

The Effects of Foreign Aid in the Form of Grants and Loans on Foreign Direct
Investment Inflow to Developing Countries in the Americas

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I. Introduction

Annually billions of dollars are transferred between countries in the form of foreign aid. In the United States alone, Obama requested \$55 billion go towards foreign aid for the 2013 fiscal year and be distributed to more than 180 countries.¹ As a result, the effectiveness of this aid and the actual impact it has on developing countries has become a topic of interest. Although financial aid is traditionally considered helpful, because the general understanding is that it expands resources and utilizes production capacity of recipient countries,² some researches are not convinced of its beneficial nature. Figuring out how to best assist developing countries and how to invest our money in such a way as to achieve the best outcome could result in a much more efficient and productive global economy.

Various studies have sought to discover whether or not foreign aid is indeed beneficial. However, the benefits of foreign aid are difficult to quantify and hard to empirically observe. Using indicators such as GDP growth and industry, economists have attempted to quantify the results of foreign aid. This paper is similar in its goal. However, it attempts to break foreign aid into two separate categories, aid given to developing countries in the form of a loan which is expected be paid back in the future and aid given in the form of a grant which not expected to be repaid. Additionally, rather than use GDP as a measure of success, this paper utilizes the inflow of foreign direct investment into the developing country to determine the effectiveness of aid. Foreign direct investment has

¹ "Good Question: How Much Foreign Aid Does the US Give?." *CBS*. N.p., 20 Aug. 2013. Web. 14 Oct 2013.

² Quazi, Rahim. "Effects of Foreign Aid on GDP Growth and Fiscal Behavior; An Econometric Case Study of Bangladesh." *Journal of Developing Areas*. 32.2 (2005): 95-117. Print.

previously been found to expand economic growth and promote industry in developing countries.

This paper attempts to build off of previous studies done on the effects of foreign aid. A full literature review is included, which discusses the pertinent research that has already been done on the topic of foreign aid and direct investment. Additionally, this paper presents a theoretical model to explain the effects loans and grants can be expected to have upon the inflow of foreign direct investment. In the last section, the paper contains an empirical analysis of data from developing countries in the Americas to see how the two types of foreign aid are invested and whether they positively affect the developing countries where they are invested.

II. Literature Review

As currently distributed, foreign aid does not appear to significantly increase the GDP growth of developing economies. In fact, some studies have found that, rather than benefiting a country, foreign aid can have negative influences on an economy, such as encouraging rent-seeking behavior (Economides, Kalyvitis and Philippopoulos, 2007).³ Rent-seeking behavior occurs when individuals in power pursue personal gain instead of investing the foreign aid in areas that would benefit the country as a whole. Although foreign aid could have a positive effect on a country's economy if invested in the intended manner, however, the possible advantages are counteracted through governing self-interest. In effect, foreign aid is taken by a small, wealthy percent of the population, while the rest of the country remains just as poor as they were previously (Holtham and

³ Economides, George, Sarantis Kalyvitis, and Apostolis Philippopoulos. "Does Foreign Aid Distort Incentives and Hurt Growth? Theory and Evidence from 75 Aid-Recipient Countries." *Public Choice*. 134.3/4 (2008): 463-488. Print.

Hazlewood, 1976).⁴ Overall, receiving money transfers promotes nonproductive decisions by creating too much opportunity for personal gain.

Furthering this idea, the type of foreign aid a country receives also appears to have an effect on how successfully it is put to use. In a study done by Rahim Quazi (2005), he found that by separating foreign aid into two categories, grants and loans, he was able to see two widely different results. Money received in the form of a transfer tended to finance non-productive civil expenditures, while money received in the form of a loan tended to be put toward public investment projects and human capital building programs. Therefore, the method in which governments allocate aid can drastically change its effectiveness.

On the other hand, another mechanism known to promote GDP growth is direct foreign investment. Attracting foreign direct investment to developing countries is essential for economic growth, development, and poverty reduction (Selaya and Sunesen, 2012)⁵. Originally, I wanted to compare the effectiveness of foreign aid to foreign direct investment, but looking at the results revealed that foreign aid has a non-conclusive effect on an economy while foreign direct investment has a significant, positive effect on production (Yao and Wei, 2007).⁶ Additionally, a positive relationship exists between the amount of foreign aid a developing country receives and the amount of direct investment flowing into that country. Selaya and Sunesen (2012) discovered that aid invested in inputs complimentary to physical capital draws in foreign capital. However, the manner

⁴ Holtham, Gerald, and Arthur Hazlewood. *Aid and Inequality in Kenya*. Oxon: Routledge, 2011. 173. Print.

⁵ Selaya, Pablo, and Eva Rytter Sunesen. "Does Foreign Aid Increase Foreign Direct Investment?" *World Development*. 40.11 (2012): 2155-2176. Web. 13 Oct. 2013.

⁶ Yao, Shujie, and Kailei Wei. "Newly Industrializing Economies." *Journal of Comparative Economics*. 35.1 (2007): 211-234. Web. 14 Oct. 2013.

in which foreign aid is invested can affect the flow of direct investment. Although aid invested in inputs complimentary to physical capital helps in the flow of direct investment, aid invested in the physical capital itself crowds out private foreign investment (Selaya and Sunesen, 2012). Therefore, the effectiveness of foreign aid and direct investment in promoting GDP in developing countries are tied together and depend on each other for their full effectualness.

A case study done by Annegeldy Arazmuradov (2012)⁷ on landlocked economies in Central Asia found that, at a regional level, aid has a significantly positive complementing effect on foreign direct investment inflows, whereas, on a country level, foreign aid only catalyzes foreign direct investment inflows in Kyrgystan and Tajikistan. The conclusion derived from this study indicated that the positive relationship between aid and direct investment is only present in countries with substantial aid inflows and faltering economic performance. In the right scenario, foreign aid can be used as a stimulus for direct investment and economic growth.

In researching foreign aid and direct investment, my project will most closely follow the studies done by Quazi (2005) and Selaya and Sunesen (2012). I want to focus my work on the combined effects of the two and which combinations maximize growth in the recipient country. Of the studies I read, the focus was on whether a relationship between aid and foreign direct investment was significant in promoting GDP, but not on what conditions optimized this effect. Using the conclusions from Rahim

⁷ Arazmuradov, Annageldy. "Foreign Aid, Foreign Direct Investment, and Domestic Investment Nexus in Landlocked Economies of Central Asia." *Economic Research Guardian*. 2.1 (2012): 129-151. Web. 18 Oct. 2013.

Quazi, I want to discover whether aid in the form of transfers or aid in the form loans promote higher levels of foreign direct investment in a country.

None of the studies pertaining to the relationship between aid and direct investment focused on any of the developing countries in the Americas. Availability of data is a determining factor in which countries can be studied and in which years, but Africa and Asia seem to be the hub of foreign aid case studies. However, Latin America and the Caribbean received over three billion dollars in foreign assistance in 2012.⁸ My project is going to focus on the effectiveness of combined foreign aid and direct investment in developing countries of the Americas.

A couple of the topics that I am not going to cover in my paper include the increasing monetary gap between rich poor, political motives for foreign aid allocation, and the amount of benefit the donating party receives from transfers in foreign aid. A reoccurring contention in foreign aid is that the money received is simply making the rich richer while leaving the poor even worse off as a result of increasing prices and lower quality of life. In my project I will be looking at the aggregate growth of the country. Breaking it down into effects at different socioeconomic levels would be too broad and not consistent or accurate across countries. Often, decisions regarding aid allocation are influenced more by politics than economics influenced and governed by motives other than increasing growth. Rather than helping the recipient developing country, motives include incentives for personal benefit. Although foreign aid may not be maximizing benefit abroad, it could be maximizing personal benefit at home. Motives determine how

⁸ "Foreign Commerce and Aid: Foreign Aid." *United States Census Bureau*. N.p., n.d. Web. 13 Oct 2013.

aid is allocated and whether government will actually institute efficient policies, therefore I intend to focus on which allocation of foreign aid will best benefit the recipient country.

III. Theoretical Analysis

a. Why Foreign Direct Investment?

When studying the effectiveness of foreign aid, the most recognized measure of success is GDP growth. In Rahim Quazi's case study of Bangladesh, he found that foreign aid in the form of grants was not as effective in promoting GDP as foreign aid in the form of loans.⁹ His conclusion for this phenomenon is that grants tend to be used to fund non-productive civil expenditures while loans are used in public investment projects and human capital building programs. Additionally, as was previously found in other studies, GDP growth is positively affected by the flow of Foreign Direct Investment (FDI) into a country.¹⁰ Therefore, the inflow of FDI is desirable for economic growth in developing countries. Knowing this, Selaya and Sunesen created a study in which they observed the relationship between FDI and foreign aid invested in physical capital and foreign aid invested in compliments to physical capital.¹¹ Their conclusion was that aid invested in compliments assisted in attracting FDI to developing countries while aid invested in physical capital itself crowded out investment and actually detracted from FDI.

⁹ Quazi, Rahim. "Effects of Foreign Aid on GDP Growth and Fiscal Behavior; An Econometric Case Study of Bangladesh." *Journal of Developing Areas*. 32.2 (2005): 95-117. Print.

¹⁰ Gursoy, Faruk. "FDI and Economic Growth Relationship Based on Cross-Country Comparison." *International Journal of Economics and Financial Issues*. Vol. 3. (2013). 519-524. Print.

¹¹ Selaya, Pablo, and Eva Rytter Sunesen. "Does Foreign Aid Increase Foreign Direct Investment?." *World Development*. 40.11 (2012): 2155-2176. Web. 13 Oct. 2013.

As previously stated, I want to look at the effect that foreign aid in the form of grants and foreign aid in the form of loans have on the inflow of FDI into developing countries in the Americas. If the conclusions from Quazi's and Selaya and Sunesen's studies are true, then I would expect loans to have a largely positive effect on attracting FDI while grants would have a much smaller effect on whether a country receives FDI. Selaya and Sunesen offer a proof in which they find that aid invested in physical capital is a substitute for foreign direct investment. Because not all loans and not all grants are invested in a single factor, either physical capital or a compliment to capital, the effect of grants and loans are indeterminate.

b. Mathematical Proof of Effects on Foreign Direct Investment

Following the model proposed by Selaya and Sunesen, I assumed a Cobb-Douglas production function

$$Y = Ak^\alpha \quad (1)$$

Where y is GDP per capita, k is the stock of physical capital per capita, K/L , α is a constant, and A represents total factor productivity.

Rather than assuming that all aid is made up of aid invested in physical capital and aid invested in compliments to capital, I assume that all aid, AID , can be broken down into aid received as grants, AID_G , and aid received as loans, AID_L . Therefore $AID = AID_G + AID_L$.

The first assumption that must be made for my model is that any aid, either grants or loans, invested into complements to physical capital have expansionary effects on the existing stock (A_0). The idea behind this is that all aspects of production, other than physical capital increase, thereby increasing the marginal product of capital. Therefore

$$A = A_0 + (1-b)AID_L + (1-c)AID_G \quad (2)$$

Where b is the percentage of loans invested in physical capital, c is the percentage of grants invested in physical capital.

In this model, I am assuming that the economy is open, meaning that goods, services, and money can be transferred between countries, which seemed to be most accurate when considering the economies of developing countries in the Americas. All of these countries are open to trade and have international trade relationships. When looking at capital equipment, in per capita terms, Selaya and Sunesen concluded that it could be funded by (i) domestic savings ($S=sy$, where s is a given savings rate), (ii) foreign direct investments (fdi) and (iii) aid invested in physical capital. The capital accumulation per capita is given by

$$\text{Change in } k = sy + fdi + b(aid_L) + c(aid_G) - (n + \delta)k \quad (3)$$

Where n is the population growth rate and δ is a fixed depreciation rate.

Assuming perfect capital mobility, means that the real world rate of return (r^w) would equal the following

$$r^w = MPK - \delta = A\alpha k^{\alpha-1} - \delta \quad (4)$$

which gives us a steady state level of k ;

$$k^* = [A\alpha/r]^{1/(1-\alpha)} \quad (5)$$

where r is the world real rate of return, $r^w + \delta$.

By setting (2) equal to zero, the equilibrium amount of capital, we can rewrite it

$$\begin{aligned} \text{Change in } k &= sy^* + fdi + b(aid_L) + c(aid_G) - (n + \delta)k^* = 0 \\ fdi &= -b(aid_L) - c(aid_G) - sy^* + (n+\delta)k^* \end{aligned} \quad (6)$$

Where $y^*=Ak^{*\alpha}$.

Looking at the effect of loans on FDI, we can see that

$$dfdi/daid_L = -b - s(dy^*/daid_L) + (n + \delta)(dk^*/daid_L) \quad (7)$$

We can break the above equation into its components to observe the separate effects.

$$\begin{aligned} s(dy^*/daid_L) &= s(d(Ak^{*\alpha})/daid_L) = s[k^{*\alpha}(dA/daid_L) + Ak^{*\alpha-1}(dk^*/daid_L)] \\ &= s[k^{*\alpha}(1-b) + Ak^{*\alpha-1}(dk^*/daid_L)] > 0 \end{aligned} \quad (8)$$

As seen above, loans to the receiving country promote savings and increase investment in physical capital. Because loans are being invested directly into physical capital, FDI is being crowded out in the market. Therefore, we can see the negative effect loans have on the amount of foreign direct investment.

Looking at the second component in the equation, we find that

$$(dk^*/daid_L) = d/daid_L([A\alpha/r]^{1/(1-\alpha)}) = 1/(1-\alpha) [A\alpha/r]^{1/(1-\alpha)}((\alpha-ab)/r) > 0 \quad (9)$$

Similarly, we can see the effect of grants on FDI

$$dfdi/daid_G = -c - s(dy^*/daid_G) + (n + \delta)(dk^*/daid_G) \quad (10)$$

and observe the separate component effects.

$$\begin{aligned} s(dy^*/daid_G) &= s(d(Ak^{*\alpha})/daid_G) = s[k^{*\alpha}(dA/daid_G) + Ak^{*\alpha-1}(dk^*/daid_G)] \\ &= s[k^{*\alpha}(1-c) + Ak^{*\alpha-1}(dk^*/daid_G)] > 0 \end{aligned}$$

Similar to loans, grants also positively promote the savings rate of the recipient country, causing capital investment to increase. The only difference between the effect of loans and the effect of capital on a country's saving's rate is the amount actually invested in physical capital.

As before, we can look at the second half of the equation.

$$(dk^*/daid_G) = d/daid_G([A\alpha/r]^{1/(1-\alpha)}) = 1/(1-\alpha) [A\alpha/r]^{1/(1-\alpha)}((\alpha-\alpha c)/r) \quad (11)$$

In the equations above, both $s(dy^*/daid_L)$ and $s(dy^*/daid_G)$ are both positive, as are $(dk^*/daid_L)$ and $(dk^*/daid_G)$. Therefore the components are working against each other and the effect of FDI is ambiguous. However, the only difference between the effects of loans and grants on FDI is the percentage invested in physical capital. Theoretically, if both forms of foreign aid are invested in a similar manner, then they should have similar effects on whether or not FDI is drawn into the developing country. If, however, Rahim Quazi's theory that grants and loans are treated differently by receiving countries, then they should have varying effects on attracting FDI.

IV. Empirical Model

a. Econometric Equation

Econometrically modeling the effect of grants and loans on fdi, this paper incorporates the influential factors that would most likely affect the amount of direct investment into a developing country.

$$fdi_{it} = \beta_0 + \beta_1 AB_{it} + \beta_2 I_{it} + \beta_3 S_{it} + \beta_4 aid^L_{it} + \beta_5 aid^G_{it} + \epsilon_{it} \quad (12)$$

Where fdi_{it} is the per capita FDI in country i during period t , AB_{it} is the current account balance of the recipient country at time t , I_{it} is the investment per capita, S_{it} is the domestic savings per capita, aid^L_{it} is aid in the form of loans, and aid^G_{it} is aid in the form of grants. In calculating foreign direct investment, both savings and investment per capita are influential, because they also help determine the economic climate of a country.

Citizens investing in their own country will have a growing economy where innovation and technology are expanding. Inversely, when individuals in a developing country are

saving, they are accumulating wealth, which in effect, lowers the country's need for foreign direct investment. Using the above equation, we can observe the direct effects that grants and loans have on the amount of FDI in a country, while accounting for other influential factors.

From the theoretical analysis above, in order to conclude that foreign aid in the form of grants and foreign aid in the form of loans are treated differently by recipient governments, then their effect on attracting foreign direct investment must be significantly different. In order to support Rahim Quazi's conclusions that aid in the form of loans is invested more effectually than grants, they should attract a larger degree of investment into the developing country. According to the previous findings, by attracting a larger amount of foreign direct investment, loans would then effectually have aided in increasing GDP.

This study observed foreign aid data for twenty-four developing countries in the Americas during the years from 1985 to 2011. Using the econometric model above, I started with the hypothesis that neither forms of aid significantly effected foreign direct investment, where β_4 and β_5 are the coefficients for loans and grants.

Null hypothesis $H_0: \beta_4 = \beta_5 = 0$

Alternative hypothesis $H_A: \beta_4 \neq \beta_5 \neq 0$

The null hypothesis in this test states that the manner in which loans and grants are invested does not significantly effect foreign direct investment either positively or negatively. If this were the case, assuming the conclusions found by Selaya and Sunesen's economic model are correct, then the negative, crowding out effect of aid

invested in physical capital on foreign direct investment would have to be offset by expansionary effect of aid invested in compliments to capital.

However, on the other hand, the alternative hypothesis for this model states that either, or both, aid in the form of loans and aid in the form of grants have a significant effect on the amount of foreign direct investment drawn to a developing country. A significantly positive result would suggest that the aid received by a developing country is being invested in compliments to capital, expanding its marginal product.

Alternatively, a negative relationship might suggest that a majority of the aid was invested in physical capital, effectively crowding out foreign direct investment.

b. Results

The table contained in appendix A displays the results from the above econometrics model. The data used to derive these results are a culmination from the United Nation Conference on Trade and Development reports on foreign direct investment, the International Monetary Fund records of current account balances, investment, and savings per country, and the Organization for Economic Cooperation and Development loan and grant data.

From Table A, at the ten percent significance level, foreign aid in the form of grants actually has a slightly positive effect on attracting foreign direct investment into the developing country. Loans, however, appear not to significantly affect the inflow of foreign direct investment. This suggests that foreign aid loans and grant are, in fact, invested in different manners. However, my results run against those found by Rahim Quazi in his study of Bangladesh. In his analysis, Quazi found that loans were more effectual in boosting the growth of an economy than grants. According to my findings

above, grants actually have a more significant positive effect on attracting foreign direct investment, and thereby expanding the growth of the developing economy. Although contradictory to Quazi's findings, my results agree with those found by Selaya and Sunesen, in that the inflow of foreign aid to a developing country does positively affect the quantity of foreign direct investment received.

It appears that, in continuing that my previous assumptions are true, when investing loans, governments distribute finances into both direct, physical capital and into complements of capital, offsetting both positive and negative effects on foreign direct investment. However, the distribution of aid in the form of grants seems to be invested more heavily in non-capital investments, such as human capital and technology, which encourages the inflow of foreign direct investment and increases the marginal product of existing capital. Reasons for this could be policies implemented by the governments of the developing countries, such as Plan Colombia, which seeks to invest moneys received as from assisting nations in and improve the standard of living and overall quality of human capital. Large improvements have already been seen in Colombian state of affairs since Plan Colombia was implemented. Awareness of mode in which foreign aid is being invested and the motivation behind investment, promotes the overall effectiveness and expansion of the economy.

Conclusion

Because so much money is poured into financial aid by governments all around the world each year, it is imperative to study the effects of these financial investments and ensure they are utilized in the most effective, efficient manner possible. Informing politicians and government officials on the most beneficial method of aiding a developing

country can have large, long-lasting impacts on policy and stimulate economic growth across the globe.

The model from this paper shows the relationship between attracting foreign direct investment and different forms of foreign aid. The positive relationship between aid and the inflow of direct investment reveals that, although the effects are small, receiving foreign aid makes a developing country more appealing to investors abroad. If this study were to be repeated in the future, a more complex model that encompasses more of the variability of foreign direct investment and utilizes statistical tools that fix the oversimplification of data may benefit an analysis. However, although basic, the model serves to represent the application of the theoretical model of investing loans and grants into physical capital and complements to capital.

Studies, such as this, can effect future policy decisions on where to allocate financial aid. This foundation can be a platform for other studies to attempt to discover an optimal balance between grants and loans to developing countries and how they should be distributed between physical capital and complements to capital. Is there a tipping point where they are no longer effective? Additionally, researchers may ask how much inflow of foreign direct investment is desirable in a developing country and what combination of foreign aid will attract the right amount of investment. By separating aid into grants and loans and understanding the theoretical implications from the type of investment undertaken, economists can break foreign aid down into a variety of parts and better understand the far-reaching effects of foreign aid.

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Appendix

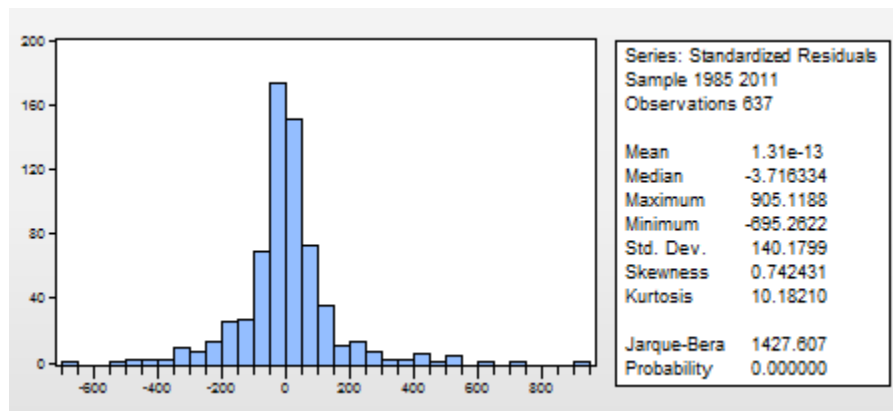
Table A.

Estimates of the Multiple Regression Model, n=637

Dependent Variable: Foreign Direct Investment

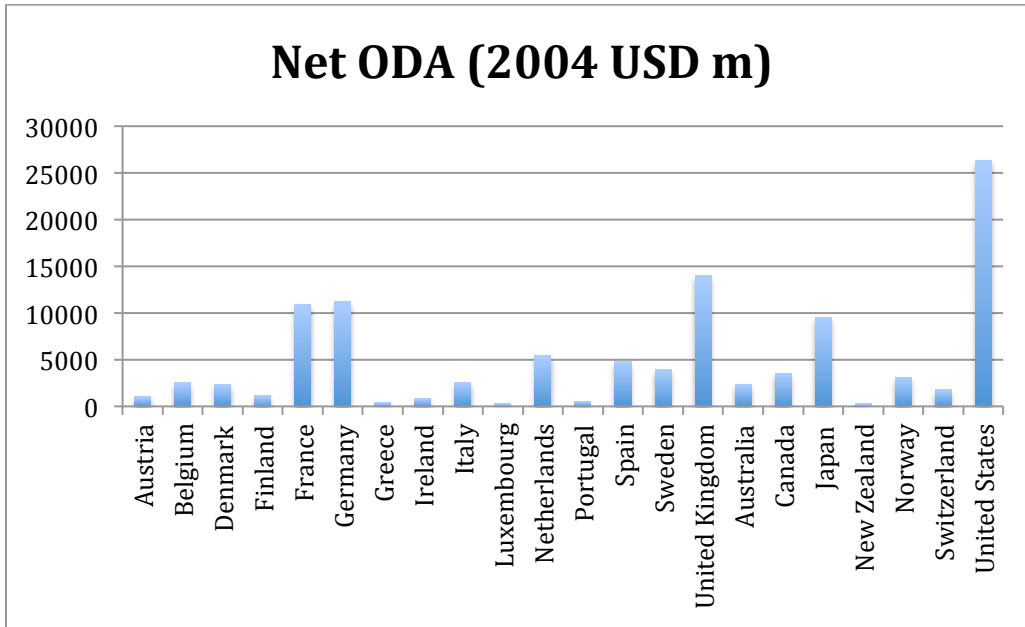
Variable	Coefficient (p-value)
Constant	-58.40** (0.00)
Current Account Balance	7.01** (0.00)
Investment	0.60** (0.00)
Savings	-0.39** (0.00)
Grants	0.04* (0.09)
Loans	0.01 (0.93)
R ² = 0.86 F = 787.98 (associated p-value = 0.00)	
Notes: The top portion of the Table contains parameter estimates with p-values in parentheses; **represents significance at 5 percent; *represents significance at 10 percent; R ² and F reported in the last rows are used to assess the model.	

Figure A.



Analyses of the residuals

Figure B.



Source: OECD-DAC Secretariat simulation of DAC members' net ODA volumes