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Does aid stimulate foreign direct investment? The role of social cohesion

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We explore the effects of foreign aid on FDI in a large number of aid-recipient countries using data for the period 1985-2008 and focusing in particular on the impact of the interplay of aid and social cohesion. The preliminary results suggest that the independent effect of aid on FDI is negative in sub-Saharan Africa (SSA) and Latin America (LAC) and positive in other regions, while aid seems to crowd out FDI in countries with high levels of human capital. In addition, we find that the interplay of aid and social cohesion in SSA and LAC has an inverted-U relationship with FDI, suggesting diminishing returns to social cohesion in these two regions.

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We explore the effects of foreign aid on FDI in a large number of aid-recipient countries using data for the period 1985-2008 and focusing in particular on the impact of the interplay of aid and social cohesion. The preliminary results suggest that the independent effect of aid on FDI is negative in sub-Saharan Africa (SSA) and Latin America (LAC) and positive in other regions, while aid seems to crowd out FDI in countries with high levels of human capital. In addition, we find that the interplay of aid and social cohesion in SSA and LAC has an inverted-U relationship with FDI, suggesting diminishing returns to social cohesion in these two regions.

1. Introduction

Global private capital flows have risen strongly over the last two decades, but many low-income countries have typically had difficulties in attracting private capital. This appears to be changing with a rise in private capital flows to some of them, at least before the global economic slowdown associated with the financial crisis of 2007-09. Foreign direct investment (FDI) is one important form of private capital flow, with potentially significant positive effects in terms of economic growth, employment creation, and public revenue generation.

A key question is: does foreign aid stimulate more private capital flow, FDI in particular? This can be the outcome if official development assistance (ODA) finances infrastructure, human capital formation, and better institutions, all of which can make a country more attractive to investors. If ODA does achieve this, then a dollar's worth of aid will in effect be leveraging further investment and growth aside from any direct effect of aid on growth. Aid and FDI are then complements. Many in the development community view aid and FDI in this way (this was a common position at the 2002 UN International Conference on Financing for Development, in Monterrey). However, if foreign aid gives rise to strong Dutch Disease effects then it could potentially deter FDI in the tradables sector, exports in particular. ODA and FDI might then be substitutes rather than complements. In theory, the relationship between ODA and FDI can go either way (Economides et al. 2008; Selaya and Sunesen 2012), especially when rent-seeking is introduced. Moreover, many of the variables that are found to affect aid effectiveness are also potential determinants of FDI. This includes, for example, good governance, corruption, institutional quality, financial development, human capital, and political stability. The empirical literature on FDI and ODA is quite scant and the few existing studies (Harms and Lutz 2006; Kimura and Todo 2010) show mixed results.

In this paper, we explore the effects of ODA on FDI (as a share of GDP) in a large number of aid-recipient countries using data over the period 1985-2008.[1] We control for various determinants of FDI, including social cohesion but we specifically include the interaction between aid and human capital and the interplay of aid with social cohesion since the latter has been shown to improve aid effectiveness (Baliamoune-Lutz and Mavrotas 2009). To the best of our knowledge, this is the first study that considers the impact of this interplay and the effect of social cohesion on FDI.

2. Data, key variables, and methodology

The dependent variable is the share of net inward FDI in GDP (%). The main right-hand side (RHS) variables include aid, openness to trade, financial development, human capital, income growth rates, and social cohesion. We also include several interaction terms. Aid is defined as ODA's share (%) in the country's gross national income (GNI). Openness to international trade is measured by the ratio of the sum of exports and imports to GDP. We use secondary enrolment rates as a measure for human capital and credit to the private sector (percent of GDP) as indicator of financial development. Social cohesion is proxied by the index of ethnic tensions from the *International Country Risk Guide* (ICRG) database. This variable is measured on a scale from 0

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[1] The choice of the time period is mainly dictated by the availability of data on some of the main variables of interest.

to 6, with 6 indicating lowest level of ethnic tension (highest level social cohesion).[2] All other variables are from the World Bank's *World Development Indicators* Database. In alternative estimations, we use governance indicators from the World Bank's *Governance Indicators* database.

We first estimate the model using a fixed-effects specification using the following equation

$$y_{it} = \alpha_i + y_{it-1} + \boldsymbol{\beta'X}_{it} + \epsilon_{it} \qquad (1)$$

where α_i is the individual (country) effect. The fixed-effects estimation treats α_i as a country specific intercept. The vector X includes the selected determinants of FDI.

However, this specification does not allow us to address the potential endogeneity of the RHS variables. While human capital can potentially be a determinant of FDI, it is possible that FDI also causes human capital. Similarly, openness to trade and financial development are potential determinants of FDI but they can also be influenced by inward FDI. A case could also be made for the endogeneity of aid. On the one hand, some of the countries that have not managed to attract significant FDI tend to be poor and this may cause them to receive significant ODA (negative effect of FDI on ODA). On the other hand, some of the countries (especially in Africa) where there is significant FDI from former colonial powers (France in particular) may receive significant amount of bilateral aid (positive effect from FDI to ODA) to maintain FDI-associated infrastructure.

In order to take into account the issue of endogeneity we use the Arellano-Bond dynamic GMM model (AB-GMM). The basic equation is as follows.

$$y_{i,t} = \alpha y_{i,t-1} + \mathbf{X}_{i,t} \beta + \eta_i + \xi_t + \varepsilon_{i,t} \qquad (2)$$

where y is inward FDI as a ratio of GDP (%), and $\mathbf{X}$ is a row vector of the factors influencing FDI, η_i is the individual (country) fixed effect, ξ_t is a time-specific effect, and $\varepsilon_{i,t}$ are disturbances assumed to be serially uncorrelated. The presence of random effects creates correlation between the error term and the lagged dependent variable. The AB-GMM estimator differences the endogenous and predetermined variables and uses lags of their own levels as instruments. We test the validity of the choice of the instruments using the Sargan test. Based on the test results we fail to reject the null hypothesis that the over-identifying restrictions are valid in all cases. In addition, the Arellano-Bond test results (may be obtained from the authors) that average autocovariance in residuals of order 2 is zero confirm that there is no evidence of second-order autocorrelation.

3. Results

Tables 1 and 2 show the results from the fixed-effects and the AB-GMM estimations, respectively. The AB-GMM estimates in general suggest that aid may start to attract FDI beyond a threshold level of cohesion, but the effect of the interplay of human capital and aid appears to be negative, suggesting that aid crowds out FDI in countries with higher levels of human capital. We note that

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[2] The ICRG defines ethnic tension as "the degree of tension within a country attributable to racial, nationality, or language divisions. Lower ratings are given to countries where racial and nationality tensions are high because opposing groups are intolerant and unwilling to compromise."

once, we include these interactions, the independent effect of aid becomes positive and statistically significant.

Table 1. Aid, social cohesion, and FDI
Fixed-effects estimates

Dependent variable = (net FDI, % of GDP)

	(1)	(2)	(3)
lagged fdi	0.383***	0.382***	0.368***
	(0.027)	(0.027)	(0.027)
aid	-0.038*	0.042	0.100**
	(0.021)	(0.044)	(0.047)
open	0.024***	0.023***	0.023***
	(0.006)	(0.006)	(0.006)
credit	0.018**	0.017**	0.017**
	(0.007)	(0.007)	(0.007)
growth	0.071***	0.074***	0.078***
	(0.019)	(0.019)	(0.019)
human capital	0.023***	0.024***	0.029***
	(0.008)	(0.008)	(0.008)
cohesion	-0.629**	-0.462**	-0.558*
	(0.32)	(0.32)	(0.33)
cohesion ^{2}	0.092**	0.081*	0.086*
	(0.04)	(0.044)	(0.044)
aid X cohesion		-0.023**	-0.006
		(0.011)	(0.012)
aid X human capital			-0.003***
			(0.0008)
Obs	898	898	898
R-sq: Within	0.32	0.33	0.34
Between	0.37	0.38	0.40
Overall	0.31	0.31	0.32

Equations are estimated with a constant (not shown).
Standard errors are in parentheses.
* , ** and *** represent significance at the 10-percent, 5-percent and 1-percent levels, respectively.

Table 2. Aid, social cohesion, and FDI
GMM estimates

Dependent variable = (net FDI, % of GDP)

	(1)	(2)	(3)	(4)
lagged fdi	0.147***	0.143***	0.143***	0.134***
	(0.026)	(0.026)	(0.026)	(0.027)
aid	-0.057***	0.165**	0.332***	0.276***
	(0.020)	(0.069)	(0.075)	(0.078)
open	0.030***	0.027***	0.025***	0.025***
	(0.007)	(0.007)	(0.007)	(0.007)
credit	0.039***	0.038***	0.035***	0.034***
	(0.007)	(0.006)	(0.007)	(0.007)
growth	0.046***	0.039**	0.042**	0.041**
	(0.016)	(0.016)	(0.016)	(0.016)
human capital	-0.082***	-0.078***	-0.061***	-0.057***
	(0.013)	(0.012)	(0.013)	(0.013)
cohesion	-0.628**	0.044	-0.042	-0.010
	(0.30)	(0.09)	(0.09)	(0.09)
cohesion ^{2}	0.087**			
	(0.04)			
aid X cohesion		-0.133***	-0.140**	-0.162***
		(0.04)	(0.04)	(0.04)
aid X cohesion^2		0.019***	0.025***	0.027***
		(0.006)	(0.006)	(0.006)
aid X human capital			-0.006***	0.0007
			(0.0008)	(0.003)
aid X (human capital ^{2}				-0.001**
				(0.0003)
Obs	692	692	692	692
Sargan test [a]	1322	1345	1228	1288
[P-value]	[0.99]	[0.99]	[0.99]	[0.76]

* ,** and *** represent significance at the 10-percent, 5-percent and 1-percent levels, respectively.
Equations are estimated with a constant (not shown). Standard errors are in parentheses.
The AR (2) test results (not shown but may be obtained from the authors) indicates that we can reject the hypothesis that there is second-autocorrelation at the 5% level of significance.

The results (also based on the GMM estimator) reported in Table 3 indicate that, after including regional dummy variables for sub-Saharan Africa (SSA) and Latin America and the Caribbean (LAC), and their interplay with aid, the coefficients on the variables openness to trade, credit to the private sector, and growth remain positive and statistically significant (columns 1-3). However, once we include the interplay of aid and social cohesion in SSA (aid x cohesion x SSA) and LAC (aid x cohesion x LAC), only the coefficient on the variable *open* remains positive and statistically significant. The interplay of social cohesion with aid maintains its U shape, suggesting the

presence of a threshold effect. Overall, the independent effect of aid on FDI is negative in SSA and LAC and positive in other regions. Interestingly, the interplay of aid and social cohesion in SSA and LAC has an *inverted-U* effect, implying that there are diminishing returns to social cohesion in these two regions. Based on the values of the coefficients involving interactions of aid with social cohesion, the overall effect in SSA and LAC also show an *inverted-U* shape. We plan to investigate why these two regions are different from other regions in future research. We also note that the interplay of human capital and aid still has a negative and statistically significant coefficient.[3]

Focusing on SSA and using the results in column (5), we identify a turning point (value of social cohesion at which the impact of the interplay between aid and social cohesion turns from being positive to being negative) at around 3.1. We find that both the mean and the median values of the index of social cohesion in SSA countries in 2008 (the last year in our data) are both around 3.3. In slightly less than 50% of the countries the index is below 3. This suggests that, in these countries, improving social cohesion could make aid stimulate more FDI flow.

On the other hand, these preliminary results suggest that in at least half the countries in SSA the interplay between social cohesion and ODA has a negative impact on FDI. This result could possibly be due to the fact that the maximum value for the indicator of social cohesion in our SSA sample is 5, perhaps implying increased ethnic polarization in countries with ethnic tension (proxy for social cohesion) values higher than 3, and that it is possible that the impact may become positive if the index were to increase beyond 5.

4. Conclusion

The preliminary empirical results suggest that aid can play an important role in attracting FDI. However, both human capital and social cohesion influence this relationship. An important question arises: How could the potentially positive link between ODA and FDI be strengthened? One way would be by enhancing social cohesion through education (Gradstein and Justman 2002; Easterly et al. 2006). ODA itself could be used to enhance social cohesion both through spending on education and through enhancing community institutions (Fearon et al. 2009).

The negative impact of human capital (notwithstanding the fact that secondary enrolment rates may be a poor proxy for human capital) could be due to the lack of complementarities between human capital and FDI. This could be difficult to tackle since FDI to developing countries tends, in many cases, to target primary-commodity based industries such as mining and mineral extraction (particularly in Africa). These industries are generally more physical-capital intensive. Promoting economic diversification may be one way to address this, along with skills development.

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[3] We also perform robustness checks using alternative indicators of governance (for the period 2002-2008), including indicator of political stability, corruption, government effectiveness, regulation, and voice and accountability. The only governance indicator that is marginally statistically significant is regulation. All other results are qualitatively similar to those reported in Table 3. Estimates are not shown but may be obtained from the authors upon request

Table 3. Aid, social cohesion, and FDI: Controlling for SSA and LAC
GMM estimates

Dependent variable = (net FDI, % of GDP)

	(1)	(2)	(3)	(4)[a]	(5)[a]	(6)[a]
lagged fdi	0.152***	0.159***	0.161***	0.164***	0.160***	0.161***
	(0.027)	(0.027)	(0.027)	(0.049)	(0.050)	(0.050)
aid	0.336***	0.667***	0.648***	3.996**	4.77***	4.61***
	(0.07)	(0.10)	(0.15)	(1.72)	(1.80)	(1.81)
open	0.025***	0.023***	0.023***	0.056***	0.058***	0.058***
	(0.007)	(0.007)	(0.007)	(0.019)	(0.019)	(0.019)
credit	0.033***	0.031***	0.031***	0.011	0.006	0.008
	(0.007)	(0.007)	(0.007)	(0.02)	(0.02)	(0.02)
growth	0.035**	0.032**	0.034**	0.027	0.025	
	(0.016)	(0.016)	(0.016)	(0.038)	(0.039)	
human capital	-0.061***	-0.053***	-0.051***	-0.007	0.005	0.011
	(0.013)	(0.014)	(0.014)	(0.035)	(0.03)	(0.03)
cohesion	-0.027	-0.018	-0.035	0.183	0.300	0.243
	(0.09)	(0.09)	(0.09)	(0.24)	(0.27)	(0.28)
aid X cohesion	-0.147***	-0.216***	-0.216***	-1.44*	-2.24**	-2.31**
	(0.04)	(0.04)	(0.04)	(0.82)	(0.99)	(0.99)
aid X cohesion^2	0.027***	0.035***	0.035***	0.179*	0.293**	0.303**
	(0.006)	(0.006)	(0.007)	(0.10)	(0.135)	(0.136)
aid X human capital	-0.006***	-0.009***	-0.009***	-0.021***	-0.018*	-0.016
	(0.0009)	(0.001)	(0.001)	(0.006)	(0.010)	(0.011)
SSA	-0.211**	-0.203**	-0.203**	0.510	0.469	0.474
	(0.083)	(0.083)	(0.084)	(0.31)	(0.32)	(0.33)
LAC	0.005	0.012	0.013		0.039	-0.029
	(0.02)	(0.027)	(0.028)		(0.14)	(0.14)
Aid x SSA		-0.293***	-0.276**	-7.87***	-8.57***	-8.33***
		(0.067)	(0.11)	(2.35)	(2.41)	(2.40)
Aid x LAC			0.017		-14.86*	-16.67*
			(0.07)		8.68	8.94
aid X cohesion X SSA				5.35***	6.01***	5.92***
				(1.55)	(1.61)	(1.60)
aid X cohesion^{2}X SSA				-0.984***	-1.069***	-1.05***
				(0.26)	(0.27)	(0.27)
Rule of law				1.900*	1.76*	1.97*
				(1.03)	(1.00)	(1.07)
aid X cohesion X LAC					8.16*	9.14**
					(4.48)	(4.62)
aid X cohesion^{2}X LAC					-1.03*	-1.15**
					(0.55)	(0.56)
Income per capita						0.0002
						(0.0003)
Obs	692	692	692	216	216	216
Sargan test	1256	1253	1254	226	222	223
[P-value]	[0.53]	[0.99]	[0.99]	[0.99]	[0.99]	[0.99]

* ,** and *** represent significance at the 10-percent, 5-percent and 1-percent levels, respectively.
Equations are estimated with a constant (not shown). Standard errors are in parentheses.
[a] Governance data are for the period 2002-2008.

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