



Impact of multilateral development finance institutions on economic growth

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August 2011

Acknowledgements

This document is an output from a project funded by the UK Department for International Development (DFID) for the benefit of developing countries. However, the views expressed and information contained in it are not necessarily those of or endorsed by DFID, which can accept no responsibility for such views or information or for any reliance placed on them.

The author would like to thank Giacomo Zanella for his valuable research assistance and for the preparation of the various datasets used in this paper. Any errors remain the sole responsibility of the author.

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Abbreviations

AfDB	African Development Bank
DEF	Development Effectiveness Framework
DFI	Development Finance Institution
DIAF	Development Impact Assessment Framework
DOTS	Development Outcome Tracking System
EBRD	European Bank for Reconstruction and Development
EDFI	European Development Finance Institution
EIB	European Investment Bank
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
GPR	Corporate-Policy Project Rating
IADB	Inter-American Development Bank
IFC	International Finance Corporation
IMF	International Monetary Fund
MDG	Millennium Development Goal
ROIC	Return on Invested Capital
SME	Small and Medium-sized Enterprises
TIMS	Transition Impact Monitoring System

Abstract

This paper contributes to filling the existing gap in the literature on the macroeconomic impact of development finance institutions (DFIs). By using the Generalized Method of Moments (GMM) for panel data analyses, we study the relationship between the investments of a selected sample of multilateral DFIs and economic growth for a sample of 101 countries in the period 1986-2009. Our findings suggest that investment by multilateral DFIs plays a positive and significant role in fostering economic growth in recipient countries, and that their impact is stronger in lower-income countries than in higher-income countries. Indeed, a 10% increase in multilateral DFIs' investment commitments may increase growth by 1.3% in lower-income countries, and by 0.9% in higher-income countries. Multilateral DFIs' investments in the infrastructure, industry and agribusiness sectors play the biggest role in fostering economic growth: lower-income countries benefit mainly from investments directed to the agribusiness and infrastructure sectors, whereas higher-income countries take advantage mostly of investments in the infrastructure and industry sectors.

1 Introduction

Development finance institutions (DFIs) finance and promote private investment with the purpose of fostering economic growth and sustainable development while at the same time remaining financially viable in the long term.

DFIs can be either bilateral or multilateral. In this paper, we focus only on multilateral DFIs, such as the International Finance Corporation (IFC), the European Bank for Reconstruction and Development (EBRD) and the European Investment Bank (EIB). Multilateral DFIs provide a broad selection of financial services, ranging from loans and guarantees to investors and entrepreneurs to equity participation in firms or investment funds. They operate in a wide variety of countries: IFC invests in several developing countries and emerging markets all over the world, whereas a large majority of EIB's activities are within the European Union (EU). Multilateral DFIs also invest in a wide variety of sectors, ranging from the financial sector to infrastructure, agribusiness, manufacturing, industry and others.

While there is a rapidly growing literature assessing the effects of DFIs at the micro level, there are gaps in the evidence on the macro impact of DFIs' investments. For example, a number of DFIs have carried out specific evaluations to assess the results of their investment operations in terms of contributions to employment creation, technology transfers, market organisation, capacity building, etc., and a few independent studies have tried to measure and assess the performance of DFIs. However, as far as we know, there is no study investigating the impact of DFIs on macroeconomic variables such as economic growth.

The main task of this paper is to fill this gap by analysing the extent to which multilateral DFIs contribute to fostering economic growth. In order to do this, we take into account different income categories of countries as well as different sectors in which multilateral DFIs operate. Our results show that investments by multilateral DFIs are growth enhancing and that their role is stronger in lower-income countries than in higher-income countries. It appears that lower-income countries benefit mainly from investments directed to the agriculture and infrastructure sectors, whereas in higher-income countries investments by DFIs in the infrastructure and industry sector play the predominant role in fostering economic growth.

The structure of the paper is as follows. Section 2 provides a brief literature survey of studies on the impacts of DFIs and highlights what we have already mentioned – that, while a number of studies have focused on DFIs' impacts at the micro level, there exists a significant gap in the empirical evidence on the macroeconomic impacts of DFIs. Section 3 describes the methodology and data we use to investigate the relationship between multilateral DFIs' investments and economic growth and reports the main results obtained, taking into account differences across countries and sectors. Section 4 concludes.

2 Measuring the impacts of DFIs: a brief overview

DFIs and their stakeholders have used a variety of assessment frameworks to carry out evaluations of their investments although, as we have seen, these studies are generally limited to measuring impacts at the micro level.

IFC assesses the results of its investment operations by means of the Development Outcome Tracking System (DOTS), established in 2005. This system measures the impacts of operations against a set of indicators that can be classified into four categories:

- Financial performance (e.g. return on invested capital (ROIC), project cost, net income, etc.);
- Economic performance (e.g. contributions to employment, taxes, subsidies received, etc.);
- Environmental and social performance (e.g. occupational injury, water and energy consumption, etc.); and
- Private sector development (e.g. small and medium-sized enterprises (SMEs) reached).

According to an evaluation conducted by the Independent Evaluation Group in 2009 (IFC 2009), over the period 2006-2008, 72% of the IFC's projects achieved high outcomes, compared with 63% in the period 2005-2007. Small projects were found to have performed less well than large ones. Project performance was strong in Europe and Central Asia and in Latin America and the Caribbean, and had improved in South Asia. However, it continued to lag in East Asia and the Pacific, the Middle East and North Africa and Sub-Saharan Africa. Significant variations were also identified at the sector level: high development outcomes were achieved in finance, infrastructure, agribusiness, communication and information technologies, health and education; much weaker outcomes were achieved in the non-telecommunications information technology sector as well as in the oil, mining and chemicals sector.

In a monitoring exercise, IFC (2007) found a strong correlation between projects' financial performance and development outcomes. Analysis of a sample of 469 investment projects in the period 1998-2003 showed that 97% of projects with satisfactory or excellent financial performance led to a high development impact.

EBRD has developed both an *ex-ante* (the Transition Impact Monitoring System (TIMS) developed in 2003) and an *ex-post* (evaluation performance indicators) assessment framework to measure the overall performance of its operations. According to the latter, the overall performance rating for each operation is defined by looking at the following dimensions:

- Transition impact (i.e. project contribution to the structure and extent of markets, market organisation, to institutions and policies that support markets, to business behaviour);
- Environment (i.e. environmental and social performance, environmental change);
- Bank's additionality;
- Sound banking principles (i.e. project and company financial performance, fulfilment of project objectives);
- Bank's investment performance; and
- Bank handling (e.g. due diligence, structuring and monitoring of the project).

The Annual Evaluation Overview Report for 2009 (EBRD, 2009) suggests that 58% of evaluated projects from the period 1996-2008 were successful or highly successful – a decline from a high in 2004. The regional breakdown shows that South Eastern Europe had the highest ratings overall, whereas Central Asia achieved the lowest ratings for overall performance.

EIB established the Development Impact Assessment Framework (DIAF) in 2005. According to this framework, the development impact of individual projects is assessed against seven dimensions (EIB, 2005):

- Financial performance;
- Economic performance (e.g. job creation, capacity building, technology transfer, demonstration effects, etc.);
- Social performance (e.g. local community participation to projects, creation of schools and hospitals, etc.);
- Environmental performance (e.g. environmental management, health and safety standards, etc.);
- Governance (e.g. accountability, transparency, etc.);
- Contribution to the Investment Facility strategy ('special value added'); and
- Contribution to the Millennium Development Goals (MDGs) (e.g. projects in the water sector, etc.).

The African Development Bank's (AfDB's) Annual Portfolio Performance Review reports that 91% of supervised investment operations achieved their development objectives in 2008 (AfDB, 2009). The most successful were undertaken in the North and West African regions, while the highest success rates by sector were reached in infrastructure (93%) and agriculture (92%). The only project undertaken in the finance sector was classified as successful.

Finally, the Inter-American Development Bank (IADB) developed the Development Effectiveness Framework (DEF) in 2008. This includes a number of evaluation procedures (e.g. development effectiveness matrix, progress monitoring report, results framework, etc.) aimed at measuring the effectiveness of IADB's projects in five areas:

- Social policy for equity and productivity;
- Infrastructure for competitiveness and social welfare;
- Institutions for growth and social welfare;
- Competitive regional and global international integration; and
- Protecting the environment, responding to climate change and ensuring food security.

According to the Development Effectiveness Overview 2008-2009 (IADB, 2010), evidence on the effectiveness of the operations undertaken is limited in all areas with the exception of social protection and education.

Meanwhile, several bilateral DFIs have developed *ex-ante* and/or *ex-post* assessments. For example, in 2000 Germany's DEG launched the Corporate-Policy Project Rating (GPR) tool, which enables both *ex-ante* and *ex-post* project evaluations. The GPR is a composite index created on the basis of four benchmarks looking at the following dimensions (DEG, 2010):

- Long-term profitability (financial sustainability of a project);
- Development effects/sustainability (e.g. government revenues, contributions to employment, technology and know-how transfer, social benefits, etc.);
- Strategic role of DEG (e.g. additionality); and
- DEG's return on equity.

In a similar way, the Netherlands' FMO developed a scorecard whose latest version, published in early 2009, allows for an assessment of the development effectiveness of its operations on the basis of three elements:

- Role of FMO (additionality, catalytic effects, non-financial role);
- Economic impact (employment effects, government revenues, balance of payment effects, sector-specific effects, etc.); and
- Sustainability impact (social and environmental effects).

According to the FMO Annual Evaluation Review 2008/09 (FMO, 2009), 83% of projects approved in 2001-2003 had satisfactory or excellent development outcomes as measured using the FMO scorecard. Across the evaluated projects, equity investments were found to have lower success rates than loans.

Another tool used by bilateral DFIs is the monitoring and evaluation framework adopted by the UK's CDC, which was strengthened in 2008. According to this approach, the development impacts of CDC investments are assessed against four dimensions:

- Financial performance (profitability);
- Economic performance (contribution to employment, tax revenues, etc.);
- Environmental and social and governance performance; and
- Private sector development (capital market efficiency, improvements in regulatory environments, better-quality goods, services and infrastructure, etc.)

In 2008, CDC conducted evaluations of 12 investment funds. Of these, nine were rated as successful overall in terms of development outcome, with only one rated as below expectations (CDC, 2008).

Finally, a report commissioned in 2010 by the Association of the European Financial Institutions found a positive correlation between financial performance and development outcomes in 64% of FMO projects, 55% of DEG projects and 42% of Proparco (France) projects (Dalberg Global Development Advisors, 2010). Moreover, it argues that European development finance institutions (EDFIs) may have both quantitative and qualitative development impacts. On the one hand, they contribute to job creation, taxes and net currency effects. For example, in 2008 DEG and CDC contributed €0.7 billion and €1.7 billion in government taxes and secured 2,072,000 and 676,000 jobs, respectively. On the other hand, EDFIs improve the investment climate, support the transfer of technologies and know-how and introduce standards and policy for gender quality and environmental sustainability, etc., thus contributing to the achievement of the MDGs.

In addition to evaluations carried out by the different multilateral and bilateral DFIs, a number of independent studies have tried to measure the performance of DFIs. Yaron (2005) finds the performance of state-owned DFIs falls short compared with original expectations. Te Velde and Warner (2007) examine the use of subsidies by DFIs in the private infrastructure sector and find a lack of risk taking by DFIs relative to their high liquidity (prior to the crisis) as well as a lack of transparency in DFIs' operations, in particular in the use of technical assistance. Francisco et al. (2008) show that integrating the subsidy dependence index with the output index is a better way to measure the performance and achievement of social objectives of DFIs, and apply this methodology to two country case studies: Honduras and Guatemala. Karani and Gantsho (2007) argue that DFIs can play a key role in promoting the Clean Development Mechanism in Africa through investment, partnership and technical assistance.

The above studies focus mainly on the effects of DFIs at the micro level – and there is no single comparable definition as to what micro-level impact is. The empirical evidence on the macroeconomic impacts of DFIs is still very limited; however, we expect DFIs to contribute to economic growth since they provide finance for private investment and it is well known that higher levels of private investment are associated with faster rates of economic growth (see Khan and Reinhart, 1990, among others). In what follows, we analyse the growth impact of multilateral DFIs.

3 Impact of multilateral DFIs on economic growth

3.1 Methodology and data

In our analysis, we study the relationship between multilateral DFIs' investments and economic growth in 101 economies around the world from 1986 to 2009 by using the methodology of Generalized Method of Moments (GMM) for panel data analyses proposed by Arellano and Bond (1991) and then further developed by Arellano and Bover (1995) and Blundell and Bond (1998). This methodology allows us to control for endogeneity in our estimations. The regression model we consider is the following:

$$y_{it} = y_{it-1}\gamma + DFI_{it}\beta + X_{it}\eta + u_i + \varepsilon_{it} \quad (1)$$

where the dependent variable y_{it} is the log of real *per capita* income growth rate of country i at time t . The main explanatory variable we are interested in is the multilateral DFIs' investments (DFI_{it}). Consistent with the literature, we also include among the regressors the lagged value of per capita income growth rate (y_{it-1}) and a matrix X_{it} of independent variables used in previous studies on determinants of economic growth. u_i represents the unobserved country-specific effects and ε_{it} is the error term. Most regressors (DFI , foreign direct investment (FDI), trade openness and government consumption) are normalised by gross domestic product (GDP). All explanatory variables are expressed in logs. In order to get rid of the country-specific effects, we difference Equation (1), which can then be rewritten as:

$$\Delta y_{it} = \Delta y_{it-1}\gamma + \Delta DFI_{it}\beta + \Delta X_{it}\eta + \Delta \rho_{it} \quad (2)$$

where $\Delta \rho_{it} = \Delta u_i + \Delta \varepsilon_{it} = (u_i - u_i) + (\varepsilon_{it} - \varepsilon_{it-1}) = \varepsilon_{it} - \varepsilon_{it-1} = \Delta \varepsilon_{it}$.

Profiting from the panel structure of our sample, we can use as instruments the previous observations of our explanatory variables, thus relaxing the assumption of strict exogeneity and treating our model as weakly exogenous. Then, under the assumptions that the error terms (ε_{it}) are independent and identically distributed (*iid*) over i and t , and that Δy_{it-2} could be a valid instrument for Δy_{it-1} , our GMM dynamic panel estimator (difference estimator) uses the following moment conditions:

$$E[y_{it-s}(\varepsilon_{it} - \varepsilon_{it-1})] = 0 \quad \text{for } s \geq 2 \quad \text{and } t = 3, \dots, T \quad (3)$$

$$E[X_{it-s}(\varepsilon_{it} - \varepsilon_{it-1})] = 0 \quad \text{for } s \geq 2 \quad \text{and } t = 3, \dots, T \quad (4)$$

where i identifies the country under examination and t and s indicate the period of assessment.

The data used in our analysis stem from different sources. Multilateral DFIs' investment commitments data (DFI_{it}) are sourced from the annual reports of the different DFIs taken into account, whereas data related to other traditional macroeconomic variables (X_{it}) are collected from the World Bank's World Development Indicators as well as from the International Monetary Fund's (IMF's) International Financial Statistics. Below we briefly explain the rationale behind the choice of our regressors.

Multilateral DFIs are expected to play an important role in fostering economic growth through the private sector. Indeed, looking at their mission statements, it is clear that their aim is to provide finance for private investment with the purpose of maximising impacts on economic growth and development while at the same time remaining financially viable in the long term. In our analysis, we focus on investment commitments of three different multilateral DFIs: IFC, EBRD and EIB. The selection of institutions was constrained by data availability. Given that DFIs' commitments are typically realised one or more years after they are granted, we expect their growth effects to become visible only one or more years after the formal commitment.

Therefore, in our econometric analysis we use the lagged value up to two years for DFIs' commitments data. The unbalanced nature of our panel and the number of years available in our sample precludes us from including more lags. We measure multilateral DFIs' investments as the sum of investment commitments by IFC, EBRD and EIB over GDP.

The vector X_{it} in Equation (1) includes the following additional regressors commonly encountered in the literature:

- *FDI* (FDI_{it}). There is a widespread belief that FDI enhances economic growth by providing direct capital financing and creating positive externalities through the adoption of foreign technology and know-how. The macro empirical literature provides weak evidence on this, and suggests that FDI exerts a positive impact on economic growth under particular conditions. Borensztein et al. (1998) argue that FDI contributes to economic growth when the country has a highly educated workforce. Alfaro et al. (2004) find that FDI is beneficial for economic growth when the country has sufficiently developed financial markets. We measure FDI as FDI inflows over GDP.
- *Trade openness* ($TRADE_{it}$) has often been referred to as an engine for growth, since in theory it enables a country to specialise using its comparative advantage and to benefit from international exchanges of goods. However, the empirical evidence is mixed owing to problems associated with the measurement of trade openness and econometric modelling.¹ For example, cross-country studies by Dollar (1992), Edwards (1998), Frankel and Romer (1999) and Sachs and Warner (1995) point to a positive link between trade openness and growth, whereas Rodriguez and Rodrik (2001) find little evidence that open trade policies as measured in the contributions mentioned above are associated significantly with economic growth. We measure trade openness as the sum of exports and imports of goods and services over GDP.
- *Government consumption* (GOV_{it}) is used as a proxy for government size. The empirical evidence on the relationship between government spending and economic growth is inconclusive, but there seems to be a general tendency for government consumption to be negatively associated with growth performance. The evidence for this is weaker with respect to developing countries. Indeed, while Alexander (1990), Hansson and Henrekson (1994) and Kneller et al. (1998) find that government consumption has a negative effect on economic growth in selected samples of developed countries, Devarajan et al. (1996) and Lin (1994) find that government spending is growth enhancing in developing countries. We measure this variable as the value of government consumption over GDP.
- *Inflation* ($INFLA_{it}$) is commonly included as a measure of macroeconomic stability. In general, low inflation levels represent higher macroeconomic stability. In the literature, there appears to be some agreement that inflation is negatively associated with economic growth, especially if it exceeds a threshold level of 12% (see, for example, Khan and Senhadji, 2001). Inflation is measured as the first difference of the consumer price index level.

Given the large heterogeneity of countries covered by multilateral DFIs, and in order to gain a better understanding of the possible different effects that the above variables may have on economic growth, we split our sample into two sub-samples.² One includes 59 lower-income countries and the other 42 higher-income countries.³

Table 1 presents some descriptive statistics for selected variables over the sample period 1986-2009, highlighting differences among each sub-sample.

¹ For a detailed overview see Winters (2004).

² See Appendix A for DFIs' country-specific effects.

³ In defining the two sub-samples we rely on the World Bank's country classification. The lower-income countries group includes both low-income and lower-middle-income countries. The higher-income group includes both upper-middle-income and high-income countries. For a list of countries included in the two sub-samples see Appendix B.

Table 1: Descriptive statistics

	Obs	Mean	Std. dev.	Min	Max
Whole sample					
Growth rate of GDP per capita (in logs)	759	1.29	0.83	-1.60	3.22
Trade openness (in logs) ^a	759	4.37	0.45	2.76	5.41
FDI (in logs) ^a	759	0.98	1.17	-3.52	3.95
Government consumption (in logs) ^a	759	2.67	0.36	1.34	3.49
Inflation (in logs[100+inf. rate]) ^a	759	4.68	0.07	4.52	4.94
DFIs (in logs) ^a	759	-1.55	1.42	-6.54	1.65
Lower-income countries					
Growth rate of GDP per capita (in logs)	395	1.16	0.86	-1.60	2.72
Trade openness (in logs) ^a	395	4.26	0.44	2.99	5.36
FDI (in logs) ^a	395	0.76	1.27	-3.52	3.79
Government consumption (in logs) ^a	395	2.59	0.36	1.52	3.48
Inflation (in logs[100+inf. rate]) ^a	395	4.69	0.07	4.55	4.93
DFIs (in logs) ^a	395	-1.40	1.46	-6.54	1.65
Higher-income countries					
Growth rate of GDP per capita (in logs)	364	1.44	0.78	-1.54	3.22
Trade openness (in logs) ^a	364	4.49	0.43	2.76	5.41
FDI (in logs) ^a	364	1.23	1.00	-1.53	3.95
Government consumption (in logs) ^a	364	2.75	0.34	1.34	3.49
Inflation (in logs[100+inf. Rate]) ^a	364	4.68	0.07	4.52	4.94
DFIs (in logs) ^a	364	-1.71	1.36	-5.76	1.53

Note: ^(a) Variables normalised by GDP.

Source: Author's calculations.

The initial total sample counts 759 observations with an average growth rate of 1.29 in log terms. The average growth rate is higher in higher-income countries (1.44) than in lower-income economies (1.16). As expected, trade openness is higher in richer countries compared with poorer ones (4.49 against 4.26). FDI follows a similar trend: higher-income countries account for on average almost double the average rate in lower-income countries, which (in log) is equal to 0.76. Government consumption is considerable in both sub-samples; on average, it appears to be higher in higher-income countries (2.75 against 2.59). On the other hand, the inflation level is similar in both sub-samples, although it is slightly higher in lower-income countries. Finally, the descriptive statistics show that DFIs tend to favour to some extent lower-income economies compared with higher-income countries.

Table 2: Correlation matrix

	Growth rate	TRADE	FDI	GOV	INFLA	DFI
Growth rate of GDP per capita (in logs)	1					
Trade openness (in logs) ^a	0.1837	1				
FDI (in logs) ^a	0.2491	0.3986	1			
Government consumption (in logs) ^a	0.0317	0.2778	0	1		
Inflation (in logs[100+inf. rate]) ^a	-0.0628	-0.0111	-0.0453	-0.0808	1	
DFIs (in logs) ^a	0.0699	0.2848	0.1991	0.1596	-0.0121	1

Note: ^(a) Variables normalised by GDP.

Source: Author's calculations.

In the correlation matrix reported in Table 2, we can see that *trade openness*, *FDI*, *government consumption* and *DFIs* are positively correlated with economic growth, leaving the highest correlation to *FDI* and *trade openness*. On the other hand, *inflation* is negatively correlated with economic growth, which is in line with theory expectations.

3.2 Results

As mentioned in Section 3.1, in order to study the effects that multilateral DFIs' investment commitments have on economic growth we use a dynamic panel regression model (GMM). It is worth noting that, although our initial sample counts around 759 observations covering 101

countries, the methodology chosen reduces the number of countries included in the econometric analysis because of the use of lags of the dependent variable and lags of DFI . Hence, the final analysis relies on 318 observations covering 64 countries when the whole sample is considered (a detailed list of countries included can be found in Appendix B).⁴

Below we present the results of the panel regressions conducted on the entire sample (Table 3); on lower-income countries only (Table 4); and on higher-income economies only (Table 5).

Table 3: Whole sample

	(1)	(2)	(3)	(4)
$Growth_{it-1}$	0.0274*** (3.85)	0.0630*** (8.73)	0.0521*** (7.96)	0.0463*** (8.17)
$TRADE_{it}$	1.026*** (8.45)	0.671*** (14.15)	0.291*** (24.42)	0.337*** (32.60)
FDI_{it}	0.0852*** (2.82)	0.129*** (5.64)	0.159*** (5.83)	
GOV_{it}	-0.331*** (-4.45)	-0.579*** (-8.52)		
$INFLA_{it}$	-0.483*** (-5.04)			
DFI_{it-2}	0.152*** (10.07)	0.154*** (11.53)	0.141*** (11.67)	0.152*** (9.74)
Observations	318	318	318	318
Countries	64	64	64	64
X^2 (Sargan Test)	43.76 ^(b)	43.91 ^(b)	43.69 ^(b)	44.90 ^(b)

Notes: ^(b) The null hypothesis of the Sargan Test of over-identifying restrictions (H_0 : over-identifying restrictions are valid) is not rejected. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively. Standard errors are reported in parenthesis. Source: Author's calculations.

In the specifications in columns (1) through (4) in Table 3, we test the effects that our variable of interest, multilateral DFIs' commitments (DFI_{it-2}), has on economic growth in the whole sample.⁵ Our findings show that trade openness ($TRADE_{it}$) plays by far the biggest role in promoting economic growth, since all specifications give a positive and highly significant coefficient, ranging from 0.29 to 1.03. On the other hand, government consumption (GOV_{it}), which can be interpreted as a proxy for government size, appears to exert a negative effect on economic growth, in line with several findings in the literature. Along the same lines, higher inflation rates ($INFLA_{it}$) reflect macroeconomic instability and have a highly significant and negative impact on economic growth (-0.48).

On the other hand, multilateral DFIs' commitments (DFI_{it-2}) and FDI (FDI_{it}) are found to play both a significant and positive role in fostering growth. In particular, DFIs' coefficients are stable throughout all specifications, at around 0.15, while FDI coefficients present higher variation but are more or less in the same range as DFIs, going from 0.09 to 0.16. This result confirms the importance of DFIs in fostering economic growth by, for example, providing financing to projects that otherwise would not be financed. But is this effect uniform throughout all countries? Or does it vary depending on the stage of development of recipient countries? Tables 4 and 5 address this issue by analysing our two sub-samples separately – one including only lower-income countries and the other only higher-income countries.

⁴ In order to avoid biases, we clean the sample from outliers by using the Grubbs (1969) and Stefansky (1972) methodologies.

⁵ We also run the same regressions by including CDC's commitments in the DFI variable in addition to those of IFC, EIB and EBRD. This does not affect the final outcome of our regressions.

Table 4: Lower-income countries

	(1)	(2)	(3)	(4)
$Growth_{it-1}$	-0.155***	-0.136***	-0.132***	-0.129***
	(-13.40)	(-7.77)	(-13.68)	(-12.23)
$TRADE_{it}$	1.006***	0.144***	0.271***	0.288***
	(7.32)	(9.22)	(112.22)	(172.30)
FDI_{it}	0.0377*	0.0853***	0.0701***	
	(1.83)	(8.84)	(6.75)	
GOV_{it}	0.373***	0.195***		
	(7.09)	(8.77)		
$INFLA_{it}$	-0.876***			
	(-8.25)			
DFI_{it-2}	0.123***	0.129***	0.131***	0.146***
	(10.60)	(12.87)	(15.52)	(14.93)
Observations	143	143	143	143
Countries	35	35	35	35
X^2 (Sargan Test)	23.85 ^(b)	24.93 ^(b)	25.51 ^(b)	26.26 ^(b)

Notes: ^(b) The null hypothesis of the Sargan Test of over-identifying restrictions (H_0 : over-identifying restrictions are valid) is not rejected. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively. Standard errors are reported in parenthesis.

Source: Author's calculations.

Results in Table 4 clearly show that, once the sample is restricted to lower-income countries, trade openness ($TRADE_{it}$) continues to maintain its role in fostering economic growth, with positive and highly significant coefficients throughout all four specifications – columns (1) to (4). However, differently from before, government consumption (GOV_{it}) exerts a positive and significant impact on growth. This is consistent with previous studies investigating the relationship between government spending and economic growth in developing countries (for example Devarajan et al., 1996 and Lin, 1994). High inflation rates ($INFLA_{it}$) still appear to be a major cause of concern and decrease growth prospects. On the other hand, FDI inflows (FDI_{it}) are confirmed to be growth enhancing in lower-income countries. Multilateral DFIs' investment commitments (DFI_{it-2}) are found to be a stable, positive and significant driver of economic growth in lower-income countries, with coefficients ranging from 0.12 to 0.15.

Table 5: Higher-income countries

	(1)	(2)	(3)	(4)
$Growth_{it-1}$	0.237***	0.240***	0.276***	0.261***
	(7.19)	(8.08)	(22.87)	(27.79)
$TRADE_{it}$	0.281	0.211***	0.249***	0.288***
	(1.38)	(3.00)	(46.64)	(104.50)
FDI_{it}	0.115***	0.112***	0.104***	
	(8.68)	(8.76)	(18.17)	
GOV_{it}	0.124	0.0782		
	(1.44)	(0.74)		
$INFLA_{it}$	-0.0967			
	(-0.55)			
DFI_{it-2}	0.0863***	0.0965***	0.0965***	0.115***
	(5.53)	(5.80)	(11.49)	(14.14)
Observations	175	175	175	175
Countries	29	29	29	29
X^2 (Sargan Test)	22.89 ^(b)	23.25 ^(b)	22.40 ^(b)	25.29 ^(b)

Notes: ^(b) The null hypothesis of the Sargan Test of over-identifying restrictions (H_0 : over-identifying restrictions are valid) is not rejected. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively. Standard errors are reported in parenthesis.

Source: Author's calculations.

As to higher-income countries, one striking difference is the stability of all the coefficients throughout most of the specifications in columns (1) to (4) in Table 5, which may suggest a greater uniformity of the effects and country characteristics in the sub-sample. Trade openness ($TRADE_{it}$) plays a positive role in fostering economic growth, although its overall effects are smaller compared with those in lower-income countries. FDI flows (FDI_{it}) are again positive and significant, and slightly higher than in lower-income countries. Government consumption (GOV_{it}) and inflation rate ($INFLA_{it}$) are not significant. Multilateral DFIs' commitments (DFI_{it-2}) are still positive and highly significant, although relatively smaller than in lower-income countries. This does not necessarily mean they are less important for economic growth;

indeed, it could simply reflect a smaller amount of flows being directed to higher-income countries, since DFIs might tend to prioritize their efforts on lower-income countries. This explanation receives some support from the descriptive statistics in Table 1 which show an average flow of DFIs' investments (DFI_{it}) as slightly higher towards lower-income countries.

In sum, our findings suggest that multilateral DFIs' investments play a positive and significant role in fostering economic growth in recipient countries. Their impact appears to be stronger in lower-income countries. Indeed, a 10% increase in multilateral DFIs' commitments lead to a 1.3% increase in growth in lower-income countries, while the same increase in DFIs' commitments enhances growth by just 0.9% in higher-income countries.

Given that multilateral DFIs invest in a wide variety of sectors, ranging from finance to agribusiness, manufacturing and infrastructure, etc., we further develop our analysis to gain a better understanding of which sectors are more relevant for growth when it comes to DFIs' investment decisions. In what follows, we break down our DFI_{it-2} variable into four broad components: one that groups all the DFI_{it} commitments in agriculture and related agribusiness projects ($AGRI_{it-2}$); one that encompasses all banking and finance businesses (FIN_{it-2}); one that gathers all investment commitments directed to infrastructure projects ($INFRA_{it-2}$); and a final one grouping commitments directed to all industry-related projects (IND_{it-2}).⁶ A complete list of the items included in each sector is provided in Appendix C.

Table 6: Sectoral analysis (whole sample)

	(1)	(2)	(3)	(4)
Growth _{it-1}	0.0243 (1.45)	0.0755*** (4.44)	0.0749*** (3.24)	0.0534*** (4.77)
TRADE _{it}	0.964*** (8.33)	0.612*** (11.69)	0.291*** (48.44)	0.322*** (50.89)
FDI _{it}	0.108*** (4.68)	0.148*** (7.77)	0.170*** (7.60)	
GOV _{it}	-0.261** (-2.31)	-0.503*** (-5.92)		
INFLA _{it}	-0.475*** (-5.08)			
AGRI _{it-2}	0.0127** (2.11)	0.0162** (2.28)	0.0174*** (2.73)	0.0130** (2.10)
IND _{it-2}	0.0373*** (5.07)	0.0451*** (6.03)	0.0441*** (6.27)	0.0417*** (6.25)
FIN _{it-2}	-0.0134* (-1.88)	-0.0123 (-1.61)	-0.00806 (-0.96)	-0.0262*** (-5.04)
INFRA _{it-2}	0.0811*** (8.67)	0.0865*** (11.18)	0.0873*** (7.94)	0.0778*** (10.84)
Observations	318	318	318	318
Countries	64	64	64	64
X ² (Sargan Test)	44.40 ^(b)	41.72 ^(b)	43.72 ^(b)	43.05 ^(b)

Notes: ^(b) The null hypothesis of the Sargan Test of over-identifying restrictions (H_0 : over-identifying restrictions are valid) is not rejected. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively. Standard errors are reported in parenthesis. Source: Author's calculations.

Table 6 summarises our results by sector when considering the entire sample. Trade openness ($TRADE_{it}$) and FDI (FDI_{it}) continue to exert positive and significant effects on economic growth, while the detrimental effects of government consumption (GOV_{it}) and inflation rates ($INFLA_{it}$) are confirmed. On the other hand, from our sector variables it emerges that DFIs' investments directed to infrastructure ($INFRA_{it-2}$) provide the biggest impact on overall growth, with coefficients averaging 0.08 over columns (1) to (4) in Table 6. DFIs' investments in the industrial sector (IND_{it-2}) exert the second biggest effect on economic growth, with coefficients ranging from 0.04 in column (1) to 0.05 in column (2). In the third position, we find DFIs' investments directed towards the agriculture sector ($AGRI_{it-2}$), with average coefficients around 0.02. One finding which is difficult to explain is that DFIs' investment commitments to

⁶ Note that not all countries in our sample necessarily receive DFI investments in all the above four sectors in each year. When a given country in a specific year receives investments in only two or three of the above sectors, the remaining missing one(s) is recorded as a zero that year.

the financial sector appear to have a negative effect on economic growth, even though coefficients are significant in only half of the specifications and in one case the coefficient is weakly significant. So, from analysis of the whole sample, it emerges that DFIs' investments in the infrastructure, industry and agriculture sector are key to promoting economic growth in recipient countries.

Splitting the sample in the same way as before, into lower-income countries and higher-income countries, provides a clearer picture of the strategic importance of certain sectors.

Table 7: Sectoral analysis (lower-income countries)

	(1)	(2)	(3)	(4)
Growth _{it-1}	-0.207***	-0.186***	-0.191***	-0.167***
	(-5.71)	(-5.03)	(-5.37)	(-4.50)
TRADE _{it}	0.895***	0.151	0.246***	0.268***
	(5.32)	(1.58)	(18.98)	(45.53)
FDI _{it}	0.0792***	0.140***	0.102***	
	(4.65)	(5.63)	(4.20)	
GOV _{it}	0.533***	0.129		
	(6.76)	(0.78)		
INFLA _{it}	-0.875***			
	(-5.45)			
AGRI _{it-2}	0.0610***	0.0380*	0.0339**	0.0342***
	(4.15)	(1.85)	(2.02)	(4.98)
IND _{it-2}	-0.0144*	-0.00527	-0.0121	-0.00439
	(-1.65)	(-0.73)	(-1.40)	(-0.36)
FIN _{it-2}	-0.0392***	-0.0273	-0.0582***	-0.0722***
	(-3.28)	(-1.18)	(-2.80)	(-6.11)
INFRA _{it-2}	0.0960***	0.0730***	0.0975***	0.113***
	(6.93)	(2.84)	(5.14)	(7.25)
Observations	143	143	143	143
Countries	35	35	35	35
X ² (Sargan Test)	23.25 ^(b)	23.83 ^(b)	27.68 ^(b)	27.32 ^(b)

Notes: ^(b) The null hypothesis of the Sargan Test of over-identifying restrictions (H_0 : over-identifying restrictions are valid) is not rejected. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively. Standard errors are reported in parenthesis.

Source: Author's calculations.

Table 7 summarises the results for lower-income countries. Trade openness ($TRADE_{it}$) and FDI (FDI_{it}) maintain their positive significance, while the inflation rate ($INFLA_{it}$) continues to be a significant detrimental factor for economic growth. Government consumption (GOV_{it}) confirms its positive and significant impact on growth. With respect to DFIs' investment commitments in the different sectors analysed, results in Table 7 show that, in the lower-income countries sub-sample, the agriculture and infrastructure sectors play the most significant role in promoting economic growth. As before, investments by DFIs directed to the finance sector present puzzling negative and significant coefficients. As such, lower-income countries benefit much more from investments directed to the agriculture and infrastructure sectors.

Sectoral analysis (higher-income countries)

	(1)	(2)	(3)	(4)
Growth _{it-1}	0.269***	0.259***	0.261***	0.262***
	(6.68)	(6.88)	(11.14)	(11.58)
TRADE _{it}	-0.0604	0.101	0.263***	0.293***
	(-0.25)	(0.83)	(24.23)	(33.48)
FDI _{it}	0.159***	0.155***	0.135***	
	(7.96)	(8.07)	(12.59)	
GOV _{it}	0.249	0.269		
	(1.42)	(1.57)		
INFLA _{it}	0.169			
	(0.78)			
AGRI _{it-2}	-0.00793	-0.00700	-0.0127*	-0.0222***
	(-0.84)	(-0.74)	(-1.66)	(-2.97)
IND _{it-2}	0.0717***	0.0655***	0.0642***	0.0644***
	(6.91)	(9.15)	(12.57)	(15.36)
FIN _{it-2}	0.00406	0.00226	0.00470	-0.00453
	(0.38)	(0.22)	(0.43)	(-0.48)
INFRA _{it-2}	0.0896***	0.0855***	0.0769***	0.0752***
	(8.16)	(8.99)	(6.40)	(10.08)
Observations	175	175	175	175
Countries	29	29	29	29
X ² (Sargan Test)	20.98 ^(b)	21.67 ^(b)	20.90 ^(b)	21.44 ^(b)

Notes: ^(b) The null hypothesis of the Sargan Test of over-identifying restrictions (H_0 : over-identifying restrictions are valid) is not rejected. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively. Standard errors are reported in parenthesis. Source: Author's calculations.

If we examine the higher-income countries sub-sample, the pattern changes. FDI (FDI_{it}) and trade openness ($TRADE_{it}$) are still positive and significant, while government consumption (GOV_{it}) and inflation rates ($INFLA_{it}$) appear to matter less for growth than in the lower-income countries sub-sample. On the other hand, higher-income countries are at a higher stage of development and so, compared with their lower-income countries peers, these economies seem to benefit more from DFIs' investments targeting the industry sector (IND_{it-2}) and slightly less from those directed to infrastructure ($INFRA_{it-2}$). DFIs' investments in the financial sector (FIN_{it-2}) are no longer significant, and those directed to the agriculture sector ($AGRI_{it-2}$) exert a negative but weakly significant impact on growth. Therefore, higher-income countries appear to benefit mostly from investments in infrastructure but also from those directed to the industry sector since, differently from lower-income countries, they possess enough physical capital and know-how to start venturing into the industrial business.

4 Conclusions

This paper has analysed the effects of multilateral DFIs' investments on economic growth in 101 countries over the period 1986-2009. Our results point to a strong positive relationship between DFIs' investments and growth in the whole sample. As the sample comprises very heterogeneous countries, we investigate whether the effects are different between lower-income and higher-income countries. We find that DFIs have a stronger growth impact in lower-income countries than in higher-income economies. In particular, our findings show that a 10% increase in multilateral DFIs' commitments increases growth by 1.3% in lower-income countries, and by 0.9% in higher-income countries.

Moreover, given that multilateral DFIs invest in a wide variety of sectors, we analyse separately the growth impact of DFIs' investments targeting four different sectors: agribusiness, infrastructure, finance and industry. The results for the whole sample show that DFIs' investments in the infrastructure, industry and agriculture sectors play the biggest role in enhancing growth. However, once we split the sample between lower-income countries and higher-income countries, it appears that the former benefit mainly from investments directed to the agribusiness and infrastructure sectors, while the latter take advantage mostly of investments in the infrastructure and industry sectors.

In addition, consistent with the existing literature and throughout all the regressions, trade openness and FDI are found to have a significant positive impact on economic growth in both lower-income economies and higher-income countries, while inflation appears to exert a negative impact on growth. On the other hand, government consumption is found to be negatively associated with growth performance in the whole sample, but is growth enhancing in lower-income countries.

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Appendix A

Quantile regressions

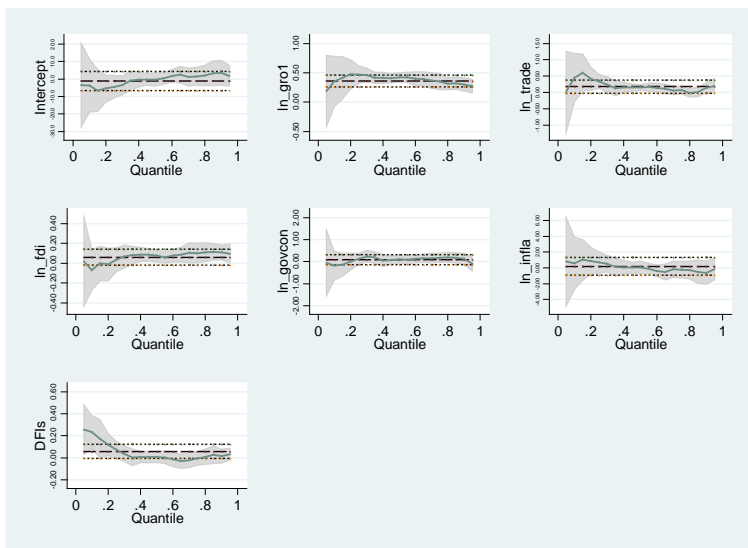
In order to assess the heterogeneity among various countries, we use quantile regression. Table A1 shows how DFIs have a greater effect on those countries in the lowest quantile of the distribution (i.e. countries with low economic growth rates) – see column (1). On the other hand, DFIs' effects are smaller and non-significant for the rest of the distribution. The bigger impact of DFIs on the lower quantile of the distribution can be appreciated better in Figure A1 – last panel.

Table A1: Quantile regression (with bootstrap standard errors)

	(1)	(2)	(3)	(4)	(5)
Quantiles	(.10)	(.25)	(.50)	(.75)	(.90)
Growth _{it-1}	0.352*	0.470***	0.421***	0.350***	0.300***
	(1.89)	(4.58)	(8.57)	(4.85)	(4.59)
TRADE _{it}	0.450	0.339**	0.149**	0.0684	0.137
	(1.35)	(2.07)	(2.14)	(0.86)	(1.13)
FDI _{it}	-0.0670	0.0378	0.0765**	0.103***	0.111**
	(-0.59)	(0.61)	(2.52)	(2.60)	(2.57)
GOV _{it}	-0.185	0.133	0.106	0.170*	0.121
	(-0.53)	(0.93)	(1.63)	(1.93)	(1.17)
INFLA _{it}	0.582	0.675	0.0537	-0.233	-0.609
	(0.41)	(1.12)	(0.16)	(-0.42)	(-0.77)
DFI _{it-2}	0.235***	0.0723	0.00820	-0.00547	0.0161
	(2.67)	(1.33)	(0.32)	(-0.23)	(0.45)
Observations	318	318	318	318	318

Source: Author's calculations.

Figure A1: Quantile regressions



Source: Author's calculations.

Appendix B

Table B1: Lower-income countries group

Low-income and lower-middle-income countries		
Armenia*	Guyana	Paraguay
Bangladesh*	Honduras	Philippines
Belize	India	Rwanda*
Benin	Indonesia	Senegal*
Bhutan	Jordan*	Sri Lanka*
Bolivia	Kenya*	Swaziland*
Burkina Faso*	Kyrgyz Rep.*	Syrian Arab Republic*
Cameroon*	Lao PDR	Tajikistan*
Cape Verde*	Lesotho	Tanzania
Chad	Madagascar*	Thailand
China*	Malawi*	Togo
Congo, Dem. Rep.	Mali	Tonga
Congo, Rep.	Mauritania*	Tunisia*
Côte d'Ivoire*	Moldova*	Uganda*
Ecuador*	Mongolia*	Ukraine*
Egypt, Arab Rep.*	Morocco*	Vietnam*
Ethiopia*	Mozambique*	West Bank and Gaza*
Gambia, The	Niger	Zambia*
Georgia*	Pakistan	Zimbabwe*
Ghana*	Papua New Guinea	

Note: * Countries effectively included in the econometric analysis.
Source: Author's calculations.

Table B2: Higher-income countries group

Upper-middle-income and high-income countries		
Albania*	Dominican Rep.*	Peru*
Algeria*	Estonia	Poland*
Argentina	Fiji	Romania*
Azerbaijan*	Grenada	Russian Federation*
Bahamas, The	Hungary*	Serbia*
Barbados	Israel*	Seychelles
Belarus*	Jamaica*	Slovak Rep.*
Botswana*	Kazakhstan*	Slovenia*
Brazil*	Latvia*	South Africa*
Bulgaria*	Lithuania*	St Kitts and Nevis
Colombia*	Macedonia, FYR*	St Lucia
Croatia*	Mauritius*	Vincent and the Grenadines
Czech Rep.*	Mexico	Trinidad and Tobago
Dominica	Panama*	Uruguay

Note: * Countries effectively included in the econometric analysis.
Source: Author's calculations.

Appendix C

For the econometric analysis, we use four sectors for DFIs' investments:

- Agribusiness;
- Finance;
- Infrastructure; and
- Industry.

These sectors stem from the aggregation of the different sub-sectors of each DFI as reported in the annual reports.

EBRD: AGRIBUSINESS (agribusiness), FINANCE (bank equity; bank lending; equity funds; small business finance; insurance and financial services), INDUSTRY (manufacturing and services; natural resources), INFRASTRUCTURE (municipal and environmental infrastructure; power and energy; property and tourism; transport; telecoms, informatics and media).

EIB: AGRIBUSINESS (agriculture; fishing; forestry), FINANCE (credit lines), INDUSTRY (industry; services), INFRASTRUCTURE (energy; water solid waste; health and education; composite infrastructure; telecommunication; transports; urban infrastructure).

IFC: AGRIBUSINESS (agribusiness; agriculture; forestry), FINANCE (finance and insurance; collective investment vehicles; global financial markets; private equity and investment funds; sub-national finance), INDUSTRY (industrial and consumer products; chemicals; food and beverages; global manufacturing and services; industrial and consumer products; non-metallic mineral product manufacturing; oil, gas and mining; oil, gas, mining and chemicals; other (for non-investment projects); primary metals; professional, scientific and technical; pulp and paper; textiles, apparel and leather), INFRASTRUCTURE (accommodation and tourism services; education services; construction and real estate; electric power; energy; global information and communication technology; health care, health and education; information; infrastructure; transportation and warehousing; utilities; wholesale and retail trade).