

**FOREIGN AID AND DEVELOPMENT:
LOOKING BEYOND THE GROWTH EFFECT**

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On the question of whether aid stimulates GDP growth, the profession provides inconclusive and often contradictory findings. While waiting for a stronger consensus, this paper analyzes the direct effect of aid on other non-monetary dimensions of development. I construct an index of social and human development similar to the UNDP's human development index but which differs from it by excluding per capita GDP. Using both non-parametric and parametric methods, I find a negative relationship between aid and social development. After controlling for per capita income, the econometric analysis suggests that higher dependence on foreign aid worsens social and human development.

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1. INTRODUCTION

In the past two decades, literature on the development effect of aid has received a lot of attention. Hansen and Tarp (2001) provide surveys of works in this area. This literature provides inconclusive and often contradictory findings.¹ Moreover, most of the contributions focus on the efficiency effect of aid and measure the role of aid in economic development through its capacity to raise GDP per capita. However, it is well

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¹ Burnside and Dollar (2000) for instance show that aid leads to economic growth when the recipient country provides a good policy environment. This result was supported by a number of contributions such as Collier and Dollar (2002); Collier and Dehn (2001) or Collier and Hoeffler (2004). However, subsequent contributions show that the Burnside and Dollar results were not robust and many other studies on the effects of aid on economic growth indicate that foreign aid has a negative effect, or no significant relationship with growth (Cassen *et al.*, 1994; Griffin and McKinley, 1994; Boone, 1996; Dalggaard and Hansen, 2001; Roodman, 2004).

known that development is not just about raising GDP per capita. In recent years, a number of developing countries have been achieving higher growth rates in their GDP, but measured poverty is not falling significantly. Therefore, while waiting for a stronger consensus in this well documented literature on the effect of aid on GDP growth, it appears important to investigate its effect on non-monetary aspects of development. That is, when we control for GDP per capita, what is the effect of aid on qualitative measures of well-being? This paper aims to investigate the direct effect of aid on the main characteristics of development by using a large set of human development indicators in an aggregated index. The purpose of my paper is thus to investigate whether aid affects development over and above its effect on GDP growth.

Just a very few papers investigate the effect of aid on non-monetary aspects of development. Kosack (2003) shows that aid enhances the level of human development index among countries, but these social effects are conditional on the extent of democracy. However, democracy by itself is also an aspect of social development. Gomanee *et al.* (2002) find that aid increases pro-poor expenditures; leading to improvements in the level of well-being. Collier and Dollar (2002) analyze the efficiency of the mode of allocation of aid in the reduction of poverty; however aid is allowed to affect poverty only indirectly through its effect on GDP growth. They didn't investigate the direct effect of aid on poverty after controlling for GDP level. Azam and Thelen (2007) for instance take into consideration this aspect when they analyze the role of aid in reducing terrorist attacks. They show that the level of foreign aid received reduces the supply of terrorist attacks by recipient countries. However as it is well known, terrorist attacks are mostly oriented towards the interests of developed countries. Consequently, reducing terrorist attacks could not significantly improve the well-being of developing countries population. Therefore, Azam and Thelen (2007) investigate just one aspect of the multidimensional concept of development. Masud and Yontcheva (2005) analyze the effectiveness of foreign aid in reducing poverty through its impact on human development indicators. They find that aid reduces infant mortality while its impact on illiteracy is less significant. However, the authors investigate the effect of aid just on two disaggregated indicators of social development and this in separated equations.

Therefore, what could theoretically be the effect of aid on social outcomes? In theory, aid is provided in order to support public financial efforts in reducing poverty. Aid is thus assumed to finance the provision of public capital which could improve access to health and education services. Public capital could also help to protect the environment or to improve access to water and sanitation facilities. In this vein, aid could enhance social development. However, it could also be argued that aid is highly volatile; thus, higher aid-dependence could lead to more volatility in the supply of public services; increasing therefore the vulnerability of the poor.² Another theoretical argument on the

² Morduch (1994) considers vulnerability as the main characteristic of underdevelopment.

effect of aid on social development is that aid could lead to more inequality because government officials and other administrative agents could invest their effort in capturing the financial assistance in accordance with the rent seeking literature. In this vein, aid by increasing inequality could worsen social development. Moreover, following Maren (1997) who shows that in countries like Somalia the battle for the control over foreign aid could lead to civil war, it might be argued that aid could lead to political instability. All in all, there is room for more theoretical arguments on the effect of aid on social outcomes.

Since there are theoretical reasons for aid to enhance social development but also to worsen it, the issue needs to be settled empirically. I try therefore to give an empirical assessment of this relationship. In a similar vein, Addison *et al.* (2005), McGillivray (2000), Swaroop *et al.* (2000), McGillivray and Ahmed (1999) analyze the effects of aid on social public expenditures mainly in the provision of health and education services. These studies provide ambiguous results because aid is shown to increase public expenditures in social sectors but it is also shown to decrease tax revenues and to increase public debt. It could be argued that the induced adverse public finance effects could hamper GDP growth which in turn could reduce public expenditures. Therefore, the argument I test in this paper is that high aid dependence worsens social development. The effects come through a variety of channels mainly by increasing inequality and the vulnerability of the poor.

Following this introduction, the second section presents the methodologies that will be used to analyze the social development effect of aid. The third section presents results and some discussions while the last section concludes the paper.

2. EMPIRICAL METHODOLOGIES AND DATA

My paper is an empirical investigation of social development effects of aid. To this end, I preliminarily use a non-parametric approach to describe some stylized facts about the link between aid and an index of social development. Later on, I estimate an econometric model of social development and I test for the significance and robustness of aid.

2.1. A Non-Parametric Approach

I construct a non-parametric scatter plot linking an index of social development and the measure of aid. To this end, I use the LOWESS³ methodology described by Cleveland (1994). This methodology has been used in recent development literature by Imbs and Wacziarg (2003) or Carmignani and Avom (2010). It is based on the

³ LOWESS stands for Locally Weighted Scatter plot Smoothing.

construction of a smoothed robust locally weighted scatter plot. The method is non-parametric since it makes minimal assumptions about the relationships among variables. It imposes just a little structure on the functional form of the relationship between these two variables. Concretely, when we call the measure of social development s and when we denote the measure of aid by a , the couple of values (a_n, s_n) gives a generic observation on these two variables for $n=1,2,\dots,N$. The LOWESS approach consists then on fitting a locally weighted polynomial regression of s on a where we give smaller weights to the observations that are more distant from a_n so that, when we take a bandwidth of x , we use only a subset of $(x*100)\%$ observations that lie around a_n . Finally, I use the fitted value of this local regression measured at a_n as the smoothed value to construct my non-parametric scatter plot. I obtain N smoothed values by repeating the same procedure for each observation (a_n, s_n) in the sample. By linking these N points, I get a line through the moving central tendency of the relationship. This method, which is especially useful for large datasets where trends can be hard to visualize, could help us to visually assess the relationship between aid and social development. It could also help to address nonlinear relationships where linear methods do not perform well.

Before the implementation of this methodology, it is important to define and give the measure of social development and foreign aid. Following the World Bank, I define foreign aid as direct grants and concessional loans for which the grant component exceeds 25 per cent at a rate of discount of 10 percent. To measure it, I use the net official development assistance (ODA)⁴ received as a percentage of Gross National Income. This enables me to consider not just aid per se but also aid-dependence.

Concerning the definition of development, I am looking for an index that could measure the qualitative aspects of development. A possible approach is to consider the United Nations Development Programme (UNDP)'s Human Development Index (HDI) which is the weighted average of five indicators representing population health, education, and standard of living. However, my study aims to analyze the effect of aid after controlling for per capita income while UNDP's human development index contains already the GDP per capita. An alternative approach to the empirical measure of development is to adopt and adapt the UNDP (1990)'s method to a larger set of variables that capture social and human development, but excluding per capita income. Therefore, my approach consists on summarizing information from selected social development variables from the World Bank's World Development Indicators into an

⁴ ODA "consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients. It includes loans with a grant element of at least 25 percent (calculated at a rate of discount of 10 percent)" (World Bank, 2012).

index similar to UNDP's human development index. However, I depart from UNDP (1990)'s approach by determining the weights used in the computation of this index through the principal components analysis. In brief, the procedure consists on modeling the variance structure of a set of observed human development indicators using linear combinations, or components, of the variables. The principal components of this set of variables are obtained by computing the eigenvalue decomposition of the observed variance matrix. These principal components may be used in subsequent analysis, and the combination coefficients, or loadings, may be used in interpreting the components. The first principal component is the unit-length linear combination of the original variables which accounts for as much of the variability in the original data as possible, and each subsequent principal component accounts for as much of the remaining variability as possible. Therefore, I compute my index of social development as the first principal component of six variables, which capture important aspects of social and human development, selected from the World Bank (2012)'s World Development Indicators. I choose the following disaggregated social and human development indicators: average years of education in the population (AVYEAREduc), rate of immunization against diphtheria, pertussis and tetanus (IMMUNIZATION), life expectancy at birth (LIFEXPECTANCYATBIRTH), average precipitation in depth (AVPRECIPITATION), renewable internal freshwater resources per capita (FRESHWATERPC) and an average index of civil liberties and political rights calculated by Freedom House (COMPO_FH). The choice of these variables is justified by the need to put together all relevant aspects of human and social development. I therefore consider indicators of population education, health, quality of life, environmental sustainability, institutional development. Finally, I measure non-monetary aspects of development by computing the variable NM_DEV as the first principal component of these six variables so that, a country with better development performances should have a higher value of NM_DEV.

To perform this empirical exercise, I use a sample of 74 low and middle income countries from all regions of the world. More precisely, my sample contains 22 Low Income Countries, 25 Lower-Middle Income Countries and 27 Upper-middle Income Countries. The period of analysis goes from 1965 to 2010 and I consider five-year averages of annual data. Therefore, the sample contains a panel of 74 developing and emerging countries on 10 quinquennia.⁵ This process of averaging data over periods of five years helps me to get rid of shorter term effects. Table 1 gives the summary statistics of these social and human development indicators.

⁵ I am unable to get all the 740 observations for each variable so that the panel is unbalanced.

Table1. Social and Human Development Indicators:
Data Description and Summary Statistics

Variable	Description and <i>source</i>	Mean	Standard Deviation	Max & <i>Min</i> ^c	Median
AVYEAREduc	Average years of schooling in the population. <i>Barro and Lee (2010)</i> .	5.29	2.64	11.52 <i>0.236</i>	5.2
IMMUNIZATION	Rate of immunization against diphtheria, pertussis and tetanus. <i>WDI</i> ^a	72.43	23.65	99.00 <i>1.000</i>	80.00
LIFEXPECTANCYATBIRTH	Life expectancy at birth. <i>WDI</i> ^a	59.69	10.54	78.87 <i>33.15</i>	61.02
AVPRECIPITATION	Average precipitation in depth. <i>WDI</i> ^a	6.77	0.87	7.98 <i>3.93</i>	6.96
FRESHWATERPERCAPITA	Renewable internal freshwater resources per capita: <i>WDI</i> ^a	8.36	1.66	12.33 <i>3.08</i>	8.20
COMPO_FH	Average index of civil liberties and political rights calculated by Freedom House. <i>Economic Freedom of the world</i> ^b .	4.35	1.59	7.00 <i>1.00</i>	4.50
NM_DEV	Human and social development index. <i>Own computation</i> .	50.7	9.8	63.66 <i>20.87</i>	51.63

Notes: a. WDI stands for World Development Indicators, The World Bank (available online at www.data.worldbank.org/data-catalog). b. Economic Freedom of the World database (available online at <http://www.freetheworld.com/datasets/efw.html>). c. Minimum values of variables are in italics.

With these variables, I can also move to the econometric investigation of the effect of foreign aid on non-monetary aspects of development.

2.2. The Econometric Model of Social Development

I employ a parsimonious specification of an estimating social development regression. The baseline specification of the social development regression for country i at time period t can be formulated as follows:

$$nm_dev_{i,t} = \alpha_0 + \alpha_1 nm_dev_{i,t-1} + \alpha_2 gdp_pc_{i,t} + \alpha_3 odapgni_{i,t-k} + \varepsilon_{i,t}, \quad (1)$$

where i represents a country, t is the time subscript, k is an integer obeying to ($k = 0, 1, \dots, t$), nm_dev is the index of social development, gdp_pc is the variable GDP per capita, $odapgni$ represents net official development assistance received by a country in percentage of GNI and ε is an error term.

This basic model has two implications. First, it contains a lagged dependant variable as explanatory variable; it is therefore equivalent to the regression of the change in

development index on its initial level and other explanatory variables (Carmignani and Avom, 2010). In this sense, the model can account for convergence of development index among countries in the sample. Second, for $k > 0$, it is possible to analyze the effect of both contemporaneous and past net inflows of foreign aid on social development. It is therefore possible to analyze the potentially lagged effect of aid.

The processes determining the link between aid and social outcomes are certainly more complex, and it is likely that other factors are involved in addition to those included in the baseline regression. I therefore subject it to sensitivity and robustness analysis, by adding other relevant exogenous variables used in previous social development studies. Therefore an extended model can be written as follows:

$$nm_dev_{i,t} = \alpha_0 + \alpha_1 nm_dev_{i,t-1} + \alpha_2 gdp_pc_{i,t} + \alpha_3 odapgni_{i,t-k} + bZ_{i,t} + \varepsilon_{i,t}, \quad (2)$$

where Z is a set of other controls and b is a vector of coefficients to be estimated together with α_1 , α_2 , and α_3 . The coefficient of interest in this analysis is α_3 as it captures the direct effect of foreign aid on qualitative measures of development. If it is positive, then I can conclude that foreign aid fosters human and social development over and above whatever indirect effect it could have through per capita income. On the contrary, if α_3 is negative then higher dependence on foreign aid could worsen human and social development over and above any effect it could have through GDP per capita.

To assess this, I set the following empirical strategy. First, I estimate the econometric models (1) and (2) under the assumptions $\alpha_1 = 0$ and $k = 0$. This prevents me from facing complications that could arise if I take into consideration the lagged dependant variable. I therefore obtain results from a basic model where development index is regressed on contemporaneous aid after controlling for per capita GDP and other regressors. This first step could help me in addressing the problem of endogeneity of some of explanatory variables mainly the gdp_pc variable. Then later, I address these complications by allowing $k > 0$ and by estimating the dynamic model where $\alpha_1 \neq 0$. This could permit me to consider the lagged effect of aid and to allow for mean reversion in social development.

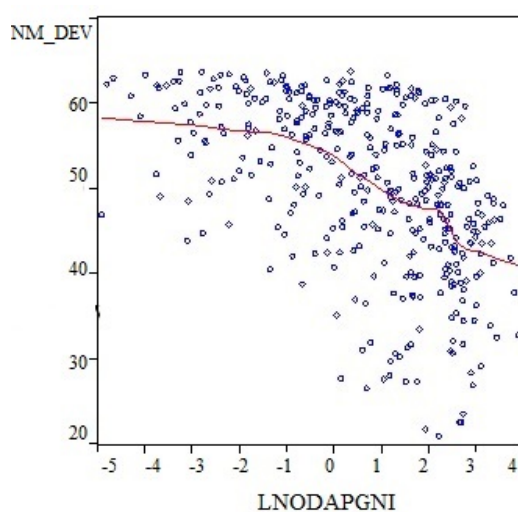
3. EMPIRICAL EVIDENCE ON THE LINKS FROM AID TO HUMAN AND SOCIAL DEVELOPMENT

I present a scatter plot of aid and development from which I can derive some stylized facts that could be later investigated more in-depth through the econometric analysis.

3.1. A Locally Weighted Scatter Plot of Social Development and Foreign Aid

Figure 1 bellow presents the scatter plot and the fitted line obtained from the above-

described procedure. To obtain it, I fit in each regression using a polynomial structure of degree 1 and I take a bandwidth of 0.2 meaning that 20% of total sample observations are included in each local regression. This figure shows that the slope of the curve linking non-monetary development to foreign aid is negative; meaning that the link between aid and human development is a negative one.



Notes: NM_DEV is an index of human and social development while LNODAPGNI represents the log of ODA as a percentage of Gross National Income. The scatter plot shows an unambiguously downward sloping relationship between aid and qualitative measures of development.

Figure 1. A Scatter Plot of Social Development Index and Aid Dependence

This figure gives some preliminary stylized facts about foreign aid and social development. Of course, the relationship between these two variables is unambiguously negative; meaning that higher dependence on aid, as measured by the ratio between net official development assistance and gross national income, is associated with lower level of income, is associated with lower level of social and human development. Moreover, the curve's slope seems steeper for higher values of aid dependence meaning that the relationship between these variables is probably non-linear. To investigate in depth these stylized facts, I undertake the econometric analysis of the relationship between aid and non-monetary aspects of development.

3.2. Econometric Evidence on Foreign Aid and Social Development

The results of my econometric analyses are presented in Table 2.

Table 2. Panel Two-Stage Least Squares Estimates

Variables ^a	I	II	III	IV ^b	V ^c
Constant	47.6313 (49.45)***	51.931 (30.86)***	51.754 (32.46)***	39.242 (8.56)***	51.949 (31.00)***
<i>gdp_pc</i>	0.0017 (5.24)***	0.0007 (2.24)**	0.0007 (2.36)**	0.0038 (4.63)***	0.0007 (2.167)**
<i>lnodapgni</i>	-0.8877 (-2.34)**	-1.183 (-3.17)***	-1.1596 (-3.15)***	0.8190 (1.21)	-1.1773 (-3.098)***
<i>govsize</i>	-	0.0012 (0.01)	-	0.0667 (0.40)	0.0038 (0.043)
<i>openness</i>	-	0.0794 (5.82)***	0.0808 (6.41)***	0.0779 (2.96)***	0.0789 (5.474)***
<i>popgrowth</i>	-	-3.6212 (-6.45)***	-3.6407 (-6.60)***	-2.9745 (-4.24)***	-3.6095 (-6.189)***
<i>lnodapgni</i> ²	-	-	-	-	-0.0156 (-0.112)
<i>R</i> ²	0.29	0.47	0.47	0.40	0.473
<i>F</i> Statistic	67.67***	53.77***	69.15***	19.49***	45.17***

Notes: t-statistics in parentheses. ***, ** and * denote significance at 1%, 5% and 10% confidence levels. The set of instruments include lagged values of the variables. I find that aid dependence worsens development performances of a country over and above any positive or negative effect it might have through GDP growth. This result has shown to be robust to some extensions of the econometric model.

a. Definition of variables: The dependant variable is an index of human and social development. The explanatory variables are as follows: *gdp_pc* is per capita GDP; *lnodapgni* is the log of net official development assistance as a percentage of Gross National Income; *govsize* is the size of government; *openness* is openness to trade variable; *popgrowth* is the rate of population growth. b. Instead of *lnodapgni* I consider *lneda* that is, the logarithm of effective development assistance taken from Chang *et al.* (1998)'s definition of aid. The coefficient becomes positive but it is no longer significant. c. I add aid-squared variable as a regressor but it turns out to be not significant. The other results remain unchanged.

First, I estimate the basic model of social development (1) under the assumptions $\alpha_1 = 0$ and $k = 0$. The key issue in estimating this restricted model is the possibility of endogeneity of *gdp_pc* variable. In fact, many of my social indicators present in *nm_dev* variable could affect the production efficiency and thus *gdp_pc* variable. Therefore, I can't adopt the standard Ordinary Least Squares approach. I need some instrumental variables method. I choose to estimate this model using the Panel Two-Stage Least Squares method. Results are presented in column I of Table 2. These results corroborate the stylized facts previously presented. The human development-aid relationship is negative. All the estimated coefficients are statistically significant and the adjusted R^2 , though relatively low, is acceptable for a panel that relies mainly on its cross-sectional dimension (74 countries) with relatively small time periods (10 quinquennia) and this

value is comparable to those obtained in other social development studies. Therefore, aid dependence worsens development performances of a country independently of any positive or negative effect it might have through GDP growth.

In Column II, I add some other controls in the baseline model. I specify the Z vector in model (2) to include population growth (*popgrowth*), government size (*Govsize*) as measured by general government final consumption expenditures in percentage of GDP and openness to international trade (*openness*) as measured by the sum of imports and exports of goods and services in percentage of GDP. All these variables are significant except the government size which turns out to be insignificant. The lack of effect of government expenditures on human and social development index might be due to inefficiencies in public spending. However, it can also lead to the conclusion that aid and public social expenditures are substitutes rather than complements; meaning that aid reduces public effort in alleviating poverty.

GDP per capita and openness to international trade have positive effects on social development while foreign aid and population growth show up with a negative sign. Hence, both Equations (1) and (2) lead to the same conclusion: foreign aid, after controlling for GDP per capita, negatively affect human and social development.

As government size is not significant, model (2) is estimated while excluding *GOVSIZE* from the list of explanatory variables. This does not affect much the other coefficients and does not reduce the global significance of the model. I report these results in column III.

In column IV, I investigate whether these results are robust to the alternative definition of foreign aid. I use, like in Burnside and Dollar (2000)'s paper, the aid variable constructed by Chang *et al.* (1998) known as "Effective Development Assistance" (EDA).⁶ I find that EDA has a positive although non-significant effect on social development. This result is similar to that obtained by Easterly (2003) who finds that the sign of the effect changes when we pass from ODA to EDA; but it is no longer significant.

Finally in column V, I investigate the possibility of non-linearity in the relationship between aid and non-monetary aspects of development. I add an "aid-squared" ($\ln odapgni^2$) variable at the right hand side of the model (2) and I find that its coefficient is also negative but it is not significant.

These results shed some light on aid-development nexus: whatever the position is in the literature on the efficiency effect of aid, foreign aid dependence worsens human and social development performances of a country.

Now, I investigate whether these results are sensitive to the inclusion of lagged

⁶ EDA differs from ODA on two aspects. First, EDA takes account of development loans regardless of how concessional they are but considers only their grant component (their net present value) while net ODA considers only low-interest (that is, very concessional) loans. The second aspect is that the usual net ODA counts technical assistance as aid while EDA excludes it.

values of dependant variable as regressor and to the inclusion of lagged values of aid.

I begin by relaxing the restriction $k = 0$. I investigate the lagged effect of foreign aid taking one period, two periods, three periods and four periods lag. A one period lag corresponds to analyzing the effect of net foreign aid inflows of a given period on the social development level of the subsequent quinquennium. Results are presented in Table 3.

Table 3. Analyzing the Lagged Effect of Aid on Human and Social Development

Variables ^a	I ^b	II ^c	III ^d	IV ^e	V ^f
Constant	52.968 (29.68)***	52.459 (28.48)***	54.320 (29.31)***	56.061 (25.48)***	51.931 (30.86)***
<i>gdp_pc</i>	0.0007 (2.041)**	0.0010 (3.015)***	0.0008 (3.161)***	0.0010 (3.558)***	0.0007 (2.24)**
<i>lnodapgni</i>	-1.1173 (-2.760)***	-0.8152 (-2.018)**	-0.8035 (-2.187)**	-0.3976 (-0.972)	-1.183 (-3.17)***
<i>govsize</i>	-0.0467 (-0.527)	-0.0265 (-0.283)	0.0233 (0.252)	-0.0819 (-0.809)	0.0012 (0.01)
<i>openness</i>	0.0841 (5.801)***	0.0794 (5.420)***	0.0627 (4.777)***	0.0537 (4.075)***	0.0794 (5.82)***
<i>popgrowth</i>	-3.8566 (-6.385)***	-3.8472 (-6.202)***	-3.9164 (-6.263)***	3.9600 (-5.348)***	-3.6212 (-6.45)***
R^2	0.45	0.46	0.47	0.46	0.47
F Statistic	51.78***	50.47***	44.57***	35.16***	53.77***

Notes: Two-stage least squares estimates. *t*-statistics in parentheses. ***, ** and * denote significance at 1%, 5% and 10% confidence levels. The set of instruments include lagged values of the variables. I analyze the lagged effect of aid on social and human development. The coefficients of lagged aid are negative and significant till the third quinquennium meaning that aid negatively affects social development up to fifteen years after its reception; but after this period its effect becomes insignificant.

a. Definition of variables: The dependant variable is an index of human and social development. The explanatory variables are as follows: *gdp_pc* is per capita GDP; *govsize* is the size of government; *openness* is openness to trade variable; *popgrowth* is the rate of population growth. b. Instead of *lnodapgni* I consider *lnodapgni* (-1) that is, the aid net inflows of the previous quinquennium. c. I consider a two periods lag in the aid variable; d. Three periods lag in the aid variable. e. Four periods lag in the aid variable. f. I report, for matter of comparison, the estimates previously presented in column II of Table 2 where I have estimated the contemporaneous effect of aid.

In columns I, II, III and IV, I consider respectively a one period, two-period, three-period and four-period lags in aid variable. Results didn't change fundamentally from those obtained in column II of Table 2. Whatever the specification, aid is negatively associated with social development. However, the lagged effect is smaller

than the contemporaneous effect and it is decreasing from recent to more distant quinquennia. The lagged effect is significant till the third quinquennium and as from the fourth quinquennium, it becomes insignificant. It means that aid negatively affects social development up to fifteen years after its reception.

Now, I relax also the restriction on the coefficient α_1 which is presently different from zero. Results of this dynamic panel model are presented in Table 4.

Table 4. Dynamic Panel Estimates of the Relationship between Aid and Development

Variables ^a	I	II	III	IV ^b	V ^c	VI ^d
<i>nm_dev</i> (-1)	0.4570 (10.42)***	0.0880 (0.85)	0.3785 (6.55)***	0.2709 (3.36)***	0.2415 (2.81)***	0.2759 (3.18)***
<i>gdp_pc</i>	0.0002 (1.77)*	0.0004 (2.31)**	0.0002 (2.04)**	0.0006 (3.11)***	0.0003 (1.90)*	0.0001 (0.58)*
<i>lnodapgni</i>	-1.5924 (-6.07)***	-1.6074 (-3.32)***	-1.1445 (-2.92)***	1.0788 (2.07)**	0.4788 (2.13)**	0.0069 (0.04)
<i>govsize</i>	-	0.3292 (1.37)	0.2377 (1.37)	0.6877 (2.52)**	0.6195 (2.04)**	0.7799 (2.71)***
<i>openness</i>	-	0.2503 (3.16)***	-	-	-	-
<i>popgrowth</i>	-	-1.7485 (-2.39)**	-1.9316 (-3.88)***	-4.5106 (-6.07)***	-6.1234 (-4.81)***	-6.0448 (5.29)***
<i>J</i> Statistic		12.27	27.13	15.88	11.14	11.91

Notes: GMM estimates. *t*-statistics in parentheses. ***, ** and * denote significance at 1%, 5% and 10% confidence levels. I analyze the social development effect of aid in a dynamic panel model and I find that aid dependence worsens human and social development even after controlling for mean reverting dynamics. The lagged effect of aid is no longer significant, but this other result is rather weak.

a. Definition of variables: The dependant variable is an index of human and social development. The explanatory variables are as follows: *nm_dev*(-1) is the lagged dependant variable, *gdp_pc* is per capita GDP; *lnodapgni* is the log of net official development assistance as a percentage of Gross National Income; *govsize* is the size of government; *openness* is openness to trade variable; *popgrowth* is the rate of population growth. b. Instead of *lnodapgni* I consider *lnodapgni*(-1) that is, the aid net inflows of the previous quinquennium. c. I consider a two periods lag in the aid variable. d. Three periods lag in the aid variable.

I begin by maintaining the assumption that $k = 0$, that is I estimate coefficients from the dynamic panel regression of social development on contemporaneous net inflows of aid after controlling for per capita income. Column I gives these estimates. The aid's coefficient remains negative and strongly significant. The lagged dependant variable has a positive and significant coefficient. As this coefficient is smaller than 1, I can conclude that there is conditional convergence of human and social development index within my sample of developing and newly industrialized countries.

In column II, I add other controls contained in Z . My main findings didn't change qualitatively. However, the coefficient of lagged dependant variable turns out to become insignificant if I control for openness to international trade. In column III, I remove the openness to trade variable from the controls' vector and the lagged dependant variable becomes significant like all other regressors except the government size. I can therefore conclude that the catch up process, or the conditional convergence of human and social development index within developing and emerging countries, operates mainly through the globalization process.

In columns IV, V and VI of Table 4, I combine mean reversion with a lagged effect of foreign aid by setting $k > 0$. In column IV, I consider one period lag in foreign aid variable which corresponds to a lag of one quinquennium while in column V aid is lagged by two quinquennia. In column VI, I take a three-period lag in foreign aid. The result is quite surprising! The coefficients of lagged values of aid are positive and significant till the second quinquennium. However, as from the third quinquennium, the lagged effect becomes insignificant. This last result is surprisingly different from my previous findings. This seemingly contradictory result is however weak because these latter equations seem to perform relatively bad when I consider for instance the R^2 s. Moreover, when I try to choose between these specifications combining mean reversion with a lagged effect of foreign aid on the one hand and the previous specifications on the other hand by using the Davidson and MacKinnon (1982)'s J -test, I find that the specification that combines mean reversion with a lagged effect of foreign aid is not the correct one. In a nutshell, the idea of this test for choosing between two non-nested models is that if one model is the correct one, then the fitted values from the other model should not have any explanatory power when estimating the former. The test involves three steps. Preliminarily, I estimate both models separately. Then I use the predicted dependent variable from model 2 as an auxiliary variable in model 1 (and vice versa). Finally I re-estimate model 1 and test whether or not the auxiliary variable makes a significant contribution to the explanation of the dependent variable. If this is true, then I can say that the second model contains some relevant information not contained in the first model. Using this test, I conclude that the specification that combines mean reverting dynamics of social development with a lagged effect of foreign aid is not the correct one. Therefore, in the best specification, foreign aid worsens human and social development.

4. CONCLUSION

This empirical exercise investigates human and social development effects of foreign aid dependence. It uses qualitative measures of development to assess the non-monetary development effect of aid. The analysis suggests that foreign aid dependence worsens countries' development performances beyond any indirect effect it might have through income. In fact, after controlling for GDP per capita and various other determinants of

human and social development indicators, I find that the coefficient of aid variable is negative and strongly significant. This negative effect of aid on human and social outcomes could operate through two potential channels. First, by introducing more volatility in recipient country, foreign aid dependence could increase uncertainty in the economy thereby inducing households to postpone or reduce education and/or health expenditures in order to smooth their consumption. The increased volatility could also lead to the depletion of natural resources, recipient countries' government officials trying to maintain public expenditures even by bypassing environmental norms. Second, foreign aid reduces government efforts in achieving developmental goals. There could be a substitution effect between aid and public social sector expenditures. In fact, throughout the econometric analysis, the variable government size has never been significant. Probably, it could mean that the effect of public expenditures has been already taken into account by the aid variable. Future research could try to investigate in-depth these transmission channels.

To overcome the negative social development effect of aid dependence, countries that strongly depend on foreign aid should adopt countercyclical fiscal policy so that they can reduce the volatility effects of foreign aid. Moreover, developing countries must try to reduce their dependence on foreign aid through the promotion of other external capital inflows (remittances by emigrants for instance), the development of local capital markets, the promotion of domestic saving and the implementation of policies that could reduce capital flights. At the same time, the international community should look at alternative sources of development finance.

APPENDIX

Table A.1. Explanatory Variables: Data Description and Summary Statistics

Variable	Description and <i>source</i>	Mean	Standard Deviation	Max & <i>Min</i> ^b	Median
<i>gdp_pc</i>	Per capita GDP, <i>WDI</i> ^a .	1532.6	2015.1	12563 42.83	697.9
Lnodapgni	Logarithm of net official development assistance received by a country in percentage of GNI, <i>Own computation from WDI</i> ^a .	0.79	1.75	3.90 -4.9	1.13
Lneda	Logarithm of effective development assistance, <i>Chang et al. (1998)</i> .	4.46	1.65	7.82 -3.45	4.63
popgrowth	Population growth, <i>WDI</i> ^a .	2.01	1.09	6.57 -1.89	2.18

govsize	General government final consumption expenditure in percentage of GDP, <i>WDI^a</i> .	13.84	5.32	46.30	12.73
				<i>3.64</i>	
openess	Imports plus exports of goods and services in percentage of GDP, <i>WDI^a</i> .	63.45	33.18	216.3	56.27
				<i>4.23</i>	

Notes: a. WDI stands for World Development Indicators, The World Bank (available at www.data.worldbank.org/data-catalog). b. Minimum value of the variable is in italics.

Table A.2. List of Countries in the Sample

Low Income Countries		Lower-middle Income Countries		Upper-middle Income Countries	
Bangladesh	Madagascar	Armenia	Morocco	Algeria	Lebanon
Burkina Faso	Malawi	Bolivia	Nigeria	Argentina	Lithuania
Burundi	Mali	Cameroon	Pakistan	Azerbaijan	Malaysia
Cambodia	Mauritania	China	Philippines	Belarus	Mauritius
Chad	Mozambique	Ecuador	Paraguay	Botswana	Mexico
Ethiopia	Niger	Egypt	El Salvador	Brazil	Panama
Gambia	Rwanda	Georgia	Senegal	Bulgaria	Peru
Ghana	Tanzania	Guinea	Sri Lanka	Chile	Romania
Kenya	Uganda	Honduras	Thailand	Colombia	Russia
Kyrgyz Republic	Zambia	Indonesia	Tunisia	Costa Rica	South Africa
Lao PDR	Zimbabwe	Cote d'Ivoire	Ukraine	Fiji	Turkey
		Jordan	Vietnam	Gabon	Uruguay
		Lesotho		Jamaica	Venezuela
				Kazakhstan	

Note: World Bank (2009) classification of countries.

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