Foreign Direct Investment, Financial Development and Economic Growth: Empirical Evidence from North African Countries

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Abstract: The present paper examines the causal linkage between foreign direct investment (FDI), financial development, and economic growth in a panel of 4 countries of North Africa (Tunisia, Morocco, Algeria and Egypt) over the period 1980-2011. The study moves away from the traditional cross-sectional analysis, and focuses on more direct evidence of the channels through which FDI inflows can promote economic growth of the host country. Using Generalized Method of Moment (GMM) panel data analysis, we find strong evidence of a positive relationship between FDI and economic growth. We also find evidence that the development of the domestic financial system is an important prerequisite for FDI to have a positive effect on economic growth. The policy implications of this study appeared clear. Improvement efforts need to be driven by local-level reforms to ensure the development of domestic financial system in order to maximize the benefits of the presence of FDI**.**

1. Introduction

The number of empirical studies examining the impact of foreign direct investment (FDI) and financial sector development on economic growth has been growing ever since the emergence of endogenous growth theory. In the FDI-growth literature, empirical studies have so far yielded mixed results on whether FDI contributes positively to economic growth (e.g. Balasubramanyam et al., 1996; Borensztein et al., 1998; De Mello, 1997, 1999; Hansen and Rand, 2006). Meanwhile, in the financial development-growth literature, the empirical results were more conclusive; most studies found that financial sector development contributes positively to economic growth (e.g. Beck et al., 2000; King and Levine, 1993a; Levine, et al., 2000).

The economic benefits of attracting FDI are generally twofold. First, countries with domestic savings so low that they are insufficient to finance a strategy of economic expansion (or where weak financial intermediation has a similar effect) may harness FDI as a source of external finance. This is assumed to be particularly relevant in the case of developing and emerging economies. Second, foreign corporate presence is, as demonstrated by an ample body of economic literature, generally associated with positive externalities ("spillovers")

toward the host economy. The channels though which the spillovers operate are at least fivefold. Foreign corporate presence may 1) act as a trigger for transfers of technology and know-how; 2) assist enterprise development and restructuring, not least in connection with privatization; 3) contribute to fuller international trade; 4) bolster business sector competition; and 5) support human capital formation in the host country (De Mello 1997; Todo 2003; Basu and Guariglia 2007). Second, FDI flows tend to be more stable compared to alternatives, as it is purportedly more costly to reverse and less sensitive to global shocks than foreign portfolio investment (Lipsey 1999).

However, a number of studies do not report significant unqualified statistical relations between FDI and economic growth (Grilli and Milesi-Ferretti 1995; Aitken et al. 1997; Aitken and Harrison 1999; Mencinger 2003).[1] Using plant level data in Venezuela, Aitken and Harrison (1999) find that the net effect of FDI on productivity is quite small, with FDI raises productivity within plants that receive the investment but lowers that of domestically owned plants. Similarly, Haddad and Harrison (1993) re-examined the relationship between economic growth and FDI, however they did not find any positive effects of FDI on economic growth. Ghosh (2003) argues that although private capital flows are conducive to economic growth, these flows may also generate the problem of macroeconomic vulnerability and unsustainability, and in such a situation, the occurrence of financial crisis may not be an uncommon possibility. Recently, Kosack and Tobin (2006) show both theoretically and empirically, that in funding development FDI is not more effective than aid. Nor are the two substitutes at all, or even complements. Instead, FDI and aid affect development differently. Once a country reaches a relatively low level of development, aid contributes powerfully to both economic growth and to building the kind of human capital essential for sustainable development. By contrast, in most countries FDI contributes little or nothing to growth or to human development, and it may actually inhibit development in the world's less-developed countries.

Rather, some empirical studies argue whether FDI promote economic growth is contingent on some key characteristics of the host country, or absorptive capacity. For example, De Mello (1997) reports two main channels through which FDI may enhance growth. First, through capital spillovers, FDI facilitates the adoption of new technology in the production process. Second, FDI may stimulate the transfer of knowledge both in terms of labor training and acquisition of skills and by introducing alternative management practices and better organizational capabilities. Most studies have essentially attempted to explain this capacity in terms of commercial policies and human capital (see, for instance, Balasubramanyam et al. 1996 and Borensztein et al. 1998). Specifically, in an authoritative explanation of the importance of host country characteristics, Balasubramanyam et al. (1996) argued that the high technology which FDI typically embodies tended to serve as a conducive clime for the establishment of intellectual property rights. More aptly put, the more the weight attached to creating legislation backed guidelines for protecting property rights, the higher the willingness of foreign firms to follow through with high technology investments.

To further underscore the crucial role of human capital, Borensztein et al. (1998) point out that in addition to the aforementioned level of investments, a well-trained and adequately motivated work force is required as a complement. At the heart of their argument is the fact that the spillover effects from the adoption of new technology can only be enjoyed by domestic firms if the host economy has attained a certain threshold in terms of human capital development.

However, Baltagi et al. (2005) find that the role of FDI is significantly influenced by the third countries effects and the complex integration strategies of multinationals, especially the bilateral trade costs among host countries. Baltagi et al. (2005, p. 16), for instance, argue that "… These policies (investment liberalization, training programs, and other FDI-attracting policies) can only be effective if a country is not too remote from large foreign consumer bases." Hence, are the effects of FDI contingent on the absorptive capacity of host countries, with particular respect to domestic financial system?

The recent empirical literature shows that the development of financial market is relevant (see, for example, Hermes and Lensink 2003; Alfaro et al. 2004, 2010; Durham 2004; Azman-Saini et al. 2010; Choong, 2012; among others). The conventional wisdom suggests that financial development is an essential determinant as well as a major contributor of economic growth for few reasons. First, a more developed financial system provides a fertile ground for the allocation of resources, better monitoring, fewer information asymmetries, and economic growth (Shen and Lee, 2006). Financial system may contribute to economic growth via two channels. On the one hand, it mobilizes savings; this increases the volume of resources available to finance investment. On the other hand, it screens and monitors investment projects (*i.e.* lowering information acquisition costs); this contributes to increasing the efficiency of the projects carried out (Greenwood and Jovanovic 1990; Levine 1991). The more developed the domestic financial system, the better it will be able to mobilize savings, and screen and monitor investment projects, which will contribute to higher economic growth.

Second, financial systems influence the amount of credit rationing in financial markets and constrain potential entrepreneurs, which in turn determine economic growth. This is especially true when the arrival of an entirely new technology brings with it the potential to tap not just domestic markets but export markets (Alfaro et al. 2004).

Third, financial sector may also determine to what extent foreign firms will be able to borrow in order to extend their innovative activities in the host country, which would lead further increase the scope for technological spillovers to domestic firms. Hence, the diffusion process may be more efficient once financial markets in the host country are better developed, since this allows the subsidiary of a multinational corporation to elaborate on the investment once it has entered the host country (Hermes and Lensink 2003). As Demetriades and Andrianova (2004) explain, the existence of a sound financial sector is a precondition for the country to materialize new innovations and exploit its resources efficiently. In this way, finance is seen as a facilitator for growth, rather than as a deep determinant for growth.

Finally, the efficiency of financial market matters to the economic growth.[2] In fact, some researchers have argued that countries with efficient financial systems are less susceptible to the risk that a financial crisis will erupt in the wake of real economic disturbances and more resilient in the face of crises that do occur (Bordo and Meissner 2006; Beck et al. 2000). Indeed, countries with better developed financial systems, i.e. financial markets and institutions that more effectively channel society's savings to its most productive use, experience faster economic growth (Bekaert et al. 2003; Ranciere et al. 2006). As pointed out by Blejer (2006), countries with efficient financial systems are less prone to banking and currency crises, and these countries also suffer much less when a crisis does occur.

Although the positive role of financial system on the relationship between FDI and economic growth is already a stylized fact from empirical evidence, how domestic financial system impacts on the relationship between FDI and economic growth. The paper, therefore, attempts

to contribute to the existing literature in two dimensions. First, given contrasting evidence in the literature pertaining to the link between FDI and economic growth, this paper, among other recent studies, is aimed to determine the appropriate financial conditions under which a host country can fully benefit from FDI than to attract FDI. This paper also identifies a number of channels through which FDI and financial system may exert an impact on economic growth, namely via efficiency or investment effect. It is an important question to investigate, given that many countries put much emphasis on attracting FDI as a major economic strategy. This effort is essential to attract more and better FDI. Second, the use of GMM technique allows not only the increase of degrees of freedom and better large sample properties, but also the reduction of endogeneity, due to the concerns of country-specific characteristics, reverse causation, omitted variable and measurement error.

The main objective of this paper is to analyze the effect of FDI on economic growth in a panel of 4 countries of North Africa (Tunisia, Morocco, Algeria and Egypt) over the period 1980-2011. The paper concludes that the effect of FDI is contingent on the absorptive capacity of host countries, with particular respect to the development of domestic financial system. The paper also finds that the main channel linking FDI, financial system, and growth runs through the efficiency effect, instead of investment effect, irrespective of the level of growth. This implies that the presence of FDI induces more capital-intensive investment in host countries and a better-developed domestic financial market is more effective in promoting economic growth. Although the relationship between FDI and economic growth is well established (see, for example, Choe 2003; Apergis et al. 2008; Yalta, 2013), the proposition that the ability to absorb the advantages embodied in FDI inflows in stimulating economic growth through the efficiency of domestic financial system is new.

The organization of the paper is as follows. Section 2 describes the data and empirical methodology. The empirical results are presented in Section 3. The final section draws conclusions based on the results.

2. Data and Empirical Methodology

2.1 Data

This section describes the data used in the empirical analysis, specifically the measures of FDI, financial market development, economic growth, and a number of controlling variables used in growth regressions.

There are several sources for data on FDI. An important source is the International Monetary Fund (2013) publication ''International Financial Statistics'' (IFS), which reports the Balance of Payments statistics on FDI. Net FDI inflows, reported in the IFS, measure the net inflows of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. Gross FDI figures reflect the sum of the absolute value of inflows and outflows accounted in the balance of payments financial accounts. Our model focuses on the inflows to the economy; therefore, we prefer using the net inflow measure.

In this study we use two indicators to measure financial deepening, facilitate resource mobilization, and gauge the efficiency of financial intermediation. The first indicator is liquid liabilities of the financial system (LIQUID): equal currency plus demand and interest-bearing

liabilities of banks and non financial intermediaries divided by GDP. It is the broadest measure of financial intermediation and includes three types of financial institutions: the central bank, deposit money banks, and other financial institutions. Hence, LIQUID provides a measure for the overall size of the financial sector without distinguishing between different financial institutions. The data are obtained from World Development Indicators (WDI) (World Bank, 2013).

This commonly used measure of financial sector development has shortcomings. It may not accurately represent the effectiveness of the financial system in ameliorating information asymmetries and easing transaction costs as well as the measure takes into account deposits by one financial intermediary in another, which may involve double counting problem (Levine et al. 2000). The use of this indicator is based on the McKinnon - Shaw hypothesis, which implies that a monetized economy reflects a highly developed capital market; hence a high degree of monetization, therefore, should be positively related to economic growth. Under this assumption, many researchers use this measure as financial depth (McKinnon 1973; King and Levine 1993a; Schich and Pelgrin 2002). Thus, we include it as one measure of financial intermediary development.

The second measure is the credit provided by the banking sector to GDP (CREDIT), which measures how much intermediation is performed by the banking system, including credit to the public and private sectors. Calderon and Liu (2003) suggest that this indicator has an advantage as it takes into account the credits to private sector only and isolates credit issued to the private sector, as opposed to credit issued to governments, government agencies, and public enterprises. Furthermore, it excludes credits issued by the central bank. They argue that the measure is even better than indicators used by previous studies such as King and Levine (1993a, b)[3] and Levine (1999).[4] Indeed, De Gregorio and Guidotti (1995) claim that CREDIT is a better measure of financial development than measures of monetary aggregates such as M1, M2 and M3 because it reflects the more accurately on the actual volume of funds channeled into private sector. The ratio, therefore, is more directly linked to the investment and economic growth. Moreover, Calderon and Liu (2003) contend that a higher ratio of CREDIT to GDP indicates more financial services and hence, greater financial intermediary development. The data are from the WDI (2013).

The dependent variable is the growth rate of output, measured as the growth of the real per capita GDP in constant dollars. Our set of controls includes: Inflation, measured as the annual percentage change in the consumption price index (INF), is used as a proxy for macroeconomic stability. To capture openness to international trade, we use the ratio of the sum of exports plus imports to GDP (OPENNES). Investment ratio, defined as the ratio of gross fixed capital formation to GDP (INV). Government consumption, defined as the ratio of central government expenditures to GDP (GOVCON). Lagged GDP per capita was included to control for economic convergence in our regressions. Several studies point out that per capita income could serve as a good proxy for the general development and sophistication of institutions (La Porta et al., 1998; Beck et al., 2003). All control variables, except inflation, are specified in natural logs. The data are from the WDI (2013). Our sample consists of 4 countries of North Africa (Tunisia, Morocco, Algeria and Egypt) with annual data for the period 1980-2011.

2.2 Empirical Methodology

The purpose of our empirical analysis is to examine the financial markets channel through which FDI may be beneficial for growth. In an influential paper, Alfaro et al. (2004) derive an empirical specification based on the assumption that countries are unlikely to be at their steady states and, therefore, transitional dynamics should be more important. We employ a specification similar to theirs. As a starting exercise, we look at the direct effect of FDI on economic growth and estimate the following equation by GMM:

$$GDP_{i,t} = \beta_0 + \beta_1 GDP_{i,t-1} + \beta_2 FDI_{i,t} + \beta_3 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \qquad (1)$$

where $GDP_{i,t-1}$ denotes the (logarithm of) initial level of GDP per capita, FDI denotes the foreign direct investment, net inflow (% of GDP) and $X_{i,t}$ is the matrix of control variables described in the previous section, μ_t is a time specific effect, η_i is an unobserved country-specific fixed effect and $\varepsilon_{i,t}$ is the error term.[5] We are interested in testing whether the marginal impact of FDI on growth, β_2, is statistically significant.

While FDI have the potential to affect economic activity through a host of channels, in a second set of regressions we examine one specific link between FDI and growth, specifically the one working through financial markets. The hypothesis we would like to test is whether the level of financial depth in the recipient country affects the impact of FDI on growth. To this end, we interact the FDI variable with an indicator of financial depth and test for the significance of the interacted coefficient.[6] A positive interaction would imply that the growth effects of FDI are enhanced in deeper financial systems, supporting complementarity of FDI and other financial flows.

The regression to be estimated is the following:

$$GDP_{i,t} = \beta_0 + \beta_1 GDP_{i,t-1} + \beta_2 FDI_{i,t} + \beta_3 FinDev_{i,t} + \beta_4 (FDI_{i,t}.FinDev_{i,t}) + \beta_5 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \ (2)$$

Our estimation technique addresses issues of endogeneity and unobserved country characteristics. Therefore, to account for endogeneity and country-specific unobserved characteristics, we use the System GMM dynamic panel estimation method. The option to use System GMM is based on the argument that the existence of weak instruments implies asymptotically that the variance of the coefficient increases and in small samples the coefficients can be biased. To reduce the potential bias and inaccuracy associated with the use of Difference GMM (Arellano and Bond, 1991), Arellano and Bover (1995) and Blundell and Bond (1998) develop a system of regressions in differences and levels. The instruments for the regression in differences are the lagged levels of the explanatory variables and the instruments for the regression in levels are the lagged differences of explanatory variables. These are considered as appropriate instruments under the assumption that although there may be correlation between the levels of explanatory variables and the country specific effect, there is no correlation between those variables in differences and the country specific effect

The consistency of the System GMM estimator is assessed by two specification tests. The Sargan test of over identifying restrictions tests the overall validity of the instruments. Failure to reject the null hypothesis gives support to the model. The second test examines the null

hypothesis that the error term is not serially correlated. Again, failure to reject the null hypothesis gives support to the model.

3. Empirical Results

The regressions in Table 1 examine the role of FDI on growth through financial markets. As the initial step, we examine the impact of FDI on economic growth. It is found that FDI have *a* positive and significant effect on growth in all countries. This result is consistent with some studies in the FDI-growth literature (e.g. Balasubramanyam, et al., 1996; De Mello, 1999). In addition, we also control for the level of financial development in the estimations. The major message is that countries with a well developed financial system have better absorptive capacity in benefiting advantages embodied in the FDI inflows. The results show a strong relationship between different components of financial intermediary development, FDI, and economic growth. While the coefficient of financial development measures is positive and statistically significant in all countries, the coefficient of FDI is also positive and significant at the 10% significance levels. Evidently, this hypothesis does hold when controlling for the level of financial development, which suggests that development of domestic financial system may help host countries to benefit more from FDI inflows.

These results, however, are questionable as these simple regressions have often been criticized due to the omission of the important explanatory variables. Thus, to insure the sensitivity of the results, we examine with another four conditioning information sets. The objective is to reduce the possibility that the growth regression either excludes a relevant variable or includes a set of regressors that produces a favored conclusion. The results with four conditioning information sets are reported. We include inflation rate, measure of government size, trade openness, and measures of financial development as the first conditioning information set. The second conditioning information set includes first conditioning information set plus FDI. The third conditioning information set includes second conditioning information set plus the interaction term between FDI and financial development.

The fourth conditioning information set includes third conditioning information set plus domestic investment. The domestic investment variable is used to differentiate how FDI, with domestic financial system, is related to economic growth. For example, if investment variable is included and FDI (or measures of financial development) is significant, then this is interpreted as FDI (or measures of financial development) promoting economic growth through the level of efficiency. Otherwise, if investment variable is not included, it is unclear whether FDI influences economic growth through investment or efficiency level (Hermes and Lensink 2003).[7] Hence, for each of the two financial development measures, we present regression results for four conditioning information sets.

The results of first three conditioning information sets are reported in Table 1. In Regression (1), all two financial development indicators are positive and statistically significant at the 10% significance levels. When FDI variable is included, as shown in Regression (2), two financial development indicators remains positive and significant. The results also show a positive effect of FDI on economic growth and the variable is statistically significant at 10% significance level or better.

In Regression (3), the newly included interaction term between FDI and financial development indicators is positive and statistically significant. Moreover, all financial

development indicators remain positive and significant. The results suggest that FDI and financial sector development are complementary in facilitating economic growth, ceteris paribus. In other words, FDI inflows alone do not accelerate host country's economic growth; FDI will have a positive effect on economic growth only when a threshold level of financial development is attained. This conclusion is also consistent with previous empirical studies such as Hermes and Lensink (2003); Alfaro et al. (2004, 2010); Durham (2004); and Azman-Saini et al. (2010).

We introduce the level of initial GDP per capita (the natural logarithm) as independent variable according to the conditional convergence hypothesis. The initial GDP per capita coefficient is negative, meaning that the conditional convergence hypothesis is evidenced: holding constant other growth determinants, countries with lower GDP per capita tend to grow faster. The initial position of the economy is thus a significant determinant of growth, as recognised by the neoclassical theory. The initial income has a negative effect on economic growth coherent to the theoretical study and statistically significant at a 1% level. With regards to the effect of the other variables in the regression, they are all consistent with standard growth regression results. The openness ratio has a significantly positive effect on economic growth in most of the regressions, unlike inflation and government spending, which have a negative impact. Barro and Sala-I-Martin (1995) attributed the negative impact of government on economic growth to unproductive public sector or some aspects of bad government such as corruption, which is likely to be captured by the variable. These factors have the tendency to hinder economic growth.

If we focus on the results for the regressions including the investment variable, that is, Regressions (4)-(6), we find that FDI, domestic investment, two financial development indicators remain positive and significant. It is interesting to note that the estimated coefficient for domestic investment is generally higher than the coefficient of FDI. This result suggests that domestic investment is more productive than FDI inflows. The interaction term is also positive and statistically significant. These results should be interpreted as follows. First, it is confirmed that a country can benefit more from the presence of FDI inflows if the development of the domestic financial system has reached a certain minimum level. Second, it suggests that the importance of domestic investment should not be neglected as both domestic investment and FDI matter for economic growth. Third, it is found that FDI affects economic growth mainly via the level of efficiency as the coefficient of FDI and the interaction term are positive and statistically significant.

4. Summary and Conclusions

Our study examines the relationship between FDI and growth in the presence of domestic financial system. Using GMM panel data model to examine the link between FDI, financial development, and economic growth in a panel of 4 countries of North Africa (Tunisia, Morocco, Algeria and Egypt) over the period 1980-2011, both FDI and financial development indicators generally show a significant and positive impact on economic growth.

To examine whether financial development helps a country to benefit more from FDI, the study interacted FDI with different measures of financial market development. The result is that when FDI is interacted with the financial development indicators, the interaction terms are generally positive and significant, shedding light on the role of financial development in benefiting from FDI.

The results have clear policy implications, namely the effect of FDI on economic growth is subject to the underlying financial conditions and institutions. A well developed domestic financial system plays an important role in complementing the impact of FDI on economic growth; that is, countries with better-developed financial sectors experience a raise in their growth rates.

Endnotes

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1. See Buckley et al. (2002) for a comprehensive survey on the channels via which FDI may affect (positively or negatively) economic growth.

2. The financial system's efficiency can be gauged by the efficiency with which it transforms resources into capital. In other words, the financial sector functions efficiently if it intermediates at a minimum price and reduces the comprehensive cost of capital to its optimal level (Blejer, 2006).

3. King and Levine (1993a, b) use a measure of gross claims on the private sector divided by GDP. But, this measure includes credits issued by the monetary authority and government agencies.

4. Levine (1999) uses a measure of money bank credits to the private sector divided by GDP, which does not include credits to the private sector by non-deposit money banks and it only covers the period 1976-1993.

5. Note that Eq. (1) can be alternatively written with the growth rate as dependent variable as: $Growth_{i,t} = GDP_{i,t} - GDP_{i,t-1} = \beta_0 + (\beta_1 - 1)GDP_{i,t-1} + \beta_2 FDI_{i,t} + \beta_3 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t}$, where $(\beta_1 - 1)$ is the convergence coefficient.

6. In order to ensure that the interaction term does not proxy for FDI or the level of development of financial markets, these variables are also included in the regression separately.

7. In general, FDI may contribute economic growth through two main channels. On the one hand, FDI can stimulate economic growth simply by augmenting capital accumulation in the host country. This is an investment effect. On the other hand, FDI may also increasing growth by introducing new technologies, such as new production processes and techniques, managerial skills, ideas, and new varieties of capital goods (Hermes and Lensink 2003).

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Table 1. FDI, Financial Development, and Economic Growth

Variable	Without investment variable			With investment variable		
	(1)	(2)	(3)	(4)	(5)	(6)
CREDIT						
GDP$_{t-1}$	-0.086***	-0.088***	-0.084***	-0.09***	-0.091***	-0.089***
GOVCON	-0.634***	-0.636***	-0.556***	-0.514***	-0.558***	-0.435**
INF	-0.017***	-0.023***	-0.02***	-0.014***	-0.02***	-0.017***
OPENNESS	0.337***	0.266*	0.277*	0.352***	0.26*	0.269*
CREDIT	0.228***	0.272***	0.251***	0.253***	0.292***	0.279***
INV	-	-	-	0.276*	0.193*	0.27*
FDI	-	0.016*	0.111*	-	0.018*	0.145*
FDI*CREDIT	-	-	0.091*	-	-	0.098*
Constant	0.76*	0.79*	0.88**	0.86*	0.83*	0.95**
R-squared	0.85	0.85	0.85	0.86	0.85	0.85
LIQUID						
GDP$_{t-1}$	0.087***	0.084***	0.085***	0.096***	0.093**	0.093**
GOVCON	-0.429***	-0.428***	-0.441***	-0.289***	-0.303**	-0.308**
INF	-0.011***	-0.017***	-0.017***	-0.006*	-0.01***	-0.012**
OPENNESS	0.414***	0.424***	0.43***	0.452***	0.413***	0.415***
LIQUID	0.412***	0.439***	0.441***	0.516***	0.524***	0.523***
INV	-	-	-	0.39*	0.302**	0.297*
FDI	-	0.006*	0.093*	-	0.08*	0.115*
FDI*LIQUID	-	-	0.022*	-	-	0.05*
Constant	-0.01*	-0.93	-0.96*	-1.36**	-1.28**	-1.28**
R-squared	0.87	0.88	0.88	0.88	0.88	0.88

Notes: Dependent variable is real GDP per capita growth rate. *, **, and *** indicate statistical significance at 10 percent, 5 percent and 1 percent levels, respectively.