Foreign Direct Investment, Regulations and Growth

*Matthias Busse and José Luis Groizard**

Revised version: February 2008

Abstract

The paper explores the linkage between income growth rates and foreign direct investment (FDI) inflows. So far the evidence is rather mixed, as no robust relationship between FDI and income growth has been established. We argue that countries need a sound business environment in the form of good government regulations to be able to benefit from FDI. Using a comprehensive data set for regulations, we test this hypothesis and find evidence that excessive regulations restrict growth through FDI only in the most regulated economies. This result is robust to different specifications of the econometric model.

JEL Classification: C31, F21, F43, L51

Key Words: Multinationals, Spillovers, Institutions, Development

*BUSSE: Hamburg Institute of International Economics (HWWI), Heimhuder Str. 71, 20148 Hamburg, Germany; GROIZARD (corresponding author): Universitat de les Illes Balears, Department of Applied Economics, Ctra. de Valldemossa Km. 7.5, 07122 Palma de Mallorca, Spain, e-mail: joseluis.groizard@uib.es, phone: +34-971 172 784. fax: +34-971 172 389. The paper was partly written while the first author was visiting the World Bank Development Economics Research Group International Trade. The authors would like to thank Joan Llull, Teodosio Pérez-Amaral, Caroline Freund, Beata Javorcik, Mariana Spatareanu, two anonymous referees and participants at a World Bank Trade Seminar in Washington, DC, the 8th annual GTAP Conference in Lübeck and the Development Economics Committee of the Vereins für Socialpolitik in Berlin for helpful discussions and comments on an earlier draft. Lars Vogel and Wendy Soh provided excellent research assistance. The usual disclaimer applies.

1. INTRODUCTION

Over the last couple of decades, the theoretical literature on the impact of foreign investment flows on host economies has identified several channels for FDI to influence per capita income growth rates. As a start, FDI may provide new capital, allowing additional investment in both human and physical capital, which can be very beneficial for (developing) countries with liquidity constraints.[1] In contrast to short-term capital flows, long-term foreign investment is much more likely to be valuable to host economies, in particular if the investment takes the form of new or expanding production plants.

Moreover, foreign investment inflows are generally accepted as a means to incorporate new knowledge from abroad. The theory of the multinational firm proposes that multinational corporations have a technological advantage over local firms that outweighs the cost of doing business in external markets (Caves, 1996; Markusen, 2002). The inflow of new knowledge may benefit domestic firms through imitation and learning (Findlay, 1978; Mansfield and Romeo, 1980; Blomström, 1986), increased competition in local markets, facilitation of human capital mobility among firms (Fosfuri et al., 2001, Glass and Saggi, 2002) and vertical linkages (Rodríguez-Clare, 1996; Markusen and Venables, 1999), thereby increasing the productivity level and sustaining a higher growth rate.

Despite the fact that the economic benefits of increasing FDI inflows are well established in the theoretical literature, the evidence on technology spillovers is far from conclusive in both

[1] Much of the earlier literature has emphasised differences in capital abundance and returns on capital as the main driving force for capital flows across countries. See Caves (1996) for a literature survey.

firm-level and country-level data.[2] For example, Aitken and Harrison (1999) could not establish any evidence of a positive technology spillover from multinationals to domestic firms in Venezuela in the 1980s. On the other hand, Görg and Hijzen (2004) find that imitation and learning can take place when local firms are geographically close to multinationals and have enough absorptive capacity. Using firm-level data for Lithuania, Javorcik (2004) discovers that spillovers may occur through backward linkages between multinationals and their local suppliers. Another finding is that labour turnover might act as an important channel. As multinationals train the workforce in their operations abroad to use new technologies, technology diffusion might also occur due to a labour turnover from multinationals to domestic firms, or if locals establish their own businesses (Djankov and Hoekman, 2000).

Unlike most of the microeconomic evidence, studies using aggregated FDI data found questionable support that FDI in itself significantly boosts growth rates in all recipient countries. In a cross-sectional regression framework based on data for the 1990s, Ram and Zhang (2002) find some evidence that FDI boosts host economies' income growth rates. Yet they note that the results are not robust to all their model specifications. UNCTAD (1999), on the other hand, fails to find a clear linkage between FDI and growth rates, as the sign of the coefficient for FDI is either positive or negative depending on the variables that enter the regressions. In a similar approach, Dutt (1997) also falls short of detecting any empirical linkage between foreign investment and per capita growth rates.

[2] De Mello (1997) and Li and Liu (2005) provide surveys of the literature. See also Görg and Greenaway (2004) for a review of the empirical literature on multinationals and productivity spillovers.

Nonetheless, using a panel of data for the period of 1970-1999 for 84 countries, Li and Liu (2005) establish a clear linkage between FDI and growth rates. They confirm this outcome using different econometric techniques, including a simultaneous equation system. In contrast, Carkovic and Levine (2005) also use a panel setting and control for simultaneity bias, but do not find robust results for positive growth effects of FDI inflows in their sample of 72 countries for the period of 1960-1995. They note that this outcome (and the inconclusive evidence in the literature in general) might be due to the specific empirical approaches and the different time periods used.

Apart from data and methodological issues, further reasons for the inconclusive evidence have been sought by a few studies. Based on their results, Balasubramanyam et al. (1996) note that FDI might promote growth only in export-promoting rather than in import-substituting countries and that, thus, openness to trade is essential for the growth effects of foreign investment. Borensztein et al. (1998) find that certain characteristics in the host countries may play an important role. More specifically, they discover that countries need a particular educational attainment level to benefit from FDI. Borensztein et al. argue that to be able to benefit from positive (technological) spillover effects, host economies have to have the educational capacity to incorporate these effects.

More recently, a series of papers has been published which examine the linkages between the effectiveness and regulations of financial markets, FDI and growth. In essence, Hermes and Lensink (2003), Durham (2004) and Alfaro et al. (2004) all find that countries with better financial systems and financial market regulations can exploit FDI more efficiently and achieve a higher growth rate. These studies argue that countries need not only a sound banking system, but also a functioning financial market to allow entrepreneurs to obtain credit

to start a new business or expand an existing one. In this way, countries are able to benefit from inward investment to achieve a higher growth rate.

Aside from financial market regulations, the impact of broader government regulations on the interaction between FDI and growth has not been analysed so far. Our paper intends to fill this gap, as we explore the linkages between government regulations, FDI and economic growth in a comprehensive manner. It can be argued that countries may only benefit from foreign investment inflows if they have appropriate local government regulations and institutions in place. Excessive regulations are likely to restrict growth through FDI if human and capital resources are prevented from reallocating. For example, if starting and closing down a business are hindered by extensive and costly government regulations, which involve many bureaucratic procedures demanding entrepreneurs' time and resources, then capital flows are prevented from being reallocated to the most productive sectors.

Likewise, if restrictive employment laws for the hiring and firing of employees cause a lower labour market turnover, technology spillovers to domestic firms are less likely to occur. A similar argument can be made for other forms of government regulations, such as protecting foreign and domestic investors by ensuring creditor rights and enforcement of contracts. Both are difficult tasks involving high uncertainty, considerable time and very large expenses. Hence, multinationals would reduce forward and backward linkages with the local economy, thereby affecting the likelihood of horizontal or vertical spillovers taking place. In summary, restrictive government regulations may prevent productivity increases related to the exploitation of technology spillovers from foreign direct investment inflows.[3]

[3] Note that the main objective of this paper is an analysis of the impact of regulations on the FDI-growth nexus. For an assessment of the direct effects of regulations on FDI inflows, see, for example, Egger (2003) on contract

Against this backdrop, we will use a broad range of government regulations, employing the extensive Doing Business database on government regulations provided by the World Bank (2006a), and test our hypothesis that countries with restrictive regulations cannot exploit FDI inflows efficiently. The World Bank database has the main advantage of focusing on relatively consistent and objective data in measuring regulations across countries. More explicitly, the effects of starting and closing down a business, labour market regulations, enforcing contracts, creditor rights and obtaining credit are examined. These forms of regulations are likely to affect the reallocation of resources and, consequently, the positive effects of FDI inflows in an economy.

Overall, we find that FDI does not stimulate growth in economies with excessive business and labour regulations, after controlling for some other relevant determinants of observed changes in GDP growth rates. However, this outcome is restricted to the top 20 or 30 per cent most regulated countries, indicating that there is a threshold level for which our results hold up. Moreover, we find that some disaggregated sub-indicators, such as market entry regulations, are more important for the FDI-growth nexus than other sub-indicators. Overall, our results have some powerful policy implications, such as that governments first have to improve the regulatory quality in their countries before they will be able to benefit from increased openness to foreign capital in the form of direct investment.

The paper is structured as follows: The next section describes the regulation data used, and Section 3 presents the specification of the econometric model. Since a number of the

---

enforcement, Javorcik and Spatareanu (2005) and Whyman and Baimbridge (2006) on labour market regulations, and Klein et al. (2002) on obtaining credit.

independent variables are likely to be endogenous, we use an instrumental variable approach. The results will be presented in Section 4, and last, Section 5 summarises the main results and concludes with some policy implications.

2. MEASURING REGULATIONS

For a long time, researchers who examined the impact of institutions and regulations across countries had to rely on a few sources, such as the indicators on political risk provided by the PRS Group (2007) in their International Country Risk Guide, or the government effectiveness indicators from the annual Global Competitiveness Report, supplied by the World Economic Forum (2006). These organisations publish a large variety of relevant indicators, for instance on the level of corruption or the quality of bureaucracy, which are clearly relevant for the effects of institutions and government regulations. These indicators, however, are derived from the results of executive opinion surveys and thus present the perceived level of corruption or rule of law. Predominantly, they do not use factual information to measure differences in institutions and regulations across countries.

The Doing Business database, provided by the World Bank (2006a), provides objective measures of business regulations. The Doing Business indicators are comparable across economies and indicate the regulatory costs of business. They allow us to obtain information on regulatory outcomes, such as time and money spent on bureaucratic procedures, and thus to investigate the efficiency of the government institutions in place. By focusing on evidence for regulations, we obtain more objective indicators that are less influenced by stages of

economic development or recent events.[4] These indicators, in turn, can then be used to analyse specific regulations that enhance or constrain investment, productivity and growth.

Out of ten indicators in the database, we have chosen those that are clearly applicable to test the linkages between the inflow of foreign investment and economic growth in the host economy. That leaves us with five sub-components: starting a business, labour market regulations, contract regulations, creditor rights and insolvency regulations. The starting a business indicator is the arithmetic mean of the average number of procedures to start a business, the number of days and the costs required to complete that process,[5] while the labour market regulation index is an average of three indexes: flexibility of hiring, conditions of employment and flexibility of firing. The contract regulation index is an average of three indexes covering the number of judicial procedures to enforce a contract, the duration and the cost, whereas the creditor rights index measures four powers of secured creditors in bankruptcy. Finally, for the insolvency index we use the goals of insolvency index from the Doing Business dataset that reflect the difficulties in closing down a business.

To get an overall index of regulations we compute a weighted average of the five individual components of regulations, taking factor loadings in principal components analysis as

[4] For an extended discussion of the advantages of the Doing Business indicators, see World Bank (2006a). In general, the Doing Business database is widely recognised and used as a high-quality measure of regulations across countries. For instance, Pica and Mora (2005), Borrmann et al. (2006), and Freund and Bolaky (2007) have used the Doing Business indicators in their empirical work.

[5] Before taking the average for this indicator, all three sub-components are rescaled to 0-1 by dividing all observations by the highest figure in each of the three sub-components.

weights.[6] Higher values for all five sub-components (and, thus, for the aggregated regulation index) reflect more regulations, that is, regulations with a lower quality for business operations. While the Doing Business indicators are available for a total of 175 countries, we had to restrict our sample to 84 countries. Included in the following analysis are all countries for which data on regulations, the dependent and independent variables are available.[7] Base year for the regulation index is 2003. For our country sample, the combined indicator ranges from -4.24 to -0.42, with a mean of -2.07 and a standard deviation of 0.83.

Similar to the quality of institutions, it has been pointed out in numerous studies that regulatory quality is an important determinant of overall income levels.[8] It is therefore not surprising that the regulation index is strongly negatively correlated with income per capita levels (Table 1). Similarly, the regulation indicator is also negatively associated with GDP per capita growth rates in the period from 1994 to 2003, the most recent ten-year period for which we have a relatively consistent dataset for developing countries, indicating that stricter regulations are associated with lower GDP growth rates, though the correlation coefficient is much smaller in comparison to GDP per capita. The regulation index is also negatively correlated with FDI inflows in that period, with a coefficient of a similar size (-0.34) in comparison to GDP growth rates.

[6] Before combining the five regulation indicators, we have taken the logarithm of each of them. This procedure yields negative values for the regulation index for all countries.

[7] See Appendix C for the country sample.

[8] See, for example, Acemoglu et al. (2001), Dollar and Kraay (2002) and Rodrik et al. (2004).

TABLE 1

Correlation Matrix

In our country sample, FDI inflows are somewhat closely associated with GDP growth rates, as the correlation coefficient is in the medium range (0.32). This outcome is supported by the partial scatter plot of both variables, shown in Figure 1, which includes a fitted regression line. Yet a correlation, simple regression or a graph cannot establish a linkage between the variables, since we have other determinants of economic growth to take into account and/or reverse causality. We will examine these issues in more detail in the following sections.[9]

FIGURE 1

FDI Inflows and GDP Growth Rates, 1994-2003[10]

3. MODEL SPECIFICATION

To analyse the interaction of foreign investment, regulations and growth, we could use the "standard" cross-country growth regression model that is usually specified as follows:

$$y_{it} - y_{it-1} = \theta\, y_{it-1} + \gamma' X_{it} + e_{it} \quad , \tag{1}$$

[9] Note that Singapore and Ireland are clear outliers in our sample (an appropriate statistical test confirms this outcome). Hence, we excluded both countries in the following econometric analysis. While the model fit improves if we drop them, the main results regarding sign and significance levels of the coefficients of key interest are hardly affected. In addition, our instrumental variable approach yields more consistent results.

[10] If we drop the two outliers, the slope coefficient falls to 0.19, the intercept remains quite stable (2.44) and both are highly significant.

where y is the log of per capita GDP for country i and periods t and t-1, X are a set of explanatory variables, including regulations, FDI inflows and other control variables, θ and γ are the coefficients to be estimated for the initial GDP per capita y_{t-1} and the control variables, respectively, and e is the error term. By following this approach, however, we are likely to obtain biased estimates due to the well-known problems of cross-country growth regression, such as reverse causality, measurement errors or omitted variables.

To deal with these issues, a panel data approach including changes over time in the variables in question would be preferable. Unfortunately, our regulations indicator is not available before 2003, which does not allow us to explore changes in a dynamic setting. Nevertheless, since changes in government regulations are relatively slow, it is reasonable to assume that our regulation index is roughly constant over a limited period of time, for instance, the last 10 years. Based on this assumption, we can analyse changes in the other key variables, that is, FDI flows, GDP growth rates and the control variables, over time in dynamic regressions. In effect, we follow the approach of Caselli et al. (1996) and Dollar and Kraay (2002) and transform (1) by taking into account that there are country effects η_i included in the error term that are likely to be correlated to the explanatory variables producing biased coefficients in a pure OLS estimation. Thus, the model can be rewritten as:

$$y_{it} = \alpha y_{it-1} + \gamma' X_{it} + \eta_i + \varepsilon_{it} \quad , \tag{2}$$

where α is 1 + θ.

To avoid the country effect bias we estimate (2) in differences:

$$y_{it} - y_{it-1} = \alpha(y_{it-1} - y_{it-2}) + \gamma'(X_{it} - X_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1}) \quad (3)$$

In essence, we regress growth in the most recent period of ten years (1994-2003) on growth in the previous period (1984-1993) and on changes from the previous to the current period in FDI and the other explanatory variables.[11] As the independent variables, we always use FDI inflows, measured as annual average of net FDI inflows as a share of GDP, average investment share of GDP, average rate of population growth, schooling years at secondary level at the beginning of the current period and an indicator for the rule of law. The latter indicator measures various components of the institutional quality of a country that might not be captured by our regulation index, such as the incidence of crime or the effectiveness and predictability of the judiciary. Overall, countries with well-designed institutions are less likely to have bad regulations.

In addition, we include a measure for the quality of regulations. We do not, however, include the regulation index, as all constant explanatory variables are eliminated when we take first differences. Instead, we construct an interactive term with FDI to ensure that regulations are properly included. Importantly, regarding the intensity of regulations it could be expected that regulations hinder countries from taking advantage of higher FDI inflows, but this might apply only to countries with relatively restrictive regulations. To check this hypothesis, we split the sample of countries using a threshold for the top 20 per cent most regulated economies.[12] More specifically, using the regulation index we construct a dummy variable (*Regulation Dummy*) that takes the value one for the top 20 per cent most regulated

[11] In the following, the period of 1994-2003 will be referred to as the current period, whereas 1984-1993 is the previous period.

[12] We later change the threshold to test the robustness of our results.

economies and zero otherwise. We then compute an interactive term of the regulation dummy and FDI to see whether regulations in the most regulated countries matter and add that to the list of independent variables.[13] Additionally, we follow the literature and add the following variables:[14]

- Human capital levels, measured as average years of secondary schooling
- openness to trade, computed as imports and exports divided by GDP
- government consumption, calculated as total government consumption as a share of GDP
- changes in consumer prices in per cent
- black market premium for foreign currency (US Dollar) in per cent

It can be argued that all of the independent variables are in fact endogenous. Lagged growth and the error term in (3) are correlated by construction. Therefore, we should exploit the moment conditions in a dynamic panel setting to find the adequate instrument. Additionally, FDI may not only lead to higher growth rates, but growing markets might attract multinational corporations. The growth (and size) of a particular market is likely to be an indication of its level of attractiveness to the investment, in the case that the multinational corporation aims to produce for the local market (horizontal or market-seeking FDI), thereby boosting growth rates of the host country (Chakrabarti, 2001; Busse, 2004).

[13] We tried to interact the regulation index directly with FDI; the sign was as expected but the significance was lower than in our final approach.

[14] These explanatory variables have been used, for instance, by Borensztein et al. (1998), Alfaro et al. (2004) and Carkovic and Levine (2005). Data sources for all variables are provided in Appendix A, while Appendix B shows descriptive statistics.

In effect, we rely on the identifying assumption that the *X* explanatory variables are weakly exogenous. Hence, FDI and regulations may be correlated with the contemporaneous and lagged shocks of GDP growth but they are uncorrelated with future shocks of GDP growth. As has been pointed out by Carkovic and Levine (2005), weak exogeneity does not mean that multinationals do not consider expected future growth in their decision to undertake FDI. It rather means that unexpected future shocks do not influence current FDI.

To deal with the problem of endogeneity, we estimate using the Generalized Method of Moments (GMM). As appropriate instruments, we employ the log-level of the GDP per capita at the beginning of the period y_{it-2} to instrument for lagged growth. To instrument for changes in FDI and in the interacted term, we use FDI levels and the interaction of FDI and the regulation dummy variable at the beginning of the period *t*-1. When the explanatory variables do not show significant variation over time, lagged variables in levels make weak instruments for the regression in differences, and we need to include lagged differences in explanatory variables as additional instruments. We therefore add to the list of instruments the change over previous periods in FDI interacted with the regulation dummy. Above all, starting with the contribution by Wheeler and Moody (1992), strong evidence has emerged in the literature to suggest that past FDI flows are in effect a powerful determinant of present or future investment decisions by multinational corporations.[15] Multinationals are much more likely to be attracted by countries that already have considerable FDI inflows. Firms' own experiences in host countries and the success of other multinationals serve as a strong attraction for further foreign investments.

[15] See also the empirical studies by Borensztein et al. (1998), Gastanaga et al. (1998) and Jensen (2003), who all find that a lagged FDI variable has a highly significant coefficient in their regressions, even though they use very different specifications.

We extend our list of instruments by adding a set of variables that has been developed in the cross-country growth literature based on history and geography: legal origin (British and French), and the fraction of population that speak a European language.[16] Hall and Jones (1999) find that the use of a European language as a measure of the influence of colonization is highly correlated with the quality of current policies and institutions. There is evidence that the legal origin is still a major determinant of the current institutional setting and regulatory quality of a country (La Porta et al., 1998; 1999).[17] Along these lines, Acemoglu et al. (2001) find that mortality rates of European settlers a couple of hundreds of years ago are still a highly significant determinant of the present institutional quality in a country and use this variable as an instrument in an income level regression. Unfortunately, using settler mortality would severely reduce the number of countries included in the regressions, which could bias the results. As a consequence, we do not use settler mortality rates but rather concentrate on the legal origin and the language variables.

4. EMPIRICAL RESULTS

Table 2 presents the estimation results using the GMM technique with a correction for heteroskedasticity of unknown form. Excluding Singapore and Ireland, we have collected data for a maximum of 84 countries in the simplest specification. However, adding human capital variable reduces the sample to 75 observations. The dependent variable is the growth rate of

[16] We also exploit the interactions of the legal origin with the instruments selected from our assumptions identified.

[17] Likewise, Djankov et al. (2002) find that French legal origin is highly correlated with an excessive regulatory environment.

GDP per capita over the current period (1994-2003) and explanatory variables for the basic specifications are change over previous period in average FDI (1994-2003 versus 1984-1993), the interaction term of regulation dummy for the top 20 per cent most regulated economies with change over previous period in average FDI, growth in the previous period (1984-1993), and changes over previous period in rule of law, investment and population growth rates.[18]

The first specification (column 1) reveals a strong correlation of changes in FDI with changes in growth, with a significant coefficient of 0.56 at the 1 per cent level. However, more interesting is that the second coefficient shows that for the most regulated economies the effect of FDI on growth is reduced by 0.52 (5 per cent significance level). For these countries, this means that due to their low-quality regulations, the growth benefits of more FDI is close to zero. We test the hypothesis whether these opposite effects cancel each other out, that is, whether the global effect of FDI on growth is null. The *p*-value associated with the Chi^2 statistic reported cannot reject the null.

In the second specification, reported in column 2, we add a human capital variable assuming that FDI might benefit only those countries that have enough educational capacity to absorb technologies brought by multinational firms (Borensztein et al., 1998). However, by including our measures for human capital, that is, average years of secondary education, our sample declines to 75 countries. Still, our results hold after including this variable.[19]

[18] The estimated coefficients should be interpreted taking into account that we use differences in ten-year periods. Hence, an increase in the coefficient of the FDI variable measures the cumulative percentage change in the level of GDP per capita over ten years of a 100 per cent increase in FDI.

[19] Note that for countries with low-quality regulations, the net impact of changes in FDI is now negative, as the coefficient for the interactive term is larger than the coefficient for changes in FDI for all countries.

Next, we check the robustness of our findings by including several control variables. According to Balasubramanyam et al. (1996), openness to trade might be important, as outward versus inward orientation of trade policy affects the FDI-growth nexus. We control for this by introducing changes over the previous decade in the trade share (column 3). Although trade share presents a positive and significant coefficient, the size and significance of the coefficients of interest do not show differences.[20]

In columns 4 to 6, we report the results for the specifications that include other control variables, such as changes over previous decade in average government expenditure, inflation, and the black market premium. For all estimated coefficients, we obtain a similar pattern, with estimates for FDI in the range between 0.38 and 0.42 and for the interactive term in the range between -0.40 and -0.45. Apart from model 4, the coefficient for the interactive term is always significant at least at the 10 per cent level, has a negative sign and is larger than the corresponding figure for the FDI variable for all countries. Other variables, such as rule of law and lagged growth, also show a persistent pattern. The coefficients for growth range from 0.40 to 0.49, which is compatible with a low-convergence speed.

TABLE 2

FDI and Growth, Top 20 per cent Most Regulated Countries (GMM)

It is important to emphasize that our estimates neither reflect the effect of sample heterogeneity nor reverse causality. In addition, the omission of relevant variables does not

[20] The large estimated correlation between trade and growth over decades likely reflects reverse causality, since we treat trade as an exogenous variable. We address this concern below.

alter our results since they are orthogonal with the levels of the endogenous variables at the beginning of the previous decade (instruments). We assess the validity of the instruments using the Hansen-*J*-test for over-identifying restrictions. Our GMM regressions are based on the assumption that the instruments are uncorrelated with the error term in the growth equation. The results for the *p*-value of the *J*-test for each GMM specification are reported at the bottom of Table 2. We cannot reject the null hypothesis that the instruments are uncorrelated with the error term in all six specifications for the endogenous variables.

Another important issue with IV estimation is to test for the instrument relevance. One way to assess this issue is to take a closer look at the magnitude of Shea partial R^2 in the first stage for each endogenous variable. In fact, the partial R^2 for changes in average FDI is around 30 per cent in all six model specifications, which is reasonable. For the interactive term, the figures are even better, as the Shea first stage R^2 is in the range between 0.47 and 0.50, indicating a relatively good fit. For the other explanatory variables, the corresponding figures are 20 per cent or better, which means that all instruments are relevant in Shea's sense and thus, the instruments have sufficient relevance for the right-hand side variables in the growth regression.

As a further instrument relevance test, we computed *F*-test statistics for the first stage for each endogenous variable. While the *F*-test is usually above ten (the conventional threshold level), some of the figures are below that level for the variables of main interest. This means that the instruments can be weak in some cases, in which they have little explanatory power for the endogenous variables. Running a regression with multiple endogenous regressors with several excluding instruments, however, the *F*-test may not be sufficiently informative, since the instruments can be highly correlated with each other and the model can be underidentified

(Stock et al., 2002). Accordingly, we test for underidentification and report the Kleibergen-Paap statistic (Kleibergen and Paap, 2006). In all specifications in Table 2, underidentification is rejected.

To asses the robustness of the results reported, we perform a number of checks. First of all, Alfaro et al. (2004) have suggested that financial markets play a key role in explaining the link between FDI and growth. As the size and the effectiveness of the local financial markets respond to economic growth, we treat financial variables as endogenous. We employ several indicators originally collected by Beck et al. (2000), such as liquid liabilities, private credit, and banking sector credit as a percentage of GDP. Following our instrumental variables approach, we use lagged values at the beginning of the previous period as instruments. GMM estimations are displayed in the first three columns in Table 3. All three variables have a positive effect on growth, while for the regulation dummy and FDI we obtain the same sign, but observe an increase in the significance level. Unfortunately, by including financial variables, our sample size is reduced considerably.

As a second robustness check, we treat trade and human capital as endogenous variables. Trade is likely to respond to reverse causality, while our indicator of human capital is measured at the beginning but within the current period. To sort out these possible critiques we have re-run the basic specification using lagged levels of trade/human capital at the beginning of the previous decade for each endogenous variable. The results are reported in columns 4 and 5. Important to note is that sign and significance levels of the interaction term are hardly changed, which supports the robustness of our results.

As mentioned in the first section, three empirical studies (Hermes and Lensink, 2003; Durham, 2004; and Alfaro et al., 2004) show that countries with more sophisticated financial systems and high-quality financial market regulations are in a better position to exploit FDI efficiently, achieving in turn an enhanced growth rate. Given that the three financial variables used in our analysis are somewhat correlated with the aggregated regulation index,[21] we are interested in testing the competing hypotheses as a final robustness check; i.e., whether a sound banking system or the overall quality of regulations have a greater effect on the FDI-growth nexus (column 6). Accordingly, we add another interactive term, that is, changes in private sector credit*changes in FDI, in addition to the explanatory variables and the interactive term used so far. Notably, the results indicate that both developed financial markets and good regulations can increase the positive impact of FDI on the growth rate of the host country.[22]

While this outcome is highly relevant from a policy point of view, we do observe an econometric problem with the relevance of the instruments. Since we add two further endogenous variables (private sector credit and the interactive term), have to rely on a reduced number of observations and have a limited number of instruments available , isolating the two different effects from each other is quite difficult. Not surprisingly, the *F*-tests show that the instruments are weak and the results are thus less reliable. Given a *p*-value of 0.56 for the Kleibergen-Paap test, we cannot reject the hypothesis of underidentification.

[21] The partial correlation between the aggregated regulation index on the one hand and liquid liabilities, private sector credit and bank credit on the other are 0.24, 0.43 and 0.38, respectively.

[22] Though we have used private sector credit for the interactive term only, the results for the other two financial market indicators are quite similar. Note that we also estimated interactions of human capital with FDI but the coefficient remains insignificant and does not affect the magnitude of coefficients for the variables of interest.

TABLE 3

Robustness Checks

In another set of regressions, we repeat the exercise for the top 30, 40 and 50 per cent most regulated economies. These further tests are useful in order to ascertain whether the results are influenced by the particular threshold level chosen for the regulation dummy. In comparison to the top 20 per cent most regulated countries, the significance levels of the coefficient for the interactive term are somewhat weaker. However, they are roughly similar if we set the cut-off point at the top 30 per cent most regulated economies (Table 4). The interactive term is statistically significant in three out of six basic specifications reported in Table 2, and in six out of six additional robust specifications displayed in Table 3. The number of significant coefficients declines further if we increase the threshold level to the top 40 or 50 per cent most regulated countries. These results mean that there is a particular threshold level, which is highly relevant for our results. In other words: Low quality regulations do not allow the top 20 to 30 per cent most regulated economies to take advantage of FDI inflows.

TABLE 4

FDI and Growth, Different Threshold Levels for the Aggregated Regulation Dummy

So far, we have used the aggregated regulation index for the computation of the regulation dummy. In a further set of regressions, we identify those regulation sub-components that drive our results by applying them individually. First, we focus on the top 20 per cent most regulated countries and show the detailed results for each sub-component (Table 5). Next, we increase the threshold as before and examine the linkages for the top 30, 40 and 50 per cent

most regulated countries. Again, as before, the results of that exercise are summarised (Table 6).

Out of the five sub-components, starting a business shows by far the strongest results if we focus on the top 20 per cent most regulated countries (Table 5).[23] In comparison to the aggregated regulation index, the significance levels for the new interactive term, where the dummy is based on regulations on starting a business only, are even slightly higher: For 12 out of 12 GMM regressions, we obtain a negative and significant coefficient for the interactive term (Table 6).[24] For this sub-component, the outcome is very similar if we select a higher threshold level for the dummy, as significance levels of the interactive term drop for the top 30, 40 or 50 per cent most regulated countries.

For the remaining sub-components, we obtain weaker results. For the labour market regulations indicator, the coefficients are negative and significant in four out of 12 regressions only (top 20 to top 40 per cent most regulated countries). For closing a business and contract enforcement, we obtain even less robust results.[25] In general, these results underline the fact that some individual regulations, such as starting a business, matter more for the interaction of FDI, regulations and growth.

---

[23] Note that the instruments perform much better for this sub-component, as the Shea partial R^2 and the F-test statistics are both relatively high for the average FDI variable and – in particular – the interactive term.

[24] Detailed results for all sub-components and cut-off points are not shown due to space constraints. Like all other results, they are available upon request.

[25] In Table 6, we have excluded the fifth sub-component, creditor rights, as there are only five different values for all countries. In comparison to the other four sub-components, we cannot establish the same clear cut-off points (other than the 20 per cent threshold level).

The outcome of our empirical investigation of the sub-components, that is, that market entry regulations have a larger impact on the FDI-growth nexus, is broadly in line with the literature on the potential positive spillover effects of FDI on the host economy. Djankov and Hoekman (2000) point out that what matters are the spillovers to other (local) firms within and across industries. However, if excessive government regulations impede the establishment of new firms or make it very costly to start a business, the potential beneficial effects cannot occur in the first place. To provide an example, in the Democratic Republic of Congo, ranked bottom in market entry regulations, an entrepreneur needs to complete 13 procedures to start up an industrial or commercial business in his country. On average, it takes him 155 days and costs 503 per cent of the average income per capita to complete the procedures. Furthermore, 216 per cent of income per capita has to be deposited as minimum capital in a bank to start the business registration (World Bank, 2006a).

Though the Democratic Republic of Congo might be an extreme example and does not receive much FDI (other than FDI in the resource extractive sector), we observe a similar picture for other countries, such as Mozambique or Indonesia, which do receive a considerable inflow of FDI as a share of GDP. Needless to say, if the establishment of new firms cannot take place or is very costly due to government regulations, fewer firms are set up (at least in the formal sector) and the spillovers are less likely to take place.

TABLE 5

FDI and Growth, Top 20 per cent Most Regulated Countries by Sub-components (GMM)

TABLE 6

FDI and Growth, Different Threshold Levels for the Disaggregated Sub-components

Finally, we have run several further robustness checks to test the explanatory power of our fundamental hypothesis that the most regulated countries are not likely to take advantage of FDI inflows. For this exercise, we have used two different econometric models. First, we employ the "standard" cross-country growth model for the period from 1975 to 2003.[26] Second, we run level regressions using the log of GDP per capita and FDI stocks (as a percentage of GDP) to analyse the long-term impact of FDI inflows on income levels.[27] Noteworthy for the robustness of our results is that the sign and significance level of the interactive term do not change much in either specification. However, we obtain slightly different results for cut-off points for the top 20 and 30 per cent most regulated countries.[28] While this underlines our basic result, it also indicates that the number of countries (based on our sample) that are less likely to benefit from an increase in FDI inflows fluctuates between these two figures.

5. CONCLUDING REMARKS

In comparison to less regulated countries, our results indicate that more regulated economies are less able to take advantage of the presence of multinational companies. This result is

[26] In fact, in this approach we simply estimate equation (1) using the same control variables as in our analysis.

[27] Results are not shown due to space constraints.

[28] For example, in the level regressions, focussing on the top 30 per cent most regulated countries yields stronger results than those for the top 20 per cent. Yet we also observe declining significance levels of the interactive term as we increase the cut-off point above 30 per cent.

further evidence of the fact that important host country characteristics can lead to a positive impact of foreign investment inflows on growth rates. While Hermes and Lensink (2003), Durham (2004) and Alfaro et al. (2004) have singled out the importance of financial markets, our empirical results support the view that regulations are another fundamental determinant of the beneficial effects of FDI reaped in host economies.

All these results have important policy implications. However, our results do not provide evidence that regulations across *all* countries (included in our sample) matter, but rather, that they restrict growth through foreign investment inflows only in the most regulated economies. Any attempts by government to attract capital in the form of foreign direct investment by offering special tax breaks are not likely to yield the expected beneficial effects if the regulatory quality is rather low. In addition to boosting the regulatory quality and liquidity of financial markets, host countries have to reform their fundamental framework for regulations to enhance chances that FDI inflows can contribute to higher growth rates. Thus, our research results are basically in line with those stressing the need for an adequate institutional framework, in order for trade liberalisation and economic integration to be successful. According to the findings of some recent studies (Rodrik et al., 2004; Borrmann et al., 2006; and Freund and Bolaky, 2008), international trade stimulates growth only in economies with better institutions and less excessive business and labour regulations. Our results lead us to conclude that regulations affect the interaction of FDI and growth rates in a very similar way. To achieve positive welfare effects of FDI inflows, governments first have to tackle the institutional setting and regulatory framework in their countries.

APPENDIX A

Data Sources for all Variables

Variable	Source
Real growth of Gross Domestic Product per capita in per cent	World Bank (2006b)
Gross Domestic Product per capita in international US dollars (PPP)	World Bank (2006b)
Foreign direct investment, net inflows in per cent of GDP	UNCTAD (2007)
Composite regulation index for business regulations, labour market regulations, contract regulations, creditor rights and insolvency regulations, January 2003	World Bank (2006a)
Composite regulation dummy for the 20/30/40/50 per cent most regulated countries in the sample, 0 and 1, January 2003	
Rule of law, 0-6 scale	PRS Group (2007)
Change in consumer prices (CPI), computed as ln (1+CPI average inflation)	World Bank (2006b)
Population growth in per cent	World Bank (2006b)
Government consumption divided by Gross Domestic Product	World Bank (2006b)
Black market premium (BMP) for foreign currency (US Dollar) in per cent, calculated as ln (1+BMP)	World Bank (2007)
Total imports and exports divided by Gross Domestic Product	World Bank (2006b)
Distance from the equator, measured as absolute value of latitude of capital city	World Bank (2007)
Fraction of population speaking a European language	World Bank (2007)
Legal origin dummies for British and French law, 0 and 1	World Bank (2006a)
Average years of secondary schooling, ages 25+	Barro and Lee (2001)
Financial variables	Beck et al. (2000)

APPENDIX B

Descriptive Statistics of the Main Variables

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
GDP per capita growth, current period	84	2.99	1.68	-2.57	8.23
GDP per capita growth, previous period	84	3.36	2.26	-3.33	10.00
FDI inflows, % of GDP, current period	84	2.54	1.85	0.06	8.41
Change over previous period in average FDI inflows	84	1.67	1.72	-1.35	7.14
Regulation index	84	-2.07	0.83	-4.24	-0.42
Change over previous period in average rule of law	84	0.67	1.03	-1.70	3.32
Change over previous period in average inflation rate	84	-0.18	0.61	-3.25	1.14
Change over previous period in average population growth	84	-0.31	0.46	-1.78	0.86
Change over previous period in average government consumption	84	-0.53	3.37	-15.02	10.08
Change over previous period in average black market premium	80	-0.27	0.64	-4.37	0.43
Change over previous period in average trade	84	0.19	0.20	-0.18	0.77
Change over previous period in average years of secondary schooling	75	0.33	0.28	-0.32	1.21

Note: Current and previous period refer to the periods 1994-2003 and 1984-1993, respectively.

APPENDIX C

Country Sample

Albania, Algeria, Argentina, Australia, Austria, Bangladesh, Bolivia, Botswana, Brazil, Bulgaria, Burkina Faso, Cameroon, Canada, Chile, China, Colombia, Democratic Republic of Congo, Republic of Congo, Costa Rica, Cote d'Ivoire, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Finland, France, Germany, Ghana, Greece, Guatemala, Haiti, Honduras, Hungary, India, Indonesia, Iran, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Republic of Korea, Madagascar, Malawi, Malaysia, Mali, Mexico, Morocco, Mozambique, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Pakistan, Panama, Paraguay, Peru, Philippines, Portugal, Saudi Arabia, Senegal, Sierra Leone, Slovak Republic, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Syrian Arab Republic, Thailand, Togo, Tunisia, Turkey, Uganda, United Kingdom, United States, Uruguay, Venezuela, Zambia

REFERENCES

Acemoglu, D., S. Johnson and J. Robinson (2001), 'The Colonial Origin of Comparative Development: An Empirical Investigation', *American Economic Review*, 91, 5, 1369-1401.

Aitken, B. and A. Harrison (1999), 'Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela', *American Economic Review*, **89**, 3, 605-618.

Alfaro, L., A. Chanda, S. Kalemli-Ozcan and S. Sayek (2004), 'FDI and Economic Growth: The Role of Local Financial Markets', *Journal of International Economics*, **64**, 1, 89-112.

Balasubramanyam, V., M. Salisu and D. Sapsford (1996), 'Foreign Direct Investment and Growth in EP and IS Countries', *Economic Journal*, **106**, 434, 92-105.

Barro, R. and J.-W. Lee (2001), 'International Data on Education Attainment: Updates and Implications', *Oxford Economic Papers*, **53**, 3, 541-563.

Beck, T., A. Demirgüç-Kunt and R. Levine (2000), 'A New Database on Financial Development and Structure', *World Bank Economic Review*, **14**, 3, 597-605.

Blomström, M. (1986), 'Foreign Investment and Productive Efficiency: The Case of Mexico', *Journal of Industrial Economics*, **35**, 1, 97-110.

Borensztein, E., J. De Gregorio and J.-W. Lee (1998), 'How Does Foreign Direct Investment Affect Economic Growth?', *Journal of International Economics*, **45**, 1, 115-135.

Borrmann, A., M. Busse and S. Neuhaus (2006), 'Institutional Quality and the Gains from Trade', *Kyklos*, **59**, 3, 345-368.

Busse, M. (2004), 'Transnational Corporations and Repression of Political Rights and Civil Liberties: An Empirical Analysis', *Kyklos*, **57**, 1, 45-66.

Carkovic, M. and R. Levine (2005), 'Does Foreign Direct Investment Accelerate Economic Growth?', in T. Moran, E. Graham and M. Blomström (eds.), *Does Foreign Direct Investment Promote Development?*, Washington, DC: Institute for International Economics, 195-220.

Caselli, F., G. Esquivel and F. Lefort (1996), 'Reopening the Convergence Debate: A New Look at Cross-country Growth Empirics', *Journal of Economic Growth*, **1**, 3, 363-389.

Caves, R. (1996), *Multinational Enterprises and Economic Analysis*, 2nd ed., Cambridge, UK: Cambridge University Press.

Chakrabarti, A. (2001), 'The Determinants of Foreign Direct Investment: Sensitivity Analyses of Cross-Country Regressions', *Kyklos*, **54**, 1, 89-113.

De Mello, L. R. (1997), 'Foreign Direct Investment in Developing Countries and Growth: A Selective Survey', *Journal of Development Studies*, **34**, 1, 1-34.

Djankov, S. and B. Hoekman (2000), 'Foreign Investment and Productivity Growth in Czech Enterprises', *World Bank Economic Review*, **14**, 1, 49-64.

Djankov, S., R. La Porta, F. López-de-Silanes and A. Shleifer (2002), 'The Regulation of Entry', *Quarterly Journal of Economics*, **117**, 1, 1-37.

Dollar, D. and A. Kraay (2002), 'Institutions, Trade, and Growth', *Journal of Monetary Economics*, **50**, 1, 133-162.

Durham, B. (2004), 'Absorptive Capacity and the Effects of Foreign Direct Investment and Equity Foreign Portfolio Investment on Economic Growth', *European Economic Review*, **48**, 2, 285-306.

Dutt, A. K. (1997), 'The Pattern of Direct Foreign Investment and Economic Growth', *World Development*, **25**, 11, 1925-1936.

Egger, P. (2003), 'Does Contract Risk Impede Foreign Direct Investment?', *Schweizerische Zeitschrift für Volkswirtschaft und Statistik*, **139**, 2, 155-172.

Findlay, R. (1978), 'Relative Backwardness, Direct Foreign Investment and the Transfer of Technology: A Simple Dynamic Model', *Quarterly Journal of Economics*, **62**, 1, 1-16.

Fosfuri, A., M. Motta and T. Ronde (2001), 'Foreign Direct Investment and Spillovers Through Workers' Mobility', *Journal of International Economics*, **53**, 1, 205-222.

Freund, C. and B. Bolaky (2008), 'Trade, Regulations, and Income', *Journal of Development Economics*, forthcoming.

Gastanaga, V., J. Nugent and B. Pashamova (1998), 'Host Country Reforms and FDI Inflows: How Much Difference Do They Make?', *World Development*, **26**, 7, 1299-1314.

Glass, A. J. and K. Saggi (2002), 'Multinational Firms and Technology Transfer', *Scandinavian Journal of Economics*, **104**, 4, 495-513.

Görg, H. and D. Greenaway (2004), 'Much Ado about Nothing? Do Domestic Firms Really Benefit from Foreign Direct Investment?', *World Bank Research Observer*, **19**, 2, 171-197.

Görg, H. and A. Hijzen (2004), 'Multinationals and Productivity Spillovers', GEP Research Paper 2004/41, University of Nottingham.

Hall, R. and C. Jones (1999), 'Why Do Some Countries Produce So Much More Output per Worker than Others?', *Quarterly Journal of Economics*, **114**, 1, 83-116.

Hermes, N. and R. Lensink (2003), 'Foreign Direct Investment, Financial Development and Economic Growth', *Journal of Development Studies*, **40**, 1, 142-163.

Javorcik, B. (2004), ‘ Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers through Backward Linkages’, *American Economic Review*, **94**, 3, 605-627.

Javorcik, B. and M. Spatareanu (2004), ‘Do Foreign Investors Care About Labor Market Regulations?‘, *Review of World Economics*, **141**, 3, 375-403.

Jensen, N. (2003), ‘Democratic Governance and Multinational Corporations: Political Regimes and Inflows of Foreign Direct Investment’, *International Organisation*, **57**, 3, 587-616.

Kleibergen, F. and R. Paap (2006), ‘Generalized Reduced Rank Tests Using the Singular Value Decomposition’, *Journal of Econometrics*, **127**, 1, 97-126.

Klein, M., J. Peek and E. Rosengren (2002), ‘Troubled Banks, Impaired Foreign Direct Investment: The Role of Relative Access to Credit‘, *American Economic Review*, **92**, 3, 664-682.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer and R. Vishny (1998), ‘Law and Finance’, *Journal of Political Economy*, **106**, 6, 1113-1155.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer and R. Vishny (1999), ‘The Quality of Government’, *Journal of Law, Economics, and Organization*, **15**, 1, 222-279.

Li, X. and X. Liu (2005), ‘Foreign Direct Investment and Economic Growth: An Increasingly Endogenous Relationship’, *World Development*, **33**, 3, 393-407.

Mansfield, E. and A. Romeo (1980), ‘Technology Transfer to Overseas Subsidiary by US-based Firms’, *Quarterly Journal of Economics*, **95**, 4, 737-750.

Markusen, J. (2002), *Multinational Firms and the Theory of International Trade*, Cambridge, MA: MIT Press.

Markusen, J. and A. Venables (1999), 'Foreign Direct Investment as a Catalyst for Industrial Development', *European Economic Review*, **43**, 2, 335-356.

Pica, G. and J. Rodríguez Mora (2005), 'FDI, Allocation of Talents and Differences in Regulation', Economics Department, University of Salerno, mimeo.

PRS Group (2007), 'About ICRG: The Political Risk Rating' (Available at http://www.icrgonline.com/page.aspx?page=icrgmethods).

Ram, R. and K. H. Zhang (2002), 'Foreign Direct Investment and Economic Growth: Evidence from Cross-Country Data for the 1990s', *Economic Development and Cultural Change*, **51**, 1, 205-214.

Rodríguez-Clare, A. (1996), 'Multinationals, Linkages, and Economic Development', *American Economic Review*, **86**, 4, 851-873.

Rodrik, D., A. Subramanian and F. Trebbi (2004), 'Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development', *Journal of Economic Growth*, **9**, 2, 131-165.

Stock, J. H., J. H. Wright and M. Yogo (2002), 'A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments', *Journal of Business & Economic Statistics*, **20**, 4, 518-29.

UNCTAD (1999), *World Investment Report: Infrastructure for Development*, New York and Geneva: United Nations.

UNCTAD (2007), Foreign Direct Investment Database (online) (Available at http://www.unctad.org/Templates/Page.asp?intItemID=1923&lang=1).

Wheeler, D. and A. Mody (1992), 'International Investment Location Decisions: The Case of US Firms', *Journal of International Economics*, **33**, 1/2, 57-76.

Whyman, P. and M. Baimbridge (2006), 'Labour Market Flexibility and Foreign Direct Investment', UK Department of Trade and Industry, Employment Relations Occasional Paper URN 06/1797.

World Bank (2006a), *Doing Business in 2006: Understanding Regulation*, World Bank and Oxford University Press: Washington, DC.

World Bank (2006b), World Development Indicators 2006, Data on CD-ROM, World Bank: Washington, DC.

World Bank (2007), Global Development Network Growth Database (Available at http://www.worldbank.org/research/growth/GDNdata.htm).

World Economic Forum (2006), *Global Competitiveness Report 2005-2006*, Houndmills, Basingstoke, Hampshire: Palgrave Macmillan.

TABLE 1

Correlation Matrix

Variable	Regulation index, 2003	ln GDP per capita, PPP $, 2003	GDP per capita growth rate, 1994-2003[1]	FDI inflows, % of GDP, 1994-2003[1]
Regulation index, 2003	1.00			
ln GDP per capita, PPP $, 2003	-0.66	1.00		
GDP per capita growth rate, 1994-2003[1]	-0.33	0.32	1.00	
FDI inflows, % of GDP, 1994-2003[1]	-0.34	0.27	0.32	1.00

Note: [1]Annual average.

TABLE 2

FDI and Growth, Top 20 per cent Most Regulated Countries (GMM)

	Dependent Variable: Growth in current period					
	(1)	(2)	(3)	(4)	(5)	(6)
Change over previous period in ln(FDI/GDP)	0.563***	0.386**	0.409***	0.384***	0.416**	0.382**
	[0.152]	[0.152]	[0.133]	[0.149]	[0.164]	[0.153]
Regulation dummy*Change over previous period	-0.517**	-0.469*	-0.511**	-0.402	-0.450*	-0.446*
in ln(FDI/GDP)	[0.231]	[0.264]	[0.247]	[0.255]	[0.266]	[0.265]
Growth in the previous period	0.404***	0.479***	0.425***	0.472***	0.479***	0.486***
	[0.088]	[0.083]	[0.084]	[0.082]	[0.086]	[0.081]
Change over previous period in average:						
Rule of law	0.988***	0.907***	0.773***	0.905***	0.913***	0.926***
	[0.326]	[0.289]	[0.278]	[0.281]	[0.290]	[0.297]
Investment	-0.097	-0.042	-0.051	-0.028	-0.018	-0.031
	[0.081]	[0.079]	[0.070]	[0.081]	[0.079]	[0.075]
Population growth	0.467	0.499	0.604	0.492	0.483	0.471
	[0.443]	[0.516]	[0.480]	[0.492]	[0.508]	[0.525]
Years of secondary school		0.791	0.673	0.965*	0.8	0.844
		[0.536]	[0.519]	[0.499]	[0.571]	[0.556]
Trade share			1.466*			
			[0.834]			
Government share				0.084		
				[0.056]		
Inflation rate					0.316	
					[0.369]	
BMP						0.215
						[0.355]
Observations	84	75	75	75	75	75
Global FDI effect is null (Chi^2)	0.05	0.13	0.20	0.01	0.02	0.07
p-value	0.82	0.72	0.65	0.94	0.90	0.79
Shea partial R^2 (first-stage)/*F*-test:						
Change over previous period in ln(FDI/GDP)	0.30/12.3	0.30/12.5	0.31/8.8	0.32/13.3	0.30/10.7	0.31/8.4
Regulation dummy*Change in ln(FDI/GDP)	0.48/5.4	0.48/16.2	0.48/15.9	0.50/9.3	0.49/38.7	0.47/6.5
Growth in the previous period	0.29/35.6	0.41/28.6	0.43/21.2	0.43/32.7	0.41/27.9	0.44/29.2
Change over previous period in average Rule of Law	0.20/3.9	0.33/10.1	0.32/8.8	0.33/8.1	0.35/8.4	0.34/6.5
Change over previous period in average Investment	0.37/5.5	0.41/5.5	0.41/5.7	0.42/6.1	0.41/5.0	0.41/5.6
Hansen-*J* overidentification test (Chi^2)	10.04	9.18	9.71	10.35	9.08	8.92
p-value	0.26	0.33	0.29	0.24	0.34	0.35
Kleibergen-Paap underidentification test (Chi^2)	19.69	17.2	16.53	18.28	16.01	17.42
p-value	0.02	0.05	0.06	0.03	0.07	0.04

Notes: Absolute values of heteroskedasticity-consistent standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%. Endogenous variables: (1) Change over previous period in FDI, (2) Regulation dummy*Change over previous period in FDI, (3) Growth in the previous period, (4) Change over previous period in Rule of Law; and (5) Change over previous period in Investment. Excluded instruments: Levels at beginning of previous period of (1) GDP per capita, (2) FDI, (3) Rule of Law, and (4) Investment rates; (5) dummy for British legal system; (6) dummy for French legal system; (7) fraction of the population speaking a European language; (8)-(12) interactions of both legal dummies and levels of former instruments, and (13) lagged change over previous period in FDI interacted with regulation dummy.

TABLE 3

Robustness Checks

	Dependent Variable: Growth in current period					
	(1)	(2)	(3)	(4)	(5)	(6)
Change over previous period in ln(FDI/GDP)	0.561***	0.273*	0.346**	0.471***	0.303**	0.745***
	[0.137]	[0.141]	[0.137]	[0.138]	[0.153]	[0.193]
Regulation dummy*Change over previous period in ln(FDI/GDP)	-0.476**	-0.608**	-0.73***	-0.563**	-0.522*	-0.81***
	[0.231]	[0.258]	[0.258]	[0.244]	[0.276]	[0.293]
Growth in the previous period	0.135	0.280***	0.326***	0.375***	0.505***	0.179*
	[0.117]	[0.096]	[0.090]	[0.113]	[0.088]	[0.098]
Change over previous period in average:						
Rule of law	0.650***	0.941***	0.931***	0.980***	0.515	1.107***
	[0.233]	[0.250]	[0.256]	[0.281]	[0.313]	[0.253]
Years of secondary school	2.168***	1.649***	1.349**	0.759	2.039**	1.517**
	[0.737]	[0.635]	[0.599]	[0.533]	[0.806]	[0.692]
Investment	0.063	0.02	0.035	-0.099	0.012	-0.024
	[0.127]	[0.092]	[0.093]	[0.063]	[0.081]	[0.078]
Population growth	-0.129	-0.12	0.008	0.753	0.53	0.346
	[0.606]	[0.513]	[0.513]	[0.500]	[0.472]	[0.514]
Liquid liabilities	7.949***					
	[2.968]					
Private sector credit		5.034***				6.409***
		[1.736]				[1.495]
Bank credit			3.133**			
			[1.339]			
Trade share				1.084		
				[2.001]		
Private sector credit*FDI						-2.32***
						[0.876]
Observations	53	62	62	75	75	62
Global FDI effect is null (Chi^2)	0.12	1.59	2.14	0.17	0.69	1.34
p-value	0.73	0.21	0.14	0.67	0.41	0.25
Shea partial R^2 (first-stage)/*F*-test:						
Change over previous period in ln(FDI/GDP)	0.49/8.5	0.48/8.6	0.48/8.7	0.33/11.4	0.30/24.2	0.27/10.7
Regulation dummy*Change in ln(FDI/GDP)	0.47/3.7	0.47/3.2	0.47/3.4	0.47/16.0	0.48/13.1	0.47/3.8
Growth in the previous period	0.42/19.8	0.49/28.0	0.53/29.1	0.28/25.9	0.41/54.6	0.41/28.5
Change over prev. period in av. Rule of law	0.56/12.4	0.37/6.3	0.39/6.5	0.31/9.0	0.33/9.7	0.31/5.1
Change over prev. period in av. Investment	0.40/3.7	0.45/4.1	0.46/3.9	0.45/7.1	0.40/11.9	0.47/5.4
Change over prev. period in av. Financial variables	0.26/9.2	0.39/6.4	0.45/6.2			0.48/17.6
Change over prev. period in av. Trade				0.20/4.5		
Change over prev. period in av. Years of sec. school					0.50/11.9	
Change over prev. period in Priv. sector credit *ln(FDI/GDP)						0.20/1.4
Hansen-*J* overidentification test (Chi^2)	8.02	10.53	10.71	11.12	8.62	7.61
p-value	0.43	0.23	0.22	0.27	0.38	0.67
Kleibergen-Paap underidentification test (Chi^2)	8.82	14.21	21.95	9.11	17.05	9.64
p-value	0.45	0.12	0.01	0.52	0.05	0.56

Notes: Absolute values of heteroskedasticity-consistent standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%. Additional endogenous variables: column (1) Change over previous period in Liquid Liabilities, column (2) Change over previous period in Private Sector Credit, column (3) Change over previous period in Bank Credit, column (4) Change over previous period in Trade, column (5) Change over previous period in Years of Secondary School and column (6) change over previous period in private sector credit interacted with change over previous period in FDI. Additional instruments: levels of endogenous variables at the beginning of the previous period. See Table 2 for further notes.

TABLE 4

FDI and Growth, Different Threshold Levels for the Aggregated Regulation Dummy

Percentage of most regulated countries for the cut-off point of the regulation dummy	Number of regressions where interactive term FDI*Regulation Dummy is negative and significant[1]		
	Basic Specifications	Extended Specifications (Robustness)	Total (12 regressions)
Top 20 per cent	5/6 (6 out of 6)	6/6 (6 out of 6)	11/12(11 out of 12)
Top 30 per cent	3/6	6/6	9/12
Top 40 per cent	1/6	5/6	6/12
Top 50 per cent	1/6	4/6	5/12

Note: [1]10 per cent significance level or better.

TABLE 5

FDI and Growth, Top 20 per cent Most Regulated Countries by Sub-components (GMM)

	Dependent Variable: Growth in current period				
	Starting a business	Labour market regulations	Contract enforcement	Creditor rights	Closing a business
Change over previous period in ln(FDI/GDP)	0.381**	0.357**	0.225	0.174	0.258*
	[0.148]	[0.178]	[0.152]	[0.151]	[0.137]
Regulation dummy*Change over previous period in ln(FDI/GDP)	-0.572**	-0.161	-0.115	0.226	-0.194
	[0.226]	[0.168]	[0.289]	[0.158]	[0.241]
Growth in the previous period	0.506***	0.501***	0.572***	0.558***	0.560***
	[0.079]	[0.084]	[0.081]	[0.076]	[0.071]
Change over previous period in average:					
Rule of law	0.738**	0.654**	0.839***	0.767***	0.582**
	[0.296]	[0.255]	[0.289]	[0.274]	[0.254]
Investment	0.004	0.023	0.038	0.03	0.032
	[0.062]	[0.064]	[0.067]	[0.064]	[0.063]
Population growth	0.202	0.156	0.236	0.146	0.059
	[0.471]	[0.401]	[0.406]	[0.388]	[0.361]
Years of secondary school	0.783	0.900*	0.542	0.803	0.748
	[0.531]	[0.493]	[0.509]	[0.518]	[0.488]
Observations	75	75	75	75	75
Global FDI effect is null (Chi^2)	0.80	3.93	0.21	6.12	0.06
p-value	0.37	0.05	0.65	0.01	0.80
Shea partial R^2 (first-stage)/*F*-test:					
Change over previous period in ln(FDI/GDP)	0.29/18.4	0.29/23.7	0.28/8.1	0.24/9.7	0.32/9.9
Regulation dummy*Change over previous period in ln(FDI/GDP)	0.51/121.1	0.61/160.3	0.45/2.7	0.73/4.4	0.66/6.4
Growth in the previous period	0.39/43.7	0.38/41.7	0.39/29.2	0.39/23.9	0.47/41.4
Change over previous period in average Rule of Law	0.26/5.6	0.27/5.7	0.24/6.1	0.26/4.6	0.29/4.0
Change over previous period in average Investment	0.43/4.4	0.47/16.7	0.40/4.8	0.40/6.3	0.45/4.9
Hansen-*J* overidentification test (Chi^2)	10.63	8.67	11.94	10.47	11.6
p-value	0.22	0.37	0.15	0.16	0.17
Kleibergen-Paap underidentification test (Chi^2)	16.19	17.78	15.13	14.29	15.22
p-value	0.06	0.04	0.09	0.08	0.09

Notes: Absolute values of heteroskedasticity-consistent standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%. See Table 2 for further notes.

TABLE 6

FDI and Growth, Different Threshold Levels for the Disaggregated Sub-components

Percentage of most regulated countries for the cut-off point of the regulation dummy	Number of regressions where interactive term FDI*Regulation Dummy is negative and significant[1]			
	Starting a business	Labour market regulations	Closing a business	Contract enforcement
Top 20 per cent	12/12	4/12	2/12	0/12
Top 30 per cent	10/12	4/12	1/12	0/12
Top 40 per cent	10/12	4/12	1/12	2/12
Top 50 per cent	7/12	1/12	1/12	2/12

Note: [1]10 per cent significance level or better.

FIGURE 1

FDI Inflows and GDP Growth Rates, 1994-2003