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Does Foreign Aid Increase Foreign Direct Investment?

PABLO SELAYA
University of Copenhagen, Denmark
Copenhagen Business School, Denmark

and

EVA RYTTER SUNESEN *
Copenhagen Economics A/S, Denmark

Summary. — We examine the idea that aid and foreign direct investment (FDI) are complementary sources of foreign capital. We argue that the relationship between aid and FDI is theoretically ambiguous: aid raises the marginal productivity of capital when used to finance complementary inputs (like public infrastructure and human capital investments), but aid may crowd out private investments when it comes in the shape of pure physical capital transfers. Empirically, we find that aid invested in complementary inputs draws in FDI, while aid invested in physical capital crowds it out. The paper shows that *the composition of aid matters* for its overall level of efficiency.

Key words — development aid, foreign direct investment (FDI), foreign capital for development, aid effectiveness

1. INTRODUCTION

The notion that foreign aid and foreign direct investment (FDI) are complementary sources of capital is conventional among governments and international cooperation agencies. For instance, the UN's 2002 Monterrey Consensus on International Financing for Development affirms that "ODA [Official Development Aid] plays an essential role as a complement to other sources of financing for development, especially in those countries with the least capacity to attract private direct investment. A central challenge, therefore, is to create the necessary domestic and international conditions to facilitate direct investment flows, conducive to achieving national development priorities, to developing countries, particularly Africa, least developed countries, small island developing States, and landlocked developing countries, and also to countries with economies in transition." (United Nations, 2002, p. 9). [1]

However, the implicit presumption in the consensus that ODA has a "catalyzing" effect on FDI, or that aid and FDI are complements, is by no means evident. For example, Kosack and Tobin (2006) argue that aid and FDI are essentially unrelated, because aid is basically oriented to support the government budget and finance investments in human capital, while FDI is a private sector decision relatively more connected to physical capital. In a more general study, Caselli and Feyrer (2007) estimate the marginal product of capital (*MPK*) across countries and find that, accounting for the contribution of land and other natural resources to income generation, "[...] the return from investing in capital is no higher in poor countries than in rich countries." (Caselli & Feyrer, 2007, p. 537). One of the implications of their study is that increasing aid inflows to developing countries will lower the *MPK* in these economies and will tend to be fully offset by outflows of other types of capital investments (Caselli & Feyrer, 2007, p. 540). If this is the case, aid and FDI are clearly closer to being substitutes rather than being complements.

This paper presents a unified framework for assessing the relative merit of these different claims. We analyze the relationship between aid and FDI in a theoretical framework that distinguishes between aid directed toward complementary factors of production and aid invested in physical capital. This distinction serves to illustrate, on the one hand, that aid invested in complementary factors increases *MPK* in the recipient country, which tends to draw in additional foreign resources and helps to sustain a higher level of capital over time. For example, aid can ease important bottlenecks in poor countries by financing public infrastructure and human capital investments that would not have been undertaken by private actors (due to the free-riding problem in financing public goods for instance), nor by public agents (for example because of the budgetary constraints that prevent aid-recipient governments from undertaking this type of investments). On the other hand, the distinction also helps to illustrate that foreign aid invested in physical capital competes directly with other types of capital, and thus replaces investments that private actors would have undertaken anyway. In this case, capital mobility and rate-of-return equalization across countries will give rise to a flight of other types of capital after an aid flow has been received.

This framework provides a number of testable predictions. First, for a given level of domestic saving, aid invested in physical capital crowds out other types of foreign investments in physical capital, one for one. Second, aid invested in complementary factors of production has an ambiguous net effect on FDI. The logic of the ambiguity is that, while an increase in complementary factors increases *MPK* and attracts additional foreign investments, the productivity increase also raises in-

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come, domestic savings, and domestic investments, which tends to lower *MPK* and thus crowds out foreign investments. These two findings suggest that the overall impact of aid on FDI is in theory indeterminate, and that *the composition of aid matters*.

We take the implications of our theoretical analysis to the data utilizing a panel of 99 countries over the period 1970–2001 for which we have disaggregated data. We find a large and positive effect of aid invested in complementary factors, while aid invested in physical capital has a negative impact on FDI. The combined impact of these two types of aid on FDI remains positive, so our results imply that more aid should be directed toward inputs complementary to physical capital to optimize the return on aid. The results are robust to (1) a broader definition of complementary aid than that adopted in the benchmark estimations, (2) allowing for imperfect capital mobility, and (3) controlling for traditional FDI correlates and regional fixed effects.

The paper is structured as follows. Section 2 reviews the scarce theoretical and empirical literature on aid and FDI. Section 3 describes our theoretical framework. Section 4 presents our empirical strategy, describes the data and discusses relevant econometric. Section 5 shows the results, and Section 6 tests their robustness. Section 7 sums up and discusses policy implications.

2. THE LITERATURE ON AID AND FDI

The relationship between aid and FDI is controversial and research results on it remain inconclusive. To our knowledge, only six papers analyze the question empirically. Harms and Lutz (2006) and Karakaplan, Neyapti, and Sayek (2005) analyze the relationship between aid and FDI for a broad sample of developing countries. Karakaplan *et al*. (2005) find that aid has a negative direct effect on FDI and that both good governance and financial market development significantly improve the impact of aid on subsequent flows of FDI. Harms and Lutz (2006), on the other hand, find that once they control for the regulatory burden in the host country, aid works as a complement to FDI and, surprisingly, that the catalyzing effect of foreign aid is stronger in countries that are characterized by an unfavorable institutional environment.

Kimura and Todo (2010) and Blaise (2005) present case studies on Japanese FDI and aid flows, and report incongruent results. While Blaise (2005) finds positive effects from aid to infrastructure projects, Kimura and Todo (2010) find no positive infrastructure effect, no negative rent-seeking effect but a positive vanguard effect (arising when foreign aid from a particular donor country promotes FDI from the same country but not from other countries). Two other case studies, Bhavan, Xu, and Zhong (2011) and Carro and Larrú (2010), find that aid attracts FDI in Bangladesh, Sri Lanka, Pakistan, and India; and that the evidence is inconclusive in the cases of Argentina and Brazil, respectively.

We believe that this type of mixed results can be explained to a large extent by the high level of aggregation used for the aid variable. Karakaplan *et al*. (2005) and Bhavan *et al*. (2011) include only overall ODA. Harms and Lutz (2006) distinguish between grants, technical cooperation grants, as well as bilateral and multilateral aid, but it remains unclear why one would expect foreign investors to react differently to these types of aid. Kimura and Todo (2010) apply the idea of different types of aid but do not implement an effective disaggregation: they rely on a proxy for aid for infrastructure that takes the bulk of total aid (namely aid for economic and social infrastructure, production and multisector activities), and a proxy for aid for non-infrastructure that contains the most volatile part of aid (food and humanitarian aid, and aid related to debt).

A general shortcoming in this literature is also the lack of consensus on the specification of the FDI relation (Blonigen & Piger, 2011). None of the cited empirical papers are supported by a theoretical model.[2] One reason might be that the only paper analyzing theoretically the relationship between aid and FDI is Beladi and Oladi (2007, Ch. 4)—who set up a general equilibrium model where all foreign aid is used to finance public goods, but where they unfortunately do not consider any further disaggregation for the aid flows nor make an empirical analysis.

This paper closes this gap by proposing a simple theoretical model for the relationship between different types of aid and FDI in a small open economy, which constitutes the base for our empirical analysis. We describe the main elements and mechanisms in the next section (a formal presentation is given in the appendix).

3. A THEORETICAL ANALYSIS OF AID AND FDI

Assume a Solow setup for a small open economy, where output per capita, y, grows with (a) the accumulation of physical capital per capita, k (financed by domestic and foreign investments), and (b) improvements in total factor productivity, A (which includes any factor complementary to the accumulation of physical capital per capita, like new technologies and better institutions); such that $y = Ak$.

Assume that foreign aid is composed of two types of flows, which contribute to the described process of growth in two different ways: one part of aid helps to increase the amount of physical capital k, and the other helps to increase the amount of complementary factors or total factor productivity A. (As an example of two types of aid imagine, for instance, aid projects to modernize agriculture or other specific productive sector, and aid projects to improve the quality of public institutions.)[3]

If international mobility of capital is unrestricted, the return to investments in physical capital (the *MPK*) should be the same across countries. If this is the case, as Caselli and Feyrer (2007) estimate in their paper, any inflow of foreign capital should tend to reduce the *MPK* in the recipient country and will tend to crowd out other sources of capital. Assuming that one part of foreign aid is effectively used to finance projects that could have been financed by private (foreign or domestic) investors, a direct implication is that, controlling for domestic sources of capital (domestic savings), an increase in the flow of aid used to make investments in physical capital will tend to crowd out FDI.[4]

In turn, the effect of aid directed to increase complementary factors is in principle positive: foreign aid that is used to finance reforms, better institutions or better producing technologies, will increase the *MPK* and will tend to attract additional FDI. But interestingly, given that an increase in complementary factors also increases the aggregate level of income, in the context of a Solow economy (where domestic savings are determined by the country's level of income), we should also observe an increase in the level of domestic savings and domestic investments, which will tend to lower the *MPK* in the country and thereby reduce the amount of additional FDI attracted to the country. Therefore, the net effect of aid to complementary factors on FDI is in theory ambiguous: it will be the result of combining the positive effects via higher total factor productivity, with the negative effects via larger availability of domestic sources of capital.

The two counterbalancing effects from aid to complementary factors are both of first order, so the final effect of this