

The effects of Aid on Foreign Direct Investment in Africa and other regions  
(Preliminary draft; please do not quote without authors' permission)

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## Abstract

We explore the effects of foreign aid on FDI in a large number of aid-recipient countries using data since the mid-1980s. We control for the various determinants of FDI and we specifically include the interplay of aid with social cohesion and the interplay of aid with human capital. The empirical results from dynamic GMM estimations indicate that the independent impact of aid on FDI is negative in sub-Saharan Africa (SSA) and Latin America (LAC) and positive in other regions. Aid in countries with high levels of human capital discourages FDI, implying that human capital and FDI are substitutes. The interplay of aid and social cohesion in SSA and LAC has an inverted-U relationship with FDI, implying diminishing returns to social cohesion in these two regions. On the other hand, the effects from the interplay of aid and social cohesion in other regions have a U shape, implying the presence of a threshold effect to social cohesion. Interestingly, once we control for human capital, aid, and social cohesion, we do not find strong evidence of a significant role of governance. We discuss the policy implications of these findings.

*Keywords:* Foreign aid, foreign direct investment (FDI), social cohesion, human capital.

JEL classification: F21, F35, Z13

## 1. Introduction

Global private capital flows have risen strongly over the last ten years, 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. It can have 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.<sup>1</sup> 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, especially when rent-seeking is introduced. Moreover, many of the variables that are found to affect aid effectiveness are also possible 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 show mixed results.

In this paper, we explore the effects of ODA on inward FDI (as a share of GDP) in a large number of aid-recipient countries using panel data since the mid-1980s. We control for the various determinants of FDI but we specifically include the interaction between aid and social cohesion (which has been found to increase aid effectiveness) and between aid and human capital. The empirical results we obtain indicate that aid in countries with high levels of human

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<sup>1</sup> There is a large body of literature on aid effectiveness; studies include Tarp (2000), Addison et al. (2005), Lahiri (2007), Riddell (2007), Addison and Mavrotas (2008), Baliaoune-Lutz and Mavrotas, 2009, and Baliaoune-Lutz (*forthcoming*).

capital has a negative effect on FDI. The interplay of aid and social cohesion in sub-Saharan Africa and Latin America has an inverted-U relationship with FDI, implying diminishing returns to social cohesion in these two regions. On the other hand, the effects from the interplay of aid and social cohesion in the other regions in our sample have a U shape, suggesting a threshold effect to social cohesion. Interestingly, we do not find strong support for a significant role of governance.

The final part of the paper draws out the policy implications and discusses how the potentially positive link between ODA and FDI might be strengthened. The paper is relevant given the present debate on how to maximize the benefits of aid, especially given the recovery in private capital flows after the global financial crisis (combined with budgetary pressures on ODA stemming from the financial crisis itself). The paper is also relevant to the debate on how ODA can refocus on infrastructure investment (a key determinant of FDI) and the linkage that some donors now make between aid and FDI in their own strategies (notably China).

We make two novel contributions to the literature that, to our knowledge, no other studies have made yet. First, we control for the role of social cohesion. Second, we specifically account for the interplay of aid with social cohesion in addition to the interplay of aid with human capital. The remainder of the paper is structured as follows. In the next section, we provide a review of the literature on aid and FDI. In Section 3, we discuss the determinants of FDI. Section 4 discusses the potential channels through which social cohesion may influence FDI. In Section 5, we describe the variables and methodology and present the empirical results. Section 6 outlines policy implications and concludes.

## 2. FDI and foreign aid: An overview of the literature

While there is a vast literature on the effects of aid on growth and the effects of FDI on growth, there exists only a small number of studies on the impact of aid on private investment and even more scant research on the effects of aid on foreign direct investment. The evidence in the existing literature on these issues is quite mixed. This section briefly reviews recent theoretical

and empirical literature on the relationship between foreign aid and FDI in the recipient country and research with relevance to this topic.

The theoretical model developed by Chatterjee et al. (2003) studies the effects of a ‘tied transfer’—transfer tied to investment in public infrastructure—and contrasts them to the effects from a traditional ‘pure transfer’. The model shows that a traditional pure transfer has no growth or dynamic consequences but it is always welfare improving with the gains increasing with the stock of government debt and the benefits of debt reduction. On the other hand, the authors show that a tied transfer leads to public capital accumulation in the recipient economy and hence generates dynamic adjustments, but its welfare and long-run growth effects are conditional upon the initial stock of infrastructure, as well as co-financing arrangements. Chatterjee et al. further note that “a temporary pure transfer has only modest short-run growth effects and leads to a permanent deterioration of the current account, while a productive transfer has significant impacts on short-run growth, leading to permanent improvements in key economic variables including the current account” (Chatterjee et al. 2003, p.1077). Thus, it is plausible that one important channel through which these effects take place is private investments including FDI, as a developed public infrastructure would attract such investments.

Exploring the theory and evidence on the effects of foreign aid transfers on individual incentives, Economides et al. (2004) construct a model of a small growing open economy that differentiates between a direct positive effect from aid (aid finances infrastructure) and an indirect negative effect reflected in the fact that higher transfers induce rent-seeking activities. The authors then empirically test the predictions of their model using data from 75 aid-recipient countries over the period 1975-1995 and obtain evidence suggesting that aid has a direct positive impact on growth. Nevertheless, this positive effect is “significantly mitigated by the adverse indirect effects of associated rent-seeking activities.” Moreover, Economides et al. argue that this result is especially notable in countries with relatively large public sectors. This is consistent with the results obtained in Baliamoune-Lutz and Ndikumana (2008) on the impact of corruption on public and private investments. The authors argue, based on their findings, that high income African countries tend to have large public sectors, as a result of large infrastructure investments and that “to the extent that these infrastructure investments are motivated by corruption it will be

difficult for countries to sustain the projects, leading to early decay of the infrastructure”. This makes growth unsustainable.

Using a Solow-model framework, Selaya and Sunesen (2008) show that the theoretical relationship between foreign aid and FDI is in fact indeterminate, in the sense that this relationship may be positive or negative. The relationship between aid and FDI is positive when foreign aid raises the marginal productivity of capital by financing complementary inputs such as public infrastructure, and investment in human capital. On the other hand, the relationship between aid and FDI is negative when aid crowds out productive private investment, if aid is in the form of physical capital transfers.

Harms and Lutz (2006) ask whether official aid paves the road for private foreign investment or whether it suffocates private initiative by diverting resources towards unproductive activities. The authors use panel data covering a large number of developing and emerging economies during the 1990s and control for the institutional environment. They find that, “evaluated at the mean, the marginal effect of aid on private foreign investment is close to zero.” Interestingly, Harms and Lutz find robust evidence showing that the effect is strictly positive for countries in which private agents face a substantial regulatory burden. On the other hand, in their empirical study of aid and FDI using panel data, Karakaplan et al. (2005) find robust evidence that both aid and FDI spur further FDI under conditions of good governance and a developed financial market. Kimura and Todo (2010) examine whether and how foreign aid stimulates FDI using a large dataset of source-recipient country pairs and gravity equation-type estimations. They find that aid in general does not have any significant effect on FDI, but when they allow for differences in the size of aid effects across donor countries, the authors find robust support for the positive effect of aid from Japan in particular “i.e., Japanese aid promotes FDI from Japan but does not attract FDI from other countries.” The authors refer to this as a ‘vanguard effect.’ Blaise (2005) uses a conditional logit analysis and data on Japanese ODA in Chinese provinces and finds that Japanese aid has an important positive effect on private investors’ location choice (but other profit-maximizing factors, such as the level of economic activity, had a leading impact). According to the author, this evidence points to complementarities between FDI and aid that aims at developing infrastructure.

Caselli and Feyrer (2007) find that the marginal product of capital (MPK) is ‘remarkably similar’ across countries. The authors use this evidence to conclude that lower capital ratios in poor countries should be attributed to lower endowments of complementary factors and lower efficiency, in addition to lower prices of output goods relative to capital. Based on this evidence, the authors point out that an implication of their findings is that “increased aid flows to developing countries will not significantly increase these countries’ capital stocks and incomes.” Banerjee and Rondinelli (2003) note that foreign aid is often used to encourage governments in recipient countries to enact market reforms and privatization policies. Indeed, an obvious channel through which aid may also affect private investment, including FDI, is privatization. In many cases, when governments in developing countries privatize state-owned enterprises there is little domestic capital and often the investors/buyers are mostly from foreign countries. However, the evidence on the impact of aid on the privatization process is mixed. Banerjee and Rondinelli (2003) find that technical assistance has a positive impact on the pace and intensity of privatization but they also note the role of complementary institutional (market supporting institutions) capacity.

Finally, Collier and Goderis (2009) examine whether aid mitigates the adverse effects of shocks in commodity export prices on growth. They find evidence that aid inflows (and the flexibility of exchange rates) significantly reduce the negative growth effects of shocks. To the extent that reducing the adverse growth effects of external shocks in commodity-dependent aid-recipient countries would enable their governments to invest more in public infrastructure and would reduce perceived risk by investors, we may see a positive link between aid and public infrastructure and FDI in these countries.

### 3. On the determinants of FDI

There is a large body of empirical literature on the determinants of FDI. However, there is no consensus on these potential determinants and how they affect (nature of the effect) FDI. Chakrabarti (2001) provides a useful summary of some of the factors that have been covered in the literature. Among the potential determinants that have been widely used, we find market size, labor cost, growth rates, openness to trade, trade barriers, exchange rates, trade deficits, taxes, human capital, governance, and financial market development. The effect of market size is

generally found to be positive (see for example, Wheeler and Mody, 1992; Tsai, 1994; Billington, 1999; and Pistorresi, 2000). On the other hand, the effect of labor costs was found to be positive (Wheeler and Mody, 1992), negative (Shamsuddin, 1994; Pistorresi, 2000), or statistically non-significant (Lucas, 1993; Tsai, 1994). Schneider and Frey (1985) and Billington (1999) find that growth rates in the host country have a positive effect, while Tsai (1994) finds the effect of growth to be statistically insignificant. Similarly, Edwards (1990) and Pistorresi (2000) find that openness to trade has a positive effect on FDI, while Wheeler and Mody (1992) find this effect to be non-significant.

Blomström and Kokko (2003) conclude from their review of the literature that spillovers from FDI are not automatic since local conditions have an important effect in influencing firms' adoption of foreign technologies and skills. Miyamoto (2003) synthesizes the existing literature on human capital formation and FDI and concludes that this literature considers human capital formation a major—though not sufficient—ingredient for FDI to generate positive effects.<sup>2</sup> However, there are studies that have found human capital (using proxies such as literacy rates, secondary school enrolments, or tertiary education rates) less significant (or non significant) relative to other determinants (Schneider and Frey, 1985; Hanson, 1996; Narula, 1996). Miyamoto (2003) points out that data from the 1960s and 1970s reflect a period when inward FDI to developing countries focused mainly on 'market and resource seeking and/or lower-end manufacturing' which implies a low demand for higher-educated labor, while studies that use data from the 1980s and 1990s should find a more important role of human capital (skilled labor) as a determinant of 'efficiency-seeking' FDI. As examples, Miyamoto cites studies such as Noorbakhsh et al. (2001) and Nunnenkamp and Spatz (2002) who find a significant positive effect of human capital using data covering the 1980s and 1990s.

The literature also highlights the important role of good policies, institutions and governance (Asiedu, 2006; Morisset, 2000; Bénassy-Quéré et al., 2007; Karakaplan et al., 2005; Walsh and Yu, 2010). For example, Bénassy-Quéré et al. (2007) find that institutions matter, independently of GDP per capita, as a major determinant of FDI. However, many of the variables they refer to as institutions are often used to represent governance (and the authors also use this term). They

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<sup>2</sup> For a theoretical discussion of FDI and human capital see Dunning (1988) and Zhang and Markusen (1999).

include for example, lack of corruption and transparency. As noted earlier, Karakaplan et al. (2005) also find evidence that good governance has a positive impact on FDI. Similarly, support for the positive impact of institutions was obtained in Walsh and Yu (2010). However, Blonigen and Piger (2011) derive different evidence. The authors examine bilateral foreign direct investment (FDI) activity using Bayesian statistical techniques to be able to select from a range of variables most likely to be determinants of FDI and find that the variables with consistently high inclusion probabilities are “traditional gravity variables, cultural distance factors, parent-country per capita GDP, relative labor endowments, and regional trade agreements.” On the other hand, variables such as multilateral trade openness, and host-country institutions and infrastructure (including credit markets) have little support for inclusion.

Another potential determinant of FDI is the level of financial market development in the host country (Hermes and Lensink, 2003; Durham, 2004; Alfaro et al. 2004, 2006, 2009). Hermes and Lensink (2003) and Durham (2004) provide support for the role of financial markets in enhancing the positive effects of FDI. Similarly, Alfaro et al. (2009) explore the channels through which the impact of local financial institutions on the growth effects of FDI operates and find that countries with well developed financial markets benefit significantly from FDI via total factor productivity (TFP) improvements while capital accumulation (both physical and human) does not appear to be the main channel through which countries benefit from FDI.

#### 4. Social cohesion and FDI

The Council for Europe defines social cohesion as follows.

Social cohesion is the capacity of a society to ensure the welfare of all its members, minimizing disparities and avoiding polarization. A cohesive society is a mutually supportive community of free individuals pursuing these common goals by democratic means...Social cohesion is not only a matter of combating social exclusion and poverty. It is also about creating solidarity in society such that exclusion will be minimized.

*A new strategy for Social Cohesion European, Committee for Social Cohesion (CDCS), 2004*

There is no consensus on the variables that would adequately measure social cohesion (see Friedkin, 2004). In the empirical literature (at least in the field of economics) several indicators have been used in empirical studies including, ethnic fractionalization, ethnic polarization, ethnic tensions, and trust. Some studies have also used social cohesion and social capital interchangeably (Baliamoune-Lutz and Mavrotas, 2009). For the purpose of this study we believe that an appropriate definition of social cohesion is the one provided by Festinger et al. (1950, p.164) who define cohesion as “the total field of forces which act on members to remain in the group.” Although, this definition seems to apply more to the micro level, if we view the group (in the large sense) as society in a country, this definition makes ethnic tensions a good indicator of the level of social cohesion in a country. Ethnic tension threatens or destroys many (or all) of the field forces that would hold members in the same sphere (of action and outcome). As a result, some would either leave or make others leave that sphere. Ethnic tensions also weaken the possibilities of cooperation.

Most of the studies that focused on the role of social cohesion in economics have examined its effects on income and growth. Baliamoune-Lutz (2011) finds robust empirical evidence that social capital (social cohesion) measured by a proxy for generalized trust (contract-intensive money) and political institutions are complements. Knack and Keefer (1997), Easterly et al. (2006), and Baliamoune-Lutz (2009a), using other indicators of social capital (or social cohesion), also find support for complementarities between institutions and social capital. However, empirical evidence from micro data in particular points to the possibility that social capital/social cohesion and institutions could be substitutes, with social capital playing an important role in growth and development when institutions are weak (Gabre-Madhin, 2001; Fafchamps and Minten, 2003).

There are at least four channels (which often reinforce each other) via which social cohesion can affect investment (including foreign direct investment). First, as noted earlier social cohesion may complement institutions and thus reinforce the impact of institutions on domestic private investment and FDI. Even in cases where social cohesion and institutions are substitutes (when institutions are weak) we could see a positive effect on private investment if investors also regard them as substitutes. Second, social cohesion may have a positive impact on social infrastructure

(Miguel and Gugerty, 2005; Escaleras and Register, 2011). Escaleras and Register (2011) use panel data from 87 countries and examine how ethnic tensions could restrict economic growth. The authors find that ethnic tensions retard economic growth through their negative effects on the formation of social infrastructure. The impact on social infrastructure could also operate through the effect that social cohesion has on community activity (Alesina and LaFerrara, 2000). The third channel is human capital (Cutler and Glaeser, 1997; Poterba, 1997; Alesina et al. 1999; Goldin and Katz, 1999; Gradstein and Justman, 2000; Luttmer, 2001, Miguel and Gugerty, 2005). For example, Miguel and Gugerty (2005) find that ethnic diversity in western Kenya has a negative correlation with primary schooling and is associated with decaying school infrastructures and poor maintenance of water systems. Similarly, the theoretical model in Gradstein and Justman (2000) shows that “social cohesion reduces wasteful rent seeking, and thus strengthens incentives for investment in human capital.”

The fourth channel is through the interaction of social cohesion with aid. Baliaoune-Lutz and Mavrotas (2009, p. 512) argue that “[t]he use of aid for the ‘purpose it is meant for’ implies a relationship of trust.” Furthermore, the authors find empirical evidence to support a significant role of social cohesion (social capital)—measured by the extent of ethnic fractionalization—in aid effectiveness. To the extent that social cohesion and trust are strongly and positively related, we should expect that foreign investors would be deterred by lack of trust in societies with low social cohesion. Baliaoune-Lutz (2009b) uses ethnic tensions as an indicator of social cohesion and finds that social cohesion has a positive effect on income in Africa’s fragile states but only once a threshold level is reached. The author outlines the implications of her results for aid allocation and notes in particular:

The findings do not suggest that aid should not flow to countries with weak social cohesion. On the contrary, these may indeed be the countries that need a substantial increase in aid. The empirical results merely point to the importance of this critical, but often ignored, factor. These findings, however, raise two fundamental questions: (1) Can aid generate positive effects on social cohesion? (2) If yes, what policies or instruments would allow these effects to be maximized?

Baliaoune-Lutz, (2009b, p. 887)

In the present paper we try to explore the empirical evidence on this channel. If social cohesion is associated with high degree of trust and cooperation among members of a society, then we

would expect societies with low levels of cohesion to have high levels of rent-seeking activities, in addition to higher probability of conflict and instability, which would prevent aid from generating an environment conducive to private investment. In this case, we should find a positive relationship between FDI and the interplay of aid with social cohesion.

## 5. Empirical analysis

### 5.1 Variables and Methodology

The dependent variable is the share of net inward FDI in GDP (%). Based on the discussion in Sections 2-4, 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 to 6, with 6 indicating lowest level of ethnic tension (highest level social cohesion). 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 (see below). Unless noted otherwise, the data cover the period 1985-2008.

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

$$y_{it} = \alpha_i + y_{it-1} + \beta'X_{it} + \epsilon_{it} \quad (1)$$

where  $\alpha_i$  is the individual (country) effect. The fixed-effects estimation treats  $\alpha_i$  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 potentially be a determinant of FDI, it is possible that FDI also

causes human capital (skill enhancing FDI). 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. The basic equation is as follows.

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

where  $y$  is inward FDI as a ratio of GDP (%), and  $\mathbf{X}$  is a row vector of the factors influencing FDI,  $\eta_i$  is the individual (country) fixed effect,  $\xi_t$  is a time-specific effect, and  $\varepsilon_{i,t}$  are disturbances assumed to be serially uncorrelated. We use the Arellano-Bond GMM-DIF estimator to estimate this equation. The presence of random effects creates correlation between the error term and the lagged dependent variable. The Arellano-Bond GMM estimator takes care of this problem. It 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 (not shown in the paper but 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.

## *5.2 Estimation results*

The estimation results are reported in Tables 1-4. Table 1 shows the results from the fixed-effects estimations. We start with an equation that includes, on the RHS, the lagged value of FDI, aid, openness to trade, an indicator of financial development (credit to the private sector, % of GDP), human capital (proxied by secondary enrolments), the indicator of social cohesion (the index of ethnic tensions), and growth in per-capita GDP. The estimates in column (1) indicate that the

coefficient on aid is negative suggesting that aid and FDI are substitutes. All other coefficients are statistically significant and correctly signed, except for social cohesion which is statistically insignificant. In column (2), we test for the presence of non-linearity in the relationship between social cohesion and FDI. The results indicate that, indeed, the relationship has a U shape. In column 3, we explore the impact of the interplay of aid and cohesion to see if social cohesion enhances the effectiveness of aid in attracting FDI. However, the coefficient on the interaction between the variables aid and cohesion is negative, suggesting that cohesion reinforces the substitutability (or crowding out) between aid and FDI. Finally, in column (4), we add the interaction between aid and human capital. Human capital has been shown to be important for the absorptive capacity of both FDI and aid. Aid may foster productivity through its interplay with human capital. Conversely, aid may be put to good use in countries with high levels of human capital. Surprisingly, we find a negative coefficient, suggesting that aid crowds out (or substitutes for) FDI in countries with higher levels of human capital. We also note that once we include the interplay of human capital and aid, the interplay of cohesion and aid becomes statistically insignificant, while the coefficient on aid becomes positive and significant.

As noted earlier, in order to address the issue of potential endogeneity in some of the RHS variables, we perform estimations using the Arellano-Bond GMM dynamic approach. We treat openness to trade (open), aid, financial development (credit), growth, human capital, and interactions involving some of these variables as endogenous. The results from these estimations are reported in Tables 2-4. In columns (1) and (2) of Table 2, the estimates are similar to those we derived in the fixed-effects estimations (Table 1), except for human capital which now has a negative effect on FDI. In column (3) of Table 2, we explore the effects of the interplay of aid and cohesion but also include the interaction between aid and the square of cohesion to explore whether there is a threshold effect to social cohesion. The coefficient on ‘aid x cohesion’ is negative while the coefficient on ‘aid x cohesion squared is positive’. This suggests that aid may start to attract FDI beyond a threshold level of cohesion. These results are robust to the inclusion of the interaction between human capital and aid. The results in columns (4) and (5) indicate that the effects of the interplay of human capital and aid remains negative, suggesting that aid crowds out FDI in countries with higher levels of human capital. We note that once, we include these interactions (columns 3-5), the independent effect of aid becomes positive and statistically

significant. Using the result in column (4), we find that a one-point increase in the aid ratio increases the FDI ratio by one third of a point. It is important to point out that the coefficients on growth, openness, and financial development (credit) are all positive and statistically significant. On the other hand, the coefficient on human capital remains negative and statistically significant at the 1-percent level.

Next, we perform robustness checks in three ways. First, we control for sub-Saharan Africa and Latin America (and the Caribbean region) by including the dummy variables SSA and LAC and their interactions with aid and social cohesion. We also include an indicator of governance, the rule of law. Second, we use alternative indicators of governance (for the period 2002-2008), including indicator of political stability, corruption, government effectiveness, regulation, and voice and accountability. All governance variables are from the World Bank Governance database and are available on a continuous annual basis only starting in 2002. Third, we control for per-capita income instead of growth. This allows us to control for the effect of the purchasing power of the population.<sup>3</sup> The results reported in Table 3 indicate that, after controlling for SSA, LAC, and their interplay with aid, the coefficients on the variables openness to trade (*open*), 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 cohesion with aid maintains its U shape (as seen earlier), suggesting the presence of a threshold effect. Interestingly, the interplay of aid and social cohesion in SSA and LAC has an *inverted-U* relationship, 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 does indeed show an *inverted-U* shape. Given that in many countries, especially in SSA, the index of social cohesion is quite low, these countries could still get significant positive impact from improving social cohesion on aid effectiveness (having aid attract FDI). It turns out, using the results in column (5) that, in the case of SSA, the turning point occurs when the index of social cohesion is around 2.2. Focusing exclusively on SSA countries, we find that both the mean

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<sup>3</sup> We also estimated the equations with real GDP (market size) but this variable was statistically insignificant. It is possible the effect of market size is already reflected in lagged FDI and/or maybe in the extent of openness to trade.

and the median values of the index of social cohesion are around 3. In 25% of the cases, the value of this index is 2 or less and in more than 50% of the cases the index is above 3. This suggests that in most SSA countries the interplay between social cohesion and aid has a negative or no impact on FDI. We also note that the interplay of human capital and aid has a negative and statistically significant coefficient. Finally, the rule of law is marginally significant (at the 10-percent level) and has, as expected, a positive coefficient, while the coefficient on income per capita is statistically non-significant. In Table 4, we report the results from estimations using alternative indicators of governance. The only indicator that is marginally statistically significant (at the 10-percent level) is regulation (column 4). The results associated with openness to trade, the interplay of aid with human capital, and the interplay of social cohesion with aid in SSA are very similar to those reported in Table 3.<sup>4</sup> Thus, we base our policy discussion primarily on the results reported in Table 3.

## 6. Policy discussion and conclusion

The empirical analysis in this paper provides strong statistical evidence that openness to trade has a positive impact on FDI while evidence on the independent effect of human capital is mixed. On the other hand, aid in countries with high human capital has a negative effect on FDI. The interplay of aid and social cohesion in SSA and LAC has an inverted-U effect on FDI, suggesting strong diminishing returns to social cohesion in these two regions. The effects of the interplay of aid with social cohesion in the other countries in our sample have a U shape, suggesting a threshold effect to social cohesion. Interestingly, we do not find robust support for a significant role of governance (institutions). This is consistent with the results in Blonigen and Piger (2011) who find that host-country institutions are not a significant determinant of FDI, once they account for traditional gravity variables, cultural distance factors, parent-country per capita GDP, regional trade agreements, and relative labor endowments.

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<sup>4</sup> It is important to note that natural resources may play a significant role, especially in the case of SSA (see Asiedu, 2006). However, including a dummy variable for natural resource (export concentration in mining and minerals) dependency does not alter the results and the coefficient on this variable is statistically non-significant.

In other regions, the independent (direct) impact of ODA on FDI is positive and robustly significant (Table 3), implying that aid seems to complement FDI. The opposite effects take place in SSA and LAC. There are additional effects from the interaction of aid and social cohesion. Focusing on SSA, we see that aid in countries with relatively low social cohesion has a positive effect on FDI. This seems to be the case in some natural resource rich SSA countries with significant inward FDI and lower than average social cohesion. However, as noted earlier, the overall effect of the interplay of aid and social cohesion in SSA is negative in most countries, suggesting the predominance of the rent-seeking effect from aid which does not allow ODA to complement FDI. A similar outcome seems to apply to Latin American countries. This seems to be consistent with the weak performance of growth especially in the 1980s and 1990s in these two regions and their inability to attract and/or use FDI in promoting skill transfer as efficiently as countries in East Asia did (Blomström and Kokko, 2003).<sup>5</sup>

The empirical results suggest that aid could 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? 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 the type of inward FDI. This could be difficult to tackle since inward FDI is, in many cases, focused on natural resources (particularly in Africa). Promoting economic diversification may be one way to address this, along with coordination between formal education and training policies and emphasizing the kind of FDI that would benefit host countries the most in terms of human capital development and technology transfer (see Miyamoto, 2003).

The influence of improving social cohesion on aid effectiveness seems to be initially positive but has strong diminishing returns (turns negative) at higher levels of cohesion. For countries that still have very low levels of social cohesion (index of ethnic tensions lower than 2.2), one way to enhance social cohesion is through education (Gradstein and Justman, 2000, 2002; Easterly et al. 2005; Baliaoune-Lutz, 2009b). On the other hand, ODA itself could be used to enhance social

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<sup>5</sup> See also the theoretical discussion on FDI and skill formation in a poor economy in Kar and Guha-Khasnobis (2006).

cohesion both through spending on education and through enhancing community institutions. For example, Fearon et al. (2009) conduct a field experiment in which villages in northern Liberia were randomly assigned to receive ODA and find that “the introduction of new local-level institutions can alter patterns of social cooperation in a way that persists after the program’s conclusion.” Their investigation shows that villages that were exposed to a community driven reconstruction program had higher subsequent levels of social cooperation than those in the control group.

This paper makes two novel contributions to the literature. First, this is the first study to control for the role of social cohesion in promoting FDI. Second, we specifically account for the interplay of aid and social cohesion in addition to the interplay of aid and human capital. The results obtained in the present paper may provide useful insight into why aid may not attract FDI into aid-recipient countries. This study is relevant given the present debate on how to maximize the benefits of aid, especially given the recovery in private capital flows after the global financial crisis and budgetary pressures on ODA. The findings in this paper could inform the debate on how ODA can refocus on infrastructure investment (a key determinant of FDI) and the linkage that some donors now make between aid and FDI in their own strategies (notably China). Addison et al. (2006) note that “the issues involved in FDI are crucial from a policy perspective, but faith—rather than robust argument and sound evidence—often underlies policymaking in this area. In this paper we hope to make a contribution to the foundation of robust empirical research in this area.

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Table 1  
Fixed-effects equations

Dependent variable = (net FDI, % of GDP)				
	(1)	(2)	(3)	(4)
<i>lagged fdi</i>	0.386*** (0.027)	0.383*** (0.027)	0.382*** (0.027)	0.368*** (0.027)
aid	-0.039* (0.021)	-0.038* (0.021)	0.042 (0.044)	0.100** (0.047)
open	0.023*** (0.006)	0.024*** (0.006)	0.023*** (0.006)	0.023*** (0.006)
credit	0.018** (0.007)	0.018** (0.007)	0.017** (0.007)	0.017** (0.007)
growth	0.071*** (0.019)	0.071*** (0.019)	0.074*** (0.019)	0.078*** (0.019)
human capital	0.021*** (0.008)	0.023*** (0.008)	0.024*** (0.008)	0.029*** (0.008)
cohesion	0.0001 (0.97)	-0.629** (0.32)	-0.462** (0.32)	-0.558* (0.33)
cohesion <sup>2</sup>		0.092** (0.04)	0.081* (0.044)	0.086* (0.044)
aid X cohesion			-0.023** (0.011)	-0.006 (0.012)
aid X human capital				-0.003*** (0.0008)
Obs	898	898	898	898
R-sq: Within	0.32	0.32	0.33	0.34
Between	0.39	0.37	0.38	0.40
Overall	0.31	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  
GMM estimates

Dependent variable = (net FDI, % of GDP)					
	(1)	(2)	(3)	(4)	(5)
<i>lagged fdi</i>	0.146*** (0.026)	0.147*** (0.026)	0.143*** (0.026)	0.143*** (0.026)	0.134*** (0.027)
<i>aid</i>	-0.057*** (0.020)	-0.057*** (0.020)	0.165** (0.069)	0.332*** (0.075)	0.276*** (0.078)
<i>open</i>	0.029*** (0.007)	0.030*** (0.007)	0.027*** (0.007)	0.025*** (0.007)	0.025*** (0.007)
<i>credit</i>	0.039*** (0.007)	0.039*** (0.007)	0.038*** (0.006)	0.035*** (0.007)	0.034*** (0.007)
<i>growth</i>	0.043*** (0.02)	0.046*** (0.016)	0.039** (0.016)	0.042** (0.016)	0.041** (0.016)
<i>human capital</i>	-0.082*** (0.013)	-0.082*** (0.013)	-0.078*** (0.012)	-0.061*** (0.013)	-0.057*** (0.013)
<i>cohesion</i>	-0.016 (0.08)	-0.628** (0.30)	0.044 (0.09)	-0.042 (0.09)	-0.010 (0.09)
<i>cohesion</i> <sup>2</sup>		0.087** (0.04)			
<i>aid X cohesion</i>			-0.133*** (0.04)	-0.140** (0.04)	-0.162*** (0.04)
<i>aid X cohesion</i> <sup>2</sup>			0.019*** (0.006)	0.025*** (0.006)	0.027*** (0.006)
<i>aid X human capital</i>				-0.006*** (0.0008)	0.0007 (0.003)
<i>aid X (human capital)</i> <sup>2</sup>					-0.001** (0.0003)
Obs	692	692	692	692	692
Sargan test <sup>a</sup> [P-value]	1327 [0.99]	1322 [0.99]	1345 [0.99]	1228 [0.99]	1288 [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.

Table 3. Robustness checks: Controlling for SSA and LAC  
GMM estimates

Dependent variable = (net FDI, % of GDP)						
	(1)	(2)	(3)	(4) <sup>a</sup>	(5) <sup>a</sup>	(6) <sup>a</sup>
<i>lagged fdi</i>	0.152*** (0.027)	0.159*** (0.027)	0.161*** (0.027)	0.164*** (0.049)	0.160*** (0.050)	0.161*** (0.050)
<i>aid</i>	0.336*** (0.07)	0.667*** (0.10)	0.648*** (0.15)	3.996** (1.72)	4.77*** (1.80)	4.61*** (1.81)
<i>open</i>	0.025*** (0.007)	0.023*** (0.007)	0.023*** (0.007)	0.056*** (0.019)	0.058*** (0.019)	0.058*** (0.019)
<i>credit</i>	0.033*** (0.007)	0.031*** (0.007)	0.031*** (0.007)	0.011 (0.02)	0.006 (0.02)	0.008 (0.02)
<i>growth</i>	0.035** (0.016)	0.032** (0.016)	0.034** (0.016)	0.027 (0.038)	0.025 (0.039)	
<i>human capital</i>	-0.061*** (0.013)	-0.053*** (0.014)	-0.051*** (0.014)	-0.007 (0.035)	0.005 (0.03)	0.011 (0.03)
<i>cohesion</i>	-0.027 (0.09)	-0.018 (0.09)	-0.035 (0.09)	0.183 (0.24)	0.300 (0.27)	0.243 (0.28)
<i>aid X cohesion</i>	-0.147*** (0.04)	-0.216*** (0.04)	-0.216*** (0.04)	-1.44* (0.82)	-2.24** (0.99)	-2.31** (0.99)
<i>aid X cohesion<sup>2</sup></i>	0.027*** (0.006)	0.035*** (0.006)	0.035*** (0.007)	0.179* (0.10)	0.293** (0.135)	0.303** (0.136)
<i>aid X human capital</i>	-0.006*** (0.0009)	-0.009*** (0.001)	-0.009*** (0.001)	-0.021*** (0.006)	-0.018* (0.010)	-0.016 (0.011)
SSA	-0.211** (0.083)	-0.203** (0.083)	-0.203** (0.084)	0.510 (0.31)	0.469 (0.32)	0.474 (0.33)
LAC	0.005 (0.02)	0.012 (0.027)	0.013 (0.028)		0.039 (0.14)	-0.029 (0.14)
Aid x SSA		-0.293*** (0.067)	-0.276** (0.11)	-7.87*** (2.35)	-8.57*** (2.41)	-8.33*** (2.40)
Aid x LAC			0.017 (0.07)		-14.86* 8.68	-16.67* 8.94
<i>aid X cohesion X SSA</i>				5.35*** (1.55)	6.01*** (1.61)	5.92*** (1.60)
<i>aid X cohesion<sup>2</sup>X SSA</i>				-0.984*** (0.26)	-1.069*** (0.27)	-1.05*** (0.27)
Rule of law				1.900* (1.03)	1.76* (1.00)	1.97* (1.07)
<i>aid X cohesion X LAC</i>					8.16* (4.48)	9.14** (4.62)
<i>aid X cohesion<sup>2</sup>X LAC</i>					-1.03* (0.55)	-1.15** (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. 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. <sup>a</sup> Governance data are for the period 2002-2008.

Table 4  
Robustness checks: Alternative indicators of governance  
GMM estimates

Dependent variable = (net FDI, % of GDP)					
	(1)	(2)	(3)	(4)	(5)
	Political stability	Corruption	Government effectiveness	Regulation	Voice and accountability
<i>lagged fdi</i>	0.169*** (0.049)	0.170*** (0.049)	0.167*** (0.049)	0.153*** (0.050)	0.167*** (0.049)
<i>aid</i>	3.96** (1.73)	3.97** (1.73)	4.00** (1.73)	3.64** (1.73)	3.42* (1.73)
<i>open</i>	0.053*** (0.019)	0.055*** (0.019)	0.058*** (0.020)	0.055*** (0.019)	0.052*** (0.019)
<i>credit</i>	0.015 (0.02)	0.015 (0.021)	0.014 (0.021)	0.011 (0.021)	0.011 (0.021)
<i>growth</i>	0.035 (0.039)	0.034 (0.038)	0.028 (0.039)	0.036 (0.038)	0.025 (0.038)
<i>human capital</i>	-0.018 (0.03)	-0.024 (0.03)	-0.015 (0.03)	-0.016 (0.03)	-0.017 (0.03)
<i>cohesion</i>	0.196 (0.26)	0.186 (0.24)	0.187 (0.24)	0.152 (0.24)	0.085 (0.25)
<i>aid X cohesion</i>	-1.38** (0.82)	-1.36* (0.83)	-1.47* (0.83)	-1.33 (0.82)	-1.19 (0.82)
<i>aid X cohesion<sup>2</sup></i>	0.172* (0.106)	0.167 (0.11)	0.183* (0.11)	0.170 (0.10)	0.150 (0.10)
<i>aid X human capital</i>	-0.021*** (0.006)	-0.022*** (0.006)	-0.021*** (0.007)	-0.020*** (0.006)	-0.020*** (0.007)
SSA	0.600* (0.31)	0.615** (0.31)	0.556* (0.31)	0.61** (0.31)	0.57* (0.31)
Aid X SSA	-7.27*** (2.37)	-7.93*** (2.36)	-7.71*** (2.37)	-7.40*** (2.37)	-7.34*** (2.39)
<i>aid X cohesion X SSA</i>	5.40*** (1.56)	5.38*** (1.55)	5.24*** (1.56)	5.16*** (1.55)	5.13*** (1.55)
<i>aid X cohesion<sup>2</sup> X SSA</i>	-0.995*** (0.26)	-0.992*** (0.26)	-0.966*** (0.26)	-0.961*** (0.27)	-0.961*** (0.26)
<i>Governance</i>	-0.146 (0.55)	-0.548 (0.87)	1.298 (1.10)	1.63* (0.93)	1.198 (1.03)
Sargan test	228	228	225	227	229
[P-value]	[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.

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.

<sup>a</sup> Governance data are for the period 2002-2008.

Number of observations: 216