		(2.35)					
	New data, ELR countries	-0.01	0.04	-0.01	0.05				
		(0.01)	(0.04)	(0.01)	(0.06)				
	New data, full sample	-0.00	0.00	-0.01	0.02				
		(0.01)	(0.05)	(0.01)	(0.05)				
Observation	ELR original	356	356	244	244	345	345	236	236
	New data, ELR countries	358	296	239	195	352	292	234	192
	New data, full sample	390	315	257	205	385	312	253	203

Notes: Bootstrap standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1. Time fixed effects are included in all regressions, but not reported in the table. Each specification includes a constant term, measure of aid/GDP, a policy index, an aid*policy interaction term, log initial GDP, ethnic fractionalization, political assassinations, a fractionalization*assassinations interaction term, a measure of institutional quality, and a measure of financial depth (M2/GDP lagged), regional dummies for Sub-Saharan Africa and fast-growing East Asian countries. BD and ELR specifications differ in their definitions of regional dummies and low-income (see Appendix 7). See Appendix 3 for detailed variable description. Regression numbers are matched with BD/ ELR original works. See Appendix 4 for regression and specification set up.

In Table 1, Panel A, we first test the model under the same time period as BD with newly collected data. BD's original results show positive and significant coefficients on the aid*policy interaction term in six of eight specifications.[12] Once we replicate BD's exact specification with the updated data, with only BD countries or all countries in the

[12] BD and ELR use different significance levels. For coefficients with p-value greater than 0.05 but less than 0.10, it is considered significant under BD but not significant under ELR. This is one potential reason why ELR found fewer significant interaction terms than BD.

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new data, none of the interactions are significant. The update of ELR's specifications also finds no significant interaction terms, as shows in Table 1, Panel B, supporting ELR's original results. Overall, we find that BD's results are not robust to the updated data, whereas ELR's replications are highly consistent with their original findings.

The most striking finding from this replication is that BD's result disappears by updating the data. In order to understand what is driving these differences, we compare our sample to BD's and find that there are quite a few unique observations belonging to each dataset. The country and year selection remain the same; however, there are country-year pairings unique to each sample.[13] Thus, these different observations might be driving the results.

[13] Comparing our "New data, BD countries" sample with BD's sample: under OLS, we find 32 and 24 unique observations, respectively; under 2SLS, there are 21 and 65, respectively. This also occurs in ELR's work. There are 19 and 47 unique observations across BD and ELR's 1970-1993 samples, respectively. Part of the reason for the differences is data availability. Some observations were available in the 1990's but are no longer reported. In addition, data has become available that was not previously reported. See Table A-2 in ELR for more information on their sample differences. Refer to Appendix 1 for more detail on the observation comparisons of BD, ELR and our new data, full sample.

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Table 1.2 BD Subsets with new data, 1970-93, BD regressions 4, 7, 5, 8

			Outliers included				Hadi Method, outliers excluded			
			All countries		Lower income		All countries		Lower income	
			4/OLS	4/2SLS	7/OLS	7/2SLS	5/OLS	5/2SLS	8/OLS	8/2SLS
Aid* policy	1	Intersection of datasets	0.06	0.08	0.20	-0.20	-0.20	-0.32*	0.26*	0.26
			(0.16)	(0.37)	(0.21)	(0.47)	(0.14)	(0.19)	(0.14)	(0.22)
	Obs		210	210	133	133	201	201	131	131
	2	Intersection of datasets, BD aid	0.24	-0.43	0.49*	0.10	-0.19	-0.27	0.31*	0.31
			(0.22)	(0.46)	(0.29)	(0.55)	(0.16)	(0.23)	(0.14)	(0.23)
	Obs		210	210	133	133	204	204	132	132
	3	Intersection of datasets, BD policy	-0.03	-0.03	0.11	-0.09	-0.11	-0.18	0.16	0.13
			(0.18)	(0.46)	(0.21)	(0.48)	(0.12)	(0.17)	(0.10)	(0.18)
	Obs		210	210	133	133	203	203	130	130
	4	BD countries, drop BD outliers	0.05	-0.06	0.05	-0.33	-0.00	-0.03	0.04	0.02
			(0.12)	(0.32)	(0.15)	(0.46)	(0.09)	(0.17)	(0.11)	(0.20)
	Obs		284	230	186	151	272	222	180	146
Marginal Effects	1	Policy at 10^{th} percentile	-0.06	0.02	0.01	-0.10	0.18	0.21	-0.09	-0.04
			(0.16)	(0.38)	(0.15)	(0.31)	(0.16)	(0.29)	(0.16)	(0.29)
		Policy at means	0.00	0.08	0.13	-0.10	0.03	-0.03	0.10	0.15
			(0.17)	(0.42)	(0.18)	(0.32)	(0.12)	(0.25)	(0.13)	(0.22)
		Policy at 90^{th} percentile	0.13	0.21	0.42	-0.07	-0.33	-0.61	0.54*	0.59
			(0.32)	(0.64)	(0.36)	(0.62)	(0.28)	(0.40)	(0.26)	(0.39)
	2	Policy at 10^{th} percentile	0.21	0.29	0.19	0.07	0.32	0.38	0.03	0.05
			(0.25)	(0.61)	(0.24)	(0.56)	(0.49)	(0.23)	(0.41)	(0.22)
		Policy at means	0.35	0.07	0.44	0.15	0.10	0.23	0.25	0.27
			(0.27)	(0.60)	(0.28)	(0.39)	(0.42)	(0.18)	(0.31)	(0.19)
		Policy at 90^{th} percentile	0.66	-0.43	1.02*	0.32	-0.38	-0.11	0.78*	0.80**
			(0.48)	(0.88)	(0.55)	(1.01)	(0.53)	(0.31)	(0.38)	(0.32)
	3	Policy at 10^{th} percentile	-0.01	0.02	0.02	0.31	0.11	0.04	-0.04	-0.00
			(0.14)	(0.36)	(0.13)	(0.96)	(0.15)	(0.30)	(0.15)	(0.29)
		Policy at means	-0.00	0.01	0.13	0.21	0.00	-0.15	0.14	0.14
			(0.16)	(0.43)	(0.16)	(0.51)	(0.13)	(0.26)	(0.12)	(0.22)
		Policy at 90^{th} percentile	0.01	-0.00	0.31	0.06	-0.20	-0.49	0.42*	0.36
			(0.31)	(0.70)	(0.31)	(0.54)	(0.27)	(0.42)	(0.23)	(0.38)
	4	Policy at 10^{th} percentile	0.03	-0.06	0.14	-0.09	0.05	0.03	0.12	0.06
			(0.11)	(0.36)	(0.12)	(0.32)	(0.11)	(0.28)	(0.12)	(0.27)
		Policy at means	0.09	-0.02	0.18	-0.09	0.05	-0.01	0.16	0.08
			(0.13)	(0.38)	(0.13)	(0.33)	(0.10)	(0.27)	(0.12)	(0.24)
		Policy at 90^{th} percentile	0.22	0.08	0.28	-0.09	0.04	-0.09	0.25	0.13
			(0.26)	(0.56)	(0.29)	(0.62)	(0.28)	(0.54)	(0.35)	(0.58)

Notes: Bootstrap standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1. See Appendix 3 for detailed variable description. See Appendix 4 for regression and specification set up. In 8/OLS, row (2) has an additional observation over rows (1) and (3). If we drop the extra observations, the results are unchanged.

To test the sensitivity of these differences, in Table 2, we re-estimate the main tests with a number of BD country subsamples from 1970-1993. As shown in Panel 1,

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'Intersection of datasets', we exclude all unique observations from both the new dataset and BD's original dataset, creating an intersection sample set. We observe only two significant aid*policy interaction term coefficients at the 10 percent level: one negative and one positive. In addition, we find one positive and weakly significant marginal effect in high policy countries. Compared to BD's original data, the intersection set has 65 fewer observations, suggesting that BD's results may relate to observations unique to their sample but unavailable with updated data.

Another possible explanation driving the differences is the change in variables, specifically the updated measures of aid and the policy index. Not only are these our main variables of interest, but they are also less consistent across datasets. We first retest the models substituting our updated BD aid with the original BD aid measure, continuing to use the intersection set of countries as in Panel 1.

As shown in Panel 2, we find two coefficients with positive and significant interactions at the 10 percent level. There are three positive and significant marginal effects from low income countries with policy at the 90th percentile. This indicates that differences in our updated work and BD's original results are partly driven by changes in aid measurement; however, this explanation is not conclusive since we only gain one significant marginal effect at the 5 percent level.[14,15]

[14] Dalgaard and Hansen (2001) argue that the difference between EDA and ODA is a simple transformation, with a correlation as high as 0.94 when excluding Somalia (1978-81) or 0.89 when including it. Their finding provides support for the validity of ELR's method of extrapolating EDA.

[15] Panels (1) and (2) have slight observation differences in some of the models. We retest dropping the extra observations, and the result holds. This is not reported in the paper to save space.

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Similarly, in Panel 3, we substitute BD's original policy index for our updated policy index given the plausibility that differences are related to a country's change in policy. In all specifications, the results show only one positive and significant marginal effect at the 10 percent level, occurring in the high policy, low-income specification, 8/OLS.

We view these subset tests as suggesting that BD's unique observations is the main factor contributing to the result differences with measurement in aid and policy explaining only a very small portion of the variation in findings. Consistent with this finding, Hansen and Tarp (2000, p.393) show that BD's results depend on the exclusion of five 'outliers'.[16] Dalgaard and Hansen (2001, pp.32-33) identify these five observations as 'leverage points' due to their above-average influence on the fitted values but not classifying as econometric outliers.[17]

To test this argument, we present a fourth specification in Table 2, Panel 4, dropping the five 'outliers' from the sample, using the updated data and BD countries.[18] We do not find any significant coefficients for the interaction terms or the marginal effects, supporting the findings in Table 1.[19]

Collectively, these sensitivity checks suggest that the change in significance from BD's work to our updated findings is driven by a change in observations, thus generalizing

[16] The five 'outliers' are Nicaragua (1986-89, 1990-93), Gambia (1986-89, 1990-93), and Guyana (1990-93).
[17] Furthermore, Chatelain and Ralf (2014, p.93) point out that these observations affect the validity of White standard errors used in BD's model. White heteroscedasticity consistent standard errors are not useful when heteroscedasticity is driven by large outliers, such as those present in BD's work.
[18] Hansen and Tarp (2000) argue that the five BD 'outliers' are not beyond the three standard errors band; hence, they should not be excluded as outliers. Dalgaard and Hansen (2001) also indicate that these are not outliers. Our results also support this argument- by first removing the five 'outliers' by hand, then applying the HADI method. HADI method further dropped some other observations as "real" outliers. Refer to Appendix 6 for details of outliers dropped for each of the models.
[19] Our "New data, BD countries" sample includes two of the five 'outliers'- Gambia (1986-89, 1990-93).

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the findings of Hansen and Tarp (2000). Our findings reflect the observation sensitive feature of the aid-growth literature, making it difficult to compare across studies even when keeping the methodology unchanged.

Extended Sample Analysis

Next, in Table 3, we extend the sample with more periods, averaged from 1962-2013. Panel A replicates the BD specifications, and Panel B replicates the ELR specifications.

Reporting on coefficients with a 5 percent or higher p-value, in the BD specifications, we find four positive and significant interaction term coefficients out of a possible 16. For the 16 ELR specifications, however, there are nine positive and significant interactions. Interestingly, the ELR specifications are more supportive of BD's conclusion than the BD specifications. In total, 13 of the 32 regressions spanning the 52-year full sample have positive and significant coefficients on the interaction term.

Although these results are more supportive of BD than previous tests, they do not provide a conclusive answer as to whether aid may or may not support growth in the presence of good policies. BD and ELR analyze the sign and significance of the coefficient of the interaction terms without reporting the marginal effects. In order to provide further insight, however, we calculate marginal effects at different policy levels.

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Table 1.3 Extended Sample, 1962-2013, BD and ELR regressions 4, 7, 5, 8

		Outliers included				Hadi Method, outliers excluded			
		All countries		Lower income		All countries		Lower income	
		4/OLS	4/2SLS	7/OLS	7/2SLS	5/OLS	5/2SLS	8/OLS	8/2SLS
Panel A: BD 1962-2013, coefficients for aid, policy, aid*policy and aid²*policy									
Aid	New data, BD countries	-0.06	-0.57*	0.03	-0.46	-0.09	-0.44	-0.02	-0.33
		(0.09)	(0.34)	(0.10)	(0.32)	(0.12)	(0.33)	(0.14)	(0.30)
	New data, full sample	-0.06	-0.75**	0.03	-0.49	-0.10	-0.56*	-0.03	-0.34
		(0.10)	(0.38)	(0.12)	(0.34)	(0.11)	(0.32)	(0.14)	(0.32)
Policy	New data, BD countries	0.77***	0.82***	0.87***	1.29**	0.84***	0.65***	0.96***	0.62
		(0.15)	(0.22)	(0.27)	(0.53)	(0.15)	(0.18)	(0.24)	(0.44)
	New data, full sample	0.77***	0.81***	0.87***	1.24**	0.83***	0.62***	0.95***	0.66
		(0.14)	(0.22)	(0.23)	(0.49)	(0.15)	(0.17)	(0.24)	(0.40)
Aid* policy	New data, BD countries	0.15**	-0.11	0.13*	-0.38	0.09	0.24**	0.06	0.22
		(0.07)	(0.20)	(0.07)	(0.29)	(0.05)	(0.10)	(0.07)	(0.14)
	New data, full sample	0.13**	-0.11	0.11	-0.32	0.09*	0.25***	0.06	0.19
		(0.06)	(0.20)	(0.07)	(0.25)	(0.05)	(0.09)	(0.06)	(0.13)
Aid²* policy	New data, BD countries	-0.01	0.06*	-0.01	0.09**				
		(0.01)	(0.04)	(0.01)	(0.04)				
	New data, full sample	-0.01	0.07*	-0.01	0.08**				
		(0.01)	(0.04)	(0.01)	(0.03)				
Observation	New data, BD	506	419	337	277	499	416	332	275
	New data, full sample	538	443	343	283	530	439	338	281
Panel B: ELR 1962-2013, coefficients for aid, policy, aid*policy and aid²*policy									
Aid	New data, ELR countries	-0.09	-0.50	-0.00	-0.44	-0.13	-0.41	-0.04	-0.14
		(0.10)	(0.33)	(0.12)	(0.37)	(0.11)	(0.28)	(0.13)	(0.35)
	New data, full sample	-0.30**	-1.03**	-0.22	-1.25**	-0.42***	-0.90**	-0.43**	-0.88*
		(0.13)	(0.41)	(0.15)	(0.53)	(0.16)	(0.37)	(0.19)	(0.48)
Policy	New data, ELR countries	0.73***	0.77***	0.94***	1.56***	0.80***	0.57***	1.03***	0.97**
		(0.15)	(0.23)	(0.25)	(0.54)	(0.14)	(0.18)	(0.25)	(0.45)
	New data, full sample	0.58***	0.51**	0.73**	0.61	0.61***	0.40**	0.63**	0.20
		(0.18)	(0.24)	(0.30)	(0.58)	(0.15)	(0.20)	(0.30)	(0.53)
Aid* policy	New data, ELR countries	0.16**	-0.13	0.14*	-0.56*	0.11**	0.24**	0.07	0.10
		(0.06)	(0.21)	(0.08)	(0.33)	(0.05)	(0.09)	(0.06)	(0.16)
	New data, full sample	0.23***	0.16	0.20**	-0.04	0.23***	0.41***	0.25***	0.44**
		(0.07)	(0.23)	(0.09)	(0.30)	(0.07)	(0.13)	(0.08)	(0.21)
Aid²* policy	New data, ELR countries	-0.01	0.07*	-0.01	0.11**				
		(0.01)	(0.04)	(0.01)	(0.05)				
	New data, full sample	-0.01	0.05	-0.00	0.09*				
		(0.00)	(0.04)	(0.00)	(0.05)				
Observation	New data, ELR	551	462	365	303	545	458	361	301
	New data, full sample	600	493	393	321	591	488	388	320

Notes: Bootstrap standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1. Time fixed effects are included in all regressions. Each specification includes a constant term, measure of aid/GDP, a policy index, an aid*policy interaction term, log initial GDP, ethnic fractionalization, political assassinations, a fractionalization*assassinations interaction term, a measure of institutional quality, and a measure of financial depth (M2/GDP lagged), regional dummies for Sub-Saharan Africa and fast-growing East Asian countries. BD and ELR specifications differ in their definitions of regional dummies and low-income (see Appendix 7). See Appendix 3 for detailed variable description.

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Table 1.4 Marginal Effects, 1962-2013, BD and ELR regressions 4, 7, 5, 8

		Outliers included				Hadi Method, outliers excluded			
		All countries		Lower income		All countries		Lower income	
		4/OLS	4/2SLS	7/OLS	7/2SLS	5/OLS	5/2SLS	8/OLS	8/2SLS
Panel A: BD 1962-2013, coefficients for marginal effects of aid									
Policy at 10th percentile	New data, BD countries	0.02	-0.50	0.10	-0.45*	-0.01	-0.29	0.09	-0.14
		(0.08)	(0.33)	(0.09)	(0.26)	(0.07)	(0.27)	(0.08)	(0.22)
	New data, full sample	0.04	-0.66*	0.10	-0.47*	0.01	-0.35	0.09	-0.13
		(0.08)	(0.37)	(0.09)	(0.28)	(0.07)	(0.26)	(0.07)	(0.23)
Policy at mean	New data, BD countries	0.15	-0.38	0.18*	-0.43	0.10	-0.00	0.17**	0.12
		(0.10)	(0.35)	(0.09)	(0.29)	(0.08)	(0.24)	(0.07)	(0.20)
	New data, full sample	0.15	-0.54	0.17*	-0.44	0.11	-0.04	0.16**	0.10
		(0.09)	(0.40)	(0.09)	(0.30)	(0.07)	(0.23)	(0.07)	(0.19)
Policy at 90th percentile	New data, BD countries	0.30**	-0.25	0.28*	-0.41	0.25**	0.32	0.27**	0.42
		(0.15)	(0.42)	(0.14)	(0.42)	(0.12)	(0.26)	(0.12)	(0.30)
	New data, full sample	0.29**	-0.40	0.27*	-0.41	0.24**	0.30	0.24**	0.38
		(0.14)	(0.48)	(0.14)	(0.42)	(0.12)	(0.25)	(0.11)	(0.27)
Observation	New data, BD countries	506	419	337	277	499	416	332	275
	New data, full sample	538	443	343	283	530	439	338	281
Panel B: ELR 1962-2013, coefficients for marginal effects of aid									
Policy at 10^{th} percentile	New data, ELR countries	0.01	-0.42	0.08	-0.46	-0.02	-0.24	0.05	-0.06
		(0.08)	(0.31)	(0.09)	(0.30)	(0.08)	(0.23)	(0.08)	(0.21)
	New data, full sample	-0.02	-0.60*	0.03	-0.70**	-0.06	-0.42*	-0.01	-0.25
		(0.09)	(0.36)	(0.08)	(0.34)	(0.07)	(0.24)	(0.08)	(0.21)
Policy at mean	New data, ELR countries	0.15	-0.31	0.17*	-0.48	0.13*	0.04	0.11	0.05
		(0.09)	(0.34)	(0.09)	(0.32)	(0.07)	(0.20)	(0.08)	(0.17)
	New data, full sample	0.14	-0.34	0.15*	-0.43	0.09	-0.07	0.12	0.06
		(0.09)	(0.37)	(0.09)	(0.32)	(0.07)	(0.20)	(0.08)	(0.18)
Policy at 90^{th} percentile	New data, ELR countries	0.35**	-0.18	0.28*	-0.50	0.31***	0.37	0.18	0.17
		(0.13)	(0.41)	(0.14)	(0.43)	(0.11)	(0.22)	(0.13)	(0.27)
	New data, full sample	0.35**	-0.03	0.31**	-0.09	0.29***	0.34	0.28**	0.45
		(0.13)	(0.42)	(0.13)	(0.39)	(0.11)	(0.21)	(0.12)	(0.28)
Observation	New data, ELR	551	462	365	303	545	458	361	301
	New data, full	600	493	393	321	591	488	388	320

Notes: Bootstrap standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1. Marginal effects from regressions in Table 2.

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Table 4 reports marginal effects of aid for the policy index at the mean, 10th percentile (poor policy) and 90th percentile (good policy) for all the specifications from Table 3. In Panel A, for policy at the 10th percentile, there are three negative and weakly significant marginal effects out of 16 specifications. At the mean level of policy, there are two positive and significant marginal effects at the 5 percent level and an additional two positive and weakly significant marginal effects (10% level). There are six positive and significant marginal effects at the 5 percent level and two positive and weakly significant marginal effects when policy is at the 90th percentile. Similarly, in Panel B, in good policy countries, six marginal effects are positive and significant at the 5 percent level and one is weakly significant with 90th percentile policy; however, in low policy countries (10th percentile) there is one negative and significant marginal effect at the 5 percent level and two at the 10 percent level. At mean level of policy, there are three positive but weakly significant marginal effects.

Together, we find 15 significant (14 positive and one negative) marginal effects at the 5 percent level from the total 96. Of the 14 positive marginal effects, 12 are from countries with 90th percentile policy scores. This implies that a one percent increase in aid to a poor country with high policy, such as Bangladesh or Senegal, growth increases between 0.16 to 0.35 percentage points. Similarly, according to the 8/OLS model with ELR full sample, a one standard deviation increase in aid increases growth of a country with 90th percentile policy by approximately a 0.10 standard deviation.[20] In addition, all 14 positive and significant marginal effects are from OLS regressions, suggesting possible differences when controlling for endogeneity.

[20] 8/OLS regression with ELR full sample, reports standard deviation of aid =3.438.

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Combined, the extended sample OLS regressions provide some support for BD's conclusion that aid may slightly increase growth when a recipient country has top policy scores. The insignificant results from the 2SLS specifications and the overwhelming insignificant marginal effects make it difficult to conclude that aid is effective at increasing growth.

Post-Cold War Analysis

In Table 5, we examine the post-Cold War period (1990-2013) as the aid landscape changed significantly over this period (Griffin 2000, Dunning 2004, Frot et al. 2014).[21] We find 10 of 32 specifications with positive and significant interaction coefficients at the 5 percent level. We find one negative and significant (5% level) interaction coefficient from 7/2SLS. All positive and significant interactions are from models excluding outliers except for one.[22]

[21] See Appendix 2 for country differences among BD, ELR, and the post-1990 sample.
[22] This may indicate that the post-Cold war data exhibit more non-linear associations. BD argue the quadratic interaction terms control for the non-linear relation caused by outliers; hence, once the outliers are dropped the quadratic terms are excluded as well. The significant quadratic interaction terms are found in both the 1962-2013 and post 1990 samples. Previous findings also report significant quadratic terms (Hansen and Tarp 2000, Dayton-Johnson and Hoddinott 2003, Kohama et al., 2003). Also, Chatelain and Ralf (2014, p.94) find the quadratic interaction term can be a spurious effect.

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Table 1.5 Post-Cold War Sample, 1990-2013, BD and ELR regressions 4, 7, 5, 8

		Outliers included				Hadi Method, outliers excluded			
		All countries		Lower income		All countries		Lower income	
		4/OLS	4/2SLS	7/OLS	7/2SLS	5/OLS	5/2SLS	8/OLS	8/2SLS
Panel A: BD 1990-2013, coefficients for aid, policy, aid*policy and aid^2*policy									
Aid	New data, BD countries	-0.26	-0.76	-0.10	-0.61	-0.64***	-1.41**	-0.34	-0.75*
		(0.16)	(0.61)	(0.15)	(0.46)	(0.23)	(0.66)	(0.21)	(0.44)
	New data, full sample	-0.43**	-1.19*	-0.19	-0.77	-0.66**	-1.76**	-0.46	-0.96*
		(0.21)	(0.66)	(0.23)	(0.57)	(0.27)	(0.88)	(0.28)	(0.53)
Policy	New data, BD countries	0.66**	0.55	1.18**	2.38**	0.37	-0.09	0.88	0.39
		(0.30)	(0.43)	(0.49)	(1.19)	(0.26)	(0.41)	(0.61)	(0.75)
	New data, full sample	0.70**	0.64*	1.24**	2.41**	0.39*	0.07	0.96*	0.67
		(0.28)	(0.38)	(0.48)	(1.00)	(0.24)	(0.43)	(0.55)	(0.94)
Aid* policy	New data, BD countries	0.17	0.09	-0.01	-0.81	0.34***	0.68***	0.19*	0.41*
		(0.14)	(0.33)	(0.16)	(0.65)	(0.11)	(0.24)	(0.11)	(0.22)
	New data, full sample	0.13	0.04	-0.02	-0.73	0.28**	0.62**	0.21	0.38
		(0.13)	(0.32)	(0.14)	(0.51)	(0.12)	(0.31)	(0.13)	(0.28)
Aid^2* policy	New data, BD countries	-0.00	0.05	0.01	0.13*				
		(0.02)	(0.05)	(0.02)	(0.07)				
	New data, full sample	0.01	0.07	0.01	0.12**				
		(0.01)	(0.05)	(0.01)	(0.06)				
Observation	New data, BD countries	245	211	165	141	238	206	159	137
	New data, full sample	262	227	168	144	253	220	162	140
Panel B: ELR 1990-2013, coefficients for aid, policy, aid*policy and aid^2*policy									
Aid	New data, ELR countries	-0.46*	-1.13**	-0.23	-0.76*	-0.64***	-1.20***	-0.43	-0.95**
		(0.24)	(0.47)	(0.25)	(0.39)	(0.22)	(0.45)	(0.28)	(0.47)
	New data, full sample	-0.71*	-1.93***	-0.42	-1.41*	-1.37***	-2.71***	-0.95**	-2.06**
		(0.38)	(0.74)	(0.40)	(0.75)	(0.36)	(0.93)	(0.42)	(0.91)
Policy	New data, ELR countries	0.59**	0.57	1.34**	2.60***	0.33	-0.02	1.14*	0.81
		(0.27)	(0.39)	(0.55)	(0.92)	(0.25)	(0.37)	(0.65)	(0.95)
	New data, full sample	0.38	0.35	0.99*	1.28	-0.33	-0.71	0.53	-0.13
		(0.31)	(0.42)	(0.59)	(1.03)	(0.38)	(0.66)	(0.77)	(1.37)
Aid* policy	New data, ELR countries	0.21	0.03	-0.02	-0.85**	0.31***	0.56***	0.21	0.40
		(0.14)	(0.32)	(0.17)	(0.43)	(0.10)	(0.20)	(0.14)	(0.25)
	New data, full sample	0.32**	0.26	0.15	-0.05	0.70***	1.13***	0.49**	0.86*
		(0.15)	(0.30)	(0.17)	(0.42)	(0.17)	(0.41)	(0.20)	(0.44)
Aid^2* policy	New data, ELR countries	0.00	0.08	0.02	0.14***				
		(0.01)	(0.05)	(0.02)	(0.05)				
	New data, full sample	0.00	0.08	0.01	0.08*				
		(0.01)	(0.05)	(0.01)	(0.04)				
Observation	New data, ELR countries	272	238	180	156	263	230	174	151
	New data, full sample	300	259	199	169	287	249	192	164

Notes: Bootstrap standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1. Time fixed effects are included in all regressions. See Appendix 4 for regression specification. BD and ELR specifications differ in their definitions of regional dummies and low-income (see Appendix 7). See Appendix 3 for detailed variable description.

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Table 1.6 Marginal Effects, 1990-2013, BD and ELR regressions 4, 7, 5, 8

		Outliers included				Hadi Method, outliers excluded			
		All countries		Lower income		All countries		Lower income	
		4/OLS	4/2SLS	7/OLS	7/2SLS	5/OLS	5/2SLS	8/OLS	8/2SLS
Panel A: BD 1990-2013, coefficients for marginal effects of aid									
Policy at 10th percentile	New data, BD countries	-0.16	-0.60	-0.08	-0.78*	-0.17	-0.62	-0.06	-0.61*
		(0.15)	(0.53)	(0.14)	(0.46)	(0.13)	(0.41)	(0.12)	(0.33)
	New data, full sample	-0.24	-0.92	-0.14	-1.02**	-0.15	-0.48	-0.06	-0.66**
		(0.17)	(0.57)	(0.15)	(0.48)	(0.11)	(0.46)	(0.13)	(0.28)
Policy at mean	New data, BD countries	0.05	-0.28	-0.03	-1.10	0.06	-0.09	0.06	-0.29
		(0.18)	(0.49)	(0.18)	(0.73)	(0.10)	(0.35)	(0.11)	(0.38)
	New data, full sample	-0.07	-0.65	-0.09	-1.26**	0.04	-0.06	0.05	-0.43
		(0.18)	(0.58)	(0.17)	(0.63)	(0.10)	(0.36)	(0.11)	(0.36)
Policy at 90th percentile	New data, BD countries	0.15	-0.13	-0.01	-1.24	0.16	0.15	0.11	-0.15
		(0.22)	(0.53)	(0.23)	(0.90)	(0.12)	(0.37)	(0.14)	(0.46)
	New data, full sample	0.02	-0.52	-0.06	-1.38*	0.14	0.15	0.11	-0.32
		(0.21)	(0.62)	(0.21)	(0.75)	(0.12)	(0.35)	(0.14)	(0.45)
Observation	New data, BD	245	211	165	141	238	206	159	137
	New data, full	262	227	168	144	253	220	162	140
Panel B: ELR 1990-2013, coefficients for marginal effects of aid									
Policy at 10th percentile	New data, ELR countries	-0.22	-0.81**	-0.16	-0.94***	-0.18	-0.33	-0.07	-0.39
		(0.15)	(0.41)	(0.14)	(0.31)	(0.12)	(0.32)	(0.12)	(0.25)
	New data, full sample	-0.15	-1.03**	-0.10	-0.89***	-0.08	-0.43	-0.03	-0.46**
		(0.16)	(0.51)	(0.15)	(0.34)	(0.11)	(0.29)	(0.11)	(0.23)
Policy at mean	New data, ELR countries	-0.01	-0.53	-0.09	-1.09***	0.04	0.05	0.02	-0.27
		(0.15)	(0.45)	(0.14)	(0.40)	(0.09)	(0.26)	(0.09)	(0.24)
	New data, full sample	0.04	-0.75	0.00	-0.73*	0.10	-0.16	0.08	-0.30
		(0.13)	(0.48)	(0.12)	(0.37)	(0.09)	(0.27)	(0.09)	(0.24)
Policy at 90th percentile	New data, ELR countries	0.11	-0.37	-0.06	-1.17**	0.16	0.26	0.07	-0.21
		(0.17)	(0.50)	(0.17)	(0.49)	(0.11)	(0.27)	(0.12)	(0.29)
	New data, full sample	0.18	-0.52	0.08	-0.60	0.24**	0.07	0.16	-0.17
		(0.15)	(0.48)	(0.15)	(0.45)	(0.12)	(0.29)	(0.13)	(0.31)
Observation	New data, ELR	272	238	180	156	263	230	174	151
	New data, full	300	259	199	169	287	249	192	164

Notes: Bootstrap standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1. Marginal effects from Table 4

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Marginal effects based on Table 5 are reported in Table 6. Of the 96 marginal effects estimates from both BD and ELR specifications, we find 10 negative and significant marginal effects and one positive and significant marginal effect, at 5 percent or higher significance level. Negative marginal effects occur at all levels of the policy index, with or without outliers, and mostly in lower income countries. For example, according to the 7/2SLS models with ELR countries, a one percent increase in aid may decrease growth by 0.09 (10^{th} percentile policy), 0.14 (mean policy), or 0.19 (90^{th} percentile policy) percentage points.[23]

In the post-Cold War period, the majority of the marginal effects are still insignificant, consistent with the results from the 1962-2013 period; however, the significant marginal effects in this sample are mostly negative. This finding provides some evidence that aid may decrease growth regardless of the type of policy environment.

Overall, we find mixed results. Most of the estimations report insignificant coefficients and marginal effects. Thus, we are unable to support BD's conclusion that a good policy environment increases aid effectiveness. However, we are also unable to strongly support ELR's finding as we do find some positive and significant interaction term coefficients and marginal effects.

Alternative Measures of Institutions

Since BD and ELR's analysis, countries have improved their economic policies, such as becoming more free trade. These improvements could explain the differences in

[23] 7/2SLS regression with ELR sample, reports standard deviation of aid =3.097. We also calculate all the marginal effects of aid at policy mean +/- one standard deviation. The results are similar to the 90th and 10th percentiles of policy; hence, they are not reported in the tables to save space.

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results between the 1970-1993/97 sample and the post-Cold War sample. As ELR suggest, significant interactions may occur if the institutional environment of recipient countries improve. The updated trade openness variable indicates that 26 BD countries and 25 ELR countries now have an open trade status.[24] Under the 2SLS full country sample, comparing the 1970-1993/1997 sample with the post-1990 period, the mean policy score increases from 1.40 to 2.22 under BD specification, and increases from 1.67 to 2.18 under ELR specification.

Kurtosis in all samples is positive indicating heavily weighted tails. Skewness for 1970-1993/1997 is positive, but it is negative for the post 1990 sample (and the 1962-2013 extended sample). This suggests that policy scores increased, on average, after 1990. We illustrate this trend in Figure 1 plotting quartiles of the policy index. Figures 1a and 1b compare the policy trend using full country sample with BD's years (1970-1993) and the post 1990 sample. The majority of policy scores for the BD sample are below two but over two for the post-1990 sample. This suggests that policies are improving over time with better policies occurring post-1990.

[24] We also add three and four new countries that are not included in BD/ELR samples, respectively, regarding their openness status. Refer to Appendix 8 for more details.

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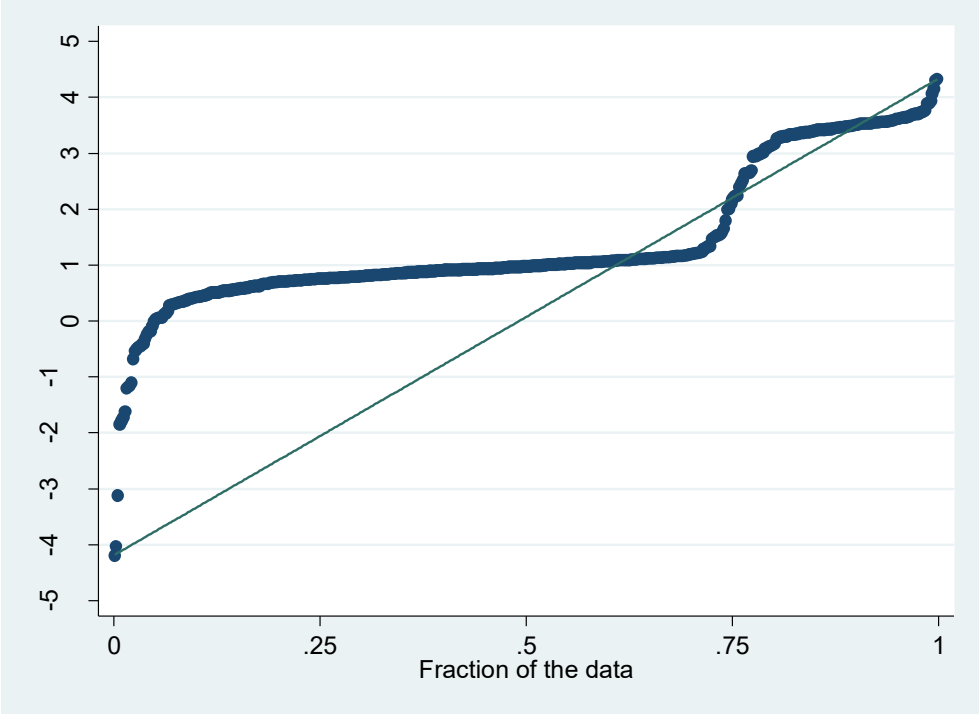

Figure 1a Quantile plot of policy, BD specification, 1970-1993 Full sample

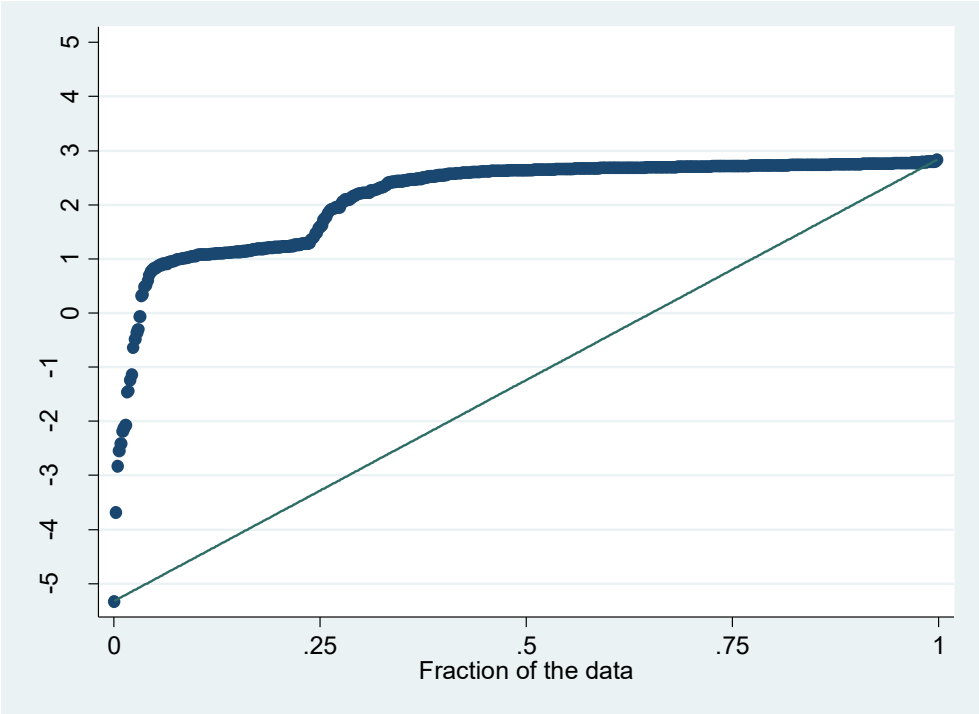

Figure 1b Quantile plot of policy, BD specification, 1990-2013 Full sample

Figure 1.1 Trend in Policy Scores

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If policy is improving over time, according to BD's argument, aid's conditional impact should also be increasing; however, we do not find evidence in support of this argument. This could be due to aid allocation patterns. Based on the post-1990 sample, we find, on average, that countries with bottom policy scores receive more aid than countries with top policy scores. The lower the policy score, the more aid tends to be allocated.[25] Donors continue to allocate disproportionately more aid to the poorest policy countries. This allocation makes sense if donors are facing a trade-off between good policy and low-income countries (Dowling and Hiemenz 1985; Schraeder et al. 1998; Neumayer 2005; Roodman 2008; Brückner 2013).

We test for this trade-off in the 1970-1993/1997 and post-1990 samples. In all the samples, the correlations between aid and policy are negative. In BD's sample, however, good policy countries positively correlate with aid providing additional evidence that BD's result is sample driven. The correlations between aid and GDP per capita are negative, as expected.

Along with the improvement of policy, institutional quality has also improved over time. At the time of BD's publication, the new institutional literature and data was in its infancy. BD used the available data on institutions from ICRG, holding the 1980 ICRG values constant throughout their sample. To make our results comparable with BD/ELR, our earlier tests used the 1980 ICRG values.

[25] For example, countries in the bottom 10% of policy scores receive about 20% (BD) or 30% (ELR) more aid than top 10% policy scoring countries, according to the 2SLS full country samples. These numbers increase to about seven times and 60 times when comparing the bottom 1% countries to the top 1% countries in policy scores, respectively.

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Table 1.7 Alternative Institutional Measures, full sample, 1990-2013, BD and ELR regressions 4, 7, 5, 8

		Outliers included				Hadi Method, outliers excluded			
		All countries		Lower income		All countries		Lower income	
		4/OLS	4/2SLS	7/OLS	7/2SLS	5/OLS	5/2SLS	8/OLS	8/2SLS
Panel A: ICRG 2016, 1990-2013 full sample coefficients for aid, policy and aid*policy									
Aid	BD specification	-0.71	-1.71	-0.11	-0.31	-0.76	-0.49	0.15	1.54
		(0.52)	(1.06)	(0.59)	(2.14)	(0.75)	(1.65)	(0.70)	(1.77)
	ELR specification	-0.80	-1.59*	-0.31	0.21	-1.17**	-1.12	-0.35	2.80
		(0.50)	(0.95)	(0.58)	(1.71)	(0.59)	(1.52)	(0.82)	(2.56)
Policy	BD specification	0.55	0.44	1.40	2.39	0.46	0.75	2.40**	4.25**
		(0.34)	(0.55)	(0.92)	(1.81)	(0.60)	(1.02)	(1.13)	(2.07)
	ELR specification	0.45	0.40	1.29*	2.62*	0.16	0.43	1.81	5.47*
		(0.33)	(0.50)	(0.78)	(1.49)	(0.52)	(0.91)	(1.14)	(2.90)
Aid*policy	BD specification	0.29	0.31	0.01	-0.61	0.34	0.16	-0.07	-0.79
		(0.22)	(0.42)	(0.25)	(0.83)	(0.34)	(0.74)	(0.32)	(0.78)
	ELR specification	0.34	0.35	0.05	-0.63	0.53*	0.39	0.15	-1.39
		(0.21)	(0.37)	(0.24)	(0.67)	(0.27)	(0.65)	(0.37)	(1.13)
Aid^2*policy	BD specification	0.01	0.06	0.01	0.09*				
		(0.01)	(0.05)	(0.01)	(0.05)				
	ELR specification	0.01	0.05	0.01	0.05				
		(0.01)	(0.06)	(0.01)	(0.04)				
Observation	BD specification	324	275	214	181	315	268	211	180
	ELR	324	275	199	169	315	268	195	167
Panel B: EFW 2016, 1990-2013 full sample coefficients for aid, policy and aid*policy with marginal effects									
Aid	BD specification	-1.22***	-2.94***	-0.94**	-2.95***	-1.19***	-1.51**	-0.67*	-1.20*
		(0.34)	(0.80)	(0.41)	(1.03)	(0.30)	(0.63)	(0.38)	(0.68)
	ELR specification	-1.15***	-2.86***	-0.85**	-3.21***	-1.16***	-1.57**	-0.54*	-1.13*
		(0.31)	(0.81)	(0.38)	(1.04)	(0.27)	(0.66)	(0.29)	(0.66)
Institution	BD specification	0.50**	0.26	0.68	0.05	0.33	0.39	0.66	0.41
		(0.23)	(0.29)	(0.43)	(0.57)	(0.23)	(0.28)	(0.45)	(0.52)
	ELR specification	0.51**	0.27	0.80**	0.13	0.34*	0.40	0.69**	0.46
		(0.20)	(0.29)	(0.33)	(0.57)	(0.20)	(0.28)	(0.32)	(0.52)
Aid*institution	BD specification	0.13***	0.30***	0.10*	0.31**	0.22***	0.20*	0.14*	0.19
		(0.05)	(0.10)	(0.06)	(0.14)	(0.06)	(0.12)	(0.07)	(0.13)
	ELR	0.12***	0.29***	0.08	0.31**	0.21***	0.20*	0.12**	0.18

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Table 1.7 (continued)

		(0.04)	(0.11)	(0.05)	(0.14)	(0.05)	(0.12)	(0.06)	(0.13)
Aid^2*institution	BD specification	0.01***	0.02**	0.01***	0.02**				
		(0.00)	(0.01)	(0.00)	(0.01)				
	ELR	0.01***	0.02**	0.01***	0.03***				
		(0.00)	(0.01)	(0.00)	(0.01)				
Panel C: EFW Marginal Effects									
EFW at 10th percentile	BD specification	-0.37***	-1.09***	-0.22*	-0.86***	-0.15**	-0.53***	-0.02	-0.27*
		(0.11)	(0.31)	(0.11)	(0.29)	(0.07)	(0.16)	(0.07)	(0.14)
	ELR	-0.36***	-1.08***	-0.23**	-0.99***	-0.16**	-0.58***	0.02	-0.24
		(0.11)	(0.32)	(0.12)	(0.31)	(0.07)	(0.18)	(0.07)	(0.15)
EFW at mean	BD specification	-0.13	-0.62**	-0.03	-0.38*	0.14	-0.28	0.14	-0.06
		(0.10)	(0.26)	(0.10)	(0.23)	(0.08)	(0.18)	(0.09)	(0.18)
	ELR	-0.13	-0.63**	-0.06	-0.50**	0.12	-0.33*	0.16*	-0.03
		(0.10)	(0.27)	(0.10)	(0.25)	(0.09)	(0.20)	(0.09)	(0.18)
EFW at 90th percentile	BD specification	0.10	-0.16	0.15	0.10	0.42***	-0.04	0.29**	0.15
		(0.13)	(0.29)	(0.14)	(0.31)	(0.14)	(0.28)	(0.14)	(0.30)
	ELR	0.09	-0.19	0.10	0.00	0.39***	-0.08	0.30**	0.18
		(0.13)	(0.30)	(0.14)	(0.32)	(0.14)	(0.29)	(0.14)	(0.30)
Observation	BD specification	435	320	285	208	428	315	282	207
	ELR	435	320	265	201	429	316	261	199

Notes: Bootstrap standard errors are reported in parentheses for Panel A. Robust standard errors are reported in parentheses for Panel B. Panel A updates the ICRG measure. Panel B replaces ICRG and policy index with EFW measures of institutions. Panel C reports the marginal effects based on Panel B. *** p<0.01, ** p<0.05, * p<0.1. Time fixed effects are included in all regressions. See Appendix 4 for regression specification. BD and ELR specifications differ in their definitions of regional dummies and low-income (see Appendix 7). See Appendix 3 for detailed variable description.

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To capture the changes in institution quality, Table 7 reports results from the post-Cold War sample utilizing two alternative institutional measures, varying values from ICRG (2016) and the economic freedom index (EFW) (Gwartney et al. 2016). In Panel A, we first replace the BD/ELR one point ICRG value for each country with varying ICRG data.[26] We find one positive and weakly significant interaction term coefficient at the 10 percent level (5/OLS, ELR specification). This finding suggests that once institutional quality is properly controlled, the aid-policy impact is weakened.

In Panel B, we drop ICRG values and include economic freedom scores. We also drop the policy index due to the overlap between economic freedom and the policy index. To test aid's conditional impact, we create an interaction term between aid and institutions. From the 16 regressions, we find nine positive and significant aid*institution interactions at the 5 percent or higher level—our strongest results yet.

Panel C reports the marginal effects from the economic freedom specifications reported in Panel B. As economic freedom increases, the marginal effects switch from negative to positive. Specifically, for countries with EFW scores in the 10th percentile, we find 11 out of 16 negative and significant marginal effects (5% or higher). At mean level EFW scores, there are three negative and significant marginal effects. In the top economically free countries (90th percentile), we find four positive and significant marginal effects.

These findings suggest in the presence of bad institution, aid could decrease growth. In a country with the average level of institutions, aid appears to be mostly

[26] The 2016 ICRG has changed their variables since BD. Following Rajan and Subramanian (2008), we take the sum of bureaucratic quality, rule of law, and corruption. Scores range 0-16. Data is available 1984-2015, so we only test for the post-1990 period in this table.

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irrelevant. There is some evidence that aid can increase growth in countries with high quality institutions, consistent with Burnside and Dollar (2004).

Sensitivity Analysis

Alternative Measurements of Growth and Aid

In this section, we further explore potential reasons why results differ across studies, including BD and ELR. Differences in variable measurements could be significant. For example, Ram and Ural (2014) compare real GDP per capita (PPP) in WDI and PWT and find large measurement differences. They suggest using both data sources for GDP as robustness.[27] When measuring growth, BD used PWT 5.6 and ELR utilized WDI (2002). In our previous tests, we also used data on growth from WDI. To test the sensitivity of the results, we switch our dependent variable to GDP growth rates collected from PWT 8.1 instead of WDI.[28]

In Table 8, at the 5 percent or higher significance level, in the 16 extended sample regressions, we find 10 positive and significant interaction term coefficients in the BD/ELR specifications. We also find seven positive and significant interaction terms in the 16 post-Cold War sample regressions. Collectively, we indeed find more significant interaction term coefficients compared to Table 3 (eight of 16 specifications) and Table 5 (six of 16 specifications).

[27] Ram and Ural (2014) compare PPP real GDP per capita in WDI 2011 with that in PWT 7.0 and between WDI 2012 and PWT 7.1.

[28] Given that in Tables 2-5, BD/ ELR countries and full country samples have very similar results, this section only reports full sample results.

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Table 1.8 Alternative dependent measure, PWT real GDP growth, full sample, 1962-2013 & 1990-2013, BD and ELR regressions 4, 7, 5, 8

		Outliers included				Hadi Method, outliers excluded			
		All countries		Lower income		All countries		Lower income	
		4/OLS	4/2SLS	7/OLS	7/2SLS	5/OLS	5/2SLS	8/OLS	8/2SLS
Panel A: BD specification, 1962-2013 & 1990-2013 full sample coefficients for aid, policy and aid*policy									
Aid	New data, 1962-2013	-0.45	-0.75	-0.29	0.06	-0.30	-0.68	-0.58*	-0.31
		(0.33)	(0.83)	(0.38)	(0.99)	(0.27)	(0.77)	(0.32)	(0.67)
	New data, 1990-2013	-1.30**	-4.00**	-0.73	-1.34	-0.92	-4.58***	-0.63	-1.15
		(0.63)	(1.98)	(0.72)	(1.87)	(0.65)	(1.64)	(0.56)	(1.43)
Policy	New data, 1962-2013	0.49*	0.26	0.81*	1.09*	0.50*	0.37	0.55*	0.55
		(0.29)	(0.33)	(0.45)	(0.64)	(0.27)	(0.29)	(0.33)	(0.47)
	New data, 1990-2013	0.32	-0.20	1.12	1.82	0.02	-0.79	0.39	0.57
		(0.58)	(0.67)	(0.79)	(1.41)	(0.34)	(0.51)	(0.53)	(0.80)
Aid* policy	New data, 1962-2013	0.25***	0.29	0.21**	-0.07	0.16***	0.28**	0.22***	0.25
		(0.07)	(0.27)	(0.09)	(0.36)	(0.06)	(0.14)	(0.08)	(0.15)
	New data, 1990-2013	0.33**	0.75	0.16	-0.15	0.35**	1.13***	0.26*	0.36
		(0.16)	(0.49)	(0.19)	(0.59)	(0.15)	(0.34)	(0.14)	(0.34)
Aid^2* policy	New data, 1962-2013	-0.01	0.01	-0.01	0.03				
		(0.01)	(0.04)	(0.01)	(0.05)				
	New data, 1990-2013	-0.00	0.03	-0.00	0.05				
		(0.01)	(0.06)	(0.02)	(0.06)				
Observation	New data, 1962-2013	538	443	343	283	528	437	338	279
	New data, 1990-2013	262	227	168	144	251	219	165	142
Panel B: ELR specification, 1962-2013 & 1990-2013 full sample coefficients for aid, policy and aid*policy									
Aid	New data, 1962-2013	-0.88***	-1.33	-0.68*	-0.67	-0.68*	-1.20	-0.62	-0.48
		(0.34)	(0.93)	(0.39)	(1.22)	(0.38)	(0.73)	(0.41)	(0.75)
	New data, 1990-2013	-2.07***	-5.26**	-1.34	-1.41	-2.42***	-4.61**	-2.89***	-1.81
		(0.73)	(2.23)	(0.88)	(3.06)	(0.89)	(1.85)	(0.89)	(2.11)
Policy	New data, 1962-2013	0.31	0.07	0.74	0.80	0.33	0.07	0.59*	0.42
		(0.31)	(0.33)	(0.48)	(0.57)	(0.23)	(0.30)	(0.34)	(0.44)
	New data, 1990-2013	0.01	-0.54	0.79	1.49	-0.29	-0.91*	-0.30	0.28
		(0.46)	(0.60)	(0.78)	(1.55)	(0.37)	(0.55)	(0.57)	(0.94)
Aid* policy	New data, 1962-2013	0.31***	0.35	0.26**	0.00	0.23***	0.42***	0.22**	0.30*
		(0.09)	(0.29)	(0.11)	(0.35)	(0.09)	(0.15)	(0.10)	(0.18)
	New data, 1990-2013	0.50***	0.87*	0.30	-0.13	0.66***	1.19***	0.80***	0.51
		(0.17)	(0.48)	(0.22)	(0.75)	(0.23)	(0.43)	(0.24)	(0.52)
Aid^2* policy	New data, 1962-2013	-0.01	0.02	-0.01	0.05				
		(0.00)	(0.05)	(0.01)	(0.05)				
	New data, 1990-2013	0.00	0.07	0.00	0.06				
		(0.01)	(0.06)	(0.01)	(0.06)				
Observation	New data, 1962-2013	600	493	393	321	591	488	385	317
	New data, 1990-2013	300	259	199	169	288	251	193	166

Notes: Bootstrap standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1. Time fixed effects are included in all regressions. See Appendix 4 for regression specification. BD and ELR specifications differ in their definitions of regional dummies and low-income (see Appendix 7). See Appendix 3 for detailed variable description. Results from BD/ELR countries are similar to the full sample, so only the full samples are reported to save space.

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Table 1.9 Marginal Effects, PWT real GDP growth, full sample, 1962-2013& 1990-2013, BD and ELR regressions 4, 7, 5, 8

		Outliers included				Hadi Method, outliers excluded			
		All countries		Lower income		All countries		Lower income	
		4/OLS	4/2SLS	7/OLS	7/2SLS	5/OLS	5/2SLS	8/OLS	8/2SLS
Panel A: BD specification, 1962-2013 & 1990-2013 full sample coefficients for marginal effects of aid scores									
Policy at 10th percentile	New data, 1962-2013	0.12	0.09	0.14	0.25	0.06	0.07	0.01	0.37
		(0.28)	(0.80)	(0.27)	(0.73)	(0.15)	(0.45)	(0.16)	(0.36)
	New data, 1990-2013	-0.41	-1.73	-0.31	-1.13	-0.17	-1.15*	-0.16	-0.32
		(0.52)	(1.32)	(0.50)	(1.20)	(0.17)	(0.65)	(0.20)	(0.60)
Policy at mean	New data, 1962-2013	0.37	0.49	0.31	0.33	0.28**	0.43	0.25*	0.66**
		(0.29)	(0.85)	(0.28)	(0.74)	(0.13)	(0.39)	(0.13)	(0.28)
	New data, 1990-2013	-0.01	-0.69	-0.12	-1.03	0.27*	-0.16	0.27	0.25
		(0.55)	(1.26)	(0.53)	(1.17)	(0.16)	(0.46)	(0.18)	(0.45)
Policy at 90th percentile	New data, 1962-2013	0.67**	0.92	0.55	0.44	0.54***	0.82**	0.58***	1.01***
		(0.33)	(0.97)	(0.35)	(0.85)	(0.16)	(0.39)	(0.17)	(0.33)
	New data, 1990-2013	0.19	-0.22	-0.01	-0.98	0.47**	0.26	0.52**	0.56
		(0.59)	(1.31)	(0.58)	(1.30)	(0.19)	(0.44)	(0.23)	(0.50)
Observation	New data, 1962-2013	538	443	343	283	528	437	338	279
	New data, 1990-2013	262	227	168	144	251	219	165	142
Panel B: ELR specification, 1962-2013 & 1990-2013 full sample coefficients for marginal effects of aid									
Policy at 10th percentile	New data, 1962-2013	-0.03	-0.07	0.01	0.06	-0.14	0.07	-0.09	0.42
		(0.24)	(0.71)	(0.23)	(0.76)	(0.13)	(0.39)	(0.14)	(0.38)
	New data, 1990-2013	-0.48	-1.82	-0.35	-0.95	-0.21	-0.26	-0.21	-0.04
		(0.37)	(1.14)	(0.37)	(1.07)	(0.18)	(0.47)	(0.17)	(0.49)
Policy at mean	New data, 1962-2013	0.23	0.34	0.20	0.27	0.12	0.47	0.14	0.69**
		(0.24)	(0.73)	(0.24)	(0.72)	(0.12)	(0.33)	(0.12)	(0.30)
	New data, 1990-2013	-0.12	-1.03	-0.15	-0.85	0.09	0.27	0.09	0.11
		(0.36)	(1.06)	(0.37)	(0.80)	(0.17)	(0.38)	(0.15)	(0.34)
Policy at 90th percentile	New data, 1962-2013	0.57**	0.82	0.47	0.55	0.46***	0.96***	0.49***	1.05***
		(0.27)	(0.82)	(0.29)	(0.74)	(0.16)	(0.34)	(0.16)	(0.32)
	New data, 1990-2013	0.14	-0.48	0.03	-0.77	0.31	0.68*	0.34*	0.23
		(0.38)	(1.05)	(0.41)	(0.77)	(0.19)	(0.40)	(0.20)	(0.38)
Observation	New data, 1962-2013	600	493	393	321	591	488	385	317
	New data, 1990-2013	300	259	199	169	288	251	193	166

Notes: Bootstrap standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1.

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To further compare our results, Table 9 reports the marginal effects based on Table 8. Most marginal effects are insignificant. At low levels of policy, we find one (out of 32 specifications) negative and weakly significant marginal effect in the post-Cold War sample. At average policy levels, there are three positive and significant marginal effects at the 5 percent level. In high policy countries, we find 12 (out of 32) positive and significant marginal effects at the 5 percent significance level, 10 of which are from the extended sample.

This is consistent with the marginal effects reported in Table 4 for the 1962-2013 sample. However, marginal effects for the post-1990 sample are less consistent. From the full sample of countries, we find seven significant interaction terms (six negative and one positive, at the 5 percent level) out of 48 specifications reported in Table 6. We find two positive and significant marginal effects out of 48 calculations reported in Table 9, in countries with good policies. This may suggest more variation between the two measures of growth post-Cold War.

Together, this provides another potential reason why BD found significance and ELR did not—the measurement of growth is sensitive to methodology differences between PWT and WDI. The specifications provided in Tables 8 and 9 from the extended samples are the strongest in favor of BD. When including post-Cold War samples, however, the majority of interaction term coefficients remain insignificant, as do the marginal effects from both the extended and post-1990 period.

Next, we examine how measurement of foreign aid may cause differences in the results. We use two alternative measurements, constant 2005 dollar EDA and ODA. Previously, we adopt ELR's aid measurement that divides current dollar EDA by current

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dollar GDP. BD, however, use nominal aid flows and nominal GDP, deflated with the unit-value of imports price index from International Financial Statistics. This difference in the construction of aid provides another potential reason for different findings across aid studies, including BD and ELR.

In order to exhaust this possibility, in Table 10 we retest the extended and post-1990 samples with BD's measure of aid. Unfortunately, the unit-value of imports price index is not available before 2000; thus, we follow Hsieh and Klenow (2007) and Caselli and Feyrer (2007) and use the investment deflator from PWT 9.0 to deflate nominal EDA to calculate aid flows.[29]

Of the 32 specifications, we find seven positive and significant interaction term coefficients at the 5 percent level or higher, five of which are from the extended sample. All significant interactions are in models with outliers excluded. Compared to previous tables, by switching to BD constructed aid measure, we find fewer significant interaction terms. This finding does suggest that there are difference in the findings based on the measurement of aid; however, it does not provide any additional support in favor of BD conclusion. The results provide some indication that BD's measurement of aid is more sensitive to outliers.

[29] We thank an anonymous reviewer for this comment. WDI (2014) has GDP in constant 2005 dollars, but EDA (based on ODA) is in constant 2012 dollars. Since PWT 8.1 ends in 2011, we rescale EDA to constant 2005 dollars with price level of capital formation in PWT 9.0.

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Table 1.10 Alternative Aid Measure, constant 2005 dollar EDA, full sample, 1962-2013 & 1990-2013, BD and ELR regressions 4, 7, 5, 8

		Outliers included				Hadi Method, outliers excluded			
		All countries		Lower income		All countries		Lower income	
		4/OLS	4/2SLS	7/OLS	7/2SLS	5/OLS	5/2SLS	8/OLS	8/2SL
Panel A: BD specification, 1962-2013 & 1990-2013 full sample coefficients for aid, policy and aid*policy									
Aid	New data, 1962-2013	-0.02	-0.10	-0.00	0.04	-0.15**	-0.31*	-0.11*	-0.20
		(0.05)	(0.21)	(0.05)	(0.15)	(0.06)	(0.17)	(0.06)	(0.14)
	New data, 1990-2013	-0.04	-0.02	-0.01	-0.11	-0.29***	-0.51**	-0.21*	-0.43*
		(0.08)	(0.37)	(0.07)	(0.22)	(0.10)	(0.24)	(0.12)	(0.22)
Policy	New data, 1962-2013	0.97**	0.77**	1.21**	1.43**	0.84***	0.68**	1.00***	0.65*
		(0.16)	(0.22)	(0.26)	(0.57)	(0.13)	(0.17)	(0.21)	(0.35)
	New data, 1990-2013	0.93**	1.02**	1.40**	1.67**	0.42*	0.21	0.97*	0.50
		(0.32)	(0.36)	(0.44)	(0.84)	(0.25)	(0.35)	(0.55)	(1.09)
Aid* policy	New data, 1962-2013	0.00	0.05	-0.01	-0.05	0.04**	0.10**	0.03	0.08*
		(0.02)	(0.08)	(0.02)	(0.09)	(0.02)	(0.05)	(0.02)	(0.04)
	New data, 1990-2013	0.02	-0.05	-0.00	-0.04	0.11***	0.20**	0.08	0.16*
		(0.03)	(0.15)	(0.03)	(0.11)	(0.04)	(0.08)	(0.05)	(0.09)
Aid^2* policy	New data, 1962-2013	-0.00	0.00	0.00	0.00				
		(0.00)	(0.00)	(0.00)	(0.00)				
	New data, 1990-2013	-0.00	0.00	0.00	0.00				
		(0.00)	(0.00)	(0.00)	(0.00)				
Observation	New data, 1962-2013	517	432	331	273	504	423	324	270
	New data, 1990-2013	245	216	156	134	237	212	149	131
Panel B: ELR specification, 1962-2013 & 1990-2013 full sample coefficients for aid, policy and aid*policy									
Aid	New data, 1962-2013	-0.03	-0.32	-0.01	-0.08	-0.13**	-0.40**	-0.11	-0.39*
		(0.04)	(0.21)	(0.04)	(0.22)	(0.06)	(0.20)	(0.07)	(0.21)
	New data, 1990-2013	-0.04	-0.01	-0.01	-0.11	-0.22*	-0.14	-0.03	-0.10
		(0.08)	(0.39)	(0.06)	(0.31)	(0.12)	(0.30)	(0.14)	(0.30)
Policy	New data, 1962-2013	0.90**	0.40	1.20**	1.11	0.89***	0.43**	0.91***	-0.05
		(0.18)	(0.30)	(0.29)	(0.92)	(0.22)	(0.21)	(0.31)	(0.56)
	New data, 1990-2013	0.81**	0.98**	1.36**	1.72*	0.78**	0.87**	1.92***	2.01
		(0.32)	(0.44)	(0.51)	(0.92)	(0.34)	(0.38)	(0.61)	(1.31)
Aid* policy	New data, 1962-2013	0.01	0.20*	0.01	0.02	0.05**	0.18**	0.04	0.17**
		(0.01)	(0.11)	(0.02)	(0.15)	(0.02)	(0.07)	(0.03)	(0.08)
	New data, 1990-2013	0.02	-0.04	0.00	-0.04	0.09*	0.05	0.01	0.03
		(0.03)	(0.20)	(0.03)	(0.18)	(0.05)	(0.12)	(0.05)	(0.12)
Aid^2* policy	New data, 1962-2013	-0.00	-0.00	-0.00	0.00				
		(0.00)	(0.00)	(0.00)	(0.00)				
	New data, 1990-2013	-0.00	0.00	-0.00	0.00				
		(0.00)	(0.00)	(0.00)	(0.00)				
Observation	New data, 1962-2013	567	474	370	304	553	465	358	297
	New data, 1990-2013	271	240	176	152	265	238	171	151

Notes: Bootstrap standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1. Time fixed effects are included in all regressions. See Appendix 4 for regression specification. BD and ELR specifications differ in their definitions of regional dummies and low-income (see Appendix 7). See Appendix 3 for detailed variable description. Results from BD/ELR countries are similar to the full sample, so only the full samples are reported to save space.

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Table 1.11 Alternative Aid Measure, ODA, full sample, 1962-2013 & 1990-2013, BD and ELR regressions 4, 7, 5, 8

		Outliers included				Hadi Method, outliers excluded			
		All countries		Lower income		All countries		Lower income	
		4/OLS	4/2SLS	7/OLS	7/2SLS	5/OLS	5/2SLS	8/OLS	8/2SL
Panel A: BD specification, 1962-2013 & 1990-2013 full sample coefficients for aid, policy and aid*policy									
Aid	New data, 1962-2013	-0.05	-0.60**	0.02	-0.39	-0.08	-0.44*	-0.02	-0.27
		(0.08)	(0.30)	(0.09)	(0.27)	(0.09)	(0.26)	(0.11)	(0.26)
	New data, 1990-2013	-0.34**	-0.95*	-0.15	-0.62	-0.53**	-1.40**	-0.37	-0.76*
		(0.16)	(0.53)	(0.18)	(0.45)	(0.21)	(0.69)	(0.22)	(0.42)
Policy	New data, 1962-2013	0.77**	0.81**	0.87**	1.24**	0.83**	0.62***	0.95***	0.66
		(0.14)	(0.22)	(0.23)	(0.49)	(0.15)	(0.17)	(0.24)	(0.40)
	New data, 1990-2013	0.70**	0.64*	1.24**	2.41**	0.39*	0.07	0.96*	0.67
		(0.28)	(0.38)	(0.47)	(1.00)	(0.24)	(0.42)	(0.56)	(0.94)
Aid* policy	New data, 1962-2013	0.10**	-0.09	0.09	-0.25	0.07*	0.20***	0.05	0.15
		(0.05)	(0.16)	(0.06)	(0.20)	(0.04)	(0.07)	(0.05)	(0.10)
	New data, 1990-2013	0.10	0.03	-0.02	-0.58	0.22**	0.50**	0.17	0.30
		(0.10)	(0.25)	(0.11)	(0.40)	(0.10)	(0.25)	(0.10)	(0.22)
Aid^2* policy	New data, 1962-2013	-0.00	0.04*	-0.01	0.05**				
		(0.00)	(0.02)	(0.00)	(0.02)				
	New data, 1990-2013	0.01	0.05	0.01	0.08**				
		(0.01)	(0.03)	(0.01)	(0.04)				
Observation	New data, 1962-2013	538	443	343	283	530	439	338	281
	New data, 1990-2013	262	227	168	144	253	220	162	140
Panel B: ELR specification, 1962-2013 & 1990-2013 full sample coefficients for aid, policy and aid*policy									
Aid	New data, 1962-2013	-0.24**	-0.82**	-0.17	-1.00**	-	-0.72**	-0.34**	-0.70*
		(0.10)	(0.33)	(0.12)	(0.42)	(0.13)	(0.30)	(0.15)	(0.38)
	New data, 1990-2013	-0.57*	-1.54**	-0.34	-1.13*	-	-	-0.75**	-
		(0.31)	(0.61)	(0.32)	(0.60)	(0.29)	(0.76)	(0.35)	(0.73)
Policy	New data, 1962-2013	0.58**	0.51**	0.73**	0.61	0.61**	0.40**	0.63**	0.20
		(0.18)	(0.24)	(0.30)	(0.58)	(0.15)	(0.20)	(0.30)	(0.53)
	New data, 1990-2013	0.38	0.35	0.99*	1.28	-0.33	-0.71	0.53	-0.13
		(0.32)	(0.42)	(0.59)	(1.03)	(0.38)	(0.66)	(0.79)	(1.38)
Aid* policy	New data, 1962-2013	0.18**	0.13	0.16**	-0.03	0.19**	0.33***	0.20***	0.35**
		(0.05)	(0.18)	(0.07)	(0.24)	(0.05)	(0.10)	(0.06)	(0.17)
	New data, 1990-2013	0.26**	0.21	0.12	-0.04	0.56**	0.90***	0.39**	0.69*
		(0.12)	(0.24)	(0.14)	(0.34)	(0.13)	(0.34)	(0.16)	(0.35)
Aid^2* policy	New data, 1962-2013	-0.00	0.03	-0.00	0.06*				
		(0.00)	(0.03)	(0.00)	(0.03)				
	New data, 1990-2013	0.00	0.05	0.00	0.05*				
		(0.01)	(0.03)	(0.00)	(0.03)				
Observation	New data, 1962-2013	600	493	393	321	591	488	388	320
	New data, 1990-2013	300	259	199	169	287	249	192	164

Notes: Bootstrap standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1. Time fixed effects are included in all regressions. See Appendix 4 for regression specification. BD and ELR specifications differ in their definitions of regional dummies and low-income (see Appendix 7). See Appendix 3 for detailed variable description. Results from BD/ELR countries are similar to the full sample, so only the full samples are reported to save space.

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Another possible issue is that our EDA measure, following ELR, is calculated by extrapolating Chang et al.'s (1998) EDA from ODA. This estimation may be biased if the linear association between EDA and ODA does not hold. Following Dalgaard and Hansen (2001), we simply swap EDA with ODA to check for any difference in the aid-poliy-growth association due to measurement issues.

In Table 11, we retest both the extended and post-1990 samples. By employing ODA, we have 14 positive and significant interaction term coefficients out of 32, the same as the sum of that from Tables 3 and 5. Together, Tables 10 and 11 demonstrate minor differences in the results due to the construction of aid that do not influence the overall conclusion of the aid-policy-growth association.

Alternative Methodologies

Lastly, we switch from OLS and 2SLS models to models using Fixed Effects (FE), First-difference (FD), or System Generalized Method of Moments (GMM). FE captures country specific unobservable or omitted features. Lu and Ram (2001) find that country dummies cancel the conditional effect of aid*policy on growth. Hansen and Tarp (2001) conclude that fixed effects increases the significance of aid's overall impact on growth. First differencing addresses issues with omitted variables in cross-country panel data. It is a common methodology when analyzing aid effectiveness (Yontcheva and Masud 2005; Clemens et. al 2012; Minasyan 2016). GMM has become more common in the aid literature as a means of addressing endogeneity (Hansen and Tarp 2001; Rajan and Subramanian 2008; Djankov et.al 2008; and Clemens et.al 2012).

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Table 1.12 Alternative Methodologies, FE, FD & system GMM, full sample, BD and ELR regressions 4, 7, 5, 8

		Outliers included						Hadi Method, outliers excluded					
		All countries			Lower income			All countries			Lower income		
		4/FE	4/FD	4/GMM	7/FE	7/FD	7/GMM	5/FE	5/FD	5/GMM	8/FE	8/FD	8/GMM
Panel A: BD specification, 1990-2013 full sample coefficients for aid, policy and aid*policy													
Aid	New data, 1962-2013	0.12	0.04	0.12	0.14	0.12	0.93	0.03	-0.00	0.08	0.04	0.10	-0.89
		(0.11)	(0.13)	(1.99)	(0.13)	(0.16)	(3.76)	(0.15)	(0.12)	(0.69)	(0.17)	(0.14)	-
	New data, 1990-2013	-0.07	0.15	-1.12	0.28	0.20	-1.35	-1.04**	-0.02	-0.60	-0.39	0.21	-1.31
		(0.38)	(0.24)	(1.16)	(0.44)	(0.26)	(1.01)	(0.41)	(0.17)	(2.32)	(0.45)	(0.17)	(2.02)
Policy	New data, 1962-2013	0.82***	0.91***	1.23	0.83***	1.44***	2.81	0.88***	1.02***	0.93	0.94***	1.54***	0.41
		(0.18)	(0.27)	(4.54)	(0.25)	(0.44)	(32.91)	(0.17)	(0.28)	(0.79)	(0.26)	(0.43)	-
	New data, 1990-2013	0.42	0.90*	-0.19	1.26	1.83**	-0.74	0.31	1.01**	0.08	1.56**	2.20***	0.56
		(0.38)	(0.47)	(4.40)	(1.05)	(0.90)	(3.00)	(0.44)	(0.44)	(2.94)	(0.79)	(0.82)	(2.15)
Aid*policy	New data, 1962-2013	0.13*	0.09	0.15	0.13	-0.01	-0.04	0.07	0.00	0.02	0.06	-0.07	0.31
		(0.07)	(0.07)	(1.00)	(0.08)	(0.09)	(2.93)	(0.07)	(0.05)	(0.26)	(0.07)	(0.06)	-
	New data, 1990-2013	0.43**	0.20	0.52	0.25	-0.02	0.70	0.52**	-0.02	0.34	0.20	-0.19*	0.63
		(0.19)	(0.14)	(3.19)	(0.24)	(0.16)	(0.80)	(0.21)	(0.10)	(1.12)	(0.20)	(0.10)	(0.67)
Aid^2*policy	New data, 1962-2013	-0.01	-0.01	-0.01	-0.01	-0.00	-0.01						
		(0.01)	(0.01)	(0.07)	(0.01)	(0.01)	(0.04)						
	New data, 1990-2013	-0.03	-0.02	0.00	-0.02	-0.01	-0.01						
		(0.02)	(0.01)	(0.23)	(0.02)	(0.01)	(0.05)						
Observation	New data, 1962-2013	538	641	536	343	419	341	530	634	522	338	415	332
	New data, 1990-2013	262	299	208	168	198	133	253	296	196	162	194	123
Number of countries	New data, 1962-2013	55		55	36		36	55		55	36		36
	New data, 1990-2013	54		51	35		33	54		51	35		32
AR(2) test p- value[1]	New data, 1962-2013			0.64			0.96			0.93			0.82
	New data, 1990-2013			0.70			0.49			0.22			0.66
Sargan/Hansen p- value [2]	New data, 1962-2013			1.00			1.00			1.00			1.00
	New data, 1990-2013			0.86			1.00			0.70			0.99

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Table 1.12 (continued)

		Outliers included						Hadi Method, outliers excluded					
		All countries			Lower income			All countries			Lower income		
		4/FE	4/FD	4/GMM	7/FE	7/FD	7/GMM	5/FE	5/FD	5/GMM	8/FE	8/FD	8/GMM
Panel B: ELR specification, full sample coefficients for aid, policy and aid*policy													
Aid	New data, 1962-2013	-0.01	0.04	-0.25	0.05	0.07	0.47	-0.11	-0.00	-0.15	-0.20	0.04	-0.87
		(0.14)	(0.13)	(0.76)	(0.18)	(0.14)	(0.54)	(0.19)	(0.13)	(0.93)	(0.22)	(0.13)	(1.17)
	New data, 1990-2013	-0.29	0.07	-	0.57	0.01	-0.94	-	-0.04	-0.10	-0.40	-0.03	0.66
		(0.47)	(0.17)	-	(0.53)	(0.19)	(1.31)	(0.56)	(0.16)	(0.99)	(0.54)	(0.14)	(6.08)
Policy	New data, 1962-2013	0.75***	0.91***	0.97	0.91**	1.15***	3.19	0.84***	1.03***	0.99	0.86**	1.25***	0.05
		(0.20)	(0.27)	(0.77)	(0.39)	(0.38)	(2.56)	(0.20)	(0.30)	(1.49)	(0.38)	(0.34)	(1.67)
	New data, 1990-2013	0.31	0.78**	-	3.76***	1.14**	0.39	0.26	0.85**	1.12	2.49**	0.95*	2.14
		(0.40)	(0.39)	-	(1.12)	(0.55)	(2.05)	(0.66)	(0.36)	(1.31)	(1.03)	(0.54)	(8.83)
Aid*policy	New data, 1962-2013	0.16**	0.09	0.08	0.15	0.03	-0.30	0.11	0.00	0.13	0.16*	-0.02	0.47
		(0.08)	(0.07)	(0.30)	(0.09)	(0.08)	(0.52)	(0.08)	(0.05)	(0.52)	(0.10)	(0.05)	(0.57)
	New data, 1990-2013	0.36*	0.19	-	-0.13	-0.04	0.52	0.76***	0.02	0.06	0.15	-0.02	-0.24
		(0.21)	(0.15)	-	(0.21)	(0.13)	(0.74)	(0.29)	(0.08)	(0.43)	(0.26)	(0.08)	(3.20)
Aid^2*policy	New data, 1962-2013	-0.01	-0.01	0.00	-0.01	-0.00	0.00						
		(0.01)	(0.01)	(0.02)	(0.01)	(0.00)	(0.02)						
	New data, 1990-2013	-0.02	-0.02	-	-0.01	0.00	-0.01						
		(0.02)	(0.02)	-	(0.02)	(0.01)	(0.04)						
Observation	New data, 1962-2013	591	641	596	384	402	389	582	635	580	379	400	381
	New data, 1990-2013	297	299	-	196	181	157	285	297	222	190	179	146
Number of countries	New data, 1962-2013	64		65	43		44	63		64	42		43
	New data, 1990-2013	62		-	41		39	62		59	41		38
AR(2) test p- value[1]	New data, 1962-2013			0.44			0.57			0.75			1.00
	New data, 1990-2013			-			0.88			0.81			0.69
Sargan/Hansen p- value [2]	New data, 1962-2013			1.00			1.00			1.00			1.00
	New data, 1990-2013			-			1.00			0.51			0.95

Notes: Bootstrap standard errors are reported in parentheses for FE and FD; robust standard errors are reported in parentheses for GMM due to insufficient observations for bootstrapping *** p<0.01, ** p<0.05, * p<0.1. Time fixed effects are included in all regressions. See Appendix 4 for regression specification. BD and ELR specifications differ in their definitions of regional dummies and low-income (see Appendix 7). See Appendix 3 for detailed variable description. Results from BD/ELR countries are similar to the full sample, so only the full samples are reported to save space. [1] The null hypothesis is that the error term exhibits no second-order serial correlation. [2] The null hypothesis is that the instruments are valid-not correlated with the residuals.

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In Table 12 we report BD (Panel A) and ELR's (Panel B) specifications for the extended and post-Cold War periods for the full country sample. At 5 percent or higher level, from the 24 extended period regressions, we find two positive and significant interaction term coefficients. There is one additional positive and significant interaction term coefficients in the post-1990 sample. Of the three

significant interactions, two are from fixed effects models and one is from a GMM specification. No significant interactions are identified from the FD models. With different methodologies, in both the extended sample and post-1990 sample, the evidence supporting aid contributing to growth in a good policy environment is minimal. In addition, there are fewer significant interactions compared to our earlier test using BD original models, suggesting that the results are associated with model selection.

We find some differences by using alternative measurements of key variables and different methodologies; however, none of these changes provides enough evidence to alter our previous conclusion. Under certain scenarios, aid may promote growth in the presence of good policies, but the majority of results suggest aid is ineffective. There is additional evidence that aid may harm growth in poor policy environments. Thus, both BD and ELR can be right.

Recent aid literature raises concerns about weak and invalid instrumental variables (Clemens et al. 2012; Dreher et al. 2014; Dreher and Langlotz 2015). Bazzi and Clemens (2009) and Deaton (2009) question the use of population, political relations, or historical/colonial ties as valid instruments for foreign aid.

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We attempt to find more suitable instruments but were unable to find satisfactory alternatives. For example, we tried using United Nations voting alignment and membership on the United Nations Security Council (Dreher and Sturm 2012; Dreher et al. 2011). Both variables are associated with political alignment of donors and more aid dollars to recipient countries.[30] Using both alternative instruments together, there are no significant interaction term coefficients. However, our specifications could not pass the Cragg-Donald test. This is due to three endogenous regressors in the first stage regression, aid, aid*policy and aid^2*policy (Stock, Wright, and Yogo, 2002). Specifications using BD's original instruments from both BD/ELR's original samples and our updated sample, also fail the Cragg-Donald test. These additional results are not tabulated to save space but are available upon request.

We also attempted to use a new instrument for aid, an indicator variable identify if a country exceeded the IDA income threshold (Galiani et al. 2017). However, this method does not provide sufficient observations in our sample.

Lastly, we retested our specifications by creating long-run averages. Arndt et al. (2010, p.6) argue "the aid-growth relationship is only likely to emerge over a long time-horizon." Arndt et al. (2015) confirm the long-term (30 years) positive effect of aid on growth. They find that a sustained foreign aid inflow of about 10% of GDP is expected to increase per capita growth rates by an average of 1 percentage point. Other works support

[30] UN voting calculates the key votes share of an aid recipient country that are in line with major aid donors, also the G7 countries (Canada, France, U.K., Germany, Italy, Japan and the U.S) in the United Nations General Assembly (UNGA). As voting alignment signals like-mindedness and political alignment in hopes of receiving more aid (Bjørnskov 2013; Midtgaard et al. 2014; Creasey et al. 2015). The second instrument is a dummy variable indicating if a recipient country serves as a temporary member on the United Nations Security Council (UNSC). Temporary members receive substantially more aid dollars while serving on the UNSC (Kuziemko and Werker 2006; Dreher et al. 2009a, 2009b).

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the argument that aid's effect requires a longer time horizon (Roodman 2007; Rajan and Subramanian 2008).

Thus, we re-aggregate the samples with multiple longer run periods, including 12-year averages, the average from 1970-1993/1997, 1990-2013 average, and a full sample average from 1962-2013. With the exception of a few specifications, almost all regressions do not have significant interaction term coefficients and the marginal effects are insignificant. The 52 year long run sample does not provide any support for BD's conclusion. In BD's framework, the period length appears irrelevant. These results are not tabulated to save space.

Conclusion

In this paper, we attempt to shed light on the aid-policy-growth debate by empirically demonstrating how both sides can be 'right'. Our tests indicate that BD's results are mainly driven by its sample, choice of GDP measurement, and model selection. In fact, we are unable to replicate BD's original findings unless we reintroduce their unique observations. This finding reflects the data sensitive feature of the aid-growth literature, including the findings of BD or ELR.

Consistent with findings in Roodman (2007a), we also find that results are fragile and driven by arbitrariness in specification choices and samples. Qian (2015) further discusses differences in results associated with measurement issues due partly to the heterogeneous nature of aid. Roodman (2007b) concludes that effects of aid on growth cannot be detected with limited and noisy data. This conclusion is clearly reflected in our research as we are unable to reach a definitive association between aid, policy, and growth.

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Donors, and the aid community in general, emphasize that in order to make aid effective at achieving its targeted goals, donors need to be more selective in allocating aid to countries with better institutions. Our findings suggest that even if donors become more selective, it is likely that aid will remain ineffective. Moreover, economic reasoning tells us that countries most in need of aid are in need because they lack growth-enhancing institutions. Thus, where aid is needed it will likely be ineffective. On the contrary, where aid can be effective, in countries with sound economic and political institutions, it is not needed. They will grow as a result of adopting quality institutions and growth-enhancing policies. This interpretation of the aid selectivity literature is directly applicable to BD's findings.

Hansen and Tarp (2000, p.394) warn against using single-cause explanations and mechanic aid allocation rules to guide policy makers. Our empirical exercises support this warning. In addition, we encourage academics and policy makers to not solely rely on empirical results to guide policy. Instead, economic reasoning should remain central to any policy recommendation. Re-examining the aid-policy-growth debate remains an important undertaking as policymakers continue to operate as if aid can be made effective if given under the 'right' conditions.

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CHAPTER II

FOREIGN AID: BOOSTING OR HINDERING ENTREPRENEURSHIP?

Introduction

With increasing agreement, the importance of entrepreneurship is recognized as a key factor for economic development (Brown and Thornton, 2013; Holcombe, 2007). In fact, there is a strand of literature arguing that entrepreneurship is the driver of economic growth (Audretsch 2006; Audretsch et al., 2006; Coyne and Leeson, 2004; Harper 2003). Specifically, Schumpeter (1934,1939) and Kirzner (1973, 1992, 1997) both emphasize the role of the entrepreneur as an innovator. Innovation increases productivity, which is the source of Smithian economic growth (Holcombe,1998). Boettke and Coyne (2003) argue that stimulating entrepreneurial activities will spur economic development and growth. McCloskey and Klamer (1995) estimate that entrepreneurship generates about one quarter of GDP by lowering transaction costs.

More than that, different 'types' of entrepreneurship – productive or non-productive – may have opposite multiplier effects in an economy (Baumol, 1990; Coyne and Leeson, 2004). Productive entrepreneurship leads to innovation and economic progress, as aforementioned, while non-productive entrepreneurs, *"seek transfers from those who are productive," "reduce social welfare,"* (Coyne at. el, 2010, p.334) and create economic stagnation (Coyne and Leeson, 2004; Coyne et al., 2010; Murphy et al., 1991). For developing countries, the differentiation between productive and non-productive

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entrepreneurship provides insights into the persistence of low growth and pervasive poverty (Coyne et. al, 2010).

In the policy realm, encouraging entrepreneurship has also become increasingly important as a development policy tool. Policy makers in the international community widely acknowledge the role entrepreneurs play in creating new businesses and jobs, promoting productivity by utilizing new technology, or intensifying competition (Acs, 2006; Acs et al., 2008). Entrepreneurship is also an effective tool in reducing poverty in underdeveloped countries (United Nations General Assembly (UNGA) Resolutions A/RES/69/320, 2014, p.3). For example, the Organisation for Economic Co-operation and Development (OECD) Jobs Strategy in 1998 launched the first cross country policy synthesis on "Fostering Entrepreneurship". The report concludes that the vibrance of entrepreneurship relies on institutions, government programs, and cultural factors (OECD, 1998).

The World Bank has similar projects aimed at promoting entrepreneurship, including infoDev and the Women Entrepreneurs Finance Initiative (We-Fi). Specifically, these programs and projects focus on technological innovation and financing early stage businesses. According to the Independent Evaluation Group (2013, p.41), World Bank has "*an investment portfolio of $18.7 billion in innovation and entrepreneurship…*" during the 2000-2013 fiscal years. These projects target "*R&D infrastructure, strengthening entrepreneurial capabilities, and financing for early-stage start-ups*" in lower and upper-middle-income countries. Likewise, the United Nations Foundation, the Global Entrepreneurs Council (GEC), and Entrepreneurs for Social Change Project all utilize the concept of entrepreneurship as a solution to global and regional level problems.

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Entrepreneurship is also positioned to support sustainable development (United Nations Sustainable Development Goals (SDGs), 2015).

Focusing on entrepreneurship as a development policy tool is supported by prior research that links entrepreneurship to various development outcomes. This includes corruption (Anokhin and Schulze, 2009; Dutta and Sobel, 2016; Wiseman, 2015), the functioning of government (Aidis et al., 2012), institutional quality (Coyne et al., 2010; Estrin et al., 2013; Hall and Sobel, 2008), education (Oosterbeek, et al., 2010; Van der Sluis et al., 2008), and infrastructure (Audrestsch et al., 2015). However, there is no research directly associating foreign aid with entrepreneurship.[31]

In this paper, I investigate if foreign aid promotes entrepreneurship using a panel of 38 countries from 2005 to 2014. I analyze if overall foreign aid, the aggregate of grants or concessional loans from the OECD Development Assistance Committee (DAC) countries, is directly linked to various entrepreneurial activities. According to Baumol (1990) and Coyne and Leeson (2004), both productive and non-productive entrepreneurship exist in all countries. Developing countries do not lack entrepreneurial activities. What they lack is enough "*productive entrepreneurial activities that trump the negative effects of non-productive entrepreneurial activities*" and "*development ultimately requires effective constraints on non-productive activities*" (Coyne at. el, 2010, p.335). Therefore, foreign aid may influence both productive entrepreneurship as well as non-productive entrepreneurship.

[31] The exception is Coyne et.al (2010), where the authors make foreign aid an example for their non-productive entrepreneurial process.

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On one hand, when aid efforts of the international community (OECD Paris Declaration, 2005; United Nations Millennium Development Goals (MDGs), 2000; United Nations SDGs, 2015) are associated with productive entrepreneurship, we should expect more evidence of a positive "aid-entrepreneurship" relation. A windfall of development resources tends to influence both the public sector and the private sector, either in a direct or an indirect way, in a recipient country. For the public sector, aid may enhance the accountability of political institutions (Eubank, 2012; Finn and Tarp, 2016) and "*release governments from… revenue constraints*" (Bräutigam and Knack, 2004, p.255). Relaxing the recipient government budget constraints may increase government investments and strengthen provisions of public goods and services, the latter of which is positively linked to the flourishing of entrepreneurship (Audretsch et al., 2015).

For the private sector, aid may also provide more financial assistance. Aid either directly provides funding or indirectly induces more foreign direct investment (FDI) (Donaubauer et al., 2016; Selaya and Sunesen, 2012). In addition to investments, aid also assists technology transfers (Sawada et al., 2012), finances education (Riddell and Niño-Zarazúa, 2016), and directly builds infrastructure (Miyamoto and Chiofalo, 2015) and productive capacities (United Nations, 2015). All of these conceptual arguments suggest that foreign aid may promote productive entrepreneurial activities in a recipient country.

On the other hand, instead of aiding productive entrepreneurs, aid allocated to countries with weak institutions, such as lack of property rights, could undermine a recipient country's incentive structures for entrepreneurship and encourage non-productive entrepreneurial activities. It is possible that aid resources will only serve to strengthen the power of a recipient government. Evidence suggests that aid induces corruption (Svensson,

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2000), and more corrupt governments receive more aid (Alesina and Weder, 2002). Aid is also linked to cronyism and patrimonialism (Buss and Gardner, 2008), more government interventions (Easterly, 2014), and rent seeking and deteriorated institutions (Djankov et al., 2008). Aid may even increase the incidence of civil conflict (Nunn and Qian, 2014). Thus, aid may worsen the business environment, crowd out private investments, and decrease productive entrepreneurial activities (Selaya and Sunesen, 2012).

In addition, it is plausible that aid could change entrepreneurial behaviors and attitudes if aid changes the institutional quality in a recipient country. For example, aid is associated with the "amplification effect" on institutional quality – making good institutions better and bad institutions worse (Dutta et al., 2013). Countries with lower quality institutions tend to suffer from more non-productive entrepreneurship and lower rates of growth, making them a prime candidate to receive foreign aid. Thus, foreign aid could directly disincentivize productive entrepreneurship, as discussed above, and indirectly increase non-productive via lowering institutional quality.

Foreign aid may still not be able to encourage productive entrepreneurial activities. Foreign aid is provided through a top-down system; thus, the current centrally planned aid allocation strategy may not be able to tap into local knowledge to discover the 'correct' entrepreneurial undertakings. To promote productive entrepreneurship, we need a decentralized economy that rewards entrepreneurship (Hayek,1945).

The current literature has not made any connection between aid and entrepreneurship. Partially, this is due to the fact that entrepreneurship is an intangible behavior, which is difficult to observe or measure. Overall, it is not theoretically clear if aid will affect entrepreneurial activities in a recipient country.

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This paper intends to advance our understanding of the aid-development literature from the entrepreneurial angle. In general, the empirical analysis suggest that aggregate aid tends to boost only necessity driven, early-stage entrepreneurship, benefitting low-income and more highly-educated entrepreneurs. Infrastructural aid promotes entrepreneurship driven by both opportunity and necessity motivations and incentivizes more entrepreneurs to compete with homogeneous products. Evidence also suggests that both types of aid discourages the utilization of new technologies, raises business failure rates, and is associated more with necessity-driven early-stage female entrepreneurship.

Data and Empirical Methodology

To measure cross-country entrepreneurial activities, the current research employs the influential Global Entrepreneurship Monitor (GEM) data. As the dependent variables, there are 33 national-level entrepreneurial indicators selected from the GEM's Adult Population Survey (APS) (Daniels et al., 2018). Based on a sample of at least 2,000 individuals in each country, GEM-APS defines entrepreneurship broadly in an occupational view, including both self-employed (owners) and managers. It also measures entrepreneurship as "early stage" business (registered for less than 42 months – TEA) and "established stage" business (registered for longer than 42 months – EB), "nascent stage" business (registered for less than three months – NA) and intention to start a business ("entrepreneurial activity to be"),[32] and "opportunity-driven" and "necessity-driven" entrepreneurship.

[32] The formal definition of entrepreneurship in GEM is "Any attempt at new business or new venture creation, such as self-employment, a new business organization, or the expansion of an existing business, by an individual, a team of individuals, or an established business" (Daniels et al., 2018).

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In addition, GEM-APS includes jobs-creation expectation (high jobs-creation or not) and new technology adoption (most recent, relatively new or no new technology). GEM-APS also divides entrepreneurial activities by entrepreneurs' socioeconomic status, specifically education and income. For example, necessity-driven total early-stage entrepreneurial activity rate (Necessity TEA) measures the combined percentage of 18-64-year-old interviewees who either attempt to own/manage a new business or are owning-managing a new business registered for less than 42 months, and the motivation is either no other option (especially private-sector) for work (Kreft and Sobel, 2005) or just maintaining income.[33]

The independent measure of interest is foreign aid flows. Aid is generally defined as total official development assistance (ODA) disbursements to a recipient country as percentage of its GDP. Following this definition, this paper adopts two aid measures. The first aid measure, aggregate aid, is taken from the OECD's DAC2a table. Aggregate aid covers both bilateral aid between pairs of governments and multilateral aid between aid organizations and recipient countries. To examine the aid-entrepreneurship transmission channel, a second aid measure, aid to economic infrastructure and services (Creditor Reporting System (CRS) – Sector 200) from OECD is also examined.

Following the recent cross-country aid literature (Young and Sheehan, 2014; Dutta and Williamson, 2016; Jones and Tarp, 2016) and entrepreneurship literature (Williamson, 2013; Dutta and Sobel, 2016), this research includes five control variables. Four of the controls are taken from the World Bank World Development Indicator (WDI): GDP per

[33] As opposite to the "opportunity-driven" TEA, which is driven by seeing an opportunity or to be independent or increasing income (Daniels et al., 2018).

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capita and GDP growth rate to control for income and living standard differences, a measure of labor force participation rate, which captures the economically active proportion of population and partly determines development patterns, and an education measure of average gross secondary education enrollment rate (Van der Sluis, et al., 2008). Additionally, as the factor that determines the prevailing type of entrepreneurship and aid effectiveness in a recipient country (Coyne and Leeson.2004; Coyne at. el, 2010; Williamson, 2010), the Economic Freedom of the World Index (Fraser Institute, 2016) is also included to control for institutional quality,

Since GEM data cover more middle income and developed countries and aid data mainly include low and middle income developing countries, merging the dependent and independent variables leaves a relatively small sample. The sample covers 38 recipient countries with 127 observations from 2005-2014.[34] The countries in the sample have median GDP per capita of about $5,910 (Columbia in 2007, with 2010 constant US dollars). They also have higher labor force participation rates, younger and less educated populations. The mean labor force participation rate is 66.1 percent, and the mean gross secondary school enrollment rate is 52.6 percent. On average, the aggregate aid distribution is about 0.47 percentage of a recipient country's GDP, with standard deviation of 1. The mean of infrastructural aid is much smaller – about 0.07 percentage of GDP, with a standard deviation of 0.11.

[34] The actual number of observations is about 200, as indicated in Table 1. Taking lags for dependent variables and adopting GMM method decreases about one third of observations. Also, the sample period 2005-2014 is determined by the availability of GEM data- national level full data sets available between 2002-2014, and indicators during 2002-2004 have majority of the indicators being different than those after 2005.

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In terms of the entrepreneurial activities, the percent of opportunity-driven TEA (mean 11.3 percent) is more than twice that of the necessity-driven TEA (mean 5.1 percent); however, the majority of the entrepreneurs in the sample compete with the same products and do not adopt new technologies. Refer to Table 1 for summary statistics and more details of the definitions and sources of the variables. Also refer to Appendix 1 for a full list of countries in the sample.

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Table 2.1 Variables Description and Summary Statistics

Variable	Description	Source	Obs.	Mean	S.D.
Aid	Official Development Aid (ODA) divided by GDP and multiplied by 100, both in constant 2010 USD. All aid variables are calculated this method.	OECD- DAC2a; World Bank-World Development Indicators (WDI).	201	0.47	1.03
Aid_{INFR}	Aid to economic infrastructure & services (CRS Sector 200).	OECD-Creditor Reporting System (CRS); WDI.	201	0.07	0.11
Log GDP per capita	GDP per capita (log.), constant 2010 PPP international dollars.	WDI.	201	9.27	0.67
GDP growth rate	GDP growth rate, annual percentage.	WDI.	201	4.60	3.38
Institutions	Economic Freedom of the World Index Chain-Linked summary index.	WDI.	201	6.68	0.79
Labor force participation rate	Labor force participation rate, total (% of total population ages 15+); International Labour Organization (ILO) Estimate.	WDI.	201	66.14	9.64
Education	Gross secondary school enrolment ratio calculated as average of 1981-1995.	WDI.	201	52.55	18.32
Total early-stage entrepreneurial activity (TEA)	% 18-64 pop. who are either a nascent entrepreneur (less than 3 months) or owner-manager of a new business (less than 3.5 years).	Global Entrepreneurship Monitor (GEM)	201	16.86	8.62
Opportunity TEA	% TEA not because of no other work option or just maintaining their income.	GEM.	194	11.26	6.01
Opportunity TEA male	% 18-64 male TEA with opportunity motivation.	GEM.	194	13.35	6.48
Opportunity TEA female	% 18-64 female TEA with opportunity motivation.	GEM.	194	9.16	6.00
Necessity TEA	% TEA due to no other work option or just maintaining their income.	GEM.	194	5.10	3.29
Necessity TEA male	% 18-64 male TEA with necessity motivation.	GEM	194	5.14	3.04
Necessity TEA female	% 18-64 female TEA with necessity motivation.	GEM	194	4.98	3.84
F/M TEA ratio	Ratio of female TEA divided by male TEA.	GEM	201	0.73	0.24
Opportunity NB	% NB are opportunity-motivated.	GEM.	194	6.55	4.12
Necessity NB	% NB are necessity -motivated NB.	GEM.	194	2.57	1.82
Business failure rate	% 18-64 pop: exited a business in past year, business did not continue.	GEM	193	5.46	4.70
TEA creating any jobs in 5 years	% of TEA expects any jobs now or in 5 years.	GEM.	194	57.00	232.49
TEA creating at least 6 jobs in 5 years	% of TEA expects at least 6 jobs now or in 5 years.	GEM.	199	19.57	11.42

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Table 2.1 (continued)

TEA creating more than 19 jobs in 5 years	% of TEA expects more than 19 jobs now or in 5 years.	GEM.	194	7.31	27.76
TEA adopts very latest technology	% within TEA uses technology only available since last year.	GEM.	194	14.81	11.38
TEA adopts new technology	% within TEA uses technology of recent 1-5 year.	GEM.	194	19.59	7.52
TEA adopts no new technology	% within TEA uses no new technology.	GEM.	194	65.60	15.62
EB adopts very latest technology	% within EB uses technology only available since last year.	GEM.	194	7.01	10.61
EB adopts new technology	% within EB uses technology of recent 1-5 year.	GEM.	194	13.86	6.98
EB adopts no new technology	% within EB uses no new technology.	GEM.	194	79.13	13.90
TEA in lowest 33 percentile income	% 18-64 pop. involved in TEA from lowest 33 percentile income household.	GEM.	175	10.83	8.05
TEA in middle 33 percentile income	% 18-64 pop. involved in TEA from middle 33 percentile income household.	GEM.	192	12.79	8.79
TEA in highest 33 percentile income	% 18-64 pop. involved in TEA from highest 33 percentile income household.	GEM.	188	14.83	9.04
TEA in group with some secondary degree	% 18-64 pop. involved in TEA with some secondary degree.	GEM.	193	14.58	8.81
TEA in group with secondary degree	% 18-64 pop. involved in TEA with secondary degree.	GEM.	190	16.95	8.76
TEA in group with post-secondary degree	% 18-64 pop. involved in TEA with post- secondary degree.	GEM.	191	18.73	9.52
TEA in group with graduate experience	% 18-64 pop. involved in TEA with graduate experience.	GEM.	153	17.60	11.01
Many TEA offer same product	% within TEA: Many businesses offer same product	GEM.	194	56.33	10.66
Few TEA offer same product	% within TEA: Few businesses offer same product	GEM	194	35.12	8.62
None TEA offer same product	% within TEA: None businesses offer same product	GEM.	194	8.56	3.82
Many EB offer same product	% within TEA: Many businesses offer same product	GEM.	194	66.75	10.16
Few EB offer same product	% within EB: Few businesses offer same product	GEM.	194	28.07	9.14
None EB offer same product	% within EB: None businesses offer same product	GEM.	194	5.18	3.68

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To allow time for aid to work in recipient countries and to partially avoid reverse causality, all explanatory variables are lagged, except for *Education*, which is already a lagged average measure. All models include time fixed effects dummies.

This paper employs the Blundell and Bond (1998) system generalized method of moments (GMM-BB) specifications. Considering that the sample has a relatively small T (time periods) compared to the number of countries (N), the dynamic panel estimators is an appropriate model choice. The GMM-BB specifications also address the endogeneity issue by employing lags of the dependent variable as instrumental variables. The specifications estimating the aid-entrepreneurship relation takes the following form:

$$E\text{ntre}_{it} = \beta_0 + \beta_1 E\text{ntre}_{it-1} + \beta_2 Aid_{it-1} + \beta_3' Z_{it-1} + \beta_4 \theta_i + \varepsilon_{it} \quad (2.1)$$

Where i and t represent country and period; $E\text{ntre}_{it}$ and $E\text{ntre}_{it-1}$ take the form of the 32 GEM entrepreneurial activity measures in year t and $t-1$;[35] Aid_{it-1} represents ODA as percentage of a recipient's GDP in year $t-1$; Z_{it-1} is a vector of all the control variables as aforementioned; θ_i is the time-fixed effects dummies and ε_{it} is the random error term.

Main Results

Table 2 tests a battery of aggregate aid-entrepreneurial measures and focuses on entrepreneurial motivations. Following Table 2, Table 3 separates the tests by entrepreneurs' socioeconomic groups. Tables 4 repeats Table 2 and investigates the relation between infrastructural aid and entrepreneurship. Tables 5 and 6 examine the

[35] For lag of dependent variable working as GMM instruments, according to Roodman (2006), only take lags starting from *t-2*; also due to sample size limit, this paper does not allow more than two lags (*t-3*).

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effects of aid on the adoption of new technology and production differentiations in recipient countries, respectively.

As presented in Table 2, aggregate aid is irrelevant to both total early-stage entrepreneurial activities (TEA) (column (1)) and opportunity driven TEA (columns (6) through (9)); however, it is positive and significant in promoting necessity driven TEA.[36] A one percent growth in aggregate aid is associated with a 1.9-4.9 percent rise in necessity-motivated TEA rates (columns (2) through (5)).[37] This may suggest that aid increases early-stage entrepreneurs that are not actively seeking improvement but arise due to no other option for work.

The rise in necessity driven TEA could be interpreted as either aid encouraging people who otherwise would not engage in necessity-driven entrepreneurship to do so, or aid changes motivations of some entrepreneurs. One possible reason for this could be that aid worsens institutional quality. Therefore, there are fewer job opportunities available and necessity-driven entrepreneurship rises as a response. Connecting results from column (2) to that in columns (4) and (5), the significance of necessity-driven TEA is mainly attributed to female entrepreneurs. Aid leads to more female entrepreneurship, but due to the lack of other employment opportunities.[38]

This finding may surprise international aid organizations advancing gender equality in entrepreneurship. Less than one in three small and medium enterprises (SMEs) are

[36] Motivation measures are only available for early-stage entrepreneurship, not for established businesses in GEM-APS.
[37] This finding holds true to businesses at the "entire" early-stage (those registered less than three and half years, column (2) and those within their first three months after registration (nascent businesses, column (3)).
[38] The measure of "Ratio of Female to Male TEA" also suggests minor but significant impact of aid on improving female entrepreneurs rate, with coefficient= 0.095 at five percent level. This is not reported due to space limitation.

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owned by females (the World Bank's We-Fi program, 2018), and promoting female entrepreneurship adds up to 1-2 percentage points to GDP growth rate (UNGA Resolutions A/RES/69/320, 2014). By revealing the different entrepreneurial impacts of aid between genders, this study may suggest that aid in general would not help with achieving the goal of entrepreneurial gender equality.

The last two columns of Table 2 find that although more aggregate aid does not create more jobs (column (11)), it does create more failed businesses. The potential of a business to create jobs relies on motivation. Necessity-driven entrepreneurs try to escape unemployment, not to create employment (UNGA Resolutions A/RES/69/320, 2014). Thus, opportunity-driven enterprises tend to generate more jobs than necessity-driven enterprises.

A one percent increase in aid is linked to about a four percent rise in business failure rates (column (10)). One possible reason for the change in business failure rate could be that aid discourages productive work, including owning or managing a business.

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Table 2.2 Aggregate Aid and Entrepreneurial Activities

Dependent Variables	TEA	Necessity TEA	Necessity NB	Necessity TEA-Male	Necessity TEA-Female	Opportunity TEA	Opportunity NB	Opportunity TEA-Male	Opportunity TEA-Female	Business Failure Rate	TEA-Jobs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Aid $_{t-1}$	7.455	3.232***	1.856**	1.907*	4.683***	0.351	-0.047	-0.239	0.103	4.043***	3.813
	(8.398)	(1.085)	(0.826)	(1.145)	(1.470)	(2.573)	(4.022)	(4.203)	(2.776)	(0.871)	(3.495)
TEA $_{t-1}$	-0.227										
	(1.063)										
Necessity TEA $_{t-1}$		0.176									
		(0.338)									
Necessity NB $_{t-1}$			0.109								
			(0.368)								
Necessity TEA-Male $_{t-1}$				0.148							
				(0.286)							
Necessity TEA-Female $_{t-1}$					0.069						
					(0.329)						
Opportunity TEA $_{t-1}$						0.599**					
						(0.283)					
Opportunity NB $_{t-1}$							0.450				
							(0.424)				
Opportunity TEA-Male $_{t-1}$								0.484			
								(0.498)			
Opportunity TEA-Female $_{t-1}$									0.691***		
									(0.259)		
Business Failure Rate $_{t-1}$										0.445***	
										(0.127)	
TEA-Jobs $_{t-1}$											0.101
											(0.189)
Log GDP Per Capita $_{t-1}$	10.092	5.228***	3.496**	3.067*	6.405**	2.295	2.138	1.682	2.153	4.620***	7.410
	(13.796)	(2.023)	(1.782)	(1.718)	(3.001)	(4.773)	(6.982)	(6.915)	(5.372)	(1.605)	(5.502)
GDP Growth Rate $_{t-1}$	0.358	0.382	0.077	0.277	0.310	0.238	0.221	0.344	0.246	-0.189	0.993
	(1.009)	(0.367)	(0.233)	(0.347)	(0.306)	(0.494)	(0.264)	(0.501)	(0.362)	(0.194)	(0.692)
Labor Force Participation Rate $_{t-1}$	0.311	-0.025	-0.073	0.002	0.046	0.265	0.067	0.434	0.078	0.018	0.266
	(0.760)	(0.161)	(0.088)	(0.154)	(0.118)	(0.236)	(0.182)	(0.284)	(0.218)	(0.100)	(0.357)
Institutions $_{t-1}$	2.026	-0.824	0.320	-0.788	-0.235	-1.288	-0.308	-1.298	0.324	0.784	-0.595
	(6.207)	(1.498)	(1.174)	(2.047)	(1.286)	(4.075)	(2.963)	(3.608)	(2.192)	(0.863)	(4.470)
Education	-0.269	-0.084	-0.061	-0.067	-0.090	-0.025	-0.041	-0.008	-0.074	-0.080*	-0.035
	(0.332)	(0.060)	(0.044)	(0.055)	(0.068)	(0.061)	(0.079)	(0.095)	(0.062)	(0.044)	(0.144)
Constant	0.000	0.000	-24.722*	-16.460	0.000	-27.413	0.000	0.000	0.000	0.000	-162.145
	(.)	(.)	(13.649)	(24.737)	(.)	(45.331)	(.)	(.)	(.)	(.)	(169.577)
Observations	127	127	127	127	127	127	127	127	127	126	127
Auto-corr p-value	0.661	0.703	0.540	0.415	0.402	0.389	0.258	0.946	0.268	0.785	0.885
Hansen-J p-value	0.269	0.411	0.248	0.373	0.541	0.273	0.270	0.321	0.336	0.770	0.154

Notes: TEA/ NB refers to Total Early-Stage Entrepreneurial Activity Rate /Nascent Business Ownership Rate. Dependent variables interpret as "percent of 18-64 years population answer yes". GMM is Blundell–Bond system generalized method of moments. All models include a set of time fixed effects. Refer to Table-1 for details of all variables. Robust standard errors are in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

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Table 3 further investigates the "aid-early-stage entrepreneurship" relation by dividing entrepreneurs into different socioeconomic groups, education and income. Aid mainly influences entrepreneurs either with graduate level experience or from the lowest 33 percentile income class. A one percent rise in aid relates to a 9.1 and a 4.7 percent gain in TEA rates from these two groups, respectively. No evidence supports that aid influences entrepreneurs in other groups or at the established stage of entrepreneurship. Insofar as aid is aimed at economic growth and poverty reduction, the findings here suggest that aid may benefit the low-income entrepreneurs in developing countries. The association between aid and low-income entrepreneurs is possibly explained by the significance of necessity driven entrepreneurship in Table 2. Aid increases necessity driven entrepreneurship, which is more likely to occur among underdeveloped recipients.

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Table 2.3 Aggregate Aid and Total Early Stage Entrepreneurial Activities by Education and Income Groups

Dependent Variables	Some Secondary Education (1)	Secondary Education (2)	Post-Secondary Education (3)	Graduate experience (4)	Lowest 33 PCTL Income (5)	Middle 33 PCTL Income (6)	Highest 33 PCTL Income (7)
Aid $_{t-1}$	13.177	-0.166	11.172	9.056**	4.727**	5.102	3.892
	(8.746)	(6.248)	(7.614)	(3.775)	(2.084)	(3.938)	(4.107)
Some Secondary Education $_{t-1}$	-0.325						
	(0.766)						
Secondary Education $_{t-1}$		0.557					
		(0.581)					
Post-Secondary Education $_{t-1}$			-0.998				
			(0.633)				
Graduate experience $_{t-1}$				-0.023			
				(0.302)			
Lowest 33 PCTL Income $_{t-1}$					0.433		
					(0.313)		
Middle 33 PCTL Income $_{t-1}$						0.065	
						(0.490)	
Highest 33 PCTL Income $_{t-1}$							-0.216
							(0.481)
Log GDP Per Capita $_{t-1}$	20.343*	2.961	19.160	18.489***	8.712**	12.320*	2.389
	(12.308)	(8.321)	(17.418)	(7.039)	(4.150)	(6.789)	(5.199)
GDP Growth Rate $_{t-1}$	1.288	0.407	1.044	3.025***	-0.097	1.798**	0.910
	(1.258)	(0.912)	(1.038)	(0.761)	(0.606)	(0.793)	(1.136)
Labor Force Participation Rate $_{t-1}$	-0.390	0.159	0.226	0.163	0.600**	-0.119	0.577
	(0.554)	(0.545)	(1.129)	(0.544)	(0.248)	(0.553)	(0.931)
Institutions $_{t-1}$	3.549	-2.958	4.969	2.935	-2.749	1.989	-3.536
	(4.130)	(4.077)	(5.731)	(7.004)	(2.146)	(4.771)	(8.194)
Education	-0.390**	-0.080	-0.409	-0.191	-0.158	-0.209	-0.079
	(0.188)	(0.172)	(0.323)	(0.166)	(0.099)	(0.177)	(0.269)
Constant	-159.274*	-10.071	0.000	0.000	0.000	0.000	0.000
	(94.846)	(65.444)	(.)	(.)	(.)	(.)	(.)
Observations	125	122	122	89	107	124	120
Auto-corr p-value	0.410	0.530	0.275	0.762	0.890	0.335	0.762
Hansen-J p-value	0.701	0.381	0.562	0.887	0.504	0.299	0.203

Notes: All dependent variables interpret as "percentage of 18-64 years population answer yes". GMM is Blundell–Bond system generalized method of moments. All models include a set of time fixed effects. Refer to Table-1 for details of all variables. Robust standard errors are in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

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Foreign aid is given for many different purposes and intentions (Bjørnskov, 2013). To better understand the effectiveness of aid on entrepreneurial activities and to examine the transmission channel of the aid-entrepreneur relation, Table 4 repeats the same tests as in Table 2 but replaces aggregate aid with a sectoral level measure – infrastructural aid.

As suggested in the literature, the quality of infrastructure including transport, communication, energy, and the financial system, is essential to both individual business success and economic growth (Audretsch et al., 2015; OECD, 2015). Therefore, aiding infrastructure is expected to assist productive entrepreneurial activities.

To some degree, the results of Table 4 match the findings from Table 2. Aiding infrastructure mainly affects the early-stage entrepreneurial activities (columns (2) through (9)). What is different is that infrastructural aid boosts TEA with both necessity and opportunity motivations, with stronger evidence supporting opportunity motivations (columns (6) through (9)). For example, in countries like Argentina, Bangladesh, Malaysia, Namibia, and Turkey, a one percent growth in infrastructural aid raises total, male, and female opportunity driven TEAs by 27.5, 21.2 and 33.22 percent, respectively. A one percent increase in infrastructural aid also raises necessity driven female TEA by 23.5 percent.

Consistent with Table 2, column (10) finds infrastructural aid deteriorates the business climate by increasing early-stage business failure rate in a recipient country. Column (11) also reports that infrastructural aid may promote job creation at a ratio of one to 35 percent. Two additional measures for job creation, TEA expected job creation, are examined: expected to add more than six employees or expected to add more than 19 jobs

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in five years; however, neither is significant.[39] These findings suggest that aid promotes job creation, but only for new businesses adding less than five new jobs.

[39] These are not reported in Table 4, but available upon request.

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Table 2.4 Aid to Economic Infrastructure and Entrepreneurial Activities

Dependent Variables	TEA	Necessity TEA	Necessity NB	Necessity TEA-Male	Necessity TEA-Female	Opportunity TEA	Opportunity NB	Opportunity TEA-Male	Opportunity TEA-Female	Business Failure Rate	TEA-Jobs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Aid $_{t-1}$	39.202	24.003*	7.646	15.361	23.458**	27.536***	14.467**	21.234***	33.222**	10.773***	35.414**
	(35.318)	(13.949)	(10.031)	(21.283)	(11.830)	(9.128)	(6.714)	(8.233)	(14.406)	(3.975)	(17.193)
TEA $_{t-1}$	0.388										
	(0.327)										
Necessity TEA $_{t-1}$		0.756***									
		(0.280)									
Necessity NB $_{t-1}$			0.348								
			(0.345)								
Necessity TEA-Male $_{t-1}$				0.634							
				(0.442)							
Necessity TEA-Female $_{t-1}$					0.667**						
					(0.264)						
Opportunity TEA $_{t-1}$						0.276					
						(0.225)					
Opportunity NB $_{t-1}$							0.404**				
							(0.198)				
Opportunity TEA-Male $_{t-1}$								0.334			
								(0.227)			
Opportunity TEA-Female $_{t-1}$									0.215		
									(0.147)		
Business Failure Rate $_{t-1}$										0.866***	
										(0.188)	
TEA-Jobs $_{t-1}$											0.100
											(0.236)
Log GDP Per Capita $_{t-1}$	3.722	1.972	1.658	1.455	2.299	2.281	2.509	2.451	2.767	2.139*	4.589
	(3.579)	(1.496)	(1.324)	(1.684)	(1.508)	(1.778)	(1.597)	(2.190)	(1.896)	(1.256)	(2.942)
GDP Growth Rate $_{t-1}$	0.130	0.002	0.136	-0.060	0.165	-0.079	0.106	0.016	-0.111	-0.253	0.072
	(0.694)	(0.322)	(0.194)	(0.444)	(0.242)	(0.297)	(0.263)	(0.362)	(0.284)	(0.210)	(0.888)
Labor Force Participation Rate $_{t-1}$	0.182	0.007	-0.011	0.040	0.037	0.276	0.047	0.368*	0.220	0.086	0.379
	(0.425)	(0.098)	(0.058)	(0.114)	(0.091)	(0.239)	(0.138)	(0.223)	(0.231)	(0.084)	(0.301)
Institutions $_{t-1}$	2.532	-1.664	-0.575	-1.404	-0.833	3.124	0.361	2.462	2.070	-0.105	2.432
	(5.720)	(2.223)	(0.748)	(2.337)	(1.604)	(2.755)	(2.026)	(2.757)	(1.896)	(1.177)	(4.039)
Education	-0.127	0.015	-0.024	-0.007	-0.002	-0.059	-0.023	-0.025	-0.088*	-0.038	-0.085
	(0.109)	(0.070)	(0.035)	(0.086)	(0.049)	(0.044)	(0.038)	(0.053)	(0.047)	(0.029)	(0.152)
Constant	0.000	0.000	-9.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(11.548)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Observations	127	127	127	127	127	127	127	127	127	126	127
Auto-corr p-value	0.595	0.729	0.244	0.367	0.384	0.415	0.261	0.433	0.733	0.675	0.705
Hansen-J p-value	0.423	0.483	0.265	0.274	0.589	0.690	0.464	0.816	0.609	0.494	0.183

Notes: TEA/ NB refers to Total Early-Stage Entrepreneurial Activity Rate /Nascent Business Ownership Rate. Dependent variables interpret as "percent of 18-64 years population answer yes". GMM is Blundell–Bond system generalized method of moments. All models include a set of time fixed effects. Refer to Table-1 for details of all variables. Robust standard errors are in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

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So far, this paper has identified evidence of aggregate aid promoting necessity-driven entrepreneurship and shutting down more businesses. Tables 5 and 6 intend to answer two other related questions: does aid encourage the adaptation of new technologies and competition with differentiated products?

The first question is addressed in Table 5, where aggregate aid is examined in Panel A and infrastructural aid is inspected in Panel B. In panel A, aggregate aid discourages both early-stage and established entrepreneurs to employ new technology. A one percent rise in aid leads to more than a four percent drop in adoption of the latest technology (available less than one year) or relatively new technology (one to five years new), or 0.57 and 0.41 standard deviation decreases, respectively.

Resembling aggregate aid, in Panel B, a one standard deviation hike in infrastructural aid also increases those entrepreneurs utilizing no new technology by 0.36 standard deviations. This finding is consistent with that in Panel A for established entrepreneurs. However, infrastructural aid does not influence early-stage entrepreneurs.

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Table 2.5 Aid and Entrepreneurial New Technology Adoption Rates

Panel A: Aggregate Aid						
	Percentage within Total Early Stage Entrepreneurial Activity (TEA) Adopted			Percentage within Established Business Ownership (EB) Adopted		
Dependent Variables	Very Latest Tech. (1 Year)	New Tech. (1-5 Years)	No New Tech.	Very Latest Tech. (1 Year)	New Tech. (1-5 Years)	No New Tech.
	(1)	(2)	(3)	(4)	(5)	(6)
Aid (% of GDP)	-4.012	-4.182**	5.791	-4.200**	-2.389	3.429
	(4.777)	(1.815)	(3.783)	(1.974)	(3.245)	(3.539)
Very Latest Tech. $_{t-1}$	0.260			0.530***		
	(0.203)			(0.166)		
New Tech. $_{t-1}$		0.240			0.254	
		(0.304)			(0.399)	
No New Tech. $_{t-1}$			0.237			0.429**
			(0.323)			(0.204)
Log GDP Per Capita $_{t-1}$	-17.113*	-3.237	11.668*	-1.816	9.086	-17.113*
	(9.578)	(3.757)	(5.955)	(7.488)	(10.073)	(9.578)
GDP Growth Rate $_{t-1}$	1.000	0.123	-1.542**	0.097	0.039	1.000
	(0.698)	(0.495)	(0.745)	(0.422)	(0.639)	(0.698)
Labor Force Participation Rate $_{t-1}$	-0.555	0.224	-0.206	0.107	0.502	-0.555
	(0.464)	(0.308)	(0.690)	(0.339)	(0.376)	(0.464)
Institutions $_{t-1}$	8.693**	-1.577	-0.308	-0.750	-6.843	8.693**
	(3.760)	(3.647)	(8.067)	(3.855)	(5.950)	(3.760)
Education	0.338**	0.048	-0.320	0.049	-0.102	0.338**
	(0.145)	(0.122)	(0.231)	(0.138)	(0.222)	(0.145)
Constant	0.000	0.000	-25.231	0.000	0.000	0.000
	(.)	(.)	(90.365)	(.)	(.)	(.)
Observations	127	127	127	127	127	127
Auto-corr p-value	0.147	0.233	0.842	0.272	0.543	0.147
Hansen-J p-value	0.402	0.441	0.225	0.382	0.168	0.402
Panel B: Aid to Economic Infrastructure & Services						
Dependent Variables	Very Latest Tech. (1 Year)	New Tech. (1-5 Years)	No New Tech.	Very Latest Tech. (1 Year)	New Tech. (1-5 Years)	No New Tech.
	(1)	(2)	(3)	(4)	(5)	(6)
Aid (% of GDP)	28.582	-26.944	7.659	-19.361	-12.691	45.862**
	(51.639)	(28.534)	(62.397)	(12.952)	(14.566)	(20.843)
Very Latest Tech. $_{t-1}$	0.536**			0.567***		
	(0.212)			(0.181)		
New Tech. $_{t-1}$		0.096			0.301	
		(0.420)			(0.687)	
No New Tech. $_{t-1}$			0.368			0.536***
			(0.260)			(0.180)
Log GDP Per Capita $_{t-1}$	-10.492**	2.499	6.230	2.349	3.504	-10.492**
	(5.252)	(6.359)	(9.510)	(6.225)	(6.973)	(5.252)
GDP Growth Rate $_{t-1}$	0.663	-0.134	-1.268	0.231	0.041	0.663
	(0.838)	(0.689)	(1.023)	(0.923)	(0.587)	(0.838)
Labor Force Participation Rate $_{t-1}$	-0.574	0.337	0.568	-0.026	0.308	-0.574
	(0.473)	(0.378)	(0.668)	(0.301)	(0.432)	(0.473)
Institutions $_{t-1}$	8.109*	-2.653	-2.301	-3.991	-2.360	8.109*
	(4.665)	(5.263)	(8.282)	(4.423)	(6.708)	(4.665)
Education	0.263	-0.062	-0.266	-0.001	-0.006	0.263
	(0.224)	(0.134)	(0.385)	(0.198)	(0.244)	(0.224)
Constant	71.262	0.000	-22.710	0.000	0.000	71.262
	(67.671)	(.)	(104.774)	(.)	(.)	(67.671)
Observations	127	127	127	127	127	127
Auto-corr p-value	0.149	0.927	0.727	0.367	0.800	0.149
Hansen-J p-value	0.208	0.101	0.083	0.355	0.201	0.208

Notes: All dependent variables interpret as "percent of 18-64 years population answer yes". GMM is Blundell–Bond system generalized method of moments. All models include a set of time fixed effects. Refer to Table-1 for details of all variables. Robust standard errors are in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

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Finally, Table 6 answers the other remaining question - does aid promote production heterogeneity? Evidence suggests that aggregate aid is irrelevant, but infrastructural aid may incentivize many established entrepreneurs to provide homogeneous products. A one standard deviation increase in aid to infrastructure increases degree of homogeneous products by 0.27 standard deviations. The reasons behind this finding, however, could be complicated. For example, low profit margin, resource endowment, or comparative advantages in international labor division can lead to homogeneous competition.

Table 5 and Table 6 together may also provide some explanation for the rise in business failure rate, as presented in Table 2 and Table 4. Aid intensifies competition in products with low technology and high homogeneity, which may contribute to higher business failure rates.

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Table 2.6 Aid and Production Homogeneity

Panel A: Aggregate Aid						
	Percentage within Total Early Stage Entrepreneurial Activity (TEA) Adopted			Percentage within Established Business Ownership (EB) Adopted		
Dependent Variables	Many Businesses Offer Same Product	Few Businesses Offer Same Product	None Businesses Offer Same Product	Many Businesses Offer Same Product	Few Businesses Offer Same Product	None Businesses Offer Same Product
	(1)	(2)	(3)	(4)	(5)	(6)
Aid (% of GDP)	-2.933	1.219	2.742	-3.526	2.309	0.061
	(2.509)	(2.335)	(2.465)	(3.980)	(2.777)	(1.097)
Many Businesses Offer Same Product $_{t-1}$	0.792***			-0.336		
	(0.147)			(0.281)		
Few Businesses Offer Same Product $_{t-1}$		0.635***			-0.491*	
		(0.200)			(0.277)	
None Businesses Offer Same Product $_{t-1}$			-0.077			-0.534
			(0.329)			(0.352)
Log GDP Per Capita $_{t-1}$	-7.757	3.641	4.490	1.604	-5.532	-2.660
	(6.051)	(5.787)	(6.377)	(9.645)	(7.163)	(3.271)
GDP Growth Rate $_{t-1}$	-0.508	0.598	0.360	-1.593*	0.691	0.359
	(0.517)	(0.431)	(0.431)	(0.907)	(0.822)	(0.288)
Labor Force Participation Rate $_{t-1}$	0.177	0.039	-0.095	0.985*	-0.722*	-0.346
	(0.247)	(0.129)	(0.293)	(0.534)	(0.429)	(0.267)
Institutions $_{t-1}$	-0.920	-3.343	3.777	-6.109	3.333	2.362
	(3.743)	(2.719)	(2.632)	(5.467)	(6.358)	(2.537)
Education	0.038	0.076	-0.004	-0.293*	0.331	0.072
	(0.139)	(0.113)	(0.125)	(0.175)	(0.226)	(0.069)
Constant	80.997	0.000	0.000	76.377	0.000	33.171
	(66.021)	(.)	(.)	(67.816)	(.)	(31.780)
Observations	127.000	127.000	127.000	127.000	127.000	127.000
Auto-corr p-value	0.799	0.119	0.606	0.952	0.766	0.145
Hansen-J p-value	0.894	0.967	0.503	0.888	0.827	0.617
Panel B: Aid to Economic Infrastructure & Services						
	(1)	(2)	(3)	(4)	(5)	(6)
Aid (% of GDP)	8.468	-4.574	-0.316	24.556**	-14.865	-3.084
	(20.064)	(19.333)	(8.217)	(11.735)	(15.610)	(7.769)
Many Businesses Offer Same Product $_{t-1}$	0.921***			-0.336		
	(0.136)			(0.278)		
Few Businesses Offer Same Product $_{t-1}$		0.720***			-0.389	
		(0.225)			(0.336)	
None Businesses Offer Same Product $_{t-1}$			0.223			-0.321
			(0.343)			(0.262)
Log GDP Per Capita $_{t-1}$	-3.358	-0.054	0.535	6.481	-7.216	-2.274
	(4.408)	(3.947)	(2.108)	(4.879)	(5.395)	(3.554)
GDP Growth Rate $_{t-1}$	-0.801**	0.671**	0.176	-1.354**	0.862	0.226
	(0.392)	(0.338)	(0.292)	(0.651)	(0.950)	(0.190)
Labor Force Participation Rate $_{t-1}$	-0.076	0.073	-0.014	0.707*	-0.558*	-0.232
	(0.227)	(0.219)	(0.194)	(0.387)	(0.298)	(0.236)
Institutions $_{t-1}$	2.345	-2.880	2.271	-3.899	-0.929	2.349
	(4.266)	(3.603)	(2.693)	(4.439)	(4.926)	(2.653)
Education	0.021	0.102	0.017	-0.236	0.350*	0.044
	(0.111)	(0.139)	(0.047)	(0.170)	(0.209)	(0.084)
Constant	0.000	16.957	0.000	0.000	0.000	23.717
	(.)	(39.703)	(.)	(.)	(.)	(32.106)
Observations	127.000	127.000	127.000	127.000	127.000	127.000
Auto-corr p-value	0.632	0.141	0.758	0.942	0.942	0.125
Hansen-J p-value	0.786	0.805	0.338	0.967	0.832	0.462

All dependent variables interpret as "percent of 18-64 years population answer yes". GMM is Blundell–Bond system generalized method of moments. All models include a set of time fixed effects. Refer to Table-1 for details of all variables. Robust standard errors are in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

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Conclusion

As the first research examining the "aid and entrepreneurship" relation, the current paper finds that aid does influence some entrepreneurial outcomes. Aggregate aid tends to mainly impact early-stage entrepreneurship, benefiting entrepreneurs in the low-income class, rewarding entrepreneurs with better education, and adding more female entrepreneurs. It also incentivizes necessity-driven entrepreneurship, especially for females.

Similarly, aiding infrastructure promotes entrepreneurship at both early and established stages for both motivations and genders. However, evidence also suggests that the higher female TEA rate is necessity motivated, and infrastructure aid only adds competition with homogeneous products. Both aggregate aid and infrastructural aid tend to incentivize more entrepreneurs to quit their businesses, and they both discourage adoption of state of the art technologies.

Overall, entrepreneurship as an "omnipresent aspect of human action" (Boettke and Coyne, 2003, p.67) and an important dimension of human development (Sen 2000), cannot be created by government policies (Coyne and Leeson, 2004). Foreign aid, like many other policies, has a mixed effect on different types of entrepreneurship. Aid may bring unintended consequence that are not in line with policies aiming at promoting entrepreneurship. One example is aid's influence on necessity driven female entrepreneurs. A second example is the higher rate of business failure associated with aid. The unexplained questions in this paper call for future research as better data becomes available.

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CHAPTER III

DOES AID FOR TRADE AFFECT TRADE?

Introduction

Economic globalization, including international trade, has improved living standards worldwide. Poverty rates have declined substantially over the past 30 years (Sala-i-Martin, 2006; Chen and Ravallion, 2010). Much of this economic growth is attributed to increases in international trade flows (Dollar and Kraay, 2004; Hall and Lawson, 2014). Although, the trade and growth literature has concluded that trade is essential to development and poverty reduction (Winters et al., 2004), many countries still impose costly restrictions on the ability to exchange goods and services across borders (Andersan and Van Wincoop, 2004).

Since 2005, the World Trade Organization (WTO)'s Hong Kong Ministerial Conference initiated calling for expansion and improvement in the allocation of foreign aid to facilitate international trade (AfT). AfT intends to liberalize trade by removing trade barriers, building trade capacity, and financing economic infrastructure. AfT has gained popularity among donor countries and the international aid community. Over the last several years, AfT has been a steady portion of total Official Development Assistance (ODA) from OECD, about 30% or $25-30 billion a year. IMF and OECD (2015) encourage implementing AfT as a policy tool for growth and poverty reduction. In addition, the

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United Nations 2030 Agenda for Sustainable Development Goals (SDGs) calls to "increase aid-for-trade support for developing countries".

By definition, AfT is supposed to contribute to promoting trade by removing supply side barriers to trade, especially for the least developed countries (LDCs) (Gnangnon 2018). However, good intentions do not always translate into ideal policy outcomes and confirmation of the positive trade-growth relation does not automatically legitimize the "AfT- trade" or "AfT-trade-growth" relation. For example, foreign aid in general strengthens the budget and power of recipient governments. In addition, it expands top-down interventions from foreign experts lacking local knowledge (Easterly, 2014), deteriorates recipients' institutional quality (Djankov, 2008; Dutta et al., 2013; Young and Sheehan, 2014), and induces armed conflict (Nielsen et. al, 2011).

These unintended consequences are against the goal of development assistance aid, making the effectiveness of aid difficult to evaluate. Is AfT like aid in general, inducing unintended consequences when intending to facilitate outward-oriented trade policies and encouraging integration of recipients into globalization? Should we expect AfT to affect trade costs and the subsequent trade flows? If so, through what channels?

On one hand, compared to the continuously debated outcomes of the general foreign aid literature (Boone,1996; Burnside and Dollar, 2000 & 2004; Hansen and Tarp, 2000; Dalgaard and Hansen, 2001; Brumm, 2003; Bräutigam and Knack, 2004; Clemens et. al, 2004; Dalgaard et al.,2004; Easterly, 2004; Rajan and Subramanian, 2008; Eubank, 2012; Chatelain and Ralf, 2014; Easterly, 2014; Dreher and Langlotz, 2015), AfT focuses on a much narrower target. The idea is to build trade capacity by removing trade barriers, financing economic infrastructure, and encouraging the production sectors. Thus, it follows

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that the complexity of aid-growth nexus is somewhat alleviated: AfT policy is more practical to implement and to evaluate, with more specific outcome variables.

On the other hand, compared to the ambitious policy actions taken by international aid and trade organizations (WTO, World Bank, IMF, OECD and United Nations), what we know is little. Nonetheless, the doubts on effectiveness of aid from the general aid literature and questionings on policy (Paris Declaration on Aid Effectiveness, 2005), leads us to question the effectiveness of AfT. One critique regarding why foreign aid may fail in achieving development goals is particularly related to exports, 'Dutch disease' phenomenon. Large amounts of aid inflow is associated with real exchange-rate appreciation that reduces the competitiveness of recipient exports in the international market (Suwa-Eisenmann and Verdier, 2007; Rajan and Subramanian, 2011). Thus, it is possible that AfT could make countries less competitive, reducing trade flows.

Aid is also questioned for its self-interested motivations (Tajoli,1999; Djajić et al., 2004). Aid may benefit the donors and leave the net effects on recipients vague. In addition, the poor incentives from either the donor or recipient to make aid dollars effective stays unchanged as in other types of aid. AfT is still disbursed by the same donor agencies in the same manner, and whether AfT circumvents these inherent problems in general aid is unanswered.

The few papers evaluating AfT report mixed findings. Empirically, it is not clear from the relatively young AfT literature that encouraging aid for trade as a policy tool facilitates more overall trade. In general, the literature tends to support the idea that AfT effectively increases exports and reduces trade costs. Among this limited research, Cali and Te Velde (2011), one of the first comprehensive papers filling the gap in literature,

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find positive effects of aid for "trade facilitation" in reducing import time and export/import costs during 2005-2009; aid for infrastructure is also related to increased exports for 2002-2007.

Similarly, Helble et al. (2011) and Pettersson and Johansson (2013) both find that AfT is positively associated with promoting exports. According to Basnett et al. (2012), a one percent increase in AfT induces about $ 290 million U.S. dollars in exports.

A few other articles emphasize poor infrastructure as trade obstacles, acknowledging the importance of aid to economic infrastructure. Busse et al. (2012) and Cadot et al. (2014) both conclude that aid to infrastructure reduces costs of trading, and Vijil and Wagner (2012) further link this to an increase in exports. Martínez‐Zarzoso et al. (2017) find that countries at the lower quantiles in export volume benefit most from aid to infrastructure, and this benefit is driven by an increase in exports of goods but not services.

Recently, the AfT literature also investigates the influence of AfT based on donor-recipient relations. For example, Hühne et al. (2014) argue that AfT increases both recipient's exports to and imports from donors, with the first effect dominating the latter. Wang and Xu (2017) find a positive but weak elasticity for AfT and quality of exports to donor and OECD countries. Udvari (2017) identifies a positive influence of AfT provided by the EU on the trade volume between the EU and their recipient countries, but not among other members within EU or for the Baltic countries.

The current literature suffers from a common problem, data availability. Most papers employ data between early 1990's to middle 2000's. This can create additional issues. For example, Cali and Te Velde (2011) employ GMM methods with a very short

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time period but GMM may require additional lags. Vijil and Wagner (2012) use only a cross-section data. Hühne et. al (2014) measure AfT in current value commitments rather than disbursement with constant dollars. The ambiguity in the literature is partially driven by these issues. The contrast of the young literature and the ambitious policy actions calls for more rigorous and comprehensive cross-country research evaluating the effectiveness of AfT. This sentiment is echoed by Hühne et. al (2014), who calls for more research to estimate the policy effectiveness of AfT in the post-2005 period.

This paper intends to deepen our understanding of the effectiveness of AfT with empirical evidence spanning a large cross section of countries during 2004-2013. Using system GMM models testing a collection of variables regarding trade cost and volume, this paper finds no direct evidence supporting AfT reducing either overall trade costs or trade-related taxes; AfT does not seem to enlarge either exports or imports in general. However, aid for economic infrastructure may boost service exports. In addition, the analysis reveals that recipient countries trade more with high-income countries but trade less with other middle and low-income countries in the same region. Lastly, aid to industry sector may reduce manufactured imports, either due to domestic substitution or because of higher tariffs on imports of manufactured products.

Primarily, this paper contributes to the AfT literature in four aspects. First, there is no general evidence supporting the role of AfT in either affecting export or trade cost. Second, it is service exports rather than goods that is affected by aid to economic infrastructure, and this result is particularly sensitive to the measure of AfT. Third, on the import side, there is evidence indicating aid to industry sector decreases manufactured imports in recipient countries. This may suggest AfT encourages domestic substitution to

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some extent. In the end, this paper finds that aid to economic infrastructure connects recipient and high-income donor countries more closely; however, this may come at the cost of decreasing the merchandise imported from neighboring low and middle-income countries in the same region.

Data and Methodologies

As the current literature mainly argues, AfT decreases trade cost and facilitates trade, especially in exports. To address this argument, a collection of dependents variables falls into three categories: trade cost measures, trade related tax measures, and trade measures for exports, imports and total trade.

Data for cost of trade are from the World Bank's Doing Business Measuring Business Regulation (2018, henceforth WBD), which is the main data source for the current literature measuring trade costs (Cali and Te Velde, 2011). The WBD dataset, currently available between 2004-2013 with 137 countries, covers six 'trading across borders' measures in both exports and imports: costs in time (number of days), paperwork (number of documents), and cost to transport a 20-foot container between the departure and entry ports (in thousands of US Dollars). This data does not directly measure taxes related to trade, including export taxes, tariffs, customs and duties. Instead, it is an indirect estimation on overall trade cost.

Nevertheless, direct tax cost is an important determinant of trade volume but has not been included in the AfT literature. Therefore, it is helpful to include direct trade taxes as an alternative measure to investigate if AfT reduces trade cost, in terms of taxes on exports, customs, duties and tariffs.

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Lastly, exports, imports, and total trade volume, measured as percent of a GDP, is included in the analysis. Data for both trade direct trade cost and trade volume measures are collected from World Development Indicators (2018, henceforth WDI). In addition, the present paper also disaggregates exports and imports into merchandise or service, and into the industry and sector for imports and exports (WDI, 2018).

One difficulty in the current research is how to appropriately measure AfT. Different definitions and measurements are found in literature. For example, 'aid for trade facilitation' is a tiny fraction of total aid, about 0.001 percent. However, 'aid for economic infrastructure and production sector' is roughly 30 percent of total aid. Thus, what is the appropriate measure of AfT and how do the varying measurements match to the various trade measures? Unfortunately, the literature does not provide a clear answer.

This paper addresses this question by combining a number of different trade and AfT measures. Based on prior literature, AfT consists of four popular definitions, all collected from Creditor Reporting System (CRS) of OECD. The first measure is aid for trade facilitation (CRS sectoral code 33120, AidTF) and is about 1.7 percent of total AfT. The second measure is aid for trade policies & regulation (CRS sectoral code 331, AidTPR). To separate the effect of AidTPR, sectoral aid 331 is subtracted from 33120, and this measure is about 4.4 percent of total AfT. The two broad definitions of AfT refer to aid for economic infrastructure & services (CRS sectoral code 200, AidEI), about 54 percent of total AfT, and aid for production sectors (CRS sectoral code 300, AidPS), about 46 percent of total AfT.

For models with sectoral level exports and imports as dependent, AidEI and AidPS are broke into six sectoral measures and matched up with sectoral exports or imports. For

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example, aid to transport & storage sector (CRS sectoral code 210, AidTRAN) is matched with exports or imports of transportation. The other pairs of sectors include aid to communications sector (CRS sectoral code 220, AidCOMM) and ICT goods exported and imported; aid to energy sector (CRS sectoral code 230, AidENER), aid to agriculture, forestry and fishing sector (CRS sectoral code 310, AidAGRI), aid to industry sector (CRS sectoral code 321, AidINDU) and aid to mineral resources & mining sector (CRS sectoral code 322, AidMINI).

Control variables, collected from WDI, include log GDP per capita, to control for income differences and donor preference to allocate more aid to the poor countries, and an oil dummy for oil and gas net export economies, capturing resource curse effects (Sachs and Warner, 1995). A measure of government effectiveness is also included (Worldwide Governance Indicators 2017) to control for political institutional quality. Lastly, an index for market potential is included.

All independent variables are lagged for one year, partially controlling for reverse causality and to allow time for aid to work. In general, sample size for current research varies between 232 to 1045, with a more broadly defined AfT, like "aid for economic infrastructure" and "aid for production sectors", including more observations. For more specifically defined AfT, like "aid for trade facilitation", "aid for trade policy and regulation" or "sectoral aid", observations drop to about 500.

All AfT variables are measured as percentage of GDP; hence they are quite small numbers. For example, the mean of "aid for trade facilitation" only counts for about 0.005 percent of a recipient country's GDP, and with "aid for economic infrastructure & services"

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being the largest category, with mean equaling to about 0.3% of GDP, on average. Refer to Table 1 for summary statistics and Appendix 1 for details of all the variables.

Table 3.1 Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Aid (ODA/GDP)	1374	4.949	9.083	-2.660	99.433
Aid for trade facilitation (CRS 33120)	698	0.005	0.013	-0.002	0.158
Aid for trade policy and regulation (CRS 331 minus 33120)	698	0.017	0.149	-0.028	3.781
Aid for economic infrastructure & services (CRS 200)	1195	0.294	0.560	-0.023	7.612
Aid for production sectors (CRS 300)	1218	0.206	0.308	0.000	3.544
Aid for energy sector (CRS 230)	1038	0.108	0.274	-0.009	3.547
Aid for transport & storage sector (CRS 210)	1074	0.142	0.336	-0.035	3.983
Aid for industry sector (CRS 321)	1104	0.025	0.062	0.000	0.923
Aid for communications sector (CRS 220)	1098	0.016	0.073	-0.091	1.211
Aid for agriculture, forestry and fishing sector (CRS 20)	1210	0.164	0.270	0.000	3.392
Aid for mineral resources and mining sector (CRS 322)	655	0.009	0.057	0.000	0.976
Time to import (days)	1313	32.210	19.918	8	130
Documents to import	1297	8.272	2.591	3	21
Cost to Import (KUSD)	1313	1.847	1.368	0.317	10.650
Time to Export (days)	1313	27.854	16.160	8	102
Documents to Export	1297	7.047	1.990	3	15
Cost to Export (KUSD)	1313	1.517	1.055	0.390	9.050
Taxes on export (% of tax revenue)	1230	0.982	4.683	-25.224	44.608
Customs and other import duties (% of tax revenue)	1250	11.942	16.066	-0.061	88.823
Tariff rate, applied, weighted mean, all products (%)	1514	6.231	5.070	0.000	31.550
Tariff rate, applied, weighted mean, primary products (%)	1514	5.930	4.934	0.000	31.110
Tariff rate, applied, weighted mean, manufactured products (%)	1514	5.469	5.602	0.000	52.160
Export (% of GDP)	1309	36.734	19.309	0.099	115.373
Import (% of GDP)	1329	48.289	23.233	0.065	236.392
Merchandise export (% of GDP)	1208	27.382	22.739	1.265	346.855
Merchandise export to high-income economies (% of total merchandise export)	2010	63.254	23.197	0.009	100.000
Merchandise export to low- and middle-income economies outside region (% of total merchandise export)	2001	17.484	16.817	0.001	99.991
Merchandise export to low- and middle-income economies within region (% of total merchandise export)	1373	25.645	22.093	0.000	98.638
Merchandise import (% of GDP)	1208	38.984	25.275	4.247	440.599
Merchandise import from high-income economies (% of total merchandise import)	2010	60.348	20.835	2.122	100

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Table 3.1 (continued)

Merchandise import from low- and middle-income economies outside region (% of total merchandise import)	2009	18.932	13.158	0.004	77.217
Merchandise import from low- and middle-income economies within region (% of total merchandise import)	1374	26.932	20.827	0.021	93.369
Service export (% of GDP)	1117	10.842	11.673	0.122	105.112
Service import (% of GDP)	1117	10.697	10.930	0.975	142.945
Merchandise trade (% of GDP)	1918	71.087	44.718	9.937	429.368
Service trade (% of GDP)	1747	26.855	28.661	2.338	266.733
Trade (% of GDP)	1329	84.747	35.997	0.167	311.355
Transport services export (% of service export)	1721	21.216	15.199	0.160	79.473
Agricultural raw materials export (% of merchandise export)	1595	3.713	8.233	0.000	75.878
Fuel export (% of merchandise export)	1561	17.304	27.526	0.000	99.858
ICT goods export (% of total goods export)	1526	4.474	8.512	0.000	51.127
Manufactures export (% of merchandise export)	1606	44.045	31.704	0.000	373.228
Transport services import (% of service import)	1734	36.837	15.871	1.183	89.937
Agricultural raw materials import (% of merchandise import)	1611	1.459	1.789	0.000	42.322
Fuel import (% of merchandise import)	1616	16.245	9.243	0.010	65.672
ICT goods import (% of total goods import)	1612	6.863	6.103	0.003	48.333
Manufactures import (% of merchandise import)	1617	63.455	12.939	0.033	92.991
Log GDP per capita	1389	8.547	0.983	6.256	10.833
Oil and gas exporter dummy	1173	0.329	0.470	0.000	1.000
Government Effectiveness	1443	-0.496	0.678	-2.402	1.572
Log Market Potential	1484	7.982	0.342	7.015	9.351

Notes: Due to sample size differences of aid measures and trade measures on different scales, observation numbers vary between specifications. In Tables 2-6, with aid for trade facilitation and aid for trade policy and regulation as dependents, number of observations range between 546 and583; with aid for economic infrastructure & services and aid for production sectors as dependents, number of observations range between 885 and 1045; and with six sectoral aid's as dependents, number of observations range between 516 and 897. In appendixes 2-3, with aid for trade facilitation and aid for trade policy and regulation as dependents, number of observations range between 232 and 381; with aid for economic infrastructure & services and aid for production sectors as dependents, number of observations range between 527 and 806. Values in Table 1 indicate summary statistics for each of the variables during 2004-2013.

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The analysis uses Blundell–Bond system generalized method of moments (GMM) and builds on Cali and Te Velde (2011). The aid for trade – trade relation is tested with the baseline model below:

$$Trade\ or\ Trade\ \ Cost_{it} = \beta_0 + \beta_1 Aid_{it-1} + \beta_2^{'} Z_{it-1} + \varepsilon_{it} \quad (3.1)$$

Where i and t represent country and period; $Trade\ or\ Trade\ Cost_{it}$ takes different forms of measures from WDI and WBD as aforementioned; Aid_{it-1} represents different forms of lagged trade-related aid's as percentage of a recipient's GDP; Z_{it-1} is a vector of all the control variables; all specifications include time and fixed effects dummies.

Empirical Results

This research starts with examining the effect of AfT on the six WBD trading across boarders' measures, following Cali and Te Velde (2011), with an extended period, 2004-2013[40].

In general, Table 2 (reporting sample between 2004-2013) and Appendix 2 (reporting limited sample between 2005-2009 to match with Te Velde, 2011) suggest that AfT is not associated with reducing trade costs, including time, number of documents, and cost. This is counter to the previous results in the literature, which found that AfT can reduce import and export costs. Recall, however, that these measures do not directly estimate trading costs. Hence, it is possible AfT still relates to direct trade cost.

[40] Note that "documents to import/export" are not included in Cali and Te Velde (2011) but reported in the current paper. Appendix 2 reports the results matching the same time period in Cali and Te Velde (2011), for 2005-2009, which has the majority of the regressions being consistent, except two FE models find AfT increasing and decreasing time to export.

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Table 3.2 The Impact of Aid for Trade Facilitation & Other Aid for Trade Policy & Regulation, Aid for Economic Infrastructure & Services and Aid for Production Sectors on Trading Across Borders Measures - Time to Import (Days), Documents to Import (Numbers), Cost to Export (US$ Per 20-Foot Container) And Time to Export (Days), 2004-2013

Dependent Variables	Time to Import		Documents to Import		Cost to Import		Time to Export		Documents to Export		Cost to Export	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Aid_{TF} (% of GDP)	-55.653		5.071		1.198		-13.908		0.659		0.036	
	(34.098)		(11.396)		(1.987)		(26.391)		(3.427)		(2.213)	
Aid_{TPR} (% of GDP)	-9.604		-2.326		0.210		-6.183*		-0.274		-0.071	
	(15.141)		(2.531)		(0.510)		(3.729)		(1.012)		(0.452)	
Aid_{EI} (% of GDP)		0.196		-0.147		0.040		0.216		-0.013		0.016
		(0.667)		(0.128)		(0.060)		(0.344)		(0.148)		(0.030)
Aid_{PS} (% of GDP)		-1.952		0.281		-0.103		-0.387		-0.146		-0.203
		(2.047)		(0.346)		(0.210)		(1.015)		(0.174)		(0.281)
Log GDP per capita	2.095*	0.557	0.429	-0.430	0.056	-0.090	0.134	-0.376	0.155	0.202	0.139	-0.081
	(1.141)	(0.734)	(0.398)	(0.567)	(0.103)	(0.100)	(0.625)	(0.462)	(0.184)	(0.272)	(0.087)	(0.059)
Oil Exporter Dummy	-1.148	0.039	-0.228	0.424	-0.053	0.067	-0.098	0.674	-0.125	-0.083	-0.103	0.029
	(0.959)	(0.792)	(0.262)	(0.536)	(0.054)	(0.062)	(0.554)	(0.500)	(0.160)	(0.282)	(0.069)	(0.045)
Government Effectiveness	-1.911	-1.229	-0.580	0.026	-0.057	0.062	-0.194	-0.613	-0.208	-0.337	-0.185*	0.010
	(1.936)	(1.495)	(0.545)	(0.555)	(0.141)	(0.117)	(1.060)	(0.595)	(0.270)	(0.342)	(0.110)	(0.082)
Dependent variable	1.053***	0.902***	0.988***	0.263	1.040***	1.029***	0.968***	0.922***	0.915***	0.670***	1.046***	1.028***
	(0.071)	(0.077)	(0.107)	(0.192)	(0.015)	(0.023)	(0.054)	(0.056)	(0.076)	(0.135)	(0.013)	(0.026)
Constant	-19.747*	-3.518	-3.782	9.572*	-0.546	0.800	-0.648	4.330	-0.801	0.438	-1.211	0.734
	(10.083)	(5.981)	(3.791)	(5.122)	(0.898)	(0.921)	(5.970)	(3.912)	(1.711)	(2.162)	(0.759)	(0.569)
Observations	556	945	540	929	556	945	556	945	540	929	556	945
Auto-corr p-value	0.405	0.917	0.829	0.855	0.413	0.505	0.929	0.240	0.919	0.126	0.969	0.782
Hansen-J p-value	0.261	0.139	0.237	0.371	0.221	0.731	0.281	0.331	0.142	0.225	0.249	0.354

Notes: Aid_{TF} is aid for trade facilitation; Aid_{TPR} is aid for trade policy and regulation; Aid_{EI} is aid for economic infrastructure & services; Aid_{PS} is aid for production. All dependent variables are lagged for 1 year. Outputs for control variables are omitted due to limited space. GMM is Blundell–Bond system generalized method of moments. All models include a full set of time fixed effects. Robust standard errors are in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

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Results reported in Appendix 3 directly tests for any possible influence of AfT on trade related taxes, including taxes on exports, import customs and duties (as percentage of a total tax), and tariffs (as percentage of the imported products prices). Out of ten specifications, only "aid for economic infrastructure" reports a weak significant coefficient on tariffs of manufactured goods, but it is positive.

Overall, the results suggest that AfT does not reduce trade cost, in terms of either direct taxes or overall costs. However, there is weak evidence that AfT could increase tariffs on manufactured products.

Cali and Te Velde (2011), Helble et al. (2011), Pettersson and Johansson (2013) and Basnett et al. (2012) suggest a positive effect of AfT on promoting exports. Cali and Te Velde (2011) also find that AidEI but not AidPS is positively associated with value of total exports. Table 3 addresses this question with both narrow (AidTF and AidTPR) and broader (AidEI and AidPS) definitions of AfT.

As shown in columns (1)-(4), no measure of AfT affects exports or imports. Reported in column (6), AidPS is negative and significant at the 1% level, indicating that AfT may significantly decrease total trade at the ratio about 1 to 19. Lastly, AfT is irrelevant to terms of trade in a recipient country, as suggested by columns (7) and (8), suggesting that unlike in general aid, the "Dutch Disease" phenomenon or real exchange rate change associated with AfT does not seem to be an issue. This is probably due to the smaller amount of AfT, compared to that of total aid.

In general, regardless of AfT's effect on trade costs, no evidence suggests AfT increases either exports or imports separately, but the results suggest that AfT could decrease total trade.

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Table 3.3 The Impact of Aid for Trade Facilitation and Trade Policy & Regulation, Aid for Economic Infrastructure & Services on Export, Import and Terms of Trade, 2004-2013

Dependent Variables	Export (% of GDP)		Import (% of GDP)		Trade (% of GDP)		Terms of trade	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Aid_{TF} (% of GDP)	-18.659		67.395		75.979		-187.886	
	(55.540)		(83.694)		(151.622)		(328.882)	
Aid_{TPR} (% of GDP)	6.571		-3.389		-22.318		47.325	
	(10.046)		(9.601)		(30.277)		(57.811)	
Aid_{EI} (% of GDP)		4.339		0.605		0.395		-0.570
		(4.477)		(1.442)		(1.703)		(2.483)
Aid_{PS} (% of GDP)		-3.160		-5.420		-19.273***		1.601
		(11.056)		(4.778)		(7.037)		(5.933)
Log GDP per capita	0.231	3.924	-0.792	-1.836	0.039	-6.140*	-4.287	-1.918
	(1.618)	(7.607)	(2.574)	(2.817)	(2.757)	(3.178)	(4.496)	(2.154)
Oil Exporter	-0.363	-1.046	-0.419	-1.397	-2.041	0.857	6.849	5.666**
Dummy	(1.611)	(5.793)	(2.540)	(2.654)	(3.418)	(2.389)	(4.583)	(2.793)
Log Market	2.345	2.400	-1.429	-2.462	-0.321	-2.402	0.713	-5.385
Potential	(3.739)	(10.552)	(3.887)	(4.460)	(4.205)	(5.323)	(8.348)	(7.228)
Government	-1.140	-4.084	1.220	1.574	-5.623	5.327	6.548	-4.588
Effectiveness	(2.538)	(12.016)	(3.724)	(4.000)	(4.407)	(4.501)	(9.228)	(3.603)
Export/imports (%	0.828***	0.789***	0.909***	0.798***	0.878***	0.948***	1.025***	0.978***
of GDP)	(0.089)	(0.148)	(0.106)	(0.054)	(0.075)	(0.068)	(0.044)	(0.041)
Constant	-13.664	-43.762	22.985	47.202	11.272	83.078	29.569	57.568
	(29.890)	(147.531)	(37.717)	(45.727)	(38.192)	(53.956)	(73.475)	(63.307)
Observations	571	1061	556	944	570	1052	583	1086
Auto-corr p-value	0.627	0.742	0.116	0.166	0.233	0.109	0.103	0.608
Hansen-J p-value	0.134	0.243	0.348	0.124	0.708	0.136	0.446	0.117

Notes: AidTF is aid for trade facilitation; AidTPR is aid for trade policy and regulation; AidEI is aid for economic infrastructure & services; AidPS is aid for production. All dependent variables are lagged for 1 year. Outputs for control variables are omitted due to limited space. GMM is Blundell–Bond system generalized method of moments. All models include a full set of time fixed effects. Robust standard errors are in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.Place the contents of your landscaped page here..

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Table 3 evaluates AfT's effects on the basis of the total imports, exports and trade. Nonetheless, it is possible that the aggregation filters out the information on effects of AfT. In addition, to investigate the reason of declined total trade associated with AfT, Tables 4-6 expand the analysis with more focused measurements.

In Table 4, export, import and trade are all broken down to merchandise and service, to capture any potential influence of AfT not reflected when summing up merchandise and service. It appears that AfT mainly works on service export but not on service import; neither does it work on export or import of merchandise. For example, a 0.01 percent or roughly one-standard deviation increase in Aid_{TF} induces about 1.69 percent increase in service export[41]. A one percent increase in Aid_{EI} is associated with about 2.14 percent increase in service exports. Total trade is largely unrelated to AfT, except for that Aid_{TF} shows some weak positive effect on service trade, at ten percent significance level.

While the current literature tends to agree on a positive role of AfT on exports over imports, results in Table 4 indicate that AfT only assists service exports with Aid_{TF} dominating the results. This result makes sense as service exports include a wide range of intangible commodities like, but not limited to, tourism, education, consulting, financial and IT. Services is a rapid, growing category in trade, as a direct consequence of increased globalization and international divisions of labor. The call centers located in the Philippines or IT outsourcing services in India are successful examples of a service export.

[41] Aid to trade facilitation is a tiny fraction of GDP-the mean of current sample equals to 0.00458 percent, with minimum=-0.00155 and maximum=0.15834.

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Table 3.4 The Impact of Aid for Trade on Merchandise, Service Export & Import, and Trade, 2004-2013

	Export				Import				Total Trade			
Dependent Variables	Merchandise export (% of GDP)		Service export (% of GDP)		Merchandise import (% of GDP)		Service import (% of GDP)		Merchandise trade (% of GDP)		Service trade (% of GDP)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Aid_{TF} (% of GDP)	0.347		169.321***		-87.365		-17.023		22.627		159.101*	
	(101.453)		(53.899)		(100.923)		(33.086)		(75.367)		(96.468)	
Aid_{TPR} (% of GDP)	9.643		5.372		-27.189		2.716		-2.423		-0.537	
	(13.530)		(6.470)		(53.043)		(3.819)		(11.820)		(5.264)	
Aid_{EI} (% of GDP)		-2.383		2.139**		1.026		-1.695		1.135		-1.829
		(2.091)		(0.862)		(1.409)		(1.808)		(5.622)		(2.190)
Aid_{PS} (% of GDP)		2.200		-0.872		-0.233		-2.463		2.991		-4.921
		(3.042)		(1.073)		(4.256)		(2.219)		(19.763)		(6.015)
Log GDP per capita	1.383	-2.694	3.355*	-0.023	-1.362	-1.102	-0.804	-1.122	3.465	3.451	1.244	-1.613
	(2.792)	(7.111)	(2.028)	(1.369)	(2.977)	(6.348)	(0.650)	(0.841)	(2.249)	(8.242)	(1.625)	(1.570)
Oil Exporter Dummy	4.100	5.953	-4.548**	-0.909	-0.816	-3.355	-0.581	-0.155	-3.307	-3.094	-2.114	-1.154
	(3.291)	(4.551)	(2.301)	(0.835)	(3.507)	(4.911)	(0.854)	(0.746)	(2.253)	(7.021)	(1.487)	(1.586)
Log Market Potential	6.845	7.628	-0.829	-2.093	-3.070	6.570	-0.613	-2.466	-4.896	-0.549	-0.680	-1.360
	(8.843)	(8.117)	(4.540)	(2.105)	(3.720)	(9.095)	(2.941)	(1.694)	(5.987)	(19.349)	(3.518)	(2.690)
Government Effectiveness	-0.591	-0.589	-4.565	1.093	2.307	-2.749	-0.592	0.368	-4.674	-9.523	-2.565	-0.415
	(3.988)	(5.969)	(3.505)	(1.832)	(3.118)	(4.799)	(1.239)	(1.027)	(4.354)	(7.330)	(2.373)	(2.835)
Dependent variables	0.308**	0.530***	0.528**	0.774***	0.941***	0.567***	0.594***	0.946***	0.837***	0.767***	0.762***	0.876***
	(0.144)	(0.041)	(0.229)	(0.085)	(0.183)	(0.032)	(0.081)	(0.054)	(0.060)	(0.230)	(0.163)	(0.077)
Constant	-51.404	-28.039	-19.057	19.525	41.245	-26.898	15.561	32.131*	19.281	-11.257	-2.006	28.455
	(69.713)	(101.671)	(44.790)	(26.238)	(38.090)	(72.848)	(25.153)	(17.249)	(52.812)	(200.3)	(33.613)	(31.323)
Observations	569	975	546	885	569	975	546	885	581	1083	558	975
Auto-corr p-value	0.796	0.441	0.167	0.233	0.321	0.426	0.133	0.506	0.110	0.287	0.645	0.403
Hansen-J p-value	0.368	0.106	0.412	0.146	0.551	0.168	0.793	0.840	0.616	0.737	0.310	0.404

Notes: AidTF is aid for trade facilitation; AidTPR is aid for trade policy and regulation; AidEI is aid for economic infrastructure & services; AidPS is aid for production. All dependent variables are lagged for 1 year. Outputs for control variables are omitted due to limited space. GMM is Blundell–Bond system generalized method of moments. All models include a full set of time fixed effects. Robust standard errors are in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

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Table 4 suggests that AfT appears unrelated to merchandise trade. This finding is inconsistent with that of Martínez‐Zarzoso et al. (2017), which identifies that goods or merchandise, not service trade, is an area that AfT can affect. In order to provide robustness to this finding, Table 5 further divides AfT into six sectors and matches them with the corresponding merchandise trade categories. This is to exhaust the possibility that AfT in a certain category works at a more micro level.

According to the results in columns (1) - (6) in Table 5, sectoral AfT does not demonstrate any significant influence on the matched sectoral exports, except for the pair of 'aid to mining sector' and 'fuel exports', which reports a positive and weakly significant coefficient. However, there are three matched import sectors with significant coefficients at the five percent level or higher. Two of the three are negative, suggesting a decrease in certain imports.

For example, a recipient country would reduce manufactured imports by 9.2 and 25.9 percentage points with a one percent increase in energy sector aid or industry sector aid, respectively. On the contrary, fuel imports would be raised by 61.4 percentage points when aid to the mining sector is increased by one percent.

To rule out the possibility that this result is driven by industry specific trends or variations in sample, manufacturing value added as percentage of GDP and fossil fuel energy consumption are included as industry controls. Results show that when these controls are included, the "aid to energy sector-manufactures import" and "aid to mining sector-fuel export/imports" pairs turn insignificant, but "aid to industry sector-manufactures import" stays significant at the five percent level.

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To summarize Table 5, there is some evidence supporting that aid to industry sectors may reduce reliance on imports of manufacturing goods and encourage replacing imports with homemade substitutes. This is possibly due to the evidence found in Appendix 3 that AfT may increases tariffs on manufactured products. This may also indicate to some extent that industry specific aid may encourage import substitution industrialization policy. To avoid deviating from the current topic, the present paper leaves this as an area for future research.

Collectively, the results thus far find some evidence to suggest that AfT increases service exports, but AfT may also decrease total trade and manufactured imports. Taken together, AfT's effect on trade is at best mixed.

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Table 3.5 The Impact of Sectoral Aid on Sectoral Exports and Imports, 2004-2013

	Panel A Sectoral Export						Panel B Sectoral Import					
Dependent Variables	Transport services	ICT goods exports	Manufactures exports	Agricultural raw materials exports	Manufactures exports	Fuel exports	Transport services	ICT goods imports	Manufactures imports	Agricultural raw materials imports	Manufactures imports	Fuel imports
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Aid_{TRAN} (% of GDP)	-3.485						-1.978					
	(2.991)						(2.639)					
Aid_{COMM} (% of GDP)		0.023						-2.943				
		(2.700)						(1.814)				
Aid_{ENER} (% of GDP)			5.920						-9.193**			
			(8.904)						(3.984)			
Aid_{AGRI} (% of GDP)				1.304						0.522		
				(1.463)						(0.682)		
Aid_{INDU} (% of GDP)					-1.560						-25.926***	
					(9.992)						(8.085)	
Aid_{MINE} (% of GDP)						4.009*						61.414***
						(2.114)						(18.538)
Log GDP per capita	-5.159*	-0.606	5.821	-0.457	-1.032	-0.192	-0.099	-0.572	-2.149	-0.314	-5.238*	3.679
	(3.104)	(0.417)	(5.545)	(0.724)	(3.575)	(2.355)	(2.723)	(0.372)	(2.686)	(0.351)	(2.982)	(3.797)
Oil Exporter Dummy	3.581	0.661*	-5.242	0.263	-0.553	0.625	-1.373	0.425	3.534*	0.195	7.380**	-3.529
	(3.228)	(0.401)	(3.634)	(0.396)	(2.784)	(1.155)	(2.099)	(0.298)	(2.087)	(0.291)	(3.083)	(2.970)
Log Market Potential	-5.401	0.740	7.713	0.044	0.970	-2.812	-4.330	-0.016	6.635	0.435	-1.683	2.594
	(5.205)	(1.375)	(8.322)	(1.712)	(8.958)	(1.871)	(4.331)	(0.761)	(5.134)	(0.744)	(7.320)	(4.379)
Government Effectiveness	7.565*	0.945	-9.440	-0.061	8.753**	1.314	-3.568	1.218**	5.695*	0.480	11.670***	-7.186
	(4.242)	(0.703)	(8.316)	(0.788)	(4.268)	(3.260)	(4.266)	(0.609)	(3.387)	(0.408)	(4.176)	(5.855)
Dependent variable	0.955***	0.925***	0.965***	0.963***	0.889***	1.002***	0.850***	0.887***	0.664***	0.540***	0.669***	0.850***
	(0.074)	(0.152)	(0.127)	(0.108)	(0.145)	(0.053)	(0.084)	(0.058)	(0.122)	(0.035)	(0.108)	(0.162)
Constant	87.560	-0.367	-108.628	3.272	8.194	24.638	39.764	6.030	-8.226	0.149	82.284	-51.436
	(54.487)	(8.710)	(89.982)	(17.182)	(53.710)	(20.777)	(46.972)	(6.702)	(54.490)	(6.944)	(67.378)	(52.321)
Observations	882	798	788	870	844	516	897.000	840.000	792.000	883.000	850.000	527.000
Auto-corr p-value	0.372	0.302	0.297	0.216	0.317	0.967	0.255	0.809	0.389	0.246	0.186	0.125
Hansen-J p-value	0.627	0.725	0.532	0.115	0.784	0.165	0.379	0.333	0.300	0.291	0.226	0.310

Notes: Aid_{TRAN} is aid to transport & storage sector; Aid_{COMM} is aid to communications sector; Aid_{ENER} is aid to energy sector; Aid_{AGRI} is aid to agriculture, forestry and fishing sector; Aid_{INDU} is aid to industry sector; Aid_{MINI} is aid to mineral resources & mining sector. GMM is Blundell–Bond system generalized method of moments. All models include a full set of time fixed effects. Robust standard errors are in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

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The last empirical investigation details income and region-based trade patterns. When donor countries aid recipient countries, I expect to observe a pattern that a one-way aid flow induces trade flow in both directions. Donors may import more from and the same time export more to their aid recipients (Younas, 2018; Hühne et.al., 2014). One possible unintended consequence of this is that AfT may encourage "donor-recipient" trade flow at the expenses of crowding out the "between recipients" trade flows.

Table 6 tests the merchandise export and import flows for two groups, one group is between high-income and low & middle-income economies, and the other group is among the low & middle-income economies, divided by either outside or within the same region.

In the upper panel of Table 6, with additional aid to economic infrastructure (AidEI), recipient countries increase merchandise exports to high-income economies and, at the same time, decrease exports to low & middle-income economies, by about the same magnitude. The lower panel shows that AidEI also increases imports from high-income economies and at the same time decreases imports from other low & middle-income economies in the same region.

The findings here support the conjecture that aid makes donor countries export and import more from their recipients, as high-income economies usually are donor countries and low & middle-income economies more likely are recipient countries.

These results also indicate that AfT strengthens the trade ties between donors and recipients, like the U.S. and Iraq, by weakening the trade relation between recipient countries in the same region, such as Zambia's trade patterns in South Saharan Africa. It does not reduce trade flows across regions, like Zambia and India. This finding confirms

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the results in Djajić et al. (2004), where they find aid in general "results in trade diversion at the expense of non-donors". The current analysis suggests this pattern also exists for AfT, but the crowding out effect does not exist to countries outside of the recipient region.

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Table 3.6 The Impact of Aid for Trade on Exports and Imports of Merchandise to Low& Middle and High-Income Economies, 2004-2013

	Panel A Export of Merchandise (% of total merchandise exports)							
Dependent Variables	To high-income economies		To low & middle-income economies		To low & middle-income economies, outside region		To low& middle-income economies, within region	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Aid_{TF} (% of GDP)	1.708		-8.250		-22.981		13.815	
	(57.257)		(43.239)		(84.398)		(124.877)	
Aid_{TPR} (% of GDP)	3.531		2.085		6.420		-13.151	
	(7.248)		(7.267)		(4.285)		(13.123)	
Aid_{EI} (% of GDP)		3.514**		-3.441*		0.063		-0.656
		(1.496)		(1.960)		(1.280)		(1.530)
Aid_{PS} (% of GDP)		-5.245		5.872		2.299		1.456
		(4.481)		(4.842)		(2.704)		(4.270)
Log GDP per capita	3.284	1.741	0.122	-1.140	0.555	0.773	-1.447	-2.435*
	(3.625)	(2.977)	(2.879)	(2.436)	(1.317)	(1.300)	(3.557)	(1.337)
Oil Exporter Dummy	0.526	0.414	-1.897	-1.634	0.017	0.096	-0.682	-1.607
	(2.387)	(2.668)	(2.032)	(2.294)	(0.960)	(1.067)	(2.305)	(2.555)
Log Market Potential	-5.275	-5.887	11.892*	12.152	1.167	-0.024	1.058	7.028
	(9.300)	(6.434)	(6.211)	(8.830)	(2.519)	(2.463)	(4.763)	(8.142)
Government Effectiveness	0.722	-0.208	-8.032	-3.026	-2.481	-0.358	-0.806	-1.117
	(5.122)	(3.379)	(5.037)	(3.324)	(2.516)	(1.905)	(3.600)	(2.513)
Dependent variables	0.673***	0.708***	0.777***	0.674***	0.992***	0.956***	0.897***	0.824***
	(0.142)	(0.097)	(0.157)	(0.133)	(0.074)	(0.073)	(0.078)	(0.141)
Constant	34.117	47.202	-83.870*	-71.966	-13.400	-6.174	6.856	-29.395
	(79.684)	(63.557)	(44.210)	(70.823)	(25.493)	(24.590)	(50.668)	(56.571)
Observations	583	1086	570	1045	583	1085	570	1046
Auto-corr p-value	0.888	0.445	0.411	0.425	0.152	0.824	0.517	0.181
Hansen-J p-value	0.487	0.360	0.237	0.354	0.561	0.187	0.217	0.387
	Panel B Import of Merchandise (% of total merchandise imports)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Aid_{TF} (% of GDP)	13.090		-49.654		4.547		-59.204	
	(85.735)		(74.437)		(21.820)		(80.917)	
Aid_{TPR} (% of GDP)	12.840		-5.630		0.837		-4.227	
	(10.329)		(5.913)		(4.217)		(6.722)	
Aid_{EI} (% of GDP)		1.796**		-3.110		-0.625		-1.014***
		(0.865)		(3.623)		(0.413)		(0.363)
Aid_{PS} (% of GDP)		-3.122		-0.612		1.811		2.333
		(1.909)		(5.658)		(1.540)		(1.933)
Log GDP per capita	2.275**	-2.383*	-2.543**	2.592	-2.090	-1.546	-1.940*	0.619
	(1.134)	(1.443)	(1.239)	(3.702)	(1.306)	(1.412)	(1.000)	(2.124)
Oil Exporter Dummy	-0.086	3.711*	0.014	-8.116	0.525	1.149	1.006	-1.154
	(1.120)	(2.067)	(1.101)	(6.154)	(1.085)	(1.200)	(0.784)	(2.180)
Log Market Potential	-3.805	-10.434**	3.646	0.539	-2.578	-0.570	0.762	7.623*
	(4.474)	(5.018)	(3.889)	(8.564)	(3.017)	(1.868)	(2.956)	(4.433)
Government Effectiveness	-1.675	3.638	2.392	-9.951	1.424	1.653	2.289*	0.176
	(2.155)	(3.039)	(2.250)	(11.859)	(1.778)	(1.647)	(1.319)	(2.686)
Dependent variables	0.851***	0.777***	0.817***	0.356	0.725***	0.841***	0.937***	0.808***
	(0.104)	(0.078)	(0.118)	(0.298)	(0.139)	(0.065)	(0.063)	(0.081)
Constant	16.713	112.702**	2.827	-0.457	42.967	20.088	13.031	-58.191
	(37.495)	(49.505)	(27.917)	(80.439)	(27.435)	(19.828)	(24.954)	(44.410)
Observations	583	1086	570	1046	583	1086	570	1046
Auto-corr p-value	0.303	0.560	0.312	0.209	0.134	0.384	0.977	0.128
Hansen-J p-value	0.584	0.323	0.426	0.634	0.616	0.151	0.659	0.723

Notes: Aid_{TF} is aid for trade facilitation; Aid_{TPR} is aid for trade policy and regulation; Aid_{EI} is aid for economic infrastructure & services; Aid_{PS} is aid for production. All dependent variables are lagged for 1 year. Outputs for control variables are omitted due to limited space. GMM is Blundell–Bond system generalized method of moments. All models include a full set of time fixed effects. Robust standard errors are in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

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Conclusion

Aid for trade has been attracting more policy attention, but the academic literature remains relatively small. This research contributes to the current aid for trade literature with updated findings.

In general, using a longer time period starting in 2005, the effectiveness of AfT on trade is overturned. The evidence on the positive role of AfT seems limited to shorter time periods around 2005, when formal AfT policy was initiated. Ironically, after AfT policy started attracting more attention and aid dollars, AfT appears to be ineffective. In addition, prior results could be driven by differences in measurements of AfT, like using current dollar amount of aid, adding one million to avoid negative numbers, and then taking the natural logarithm (Cali and Te Velde, 2011).

The empirical results add to the existing literature by revealing some new evidence on effectiveness of multilateral AfT at aggregate, industry and regional levels. In aggregate, there is no evidence supporting that AfT either reduces trade costs or facilitates trade across borders; neither does AfT affect trade related taxes, customs, duties or tariffs in a recipient country. On the contrary, there is moderate evidence on aid to production sector may reduce total trade as percentage of GDP.

In general, this article finds evidence that aid for trade may not be able to achieve the "big goals" such as reducing trade cost or boosting exports. Aid for trade does change some of the trade patterns, including encouraging more service exports, trading more with donors but less with other recipient countries, and decreasing imported manufactured products.

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APPENDIX A

CHAPTER ONE

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Table A.1 Difference in sample between BD, ELR and the New Data

Obs. Unique to BD original sample, 1970-1993 (compare with New data, BD countries, 1970-1993)												**Obs.=65**
BOL3	DZA3	DZA4	GHA3	GHA4	GHA5	GHA6	GHA7	GHA8	GMB4	GMB5	GMB7	GUY3
GUY4	GUY5	GUY6	GUY7	GUY8	HTI3	HTI4	HTI5	HTI6	HTI7	JAM4	JAM5	JAM6
LKA3	LKA4	LKA5	LKA6	MDG3	MDG8	MWI5	MWI6	MWI7	MWI8	NER4	NER5	NGA3
NGA4	NGA5	NIC3	NIC4	NIC5	NIC6	NIC7	NIC8	PRY3	PRY4	PRY5	PRY6	PRY7
PRY8	SLE3	SOM4	SOM5	SYR3	SYR4	TTO5	TTO7	TZA6	TZA7	VEN3	VEN4	ZMB8
Obs. Unique to New data, BD countries, 1970-1993												**Obs.=21**
BWA8	CIV6	CIV7	CIV8	ETH8	MDG5	MDG6	MLI4	MLI5	MLI6	MLI8	SEN7	SEN8
SYR6	TGO8	TTO8	TUN3	TUN4	TUN5	ZAR8	ZWE5					
Obs. Unique to New data, full sample, 1970-1993, BD												**Obs.=33**
BGD5	BGD6	BGD7	BGD8	BWA8	CIV6	CIV7	CIV8	ETH8	MDG5	MDG6	MLI4	MLI5
MLI6	MLI8	PAN6	PAN7	PAN8	SEN7	SEN8	SGP5	SGP6	SGP7	SGP8	SYR6	TGO8
TTO8	TUN3	TUN4	TUN5	ZAF8	ZAR8	ZWE5						
Obs. Unique to ELR original sample, 1970-1997 (compare with New data, ELR countries, 1970-1997)												**Obs.=86**
BOL3	BWA4	DOM9	DZA9	GHA3	GHA4	GHA5	GHA6	GHA7	GHA8	GHA9	GMB4	GMB5
GUY9	HND9	HTI3	HTI4	HTI5	HTI6	HTI7	HTI8	HTI9	JAM4	JAM5	JAM6	JAM8
JAM9	JOR4	LKA3	LKA4	LKA5	LKA6	MDG3	MDG8	MDG9	MMR3	MMR4	MMR5	MMR6
MMR7	MMR8	MMR9	MWI5	MWI6	MWI7	MWI8	NER4	NER5	NGA3	NGA4	NGA5	NIC3
NIC4	NIC5	NIC6	NIC7	NIC8	NIC9	PNG5	PNG6	PNG7	PNG8	PNG9	PRY3	PRY4
PRY5	PRY6	PRY7	PRY8	SLE3	SYR3	SYR4	TTO5	TTO7	TTO9	TUR3	TUR4	TUR5
TUR6	TUR7	UGA6	UGA9	VEN3	VEN4	ZMB8	ZMB9					
Obs. Unique to New data, ELR countries, 1970-1997												**Obs.=26**
BRA3	BRA4	COG3	COG4	COG5	COG6	COG7	IRN3	IRN4	MDG5	MDG6	MLI4	MLI5
MLI6	PRY9	SEN7	SEN8	SYR6	TUN3	TUN4	TUN5	ZAF8	ZMB3	ZMB4	ZMB5	ZMB6
Obs. Unique to New data, full sample, 1970-1997, ELR												**Obs.=45**
BGD5	BGD6	BGD7	BGD8	BGD9	BRA3	BRA4	CHN6	CHN7	CHN8	CHN9	COG3	COG4
COG5	COG6	COG7	IRN3	IRN4	MDG5	MDG6	MLI4	MLI5	MLI6	PAN6	PAN7	PAN8
PAN9	PRY9	SEN7	SEN8	SGP5	SGP6	SGP7	SGP8	SGP9	SYR6	TUN3	TUN4	TUN5
TZA9	ZAF8	ZMB3	ZMB4	ZMB5	ZMB6							
New data, full sample, 1962-1969 & 1994-2013, BD specification												**Obs.=200**
ARG9	ARG10	ARG11	ARG12	ARG13	BGD9	BGD10	BOL9	BOL10	BOL11	BOL12	BOL13	BRA2
BRA9	BRA10	BRA11	BRA12	BRA13	BWA9	BWA10	BWA11	BWA12	BWA13	CHL2	CHL9	CHL10
CHL11	CHL12	CHL13	CIV9	CIV10	CIV11	CIV12	CMR9	CMR10	COL2	COL9	COL10	COL11
COL12	COL13	CRI9	DOM2	DOM10	DOM11	DOM12	DOM13	ECU2	ECU9	ECU10	ECU11	ECU12
ECU13	EGY9	EGY10	EGY11	EGY12	EGY13	ETH9	ETH10	GTM2	GTM9	GTM10	GTM11	GTM13
HND2	HND13	IDN9	IDN10	IDN11	IDN12	IDN13	IND2	IND9	IND10	IND11	IND12	IND13
JAM12	KEN9	KEN10	KEN11	KEN13	KOR2	KOR9	LKA9	LKA10	LKA11	LKA12	LKA13	MAR2
MAR9	MAR10	MAR11	MAR12	MAR13	MDG10	MEX9	MEX10	MEX11	MEX12	MEX13	MLI9	MLI10
MLI11	MLI12	MLI13	MYS2	MYS9	MYS10	NGA9	NGA10	NGA11	NGA12	NGA13	PAK2	PAK9
PAK10	PAK11	PAK12	PAK13	PAN9	PAN10	PAN12	PAN13	PER2	PER9	PER10	PER11	PER12
PER13	PHL2	PHL9	PHL10	PHL11	PHL12	PHL13	PRY9	PRY10	PRY11	PRY12	SEN10	SGP9
SLE9	SLE10	SLE11	SLE13	SLV2	SLV9	SLV10	SLV11	SLV12	SLV13	SYR9	SYR10	TGO9
TGO10	THA2	THA9	THA10	THA11	THA12	THA13	TTO2	TTO11	TTO12	TTO13	TUN9	TUN10
TUN11	TUN12	TUN13	TUR9	TUR10	TZA9	TZA10	TZA12	TZA13	URY2	URY9	URY10	URY11
URY12	URY13	VEN9	VEN10	VEN11	VEN12	VEN13	ZAF9	ZAF10	ZAF11	ZAF12	ZAF13	ZAR2
ZAR9	ZAR10	ZMB2	ZMB10	ZWE9								
New data, full sample, 1962-1969 & 1998-2013, ELR specification												**Obs.=178**
ALB10	ARG10	ARG11	ARG12	ARG13	BFA11	BFA12	BFA13	BGD10	BOL10	BOL11	BOL12	BOL13
BRA2	BRA10	BRA11	BRA12	BRA13	BWA10	BWA11	BWA12	BWA13	CHL2	CHL10	CHL11	CHL12
CHL13	CHN10	CHN11	CHN12	CHN13	CIV10	CIV11	CIV12	CMR10	COG10	COL2	COL10	COL11

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Table A.1 (continued)

COL12	COL13	DOM2	DOM10	DOM11	DOM12	DOM13	ECU2	ECU10	ECU11	ECU12	ECU13	EGY10
EGY11	EGY12	EGY13	ETH10	GTM2	GTM10	GTM11	GTM13	HND2	HND13	IDN10	IDN11	IDN12
IDN13	IND2	IND10	IND11	IND12	IND13	IRN10	IRN11	IRN12	IRN13	JAM12	JOR10	JOR11
JOR12	JOR13	KEN10	KEN11	KEN13	KOR2	LKA10	LKA11	LKA12	LKA13	MAR2	MAR10	MAR11
MAR12	MAR13	MDG10	MEX10	MEX11	MEX12	MEX13	MLI10	MLI11	MLI12	MLI13	MYS2	MYS10
NGA10	NGA11	NGA12	NGA13	PAK2	PAK10	PAK11	PAK12	PAK13	PAN10	PAN12	PAN13	PER2
PER10	PER11	PER12	PER13	PHL2	PHL10	PHL11	PHL12	PHL13	PRY10	PRY11	PRY12	SEN10
SLE10	SLE11	SLE13	SLV2	SLV10	SLV11	SLV12	SLV13	SYR10	TGO10	THA2	THA10	THA11
THA12	THA13	TTO2	TTO11	TTO12	TTO13	TUN10	TUN11	TUN12	TUN13	TUR10	TZA10	TZA12
TZA13	UGA10	UGA11	UGA12	UGA13	URY2	URY10	URY11	URY12	URY13	VEN10	VEN11	VEN12
VEN13	ZAF10	ZAF11	ZAF12	ZAF13	ZAR2	ZAR10	ZMB2	ZMB10				

Notes: Each of the panels below show observations unique to a certain sample. Observations are counted between BD and ELR's original samples and the full sample with the new data, based on the 2SLS estimations. Country codes refer to International Standards Organization (ISO) 3-digit alphabetic codes; numbers represent 4-year period, period 1 = 1962-1965, period 2 = 1966-1969…period 13 = 2010-2013. For example, BOL3 refers to Bolivia, 1970-1973.

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Table A.2 Country differences in BD/ELR samples and new data, full sample in post 1990 period/ 1962-2013 full sample

Comparisons		**Unique countries to each set**			
BD sample 70-93 versus new sample post-1990/1962-2013 full sample	BD unique countries	Algeria	Ghana	Guyana	Haiti
		Malawi	Nicaragua	Niger	Somalia
	New unique countries	Bangladesh	Egypt	Panama	Singapore
		South Africa	Syria		
ELR sample 70-97 versus new sample post-1990/1962-2013 full sample	ELR unique countries	Algeria	Ghana	Guyana	Haiti
		Malawi	Myanmar	Nicaragua	Niger
		Papua New Guinea			
	New unique countries	Albania	Bangladesh	China	Congo, Rep.
		Egypt	Panama	Singapore	Syria
		Tanzania			

Notes: Based on 2SLS regression with BD/ELR specification. Compared with BD/ELR samples, our new sample only adds new countries for the post 1990 period. With OLS, both BD/ELR specifications exclude Ghana and Malawi from their unique countries; under ELR specification, new sample adds two more countries, Guinea and Guinea-Bissau.

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Table A.3 Variable description

Variable name	Abbreviation	Correlation with BD/ELR	Data source	Notes
GDP growth rate WDI	gdpg	0.797/0.880	WDI 2016	Constant 2005 U.S. dollars, following ELR
GDP growth rate PWT 8.1	gdpgPWT	0.691/0.712	PWT 8.1	Expenditure-side real GDP at chained PPPs (in mil. 2005 US$) divided by population (in millions) from PWT 8.1
Initial GDP per capita	igdppc	0.892/0.891	PWT 8.1	Natural logarithm GDP per capita for first year of period. Rgdpe (expenditure side real GDP at chained PPPs in 2005 U.S. dollars) divided by population PWT 8.1. BD/ELR use rgdpch in PWT 5.6, which is no longer reported.
Ethnic fractionalization	ethnic	0.701/0.715	Norwegian Social Science Data Services (NSD)-Macro Data Guide 2003	Dataset compiled by Alesina et al. (2003). Measures probability that two individuals will belong to different ethnic groups.
Assassinations	assa	0.743/0.747	Banks and Wilson (2016). Cross-National Time-Series Data Archive.	Dataset covers 1815-2015.
Institutional quality	bdicrge/elricrge	N/A	PRS Group's IRIS III data set (see Knack and Keefer 1995)	Bdicrge/elricrge are based on 1980/1982 values, both only have one point value for each country through all periods. We update the rest years with adjacent observation.
Institutional quality16	icrg3	0.628/0/590	PRS Group International Country Risk Guide-Table 3B 2016	Following Rajan & Subramanian (2008), take the sum of the 3 variables- bureaucratic quality, rule of law and corruption. Scores range 0-16, available 1984-2015.
Economic Freedom of the World	efw	0.30/0.38	James Gwartney, Robert Lawson, and Joshua Hall (2016) Fraser Institute	Chain-Linked summary index
M2/GDP, lagged	m2gdp_lag	0.845/0.258*	WDI 2016	**Calculated with pairwise correlation; listwise correlations equal to 0.847/0.864.
Sub-Saharan Africa	bdssa/elrssa	N/A	BD(2000)/ELR(2004)	Same as BD(2000)/ELR(2004)
East Asia	bdeasia/elrasia	N/A	BD(2000)/ELR(2004)	Same as BD(2000)/ELR(2004)
Franc Zone	bdfrz/ elrfrz	N/A	BD(2000)/ELR(2004)	Same as BD(2000)/ELR(2004)
Central America	bdcentam/ elrcentam	N/A	BD(2000)/ELR(2004)	Same as BD(2000)/ELR(2004)
Egypt	bdegypt/ elregypt	N/A	BD(2000)/ELR(2004)	Same as BD(2000)/ELR(2004)

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0 (continued)

Budget surplus	bb	0.839/0.950	Clemens et al.(2012); BD(2000); ELR(2004)	Budget surplus data is not available post 1997. Clemens et al. (2012) update to 2005, neither available for their data source; we fill theirs with adjacent year observation.
Inflation	linfl	0.950/0.935	WDI 2014	Ln (1+Inflation) using GDP deflator.
Sachs-Warner Openness updated	openness	0.886/0.887	Sachs and Warner (1995); Wacziarg and Welch (2008); Clemens et al. (2012); EFW (2015).	Updated trade openness data to 2013, based on Wacziarg and Welch (2008) and Clemens et al. (2012) Appendices. Refer to Appendix 8 for more details.
Aid (Effective Development Assistance (EDA) / GDP)	aid	0.708/0.740**	Chang et al. 1998; IMF 2014; DAC 2014; WDI 2014	Aid= EDA/GDP*100 in current price. EDA is extrapolated based on Chang's EDA and ODA. Use WDI 2016 for GDP current price data. BD (2000) and ELR (2004) use PWT 6.1 for GDP data (with chain series). **list-wise correlation is 0.836/0.718.
Aid (Constant 2005 US dollar EDA/ Constant 2005 US dollar GDP)	aid05	0.643/0.541***	WDI 2014; PWT9.0	Aid= EDA in 2005 US dollar/GDP in 2005 US dollar *100. Note that EDA (based on ODA) from WDI 2014 is in constant 2012 US dollars, but PWT 8.1 ends in year of 2011, we rescale it to constant 2005 US dollars with price level of capital formation in PWT 9.0, which ends in year of 2015. ***list-wise correlation is 0.764/0.519.
Official Development Aid (ODA)	aido	0.708/0.740	WDI 2014	Aid= ODA/GDP*100, both are current price US dollars.
Population	lpop	0.999/1.000	WDI 2014	Natural logarithm of population
Arms imports/total imports lagged	armimports_lag	0.905/ 0.878	WDI 2014; PWT 8.1	Arms imports (SIPRI trend indicator 1990 values are rescaled to constant 2005 US dollars with price level of imports in PWT 8.1), total imports is in constant 2005 US dollars.
Policy Index	policy	0.915/0.888	BD (2000)/ELR(2004);WDI 2014;Sachs and Warner data sets (1995); Wacziarg and Welch (2008); Clemens et al.(2012)	Correlation is calculated between BD policy (1970-1993)/ELR policy (1970-1997) and new full data set (1962-2013), under BD/ELR specification, respectively.

Notes: Correlation coefficients are calculated for 1962-2013, based on Pearson pairwise correlation.

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Table A.4 Regression and specification setting up

To investigate the relation of aid-policy-growth, BD employ methods of Pooled Ordinary Least Squares (OLS) and Two-Stage Least Squares (2SLS). The model specification is GDP growth rate being the LHS variable, and initial real GDP, amount of international aid, policy index, interaction term of aid and policy and other control variables being the RHS variables.

This expresses as the following equation:

$$g_{it} = y_{it}\beta_y + a_{it}\beta_a + p_{it}'\beta_p + a_{it}p_{it}'\beta_1 + z_{it}'\beta_z + g_t + \varepsilon_{it}^g \quad (A.1)$$

$$a_{it} = y_{it}\gamma_y + p_{it}'\gamma_p + z_{it}'\gamma_z + a_t + \varepsilon_{it}^a . \quad (A.2)$$

Where i denotes countries, t denotes period, git is per capita real GDP growth, yit is natural logarithm of per capita real GDP, ait is international aid received relative to its total GDP, gt and at are fixed-time effects, z_{it}' is a vector of other exogenous variables, pit is the policy index vector constructed by BD, which calculates the weights of different policies to the growth regression.

It follows the steps:

i) Run equation (1) without aid and aid*policy terms, and collect the policy coefficients

$$g_{it} = y_{it}\beta_y + p_{it}'\beta_p + z_{it}'\beta_z + g_t + \varepsilon_{it}^g \quad (A.3)$$

ii) Construct a variable "Policy^0", with coefficients collected from step i), and calculate the mean of Policy ^{0}

$$p_{it}^o = \beta_b BudSurplus + \beta_i Inflation + \beta_o Openness \quad (A.4)$$

and get $\bar{p}$

iii) Calculate the constant of the policy index, which is the difference between the mean of GDP growth rate and the mean of Policy^0

$$Cons\tan t = \bar{g} - \bar{p} \quad (A.5)$$

iv) Add the constant term to p_{it}^0, and get the policy index;

$$p_{it} = p_{it}^0 + constan\tan t \quad (A.6)$$

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Table A.5 Summary statistics, 1962-2013 full sample

Variable	Obs.	Mean	Std. Dev.	Min	Max
GDP growth rate WDI	2,079	2.12	4.50	-42.62	57.21
GDP growth rate PWT 8.1	1,935	3.92	5.42	-50.06	37.13
Initial GDP per capita (log)	1,934	8.42	1.21	5.32	11.65
Ethnic fractionalization	2,470	0.44	0.26	0.00	0.93
Assassinations	2,177	0.08	0.19	0.00	1.00
BD Institutional quality filled	832	4.71	1.40	2.27	8.56
ELR Institutional quality filled	1,347	4.68	1.82	1.58	9.60
Institutional quality 16	1,073	8.76	3.52	0.00	16.00
M2/GDP, lagged	1,576	46.32	179.06	0.05	6797.89
Budget surplus filled	1,488	-0.16	1.60	-28.71	8.76
Inflation (log)	2,087	0.14	0.35	-0.22	4.06
Sachs-Warner Openness updated	1,440	0.42	0.48	0.00	1.00
EDA/GDP	1,600	3.84	6.26	-0.21	88.80
EDA/GDP (constant 2005 dollar)	1,447	10.44	16.54	-0.06	157.60
ODA/GDP	1,600	4.82	7.85	-0.26	111.30
Population (log)	2,759	14.81	2.37	8.42	21.02
Arms imports/total imports lagged	935	0.00	0.03	-0.30	0.19
Policy Index (BD specification)	958	2.12	1.27	-4.45	3.75
Policy Index (ELR specification)	958	2.12	0.98	-4.59	3.50
Aid*policy (BD specification)	822	4.49	6.95	-36.18	59.55
Aid*policy(ELR specification)	822	4.69	6.71	-49.68	52.46
Aid^2*policy (BD specification)	822	26.19	91.38	-822.23	1230.27
Aid^2*policy(ELR specification)	822	27.17	90.42	-1128.89	1059.16

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Table A.6 Create a short, concise table title and place all detailed caption, notes, reference, legend information, etc in the notes section below

	Regressions	Outliers												
1	BD original,1970-93	GMB7	GMB8	GUY8	NIC7	NIC8								
2	New data, BD countries,1970-93	GAB4	GMB7	GMB8	MLI8	ZMB7	ZMB8							
3	New data, full sample,1970-93	GAB4	GMB7	GMB8	MLI8	ZMB7	ZMB8							
4	ELR original,1970-97	BRA7	BRA8	GAB4	GAM8	GUY9	JOR5	NIC7						
5	New data, ELR countries,1970-97	GAB4	GMB7	IRN5	NER9	ZMB7	ZMB8							
6	New data, full sample,1970-97	GAB4	GMB7	IRN5	ZMB7	ZMB8								
7	New data, BD countries,1962-2013	GAB4	GMB7	SLE11	SLE12	TZA8	ZMB7	ZMB8						
8	New data, full sample, BD specification,1962-2013	GAB4	GMB7	MLI8	SLE11	SLE12	TZA8	ZMB7	ZMB8					
9	New data, ELR countries,1962-2013	GAB4	GMB7	IRN5	SLE11	ZMB7	ZMB8							
10	New data, full sample, ELR specification,1962-2013	GAB4	GMB7	GNB8	IRN5	SLE8	SLE11	TZA8	ZMB7	ZMB8				
11	New data, BD countries,1990-2013	BRA8	NGA11	SLE8	SLE11	TGO9	TZA8	ZMB8						
12	New data, full sample, BD specification,1990-2013	ARG8	BRA8	NGA11	SLE8	SLE11	TGO9	TZA8	ZAR8	ZMB8				
13	New data, ELR countries,1990-2013	ARG8	BRA8	CMR8	NGA11	SLE8	SLE11	TGO9	ZAR8	ZMB8				
14	New data, full sample, ELR specification,1990-2013	ARG8	BRA8	BRA9	JOR8	MLI8	NGA11	SLE8	SLE11	SLE12	TGO9	TZA8	ZAR8	ZMB8

Note: Consistent with ELR, this table contains outliers excluded with HADI method in all countries; outliers excluded in lower income countries with HADI method are not reported in this table. Country codes refer to International Standards Organization (ISO) 3-digit alphabetic codes; numbers represent different 4-year period, starting in 1962. For example, BOL3 means Bolivia 1970-1973.

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Table A.7 Country list of BD and ELR regional dummy variables

Variable Name	BD			ELR		
Sub-Saharan Africa	Botswana	Ghana	Senegal	Botswana	Gambia	Senegal
	Cameroon	Kenya	Sierra Leone	Burkina Faso	Ghana	Sierra Leone
	Congo, Dem. Rep.	Madagascar	Somalia	Cameroon	Kenya	South Africa
	Cote d'Ivoire	Malawi	Tanzania	Congo, Dem. Rep.	Madagascar	Togo
	Ethiopia	Mali	Togo	Congo, Rep.	Malawi	Uganda
	Gabon	Niger	Zambia	Cote d'Ivoire	Mali	Zambia
	Gambia	Nigeria	Zimbabwe	Ethiopia	Niger	Zimbabwe
				Gabon	Nigeria	
East Asia	Indonesia	Malaysia	Thailand	Indonesia	Malaysia	Thailand
	Korea, Rep.	Philippines		Korea, Rep.	Philippines	
Franc Zone	Cameroon	Mali	Togo	Burkina Faso	Cote d'Ivoire	Niger
	Cote d'Ivoire	Niger		Cameroon	Gabon	Senegal
	Gabon	Senegal		Congo, Rep.	Mali	Togo
Central America	Costa Rica	Guatemala	Nicaragua	Costa Rica	Guatemala	Nicaragua
	El Salvador	Honduras		El Salvador	Honduras	

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Table A.8 Countries with trade openness status changed between BD/ELR samples and new sample

Comparisons	Countries with openness status changed			
Compared with BD	Argentina	Bangladesh*	Brazil	Cote d'Ivoire
	Cameroon	Dom. Republic	Ecuador	Egypt
	Ethiopia	Honduras	India	Kenya
	Sri Lanka	Madagascar	Malawi	Niger
	Nigeria	Pakistan	Panama*	Peru
	Senegal	Sierra Leone	Syria	Trin. & Tobago
	Tanzania	Venezuela	South Africa*	Zambia
	Zimbabwe			
Compared with ELR	Argentina	Burkina Faso	Bangladesh*	Brazil
	China*	Cote d'Ivoire	DR Congo	Dom. Republic
	Egypt	Ethiopia	Gabon	India
	Iran	Kenya	Liberia*	Madagascar
	Nigeria	Pakistan	Panama*	Senegal
	Sierra Leone	Syria	Trin. & Tobago	Tanzania
	Uganda	Uruguay	Venezuela	Zambia
	Zimbabwe			
Compared with Clemens et.al, BD specification	Argentina	Egypt	India	Venezuela
	Zimbabwe			
Compared with Clemens et.al, ELR specification	Argentina	China	Egypt	India
	Iran	Zimbabwe	Venezuela	

Notes: Countries listed here include missing countries from BD/ELR (marked with *), trade openness status change after 1993/1997(compared with BD/ELR sample), and trade openness status change during 2006-2013 (compared with Clemens et al. (2012) sample); based on full sample from 2SLS.

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APPENDIX B

CHAPTER TWO

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Table B.1 List of countries in the sample

Argentina	Ecuador	Mexico	Trinidad and Tobago
Bangladesh	Egypt, Arab Rep.	Malawi	Tunisia
Belize	Ghana	Malaysia	Turkey
Botswana	Guatemala	Namibia	Uganda
Chile	Croatia	Nigeria	Uruguay
China	Indonesia	Pakistan	Venezuela, RB
Cameroon	India	Panama	South Africa
Colombia	Iran, Islamic Rep.	Peru	Zambia
Costa Rica	Jamaica	Philippines	
Dominican Republic	Jordan	El Salvador	
Algeria	Morocco	Thailand	

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APPENDIX C

CHAPTER THREE

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0 Data Description

Variables	Definition	Source
Aid, sectoral Aid's	Aid= ODA/GDP*100, both in 2010 constant U.S. dollars.	OECD DAC2a Table; Creditor Reporting System 2017; World Bank, World Development Indicator, 2016
Costs to import / export	Number of days, number of documents and in US Dollars (thousands) to transport a 20-foot container between the departure and entry ports.	World Bank, Doing Business 2018
Taxes on exports	Percentage of tax revenue	World Bank, WDI, 2018
Customs and other import duties	Percentage of tax revenue	World Bank, WDI, 2018
Tariff rate, applied, weighted mean, all products	A fixed fee or percentage of price based on the type of item	World Bank, WDI, 2018
Service import, export	Percentage of GDP	World Bank, WDI, 2018
Trade	The sum of exports and imports of goods and services measured as a share of gross domestic product.	World Bank, WDI, 2018
Merchandise/services/ total trade	Percentage of GDP	World Bank, WDI, 2018
Merchandise/service exports and imports	Percentage of GDP	World Bank, WDI, 2018
Merchandise exports/ imports to high-income/ low- and middle-income economies	Percentage of total merchandise exports/imports	World Bank, WDI, 2018
Transport services exports/imports	Percentage of service exports/imports	World Bank, WDI, 2018
ICT goods exports/imports	Information and communication technology goods as percentage of total merchandise exports/imports	World Bank, WDI, 2018
Manufactures exports/imports	Percentage of merchandise exports/imports	World Bank, WDI, 2018
Agricultural raw materials exports/imports	Percentage of merchandise exports/imports	World Bank, WDI, 2018
Fuel exports/imports	Percentage of merchandise exports/imports	World Bank, WDI, 2018
Net barter terms of trade index	Percentage ratio of the export unit value indexes to the import unit value indexes, measured relative to the base year 2000	World Bank, WDI, 2018
Oil and Gas Net Exporter Dummy	Takes a value of one if sum of oil and gas net exports is greater than zero. Fill in period 2013-2015 with 2011 data.	Ross, Michael L, Global dataset of oil and gas production and exports, 1932-2011
GDP per capita	Gross Domestic Products per capita (PPP), in 2010 constant dollars	World Bank, WDI, 2018
Government Effectiveness	Captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Scored between -2.5 to 2.5, higher the better	The Worldwide Governance Indicators 2017
Market Potential	The sum of all the bilateral distance weighted other countries' GDP at any given time t, where distance is calculated as the great circle distance (in km) between the capital cities of two countries.	Calculated based on the methodology of Cali and Te Velde (2011).
Polity2	Revised Combined Polity Score, with polity scale ranges from -10 (strongly autocratic) to +10 (strongly democratic)	Center for Systemic Peace, Polity IV project 2015
Xconst Executive Constraints	With polity scale ranges from 1 to 10, higher the better	Center for Systemic Peace, Polity IV project 2015
Economic Freedom of the World (EFW) Index	Chain-Linked summary index	Fraser Institute, EFW 2016

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Table C.1 The Impact of Aid for Trade Facilitation and Aid for Trade Policy & Regulation on Trading across Borders Measures-Time to Import (Days), Documents to Import (Numbers), Cost to Export (US$ Per 20-Foot Container) and Time to Export (Days), 2005-2009

Dependent Variables	Time to Import		Documents to Import		Cost to Import		Time to Export		Documents to Export		Cost to Export	
	Aid for Trade Facilitation and Other Trade Policy & Regulation											
Methods	FE	GMM	FE	GMM	FE	GMM	FE	GMM	FE	GMM	FE	GMM
Aid_{TF} (% of GDP)	-84.696	-181.812	45.308	9.435	-4.651	0.959	-97.113**	-64.785	27.769	14.250	-3.863	4.075
	(58.849)	(235.391)	(30.796)	(34.368)	(3.475)	(7.117)	(44.422)	(108.775)	(32.814)	(23.925)	(3.182)	(4.886)
Aid_{TPR} (% of GDP)	0.514**	2.497	-0.015	-0.539	-0.002	0.248	-0.173	1.009	-0.042	-0.548	-0.006	0.115
	(0.212)	(11.547)	(0.035)	(1.818)	(0.011)	(0.333)	(0.194)	(5.616)	(0.028)	(0.675)	(0.011)	(0.217)
Constant	9.208	-15.531	38.056*	0.693	-6.989	0.134	8.471	-15.777	10.751	-1.885	-11.338	-0.408
	(156.496)	(28.665)	(22.535)	(3.599)	(7.127)	(1.074)	(141.715)	(15.990)	(18.349)	(3.355)	(8.289)	(0.534)
Observations	233	232	233	232	233	232	233	232	233	232	233	232
Adjusted R2	0.432		0.136		0.113		0.349		0.087		0.177	
Auto-corr p-value		0.250		0.536		0.352		0.275		0.484		0.287
Hansen-J p-value		0.744		0.495		0.752		0.786		0.650		0.318
	Aid for Economic Infrastructure and Production Sectors											
Methods	FE	GMM	FE	GMM	FE	GMM	FE	GMM	FE	GMM	FE	GMM
Aid_{TF} (% of GDP)	0.154	0.760	-0.018	-0.001	-0.071**	0.077	0.700	0.697	0.080	0.058	-0.068*	0.058
	(0.884)	(1.608)	(0.122)	(0.305)	(0.034)	(0.057)	(0.852)	(0.905)	(0.097)	(0.176)	(0.035)	(0.176)
Aid_{TPR} (% of GDP)	-2.150	-2.498	0.223	0.464	-0.082	0.002	-1.530	-1.618	0.117	0.133	-0.031	0.133
	(1.971)	(2.082)	(0.488)	(0.728)	(0.116)	(0.221)	(0.994)	(1.297)	(0.497)	(0.464)	(0.066)	(0.464)
Constant	73.416*	-3.804	13.507*	9.436	6.604	-0.057	74.760**	2.989	11.639**	0.308	1.914	0.308
	(38.290)	(12.171)	(8.070)	(8.021)	(5.828)	(0.709)	(35.333)	(10.357)	(5.586)	(2.084)	(2.785)	(2.084)
Observations	529	527	529	527	529	527	529	527	529	527	529	527
Adjusted R2	0.288		0.076		0.175		0.280		0.052		0.250	
Auto-corr p-value		0.720		0.915		0.965		0.584		0.123		0.456
Hansen-J p-value		0.111		0.606		0.413		0.212		0.192		0.473

Notes: Aid_{TF} is aid for trade facilitation; Aid_{TPR} is aid for trade policy and regulation; Aid_{EI} is aid for economic infrastructure & services; Aid_{PS} is aid for production. All dependent variables are lagged for 1 year. Outputs for control variables are omitted due to limited space. FE is fixed effects model of pooled ordinary least squares regression; GMM is Blundell–Bond system generalized method of moments. All models include a full set of time fixed effects; FE includes country fixed effects. Also note that, "documents to import/export" have weak or insignificant F-statistics', and they are not reported in Cali and Te Velde (2011). Robust standard errors are in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

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Table C.1 : The Impact of Aid for Trade on Taxes on Exports and Duties on Imports, 2004-2013

Dependent Variables	Taxes on exports (% of tax revenue)		Customs and other import duties (% of tax revenue)		Tariff rate, applied, weighted mean, all products (%)		Tariff rate, applied, weighted mean, primary products (%)		Tariff rate, applied, weighted mean, manufactured products (%)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Aid_{TF} (% of GDP)	19.056		-1.298		26.801		31.170		26.486	
	(28.776)		(30.790)		(30.968)		(26.726)		(28.541)	
Aid_{TPR} (% of GDP)	-3.346		0.056		1.058		2.563		0.727	
	(3.881)		(3.857)		(1.776)		(3.710)		(2.166)	
Aid_{EI} (% of GDP)		0.341		1.562		0.160		0.319		0.481*
		(0.499)		(1.627)		(0.569)		(0.282)		(0.275)
Aid_{PS} (% of GDP)		0.400		-1.944		-1.226		0.508		0.013
		(0.631)		(2.718)		(1.874)		(1.011)		(0.857)
Log GDP per capita	1.062	1.053	-4.761*	-0.497	-1.673	-2.446*	-2.122	-0.055	-1.494	-1.014
	(1.035)	(1.157)	(2.586)	(1.324)	(1.652)	(1.269)	(1.804)	(0.774)	(1.574)	(0.891)
Oil Exporter Dummy	0.209	-0.037	0.377	0.269	1.223*	1.555	1.452	-0.016	1.145	0.941
	(0.822)	(1.082)	(0.986)	(0.785)	(0.733)	(1.049)	(1.157)	(0.715)	(0.706)	(0.809)
Log Market Potential	0.549	-2.237	-1.900	-1.325	-1.214	-1.104	-0.528	0.447	-1.207	-0.664
	(1.826)	(1.828)	(3.975)	(1.813)	(2.865)	(2.403)	(1.807)	(0.845)	(2.955)	(1.127)
Government Effectiveness	-1.589	-0.896	2.749	-0.631	0.113	-0.795	1.200	-0.258	-0.330	-0.367
	(1.100)	(0.971)	(1.794)	(1.205)	(1.222)	(1.163)	(1.300)	(0.962)	(1.015)	(0.948)
Dependent variables	0.379***	0.306**	0.709***	0.970***	0.532**	0.531**	0.660***	0.886***	0.502**	0.668***
	(0.139)	(0.129)	(0.190)	(0.075)	(0.222)	(0.225)	(0.204)	(0.098)	(0.238)	(0.140)
Constant	-13.512	8.425	59.199	14.787	27.241	33.723	24.237	-2.319	26.044	16.588
	(14.641)	(11.730)	(39.071)	(15.706)	(18.814)	(26.900)	(21.473)	(11.821)	(18.789)	(11.890)
Observations	381	626	381	626	472	806	472	806	472	806
Auto-corr p-value	0.298	0.478	0.956	0.786	0.154	0.135	0.135	0.515	0.207	0.014[42]
Hansen-J p-value	0.483	0.180	0.346	0.395	0.453	0.134	0.568	0.327	0.198	0.320

Notes: Aid_{TF} is aid for trade facilitation; Aid_{TPR} is aid for trade policy and regulation; Aid_{EI} is aid for economic infrastructure & services; Aid_{PS} is aid for production. All dependent variables are lagged for 1 year. Outputs for control variables are omitted due to limited space. GMM is Blundell–Bond system generalized method of moments. All models include a full set of time fixed effects. Robust standard errors are in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

[42] This model should use caution to interpret, as adjusting number of lags in GMM model does not make it not suffer from auto-correlation.

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