ECONOMIC RESEARCH FORUM
منتدى البحوث الاقتصادية
2013

working paper series

THE GROWTH EFFECTS OF GREENFIELD INVESTMENT AND MERGERS AND ACQUISITIONS: ECONOMETRIC INVESTIGATION AND IMPLICATION FOR MENA COUNTRIES

Philipp Harms and Pierre-Guillaume Méon

Working Paper No. 794

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November 2013

We are indebted to seminar participants at Lille, Reading, the Deutsche Bundesbank, the GSEFM workshop in Mainz, the AEL conference in Berlin, and the ERF conference in Cairo for helpful comments.

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First published in 2013 by
The Economic Research Forum (ERF)
21 Al-Sad Al-Aaly Street
Dokki, Giza
Egypt
www.erf.org.eg

Abstract

We explore the effect of foreign direct investment on economic growth in developing countries, distinguishing between mergers and acquisitions ("M&As") and "greenfield" investment. A simple model underlines that, unlike greenfield investment, M&As partly represent a rent accruing to previous owners, and do not necessarily contribute to expanding the host country's capital stock. Greenfield FDI should therefore have a stronger impact on growth than M&A sales. This hypothesis is robustly supported by our empirical results, which show that greenfield FDI enhances growth, while M&As have no effect, at best, in a panel of up to 78 developing and emerging countries over 1987-2005.

JEL Classifications: F21, F23, F43, O16.

Keywords: Growth, foreign direct investment, mergers and acquisitions, greenfield investment.

ملخص

نستكشف تأثير الاستثمار الأجنبي المباشر على النمو الاقتصادي في البلدان النامية، مع التمييز بين عمليات الاندماج والاستحواذ والاستثمار "التأسيسي". هناك نموذج بسيط يؤكد أنه، وبخلاف الاستثمارات التأسيسة، تمثل جزئيا الإيجار التي تعود على أصحابها السابقين، ولا تساهم بالضرورة فى توسيع رأس المال في البلد المضيف. ولذلك ينبغي أن يكون للاستثمار الأجنبي المباشر التأسيسي تأثير أقوى على النمو من المبيعات. ويدعم هذه الفرضية بقوة من خلال النتائج التجريبية لدينا، والتي تظهر أن الاستثمار الأجنبي المباشر التأسيسي يعزز النمو، في حين أن عمليات الاندماج والشراء ليس لها أي تأثير، في أحسن الأحوال، في مسح لمدة تصل إلى 78 النامية والبلدان الناشئة خلال 1987-2005.

1. Introduction

Foreign direct investments (FDIs) are usually considered a desirable form of capital inflow. First, they are believed to directly add to the host countries' capital stock and to substantially contribute to the transfer of managerial and technological expertise (Kose et al. 2010; Poole forthcoming). Second, they are presumed to be more stable and less prone to reversals than other forms of capital flows (Levchenko and Mauro 2007; Tong and Wei 2009). For these reasons, FDI is often viewed as the financial equivalent of "good cholesterol" (Hausmann and Fernández-Arias 2001) or the "poster child for the benefits of financial globalization" (Kose et al. 2006, 27).

Given the overall enthusiasm for FDI, it is not surprising that numerous studies have tried to identify the empirical effect of FDI on growth (e.g. Borensztein et al. 1998; Alfaro et al. 2004/2010; Carkovic and Levine 2005; Blonigen and Wang 2005; Lensink and Morrissey 2006; Aizenman et al. 2011). However, to date no consensus has emerged on whether the expected positive influence can actually be found in the data. In their metastudy, Doucouliagos et al. (2010) report that only 43% of the regressions they survey record a significantly positive coefficient, while 17% are significantly negative and 40% are insignificant. These diverse results may reflect the heterogeneity of studies in terms of methodologies, samples and specifications. What is often overlooked, though, is that not only is empirical work on FDI heterogeneous, FDI itself is.

The official benchmark definition of FDI specifies that a financial-account transaction is counted as FDI if a company's stake in a subsidiary exceeds ten percent (OECD 2008a). However, this definition pools together two very different forms of foreign investments: *greenfield investment*, whereby foreign investors build a new productive unit from scratch, and *mergers and acquisitions* (M&As), whereby foreign investors acquire existing assets. While the former implies an accumulation of capital, the latter is essentially a transfer of ownership. These two forms of foreign investments are fundamentally different, and there is no reason to believe, *a priori*, that their effects on host countries' capital stock, productivity, and growth are the same. This, however, is the restriction that standard regressions impose when they relate growth to total FDI inflows, and it is the gap we are trying to fill with this paper.

Distinguishing between greenfield investment and M&A sales is particularly important for developing countries: in these countries, the average reliance on FDI flows has increased remarkably over the past decades. During the same period, their relative importance has also varied substantially across countries.[1] Accounting for the *composition* of FDI flows may therefore improve our understanding of the relationship between financial liberalization and a country's growth performance. This, in turn, may offer guidance on whether public policies should target a particular form of FDI or encourage all forms of direct investment.

To our knowledge, the distinction between greenfield investment and M&As has so far only been addressed by Calderón et al. (2004) and Wang and Wong (2009). However, both studies focused on the short-run impact that both types of FDI have on growth and output, and therefore might run the risk of putting too much emphasis on business-cycle fluctuations. In contrast, we want to explore whether the two types of FDI differ in their effect on long-run growth. To achieve this goal, we start in section 2 by presenting a simple model that supports the conjecture that greenfield FDI and M&A sales have different effects on future output. While in both cases the entry of foreign firms raises aggregate productivity, greenfield FDI expands the host country's capital stock, whereas M&A sales partly represent a rent that accrues to the firms' previous owners without resulting in additional investment. We thus

[1] In section 3, we will present data both on the overall evolution and on the composition of FDI inflows.

conclude that a dollar of greenfield FDI has a stronger impact on the growth of output than a dollar of M&As. After a look at the data in section 3, we describe our empirical strategy in section 4. Section 5 reports the results of the growth regressions we ran using a panel data set that comprises a large number of developing countries and emerging markets. Our empirical results show that greenfield FDI has a significantly positive effect on economic growth, while M&As do not. As we demonstrate, this finding is robust across various definitions of greenfield FDI and across various subsamples. Moreover, it is neither driven by reverse causality nor by unobserved heterogeneity. Section 6 discusses and summarizes the implications for the MENA region and section 7 concludes the paper.

2. A Model of Greenfield Investment, M&As and Growth

In this subsection, we develop a simple model to analyze how the impact of a given volume of FDI on economic growth depends on the *nature* of this FDI. Our model shares several features with the framework developed by Nocke and Yeaple (2007/2008)—in particular, the notion that setting up a new plant through greenfield FDI is associated with a one-time fixed cost while the acquisition of an existing plant through a M&A is not. However, while the contributions of Nocke and Yeaple explore the influence of firm characteristics on the choice of entry mode, we take this decision as given and focus on the growth effects of the different types of FDI.

The economy we consider consists of *n* symmetric sectors. Every sector allows for a continuum of firms indexed on the unit interval, each of which produces a differentiated good whose price is set on world markets and normalized to one. Whether a firm actually starts producing depends on its profitability. Firms are monopolists, and a firm's output at time *t*, y_t, is proportional to its profits, i.e. $y_t = \gamma \pi_t$ with $\gamma > 1$. Profits, in turn, are proportional to productivity, i.e. $\pi_t = \theta A$. In the spirit of the contributions of Melitz (2003) and Helpman et al. (2004), the firm-specific productivity parameter A varies across firms. For simplicity, we assume that it is constant over time, and uniformly distributed on the unit-interval. The parameter θ, by contrast, depends on firm ownership: we assume that $\theta = 1$ if the firm is owned by domestic residents, and $\theta = \theta^F > 1$ if it is owned by foreigners.[2] Setting up a new firm is associated with a one-time sunk cost κ, which is identical across sectors.

In what follows, we will first consider the set of firms and sectoral output in *financial autarky*, i.e. before foreign investors are allowed to enter the domestic economy. We then allow for FDI inflows into all sectors, distinguishing between two "regimes": In the "greenfield FDI regime", foreign investors are free to set up new firms, while the existing domestic firms keep being run by their domestic owners. In the "M&A regime", by contrast, all existing domestic firms in a sector are sold to foreign investors. We allow for the possibility that FDI into different sectors follows different regimes, but we assume that all FDI in a given sector follows the same regime.[3] Our goal is to explore whether the impact of a given volume of FDI on sectoral output growth depends on the nature of this FDI, i.e. the choice of regime, and how the different types of FDI affect the growth of the entire economy.

[2] The idea that foreign firms have a productivity advantage has been central to the theory of multinational firms since the early contributions on this topic, such as Caves (1974) and Hymer (1976). While the evidence on the relationship between foreign ownership and productivity is mixed for industrialized countries (Griffith 1999; Griffith et al. 2004; Benfratello and Sembenelli 2006; Schiffbauer et al. 2009); there is strong evidence that multinational firms in developing countries are characterized by a higher productivity (Aitken and Harrison 1999; Arnold and Javorcik 2009; Harrison and Rodríguez-Clare 2010) and that they pay higher wages (Velde and Morrissey 2003; Lipsey and Sjöholm 2004; OECD 2008b).

[3] In contrast to Nocke and Yeaple (2007/2008), we thus treat foreign investors' choice of entry mode as exogenous.

To determine the number of firms that are active in financial autarky, we observe that there is a critical productivity level $\hat{A}$, which has to be exceeded to give a domestic investor an incentive to start a new firm. This threshold value is determined by the fact that the present value of future operating profits must equal the fixed cost of setting up the firm. It is implicitly defined by the following equation:

$$\sum_{t=1}^{\infty}\left(\frac{1}{1+r}\right)^{t}\pi\left(\hat{A}\right)=\kappa^{H} \tag{1}$$

In (1), the left hand side (LHS) represents the value of the firm, given by the stream of future profits, which are discounted at a constant interest rate *r*. The right hand side (RHS) reflects the fixed costs incurred by domestic investors. The superscript *H* indicates that these costs may be different for domestic and foreign investors. Using the fact that $\pi = A$, it is easy to show that the threshold value $\hat{A}$ is characterized by:

$$\hat{A}=r\,\kappa^{H} \tag{2}$$

Hence, only firms with $A \geq \hat{A}$ are operating under financial autarky. We assume that $\hat{A} < 1$, i.e. there are *some* domestic firms operating in the initial situation. Note that the threshold value $\hat{A}$ remains constant as long as κ^{H} and *r* do not change, which we assume. The value of sectoral output under financial autarky at any point in time *t* is given by the following expression:

$$Y_t=\int_{\hat{A}}^{1}\gamma\,A\,dA \tag{3}$$

where the lower boundary $\hat{A}$ is defined by (2).

At the end of period *t*, the sector is opened up to FDI inflows from abroad. In the greenfield FDI regime, foreign investors are allowed to set up new firms, while existing firms keep operating.[4] To determine the volume of sectoral FDI in that regime, we observe that there is a critical productivity level $\tilde{A}$, which a potential firm has to exceed to attract a foreign investor. Allowing for the possibility that the sunk costs for foreign investors (κ^{F}) differ from κ^{H}, we can derive the following expression:

$$\tilde{A}=\frac{r\,\kappa^{F}}{\theta^{F}} \tag{4}$$

We focus on the interesting case where $\hat{A} > \tilde{A}$.[5] This condition requires that the productivity advantage of foreign-owned firms dominates a potential disadvantage in setting up a firm abroad, i.e. $\kappa^{F}/\theta^{F} < \kappa^{H}$. It is in line with the traditional theory of multinational firms which posits that foreign firms must have a productive advantage to compensate for the cost of the initial investment (Caves 1974; Hymer 1976).

The volume of period-*t* greenfield FDI in a given sector is equal to the sum of all fixed costs that foreign investors incur to start new firms:

$$FDI_t^{GRF}=\int_{\tilde{A}}^{\hat{A}}\kappa^{F}\,dA \tag{5}$$

[4] For simplicity, we abstract from the possibility that foreign producers crowd out domestic firms, and also ignore potential productivity spillovers from foreign to domestic firms.

[5] Without this assumption, foreign investors would have no incentive to enter the domestic market, and FDI inflows would be zero.

Under the greenfield FDI regime, the sector's output in period t+1 is given by:

$$Y_{t+1}^{GRF} = \int_{\hat{A}}^{1} \gamma A dA + \int_{\tilde{A}}^{\hat{A}} \gamma \theta^F A dA \tag{6}$$

with $\hat{A}$ given by (2), and $\tilde{A}$ by (4). Note that, due to our assumption that $\hat{A} > \tilde{A}$, greenfield investment expands the range of goods produced in the sector under consideration, i.e. there is an adjustment at the *extensive margin.*

While the greenfield FDI regime is characterized by foreign investors setting up *new* firms, the M&A regime is characterized by *existing* firms in a sector being sold to foreign owners. In that regime, the volume of FDI inflows does not reflect aggregate fixed costs, but foreign investors' willingness to pay. This willingness, in turn, reflects firms' value, which is equal to the present value of their future profits.[6] Total FDI in a given sector at time t under the "M&A regime" is then given by:

$$FDI_t^{M\&A} = \int_{\hat{A}}^{1} \frac{\theta^F A}{r} dA \tag{7}$$

and sectoral output in period t+1 is defined by:

$$Y_{t+1}^{M\&A} = \int_{\hat{A}}^{1} \gamma \theta^F A \, dA \tag{8}$$

The lower boundary of the integral in (8) implies that the M&A regime does not result in an adjustment at the extensive margin, i.e. the set of operating firms is left unchanged. However, in contrast to the greenfield FDI regime, *all* firms in the sector benefit from the productivity advantage associated with foreign ownership.

Our goal is to determine, which type of FDI has a stronger impact on sectoral output. This is stated in the following lemma:

Lemma 1: Writing $\frac{Y_{t+1}^k}{Y_t} = \beta^k \frac{FDI_t^k}{Y_t}$ with $k \in \{GRF, M\&A\}$, it holds that $\beta^{GRF} > \beta^{M\&A}$.

Proof: See the Appendix.

The economic intuition behind our finding is straightforward: while both types of FDI are growth-enhancing (since foreign ownership comes along with higher productivity), the additional sectoral output generated *per dollar of FDI* is higher in the greenfield FDI regime. This is because, in this case, the initial payment of greenfield investors is smaller than the firms' value (which is proportional to its output), while M&A inflows exactly reflect this value, generating a rent for their previous owners. Hence, engaging in M&As—i.e. purchasing an existing firm—is more expensive than setting up a firm from scratch in our model, and this depresses the ratio of future output to FDI.

Lemma 1 states that—for a given amount of FDI—a sector's output growth is higher if the sector adopts the greenfield FDI regime than in case of the M&A regime. What is left to do is to characterize the relationship between *economy-wide* greenfield FDI and M&A sales (as a share of total output) and the aggregate growth rate. This is accomplished by aggregating sector growth rates, which leads to the following proposition:

[6] We assume that every firm meets an infinite number of potential buyers, such that all the bargaining power rests with the seller, and the firm's price reflects the buyers' reservation price.

Proposition 1: The total volume of greenfield FDI (relative to GDP) has a stronger effect on aggregate output growth than the total volume of M&A sales (relative to GDP).

Proof: See the Appendix.

Our model highlights a particular reason why greenfield FDI and M&A sales may differ in their impact on growth, and offers a result that readily lends itself to an empirical test. Obviously, our strong conclusion rests on a set of simplifications—most notably, the partial-equilibrium nature of our analysis as well as the fact that, unlike in Nocke and Yeaple (2007/2008), the choice of FDI type in a given sector is exogenous. However, we believe that the basic insight that every dollar of greenfield FDI expands productive capacity while a share of M&A sales merely represents a rent to incumbent owners would still prevail in a more sophisticated framework.

Still, some of the assumptions on which our analysis was based may not be satisfied, and this may either reinforce or dampen the superior impact of greenfield FDI. On the one hand, we have abstracted from spillover effects, through which the presence of foreign multinationals may enhance the productivity of domestic firms.[7] If greenfield FDI is associated with stronger spillovers—e.g. because new plants are more innovative and technology-intensive than existing ones (Marin and Bell 2006; Marin and Sasidharan 2010)—the discrepancy between the two types of FDI in terms of their effect on growth may be even stronger than suggested by our model.

On the other hand, our theoretical framework may be too harsh on M&As by assuming that the proceeds from the sale of domestic firms are spent on anything but capital.[8] If a share of those proceeds is spent on domestic investment then M&As will also contribute to capital accumulation, and this may affect the ranking of the two types of FDI. Finally, the growth effects of greenfield FDI may be weaker or even negative if new firms disrupt existing domestic supply chains (Rodríguez-Clare 1996), or reduce the productivity of domestic firms (Aitken and Harrison 1999). Again, this would imply that the difference between greenfield FDI and M&A sales is muted or even reversed.

3. Greenfield FDI vs. Mergers and Acquisitions: A First Look at the Data

Data on total FDI inflows and on sales of assets associated with mergers and acquisitions (M&A sales) is provided by UNCTAD (2007/2008) for a large number of countries. We follow Calderón et al. (2004) and Wang and Wong (2009) in defining greenfield FDI inflows as the difference between total FDI inflows and M&A sales.

A look at figure 1 suggests that M&A sales as a share of total FDI in developing countries increased substantially around the turn of the millennium—due to, probably, a wave of mergers and acquisitions in the context of large-scale privatizations. Conversely, the stark decline of M&As in the years 2002 and 2003 is in line with the notion that business-cycle and financial conditions in the US and Europe may be important determinants of this type of capital inflow, as di Giovanni (2005) argues. Total FDI, in contrast, has proven to be quite resilient during this period.

Our approach to interpret the difference between total FDI inflows and M&A sales as greenfield investment is straightforward if we are inspired by a model in which all FDI takes

[7] See the discussion in Blomström and Wolff (1994), Aitken and Harrison (1999), Javorcik (2004), Haskel et al. (2007), as well as Keller and Yeaple (2009).

[8] Recall that once existing firms have been sold in the M&A regime, domestic investors, knowing their low productivity level, have no incentive to further expand the set of firms. Mencinger (2003) presents some evidence for EU candidate countries that sales of domestic assets were spent on consumption and imports. This suggests that our notion is not too far-fetched, and that the proceeds from privatizations largely go to consumption.

place simultaneously and reflects either the acquisition of domestic firms or the setting up of new subsidiaries by foreign multinationals. However, when taking this model to real-world data, we need to address a number of potential problems. First, there might be an issue with the timing of transactions. As UNCTAD (2007, p.92) emphasizes, "[...] M&A statistics are those at the time of the closure of the deals, […]. The M&A values are not necessarily paid out in a single year." To mitigate that problem, we transform our data into five-year averages. The rationale for choosing that strategy is that the bulk of the value of announced deals should be disbursed by the end of a five-year period.

The second issue concerns the fact that a large share of FDI flows reflects payments *within* existing firms. The IMF defines total FDI inflows as the sum of equity purchases, reinvested earnings, and other capital flows—with the latter predominantly reflecting intra-company loans. Given this disaggregation, it is not obvious that the difference between total FDI and M&A sales coincides with the conventional idea of (capital-stock enhancing) greenfield investments. To gauge the relative importance of these components, figure 2a offers a more detailed view on FDI inflows to developing countries and emerging markets for the time span we consider. While this data is taken from the IMF's Balance of Payments Statistics, figure 2b presents the data provided by UNCTAD, with greenfield FDI defined as the difference between total FDI inflows and M&A sales.

First, these figures illustrate that the IMF's and UNCTAD's data on aggregate FDI inflows roughly coincide.[9] They also show that, while the contribution of reinvested earnings and other capital is important, equity inflows represent by far the largest component of total FDI. Finally, for our derivation of greenfield FDI to make sense, equity inflows should be at least as large as M&A sales. A comparison of figures 2a and 2b confirms this conjecture.

Nevertheless, our interpretation of the difference between total FDI inflows and M&A sales might be contested. It might be argued that, while equity inflows and reinvested earnings add to a (new or existing) firm's capital stock, this does not necessarily apply to intra-company loans labeled as "other capital" in the IMF's statistics. To meet this challenge, we will later test the robustness of our empirical results to using alternative measures of greenfield FDI: as a first alternative to our standard measure—the difference between total FDI inflows and M&A sales—we will remove *other capital* inflows from total FDI inflows before subtracting M&A sales. This purges our measure of greenfield FDI from its intra-company loan component. The second alternative defines greenfield investment as the difference between FDI-related equity inflows (as reported in the IMF's balance-of-payments statistics) and M&A sales, thus removing the *other capital* and the *reinvested earnings* component of FDI. As we will demonstrate, the alternative definitions of greenfield FDI yield qualitatively similar results.

4. A Disaggregated View on the Growth Effects of FDI: Empirical Strategy and Data

4.1 The Regression Equation

In what follows, we will estimate variants of the following regression equation:

$$\ln y_{it} - \ln y_{i,t-1} = \alpha + \beta \ln y_{i,t-1} + \gamma\ FDI_{it}^{M\&A} + \delta\ FDI_{it}^{Greenfield} + \sum_{k=1}^{N} \varphi_k x_{it}^k + \xi_t + \varepsilon_{it} \qquad (9)$$

where the LHS is the growth rate of real per-capita GDP in country *i* over a five-year period, $\ln y_{i,t-1}$ is the (log of) initial per-capita GDP at the start of that period, $FDI_{it}^{M\&A}$ and $FDI_{it}^{Greenfield}$ are the two types of FDI inflows—mergers and acquisitions sales and "greenfield

[9] At the country level, the correlation between quinquennial FDI inflows from the two sources is 99.7 percent.

FDI" relative to GDP—in that period.[10] The set of control variables x_{it}^{k} that is used to avoid omitted variable bias will be described below. The time dummies ξ_t are meant to capture period-specific effects—such as global growth surges and recessions—that might blur the separate effect of FDI. Since the disturbance ε_{it} possibly does not have a constant variance, and since it is potentially correlated across time periods, our inference will be based on a cluster-robust covariance matrix. Later on, we will also add fixed effects to account for unobserved heterogeneity. Moreover, we will confront the potential endogeneity of FDI with respect to growth by estimating (9) by two-stage least squares (2SLS).

Using five-year averages in growth regressions has been suggested by Islam (1995) as well as Caselli et al. (1996). While the question whether a quinquennial structure is appropriate for discovering long-run growth effects might be debated, using a panel data set instead of the purely cross-sectional structure as in Barro (1991) offers the huge advantage of potentially controlling for unobserved heterogeneity.

4.2 Data

Our data set comprises 78 low-income and middle-income countries.[11] Since we are predominantly interested in the growth effects of the M&A-type FDI and greenfield-type FDI —with the latter defined as the difference between total FDI inflows and M&A sales—our sample is constrained by the availability of this data. As reported in section 3, data on M&A sales as well as data on total FDI inflows are provided in the UNCTAD's World Investment Report (UNCTAD 2007/2008), and are available on an annual basis since 1987. To estimate the parameters of equation (9), we use the intervals 1987-90, 1991-95, 1996-2000, 2001-05.[12]

As for the normalization of FDI flows, we divide five-year averages of M&A/greenfield FDI (in current US dollars) by average GDP (in current US dollars) in the same interval. This yields the variables $FDI_{it}^{M\&A}$ and $FDI_{it}^{Greenfield}$. To demonstrate that our results do not hinge on that particular choice, we will also explore the effect of FDI relative to the recipient country's *population*.

We will report the results of using a *small* set of control variables and a *large* set of control variables.[13] The *small* set of control variables consists of growth determinants suggested by the human-capital augmented Solow model, as introduced by Mankiw et al. (1992): the average years of secondary schooling in the population, the average share of investment in GDP and the average population growth rate. As suggested by neoclassical growth theory, we expect secondary schooling and the investment share to have a positive effect on growth, while the population growth rate should have a negative effect.[14] For the large set of control

[10] Our results do not hinge on our decision to use FDI (net) *inflows* instead of *total* net FDI flows—i.e. the difference between net inflows and net outflows. While some "emerging market multinationals" have engaged in large-scale foreign investment in the recent past, FDI outflows are negligible for most of the countries and years in our sample. This is also reflected by a high correlation of 99 percent between (net) FDI inflows and total (net) FDI flows.

[11] We start by excluding countries with less than one million inhabitants. As we will demonstrate below, this choice is inconsequential for our main results.

[12] Since data on M&A inflows is only available from 1987 on, the five-year average for the 87-90 period is actually a four-year average. As we will show below, our results do not hinge on this adjustment and do not change if we omit the first period.

[13] Details on the definition and the sources of all variables as well as summary statistics are given in the Data Appendix.

[14] Since greenfield FDI adds to the overall capital formation in the recipient economy it would be ideal to separately consider the growth effects of FDI and domestic investment. However, disentangling these two poses numerous challenges—in particular, since the respective data are collected by different institutions, following different rules etc. We decided to include both FDI and total investment (as a share of GDP) in the regression in

variables, we add the average inflation rate (in logs), a standard measure of trade openness—exports plus imports relative to GDP—as well as the Investment Profile indicator from the International Country Risk Guide, which reflects the risk of expropriation and of other activities that infringe on investors' property rights. Finally, we include a dummy for oil-exporting countries and regional dummies.[15]

5. A Disaggregated View on the Growth Effects of FDI: Results

5.1 Benchmark Results

While our focus is on the differential effect of greenfield FDI and M&As, we start by regressing growth on *total* FDI inflows relative to GDP and our control variables. The result is displayed in column (1.1) of table 1. It turns out that total FDI has a significantly positive effect on growth: increasing average FDI/GDP over a five-year period by one percentage point raises growth during that period by 1.56 percentage points. This corresponds to an increase in the annual growth rate of roughly 0.3 percentage points—a non-negligible effect, which is much larger than the effect of the overall investment/GDP ratio.

Column (1.2) of table 1 suggests that the influence of total FDI is predominantly driven by its greenfield component: while the coefficient of greenfield FDI is significantly positive and higher than the coefficient of total FDI, M&A sales do not have a significant effect on growth.

The discrepancy between the two coefficients becomes even more pronounced when we add the other control variables in column (1.3). The coefficient of M&A sales now turns negative—though insignificant—while the coefficient of greenfield FDI increases substantially: raising greenfield FDI over GDP by one percentage point raises average annual growth by almost 0.5 percentage points.[16]

To check whether our results were driven by our definition of greenfield FDI as the difference between total FDI inflows and M&A sales, we used alternative approaches to identify greenfield FDI (see the discussion at the end of section 3). Column (1.4) in table 1 reports the results we got when we removed "other capital" inflows—mostly intra-company loans—from total FDI inflows before subtracting M&A sales. For the results displayed in column (1.5), we used the difference between "equity inflows" (as reported by the IMF's Balance of Payments Statistics) and M&A sales, thus removing both intra-company loans and reinvested earnings from our definition of greenfield FDI. While the first approach resulted in a somewhat lower coefficient of greenfield investment and the second approach in a somewhat higher coefficient, the qualitative results from column (1.3) were largely unaffected.

Our model suggests relating the two types of FDI *divided by GDP* to countries' subsequent growth. However, this is not the only way to control for country size, and we wanted to test whether our main qualitative finding still occurs when we use total population to control for country size. Column (1.6) documents that we still find a substantial discrepancy between the two types of FDI when we look at inflows per capita.

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order to avoid *overrating* the effect of greenfield FDI: if greenfield FDI and total investment are positively correlated, the coefficient of greenfield FDI would be biased *upward* in a specification that omits total investment. Conversely, the coefficient of greenfield FDI is likely to *underrate* the impact of foreign investment if FDI is part of total investment. Taking a conservative stance, we considered the latter problem the lesser of two evils.

[15] To improve the readability of our tables, we do not display the coefficients of the oil dummy, the regional and time dummies, as well as the constant. Those results are available upon request.

[16] A test of the hypothesis that the coefficients of the two types of FDI are identical yielded an F-statistic of 9.05, suggesting that the hypothesis could be rejected at the one-percent level.

Finally, we checked whether the results yielded by our linear specification are hiding some nonlinear influence of FDI, as suggested, e.g. by Borensztein et al. (1998), Alfaro et al. (2004) or Wang and Wong (2009). However, interacting total FDI or its components with a measure of human capital (secondary schooling), a measure of financial development (the volume of domestic credit to the private sector relative to GDP), the International Country Risk Guide's measure of corruption, or the Freedom House index of political rights did not suggest that the marginal effect of FDI depends on any of these variables. In particular, we could not reproduce the finding by Wang and Wong (2009) that the impact of M&A sales increases the stock of human capital.[17]

While the result that greenfield FDI has a stronger effect on growth than M&A sales is in line with our model's predictions, the finding that M&A sales have *no effect at all* comes as a surprise. To explain this observation, we have to go beyond the model. First, our benevolent view of the productivity advances that come along with foreign ownership may not always be supported by the facts: if the transfer of firm ownership takes place in times of crises, foreign investors need not be characterized by a higher ability to run a firm. They may simply have access to the cash that is denied to the firms' owners (Krugman 2000; Loungani and Razin 2001). Moreover, there may be adverse macroeconomic consequences of M&A-related capital inflows which dominate any productivity gain at the firm-level. As argued by Prasad et al. (2007) as well as Rodrik and Subramanian (2009), financial integration may do more harm than good by resulting in a real appreciation that reduces domestic firms' international price competitiveness.[18] While our model does not spell out such effects, its logic is compatible with this line of reasoning: while greenfield FDI does not generate any extra revenue for domestic residents—a plausible interpretation of the initial fixed cost would be that it simply reflects the imports of foreign machinery—M&A sales generate a rent to the firms' previous domestic owners. his rent is not spent on investment, since all attractive investment opportunities have already been exhausted. Hence, M&A sales are likely to result in increased consumption which, in turn, may result in a real appreciation. If this appreciation dominates the potentially productivity-enhancing effect of foreign ownership, M&A sales do not have a positive influence on growth.

5.2 Alternative Estimators

The findings presented in table 1 may be biased due to country-specific variables, which are correlated with the regressors and which we could not account for explicitly (i.e. unobserved heterogeneity), or due to a reverse causal relationship between growth and FDI. To solve the problem of unobserved heterogeneity, we estimated equation (9) using the fixed effects (FE) estimator. Column (2.1) in table 2 gives the results, indicating that our previous findings were not driven by omitted variable bias: while the coefficient of greenfield FDI is somewhat lower relative to the pooled OLS result, it is still quite close to the previous point estimate and— contrary to the coefficient of M&A sales—statistically significant.

In a next step, we tackled the (potential) endogeneity problem head-on by using the two-stage-least squares (2SLS) estimator: we started by instrumenting greenfield FDI while treating M&A sales as exogenous. The instruments we used are: the initial number of telephone main lines per 1000 inhabitants as a measure of a country's infrastructure, and a dummy for landlocked countries. Both variables are likely to enhance the profitability of new plants by facilitating communication and transport. Moreover, we used the initial *stock* of FDI relative to GDP and the lagged growth rate of a weighted average of trading partners'

[17] These findings are not reported in a separate table, but are available upon request.

[18] The detrimental effect of an overvalued (real) exchange rate on economic growth is further explored by Rodrik (2008) who shows empirically that it results in an inflated nontradables sector and lower growth. Eichengreen (2008) makes a similar point.

GDP, which document the presence of production networks and prosperous export markets, respectively. Finally, we used the Fraser Institute's "Legal structure and Security of Property Rights" index, and the International Country Risk Guide's measure of corruption to account for the fact that a bad institutional environment reduces a country's attractiveness for new investment. These instruments are likely to influence greenfield FDI, but unlikely to affect growth beyond what is already captured by the Investment Profile indicator, which is a broad measure of the security of property rights. The relatively high first-stage F-statistic of 7.78 indicates that our instruments are jointly relevant—a conjecture that is also confirmed by the low p-value of the Kleibergen-Paap test for underidentification. Finally, the p-value associated with Hansen's J-test shows that we cannot reject the hypothesis that the instruments are exogenous. In addition to the J test which checks the joint exogeneity of *all* instruments—i.e. the hypothesis that they do not affect growth beyond the effect already captured by the control variables—we also ran "difference-in-Sargan" tests on *individual* instruments. For none of the variables could we reject the null hypothesis of exogeneity. [19] The results in column (2.2) are interesting for (at least) two reasons: first, contrary to our expectations, using the 2SLS estimator results in a coefficient that does not differ too much from the OLS results. In fact, a formal test for the endogeneity of greenfield investment prevents us from rejecting the null hypothesis that this variable is actually exogenous.[20] Second, the coefficient resulting from 2SLS estimation is somewhat *higher* than the coefficient from OLS estimation in column (1.3), suggesting that—if it is biased at all—the OLS estimator *under*rates the influence of greenfield investment on growth. To control whether our results are an artifact of using weak instruments, we finally used the conditional likelihood ratio (CLR) approach developed by Moreira (2003) in order to compute confidence intervals and p-values that are robust with respect to weak instruments. The resulting estimates allow us to reject the null hypothesis that the coefficient of greenfield FDI is actually zero at the one-percent level.

In a next step, we instrumented M&A sales (relative to GDP), while treating greenfield FDI as exogenous.[21] The instruments we used capture factors that should be conducive to the acquisition of domestic firms by foreign investors: the development of domestic financial markets, proxied by the volume of domestic credit to the private sector relative to GDP (lagged by one period), the initial urban population as a share of the total population to reflect the presence of financial centers and the availability of firms to be acquired, and the Freedom House index of civil liberties to account for the conjecture that more repressive regimes are unlikely to encourage foreign ownership of domestic firms. Again, these instruments perform reasonably well in terms of relevance and exogeneity. Column (2.3) of table 2 shows that the point estimate of the coefficient of M&A FDI increases substantially when we use the 2SLS estimator, indicating that the OLS estimator yielded biased estimates. This observation is supported by a formal test, which suggests that, in the case of M&A inflows, we have to reject the hypothesis of exogeneity. However, the standard error of this variable is too high to conclude a significant influence—a finding that is confirmed when we compute weak-instrument robust standard errors following Moreira (2003).

[19] These results are available upon request.

[20] The test is based on the difference of two Sargan–Hansen statistics: one for the equation in which the instrumented variable is treated as endogenous, and one in which it is treated as exogenous. It yielded a p-value of 0.22, suggesting that, for greenfield FDI, we cannot confidently reject the null hypothesis of exogeneity.

[21] Eichengreen (2008,19) argues that "the literature on mergers and acquisitions (a form of FDI) suggests that such activity depends on the internal resources of firms in the acquiring countries.[...] Hence, there will be a component of FDI in emerging markets that is exogenous with respect to economic conditions there." However, we did not want to take this conjecture for granted.

When we treated *both* FDI variables as potentially endogenous, using the instruments described above, our previous results were mostly supported.[22] However, the coefficient of M&A FDI in column (2.4) is much lower compared to a specification that treated greenfield FDI as exogenous, and the test for endogeneity of M&A FDI no longer allows us to reject the hypothesis that mergers and acquisitions are exogenous. However, given the poor fit of the entire set of instruments as documented by the low F-statistics, this result has to be read with caution.

Column (2.5) finally presents the results of applying the Blundell-Bond (1998) systems GMM estimator to equation (9). The rationale for using this estimator is that this equation can be rewritten as

$$\ln y_{it} = \alpha + (1+\beta)\ln y_{i,t-1} + \gamma\ FDI_{it}^{M\&A} + \delta\ FDI_{it}^{Greenfield} + \sum_{k=1}^{N}\varphi_k x_{it}^k + \xi_t + \varepsilon_{it}\,, \qquad (10)$$

which reveals the presence of a lagged dependent variable on the RHS. Applying the fixed effects estimator to such an equation results in biased estimates, since the error term is mechanically correlated with one of the regressors (Nickell 1981). The systems-GMM estimator reacts to this problem by combining two equations: a first-differenced version of (10) is estimated using lagged levels of the regressors as instruments, and the original equation is estimated using lagged differences as instruments. Comparing the results in column (2.5) with those in column (2.1) indicates that ignoring the "Nickell bias" indeed led us to under-estimate the coefficient of the lagged dependent variable. More importantly, using the systems-GMM estimator also supports our key results that greenfield FDI has a significantly positive influence on growth while M&As have no effect. Interestingly, the estimated coefficient for $FDI_{it}^{Greenfield}$ is between the findings from the fixed effects and the 2SLS estimation and does not differ too much from the original OLS results.

5.3 Varying Samples

In order to explore whether the previous results were driven by a particular set of data points, we estimated equation (9) for various subsamples. We used the OLS estimator to run these regressions, but—given the findings of the previous subsection—also used 2SLS, treating M&A inflows as a potentially endogenous variable. As reported at the bottom of table 3, we cannot reject the hypothesis that M&A inflows are *exogenous* for any of those subsamples.

Columns (3.1) and (3.2) report the results of excluding upper-middle-income and low-income countries, respectively. While this modification chops off roughly 20 percent of all observations, our key findings are essentially unchanged: greenfield FDI has a significantly positive effect on growth while there is no such effect for M&As, with the influence of greenfield FDI being somewhat weaker in the "richer" subsample. These results hold regardless of whether we are using OLS or 2SLS.

As column (3.3) demonstrates, including "small" countries in the sample slightly increases the number of observations without altering our results. Column (3.4) reports the effect of focusing only on the years after the end of the cold war, i.e. from 1991 onward. Again, despite a substantial reduction of the sample, our qualitative findings are largely unscathed. Finally, we removed episodes in which countries where characterized by extreme macroeconomic instability, i.e. by an inflation rate of more than 40 percent.[23] Again, the coefficient of greenfield FDI, reported in column (3.5) of table 3, does not deviate too much

[22] Interestingly, the instruments that have a significant influence on greenfield FDI have no effect on M&A sales and vice versa.

[23] The threshold value of 40 percent was adopted following Reinhart and Rogoff (2004) who characterize countries during such episodes as "freely falling".

from the benchmark result, while M&A sales stay insignificant.[24] Given these results, we conclude that our key findings are robust with respect to various perturbations of the sample.

6. Implications for the MENA region

In this section, we first discuss the growth performance of MENA. We then describe the flows of FDI to the MENA region, and compare them to the flows to other regions. We then simulate the potential impact of increasing those flows on the region's growth.

6.1 Growth in MENA

Figure 3 displays the evolution of the growth rate of MENA's GDP per capita over the period of study, as reported in the World Bank's World Development Indicators database. The region's growth rate fluctuated wildly over the period of study. Starting from negative values in the second half of the eighties, the region's growth rate rose in the beginning of the nineties and remained positive, except in 1993. It was particularly high in the late 2000s, but showed signs of decline in 2009.

Figure 4 complements the previous figure by comparing the regional average growth rates of GDP per capita. MENA's growth rate over the period amounted to 1.57 percent, which is the median of reported growth rates. It was larger than the growth rate of Europe and Central Asia (0.98 percent), and of Sub-Saharan Africa (0.55 percent). It was of similar magnitude but larger than the growth rate of Latin America and the Caribbean (1.25 percent). It was similar but smaller than the growth rate of North America (1.57 percent). Most of all, it was considerably smaller than the growth rate of South Asia (4.05 percent) or East Asia and the Pacific (7.20 percent).

MENA's growth performance may therefore be considered as disappointing. Its growth was slightly lower than North America's, despite the level of GDP in North America consisting of countries with a much higher level of GDP per capita. When compared to South Asia or to East Asia and the Pacific, MENA's performance looks even more disappointing.

6.2 FDI flows to MENA

Figure 5 describes the evolution of the ratio of total FDI to GDP in various regions over the 1986-2010 period. Regional indexes are defined as averages of the ratios of individual countries for which data is available. They therefore describe the average country's ratio, rather than the ratio computed for each region as a whole.

Over that period, the ratio of total FDI to GDP for MENA exhibits a rising trend. It amounted to half a percent (0.51%) in the second half of the 1980s and reaches 5.51 percent in the last period under study.

Roughly speaking, the rising trend of FDI in the MENA region mimics that of other developing regions, such as East Asia and Pacific, Europe and Central Asia, Latin America and the Caribbean, South Asia, or Sub-Saharan Africa. Strikingly, that trend did not reverse in the early 2000s, when global FDI collapsed following the end of the internet bubble. The only regions where one can observe a reduction of total FDI inflows following the explosion of the bubble are North America and Western Europe.

Figure 5 not only allows comparing the evolution but also the absolute volume of FDI to each region. At the end of the period, the volume of FDI to the MENA region reached 5.56 percent, which ranks the average MENA country third in the sample. Only Latin American and the Caribbean (7.2 percent) and East Asia and Pacific (5.62 percent) exceed that level. The total amount of FDI received by the average MENA country is larger than what the

[24] The fact that the exclusion of "freely falling" episodes does matter for *some* variables is illustrated by the considerable drop of the t-statistic for the inflation rate. This echoes the finding of many growth regressions that the negative effect of inflation is predominantly driven by episodes of very high inflation (Barro 1995).

average Sub-Saharan country received (4.39 percent). It is one order of magnitude larger than what the average South Asian country received (1.71 percent).

What the average MENA country received is of a similar order of magnitude as, but slightly larger than what North America (4.07 percent) and Western Europe received (5.02 percent). However, both North America and Western Europe were receiving larger amounts of FDI as a share of their GDPs in previous periods, except North America during the first half of the 2000s, following the collapse of the internet bubble.

Our data allow us to split M&As and greenfield investment. Figure 6 describes the evolution of the ratio of M&As to GDP in various regions. Again, regional ratios are defined as country averages.

Over the period of study, the ratio of M&As to GDP in the MENA region follows and upward trend. It rose from 0.01 percent between 1986 and 1990 to 1.10 percent between 2006 and 2010.

The data shows a rising trend in most regions, although fluctuations are also observable, in particular in the first half of the 2000s. Again, the 2001 explosion of the internet bubble put an end to the late 90s mergers wave.

The discrepancies between regions appear to be more marked for M&A flows than for total FDI flows. Over the period of study, Western Europe and North America received more M&A flows than other regions. At the end of the period of study, the volume of M&As reached 3.27 percent in North America, and even 6.12 percent in Western Europe. Over the whole period of study M&A flows to Western Europe and North America were larger than to any other region. Only in the latest period of the study does Latin American and the Caribbean exceed North America.

The performance of the MENA region in attracting greenfield investment contrasts with its performance in attracting M&As. Figure 7 describes the evolution of the greenfield to GDP ratio by region over the period of study.

The trend is clearly rising for the MENA region. The ratio of greenfield investment to GDP in the MENA region rose monotonically from 0.50 percent to 4.46 percent.

Although the trend is also rising in other regions, it is less systematic than the trends observed in total FDI and M&As. Overall, the MENA region was one of the regions receiving the largest amount of greenfield FDI as share of its GDP, especially during the later periods. In the 2006-2010 period, the average MENA country was ranked second, with a ratio of 4.46 percent that was only exceeded by Europe and Central Asia, with a ratio of 4.56 percent.

To complete the description of the FDI flows to the MENA region, we turn to a more qualitative view, and compute the ratio of greenfield investment to total FDI, so as to gauge the distribution of FDI across the two main forms of capital flows. Figure 8 displays the results of our calculations. To interpret the figure correctly, one must bear in mind that greenfield investment was computed as the difference between total flows and M&A flows. FDI inflows can be negative if parent companies repatriate profits without providing new capital.

Over the period of study, the ratio of greenfield investment to total FDI in the MENA region in general fluctuated between 75 and 100 percent. The negative figure for the period 2000-2005 is entirely driven by very large M&A sales in Kuwait during that period. If Kuwait is excluded from the computation, the average greenfield to FDI ratio of the region amounts to 86 percent, which is in line with the ratios of previous periods.

When comparing regions, the ratio of greenfield investment to total FDI in the MENA region is similar to that of other developing regions. It is for instance very similar to the ratio of greenfield investment to FDI in South Asia. North America and Western Europe are the two regions that stand out, with ratios that are much lower than other regions. This finding confirms the common view that M&As are concentrated in a few developed economies.

To summarize the findings of this section, the average MENA country does not stand out as receiving particularly little FDI. The region's performance is, in that respect, similar to the performance of other regions. The composition of FDI flows is, however, more specific. It seems that the region attracts a lot more greenfield investment than mergers and acquisitions. In the next section, we investigate for each country in the region for which we have enough data, how a change in M&A flows may affect its growth rate.

6.3 The impact of increasing FDI flows to the MENA

In this section, we investigate the impact of increasing FDI inflows on the growth rates of countries that belong to the MENA region. To do so, we use the relations estimated in section 5, and consider two types scenarios. In the first type, we assume that MENA countries increase their FDI inflows by one standard deviation of FDI inflows in the sample. We then more modestly consider scenarios where countries can increase their FDI inflows by 50%. In both types of scenarios, we consider separately the impact of raising total FDI flows, then the impact of raising greenfield investment.

All simulations are based on our benchmark estimates reported in table 1, where estimated coefficients are more conservative than in other regressions. We can therefore use them to obtain a lower limit on the impact on growth of increasing FDI flows. Finally, we report estimates for all the MENA countries for which we have data. Those countries are: Algeria, Egypt, Iran, Iraq, Jordan, Lebanon, Libya, Morocco, Oman, Syria, and Tunisia.

Figure 9 reports the outcome of the first scenario. The standard deviation of the FDI to GDP ratio in the sample is 3.02 percent. In the first scenario, we assume that the FDI to GDP ratio increases by 3.02 percentage points over the total period of study. We then compute the increase in growth implied by that increase in FDI inflows using the marginal effect estimated in equation (1.1). Our estimate implies that a 3.02 points increase in the FDI to GP ratio should lead to an additional percentage point in growth. Figure 9 compares the observed and simulated growth rates for MENA countries in the sample. It shows that the growth performances of MENA countries have been diverse, but over the last period of the study, growth rates have been positive everywhere except in Iraq and Oman. The simulated increase in FDI inflows growth rates adds a percentage point to per capita GDP growth in every period. In some cases, like Algeria and Iran between 1986 and 1990, Jordan and Libya between 1991 and 1995, and Oman between 2001 and 2005, the additional percentage point would have sufficed to turn a negative average growth rate into a positive rate.

Figure 10 also considers an additive scenario. This time greenfield investment is increased by one standard deviation. The standard deviation of greenfield FDI to GDP ratio in the sample is 2.62 percent. We again assume that the FDI to GDP ratio increases by 2.62 percentage points over the total period of study. We compute the implied increase in growth implied by that increase in FDI inflows using the marginal effect estimated in equation (1.2). Our estimates imply that growth increases again by a percentage point. Figure 10 reports the observed and simulated growth rates for MENA countries in the sample. Its results are similar to those obtained in the previous scenario. This should not come as a surprise, because our results indicate that greenfield investment is the only component of FDI that has a significant impact on growth.

We now turn from additive to multiplicative scenarios. Now, instead of assuming a constant increase of the FDI to GDP ratio across countries and periods, we more modestly assume a relative increase in FDI flows of 50%. As a result, countries that receive more FDI initially should be affected more.

Figure 11 displays the results of our simulations for total FDI. Overall, the impact of the simulated increase in FDI is smaller than in previous scenarios. This is due to the fact that the countries under study receive relatively little FDI, and that the simulated increase in FDI is therefore smaller than in the previous scenario. Unsurprisingly, the growth rates of countries that receive little FDI are little affected. However, the growth rates of some countries are significantly affected. For instance, Lebanon could have increased its growth rate by 1.73 percentage points between 2001 and 2005 if its FDI inflows had been 50 percent larger. Over the same period, Jordan could have increased its growth rate by 1.03 percentage points. Of course, those countries received large amounts of FDI, which explains their simulated performance. The impact of increasing FDI inflows by 50% remains sizeable for other countries. Over the 2001-2005 period, Morocco could have raised its growth rate by 0.54 percentage point, Oman by 0.34 percentage point, or Egypt by 0.33 percentage point.

Figure 12 displays the reaction of average growth rates to a 50 percent increase in greenfield investment inflows. Again, the impact depends on the initial volume of greenfield investment to the country. This simulation suggests that Lebanon could have added 1.96 percentage points to its growth rate by increasing its volume of greenfield investment by 50 percent during the 2001-2005 period. Beside this extreme example, other countries could also have affected their growth rates. For instance, Jordan or Tunisia could have raised their growth rates by 0.81 and 0.47 percentage points over the same period. Morocco's growth rate would have been 0.21 percentage point higher.

7. Concluding Remarks

Foreign direct investment (FDI) comes in different forms: its greenfield variant implies the creation of *new* productive units, while its M&A variant reflects a change of ownership of already *existing* firms. The goal of this paper was to explore whether the two conceptually different types of FDI differ in their effects on economic growth. Our theoretical analysis suggests that they do. While the volume of greenfield FDI reflects the expansion of the host country's capital stock, M&A sales generate rents for the domestic firms' previous owners which are not channeled into new investment. Despite the productivity gain that is associated with foreign ownership, any dollar of M&A sales therefore has a weaker effect on growth than a dollar of greenfield FDI. Our empirical results support the model's key prediction: the growth effect of greenfield FDI (relative to GDP) is much stronger than the effect of M&A sales. This finding is robust across various estimation methods and subsamples.

Given the model's predictions, our empirical result that M&A sales have *no* growth effect *at all* comes as a surprise. As we have argued above, this may be either due to factors that mute the productivity-enhancing effect of foreign ownership on foreign firms, or it may be due to macroeconomic side effects—e.g. a real appreciation—that run against the potential firm-level increase in productivity. The possible presence of such a "micro-macro paradox" highlights the importance of complementing firm- and industry-level studies by analyses that take a macroeconomic perspective and also capture the aggregate—and possibly harmful—repercussions of M&As.

We believe that further exploring the various transmission channels through which different types of FDI affect growth offers ample scope for future research. Moreover, the large cross-country differences with respect to M&As and greenfield investment demonstrate that we need to further explore the economic and institutional forces that determine the composition of FDI inflows to developing countries.

We have used our estimations to determine the impact that increasing FDI in general, and greenfield investment in particular may have on MENA countries. Overall, those results suggest that increasing FDI inflows, and greenfield investment in particular, may help MENA countries increase their growth rates. The outcome will ultimately depend on the countries' capacity to attract more FDI, and more greenfield investment in particular.

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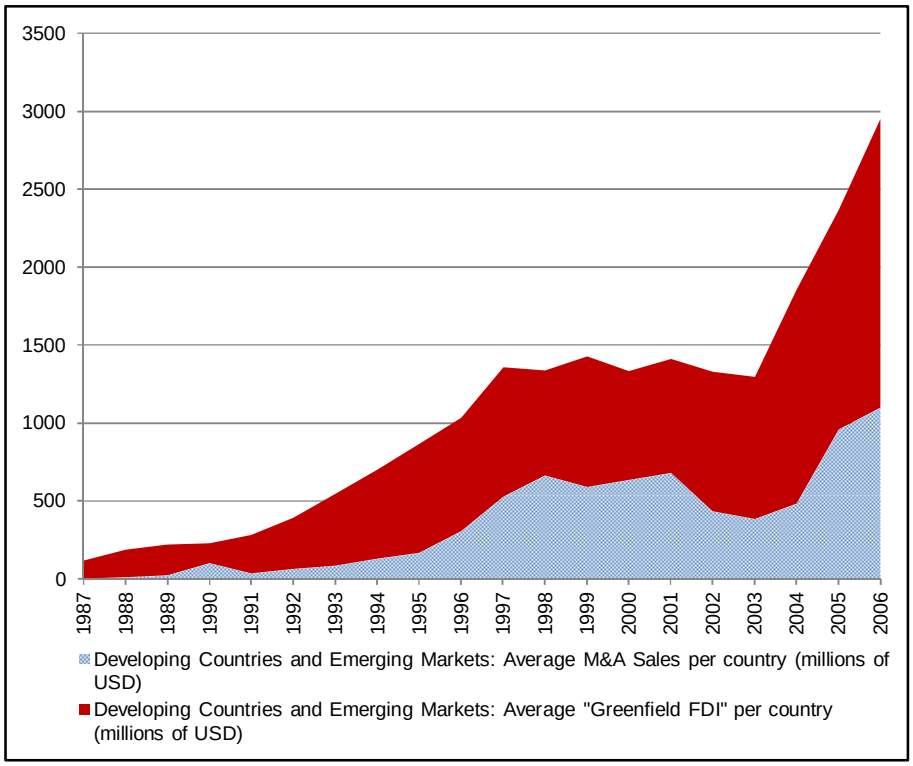
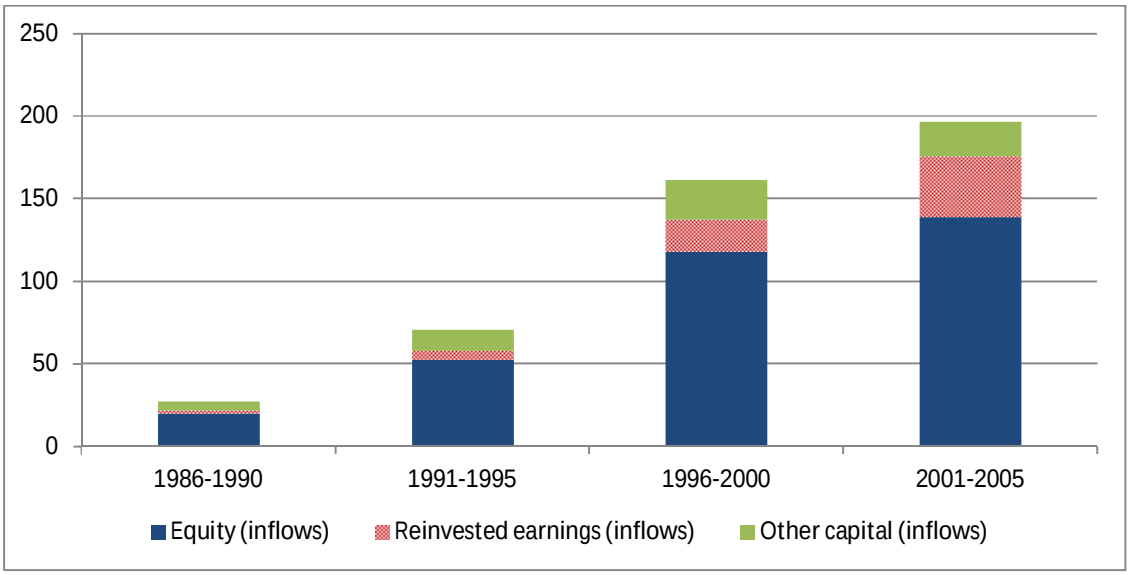
Figure 1: Greenfield FDI and M&A Sales in Developing Countries and Emerging Markets



Source: UNCTAD (2007, 2008).

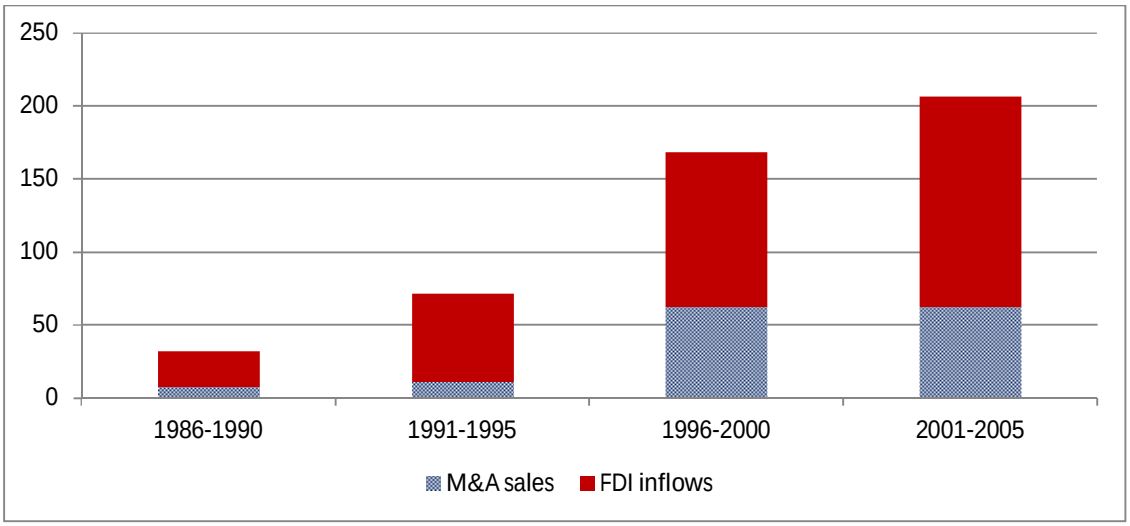
Figure 2: FDI Inflows – Various Disaggregations

Figure 2a: Average total FDI inflows to low- and middle- income countries and its components (billions of US dollars).



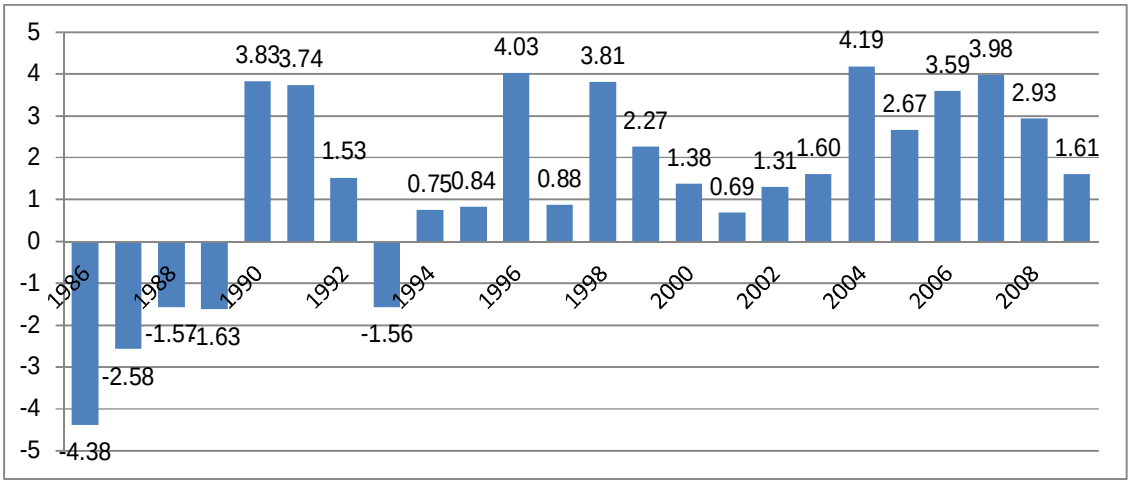
Source: IMF (2009).

Figure 2b: Average total FDI inflows to low-and middle-income countries and its components (billions of US dollars).



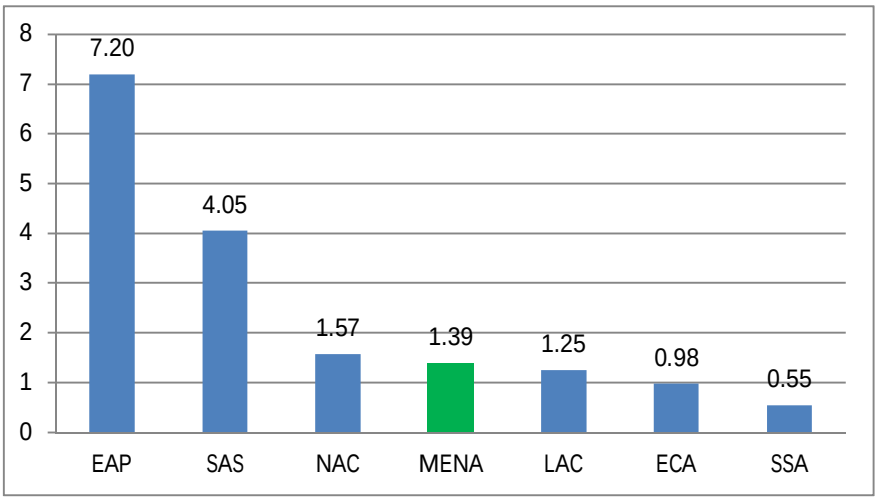
Source: UNCTAD (2007, 2008).

Figure3: Annual Growth Rate of GDP Per Capita in the MENA Region



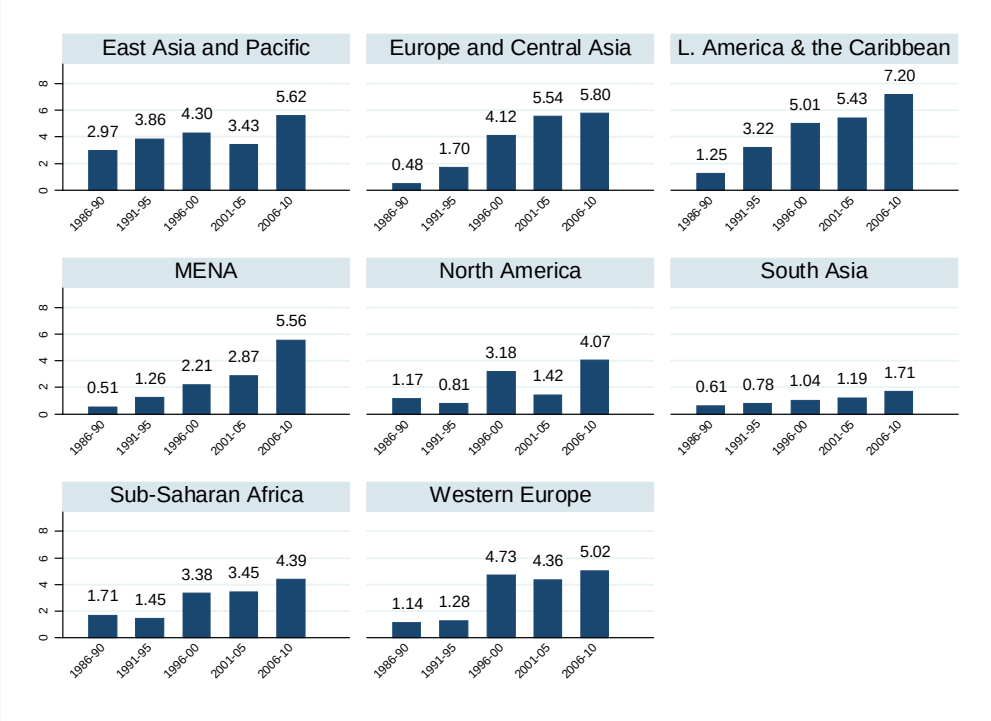
Source: World Development Indicators.

Figure4: Average Growth Rate of GDP Per Capita Across Regions (1986-2009)



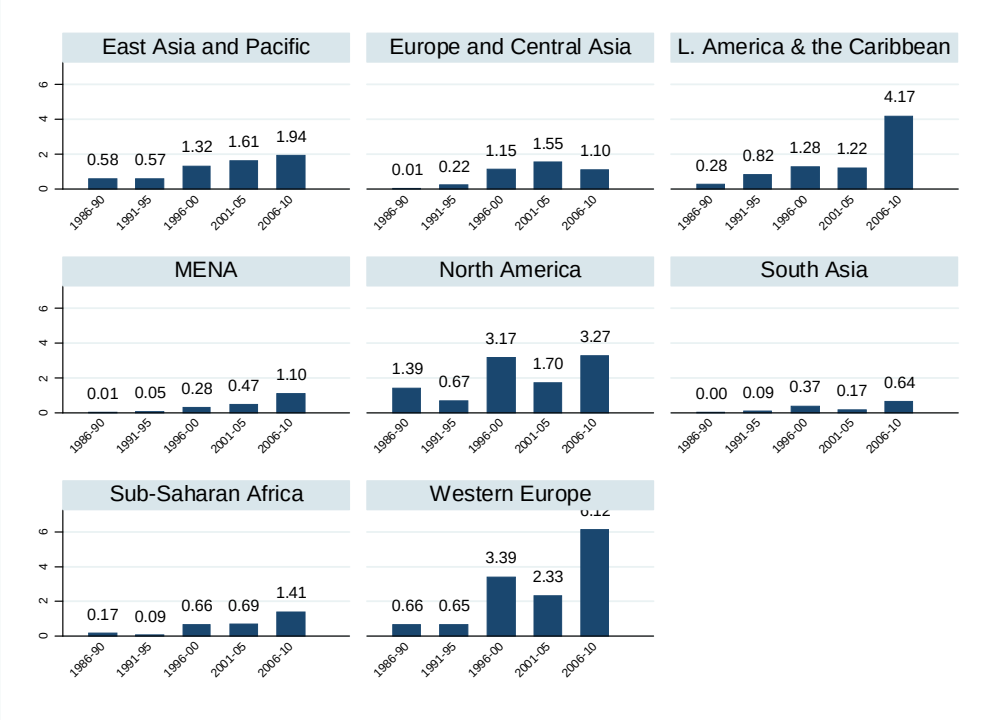
Source: World Development Indicators.

Figure 5: Evolution of Total FDI to GDP by Region (in percent)



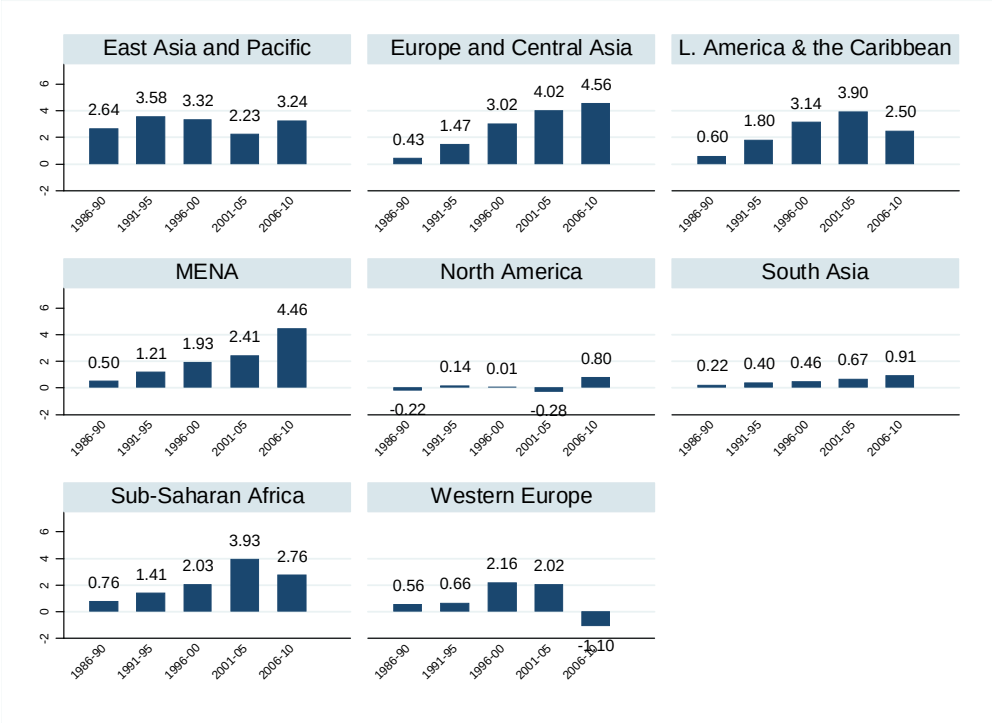
Source: UNCTAD and authors' calculations.

Figure 6: Evolution of the Ratio of M&As to GDP by Region (in percent)



Source: UNCTAD and authors' calculations.

Figure 7: Evolution of the Ratio of Greenfield Investment to GDP by Region (in percent)

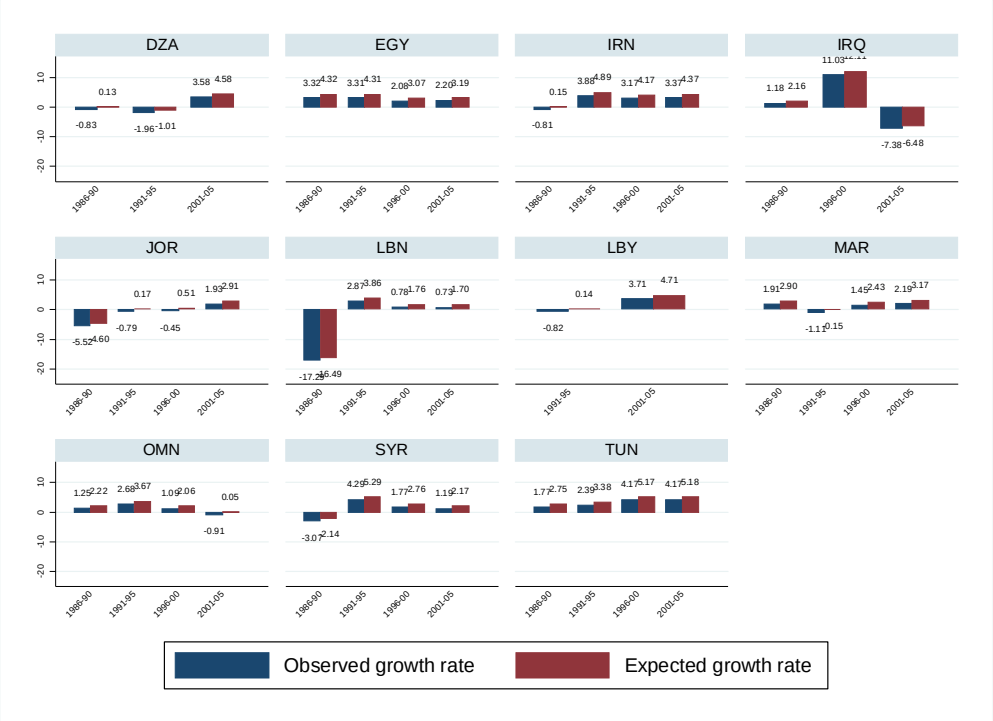


Source: UNCTAD and authors' calculations.

Figure 8: Evolution of the Ratio of Greenfield Investment to total FDI by Region (%)

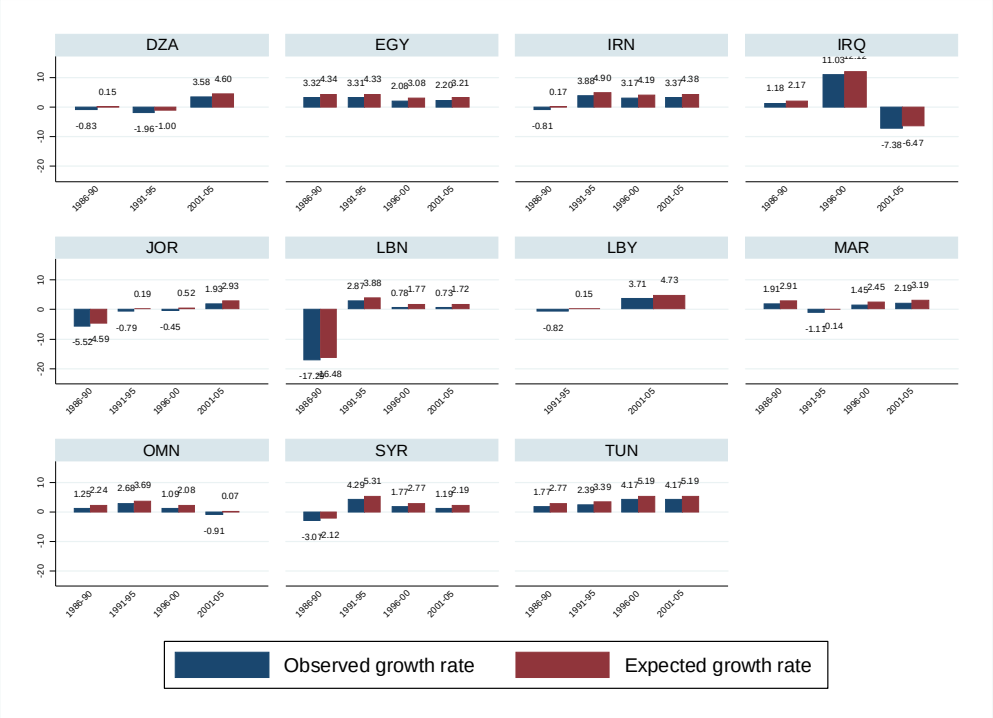
Source: UNCTAD and authors' calculations.

Figure 9: Simulation of an Increase in Total FDI by One Standard Deviation



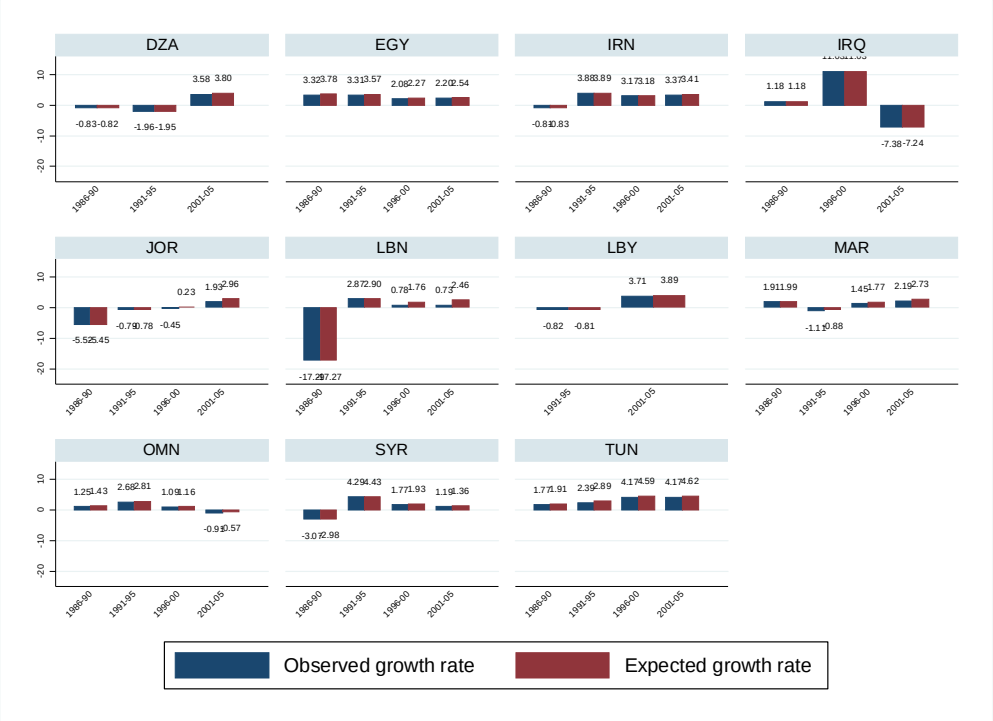
Source: Authors' calculations.

Figure10: Simulation of an Increase in Greenfield Investment by One Standard Deviation



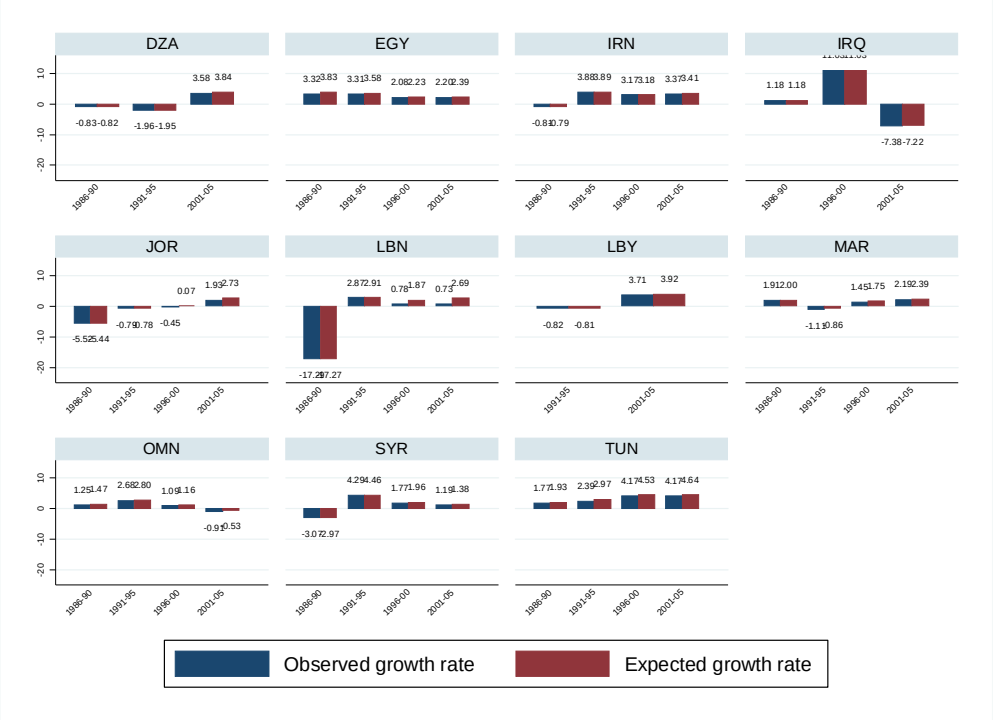
Source: Authors' calculations.

Figure 11: Simulation of an Increase in Total FDI by 50%



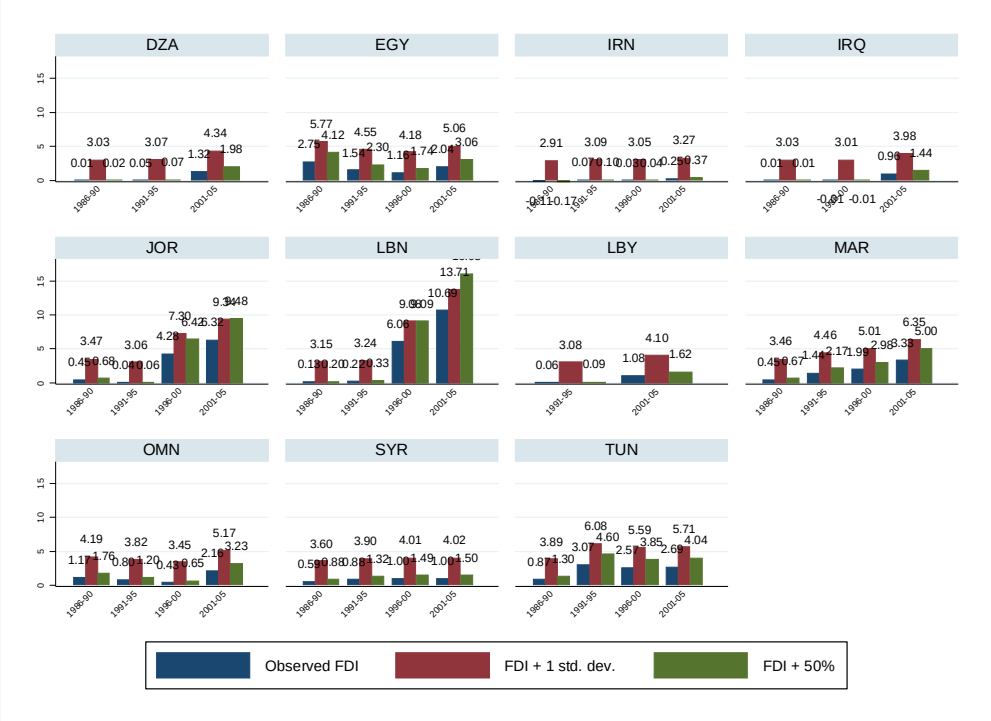
Source: Authors' calculations.

Figure 12: Simulation of an Increase in Greenfield Investment by 50%



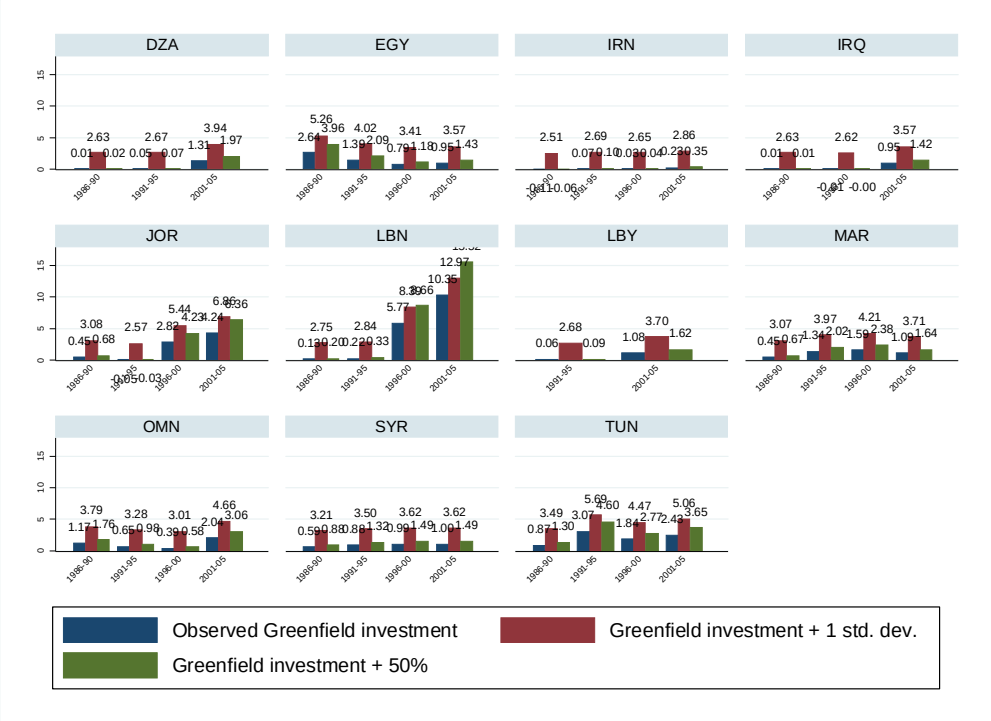
Source: Authors' calculations.

Figure 13: Actual vs. Simulated FDI to GDP Ratios in Percent



Source: Authors' calculations.

Figure 14: Actual vs. Simulated Greenfield Investment to GDP Ratios in Percent



Source: Authors' calculations.

Table 1: OLS Regressions (Dependent Variable: Growth of Real Per-Capita GDP)

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS
Initial GDP per capita	-0.0291	-0.0252	-0.0864	-0.0982	-0.0960	-0.105
	(-1.376)	(-1.164)	(-4.328)***	(-4.963)***	(-4.818)***	(-5.145)***
FDI/GDP	1.555					
	(2.116)**					
M&A sales/GDP		0.392	-0.932	-0.745	-0.342	
		(0.473)	(-1.108)	(-0.973)	(-0.437)	
Greenfield FDI/GDP		1.888	2.290			
		(2.109)**	(4.013)***			
Grf. FDI without other cap.				1.788		
				(2.925)***		
Grf. FDI based on equity					2.569	
					(3.206)***	
M&A sales/Pop.						-0.231
						(-1.433)
Greenfield FDI/Pop.						0.358
						(3.284)***
Observations	298	298	264	244	246	264
Adjusted R-squared	0.218	0.220	0.444	0.409	0.427	0.420

Notes: Robust t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1; regressions include regional dummies and time dummies.

Table 2: Alternative Estimators (Dependent Variable: Growth of Real GDP Per Capita)

	(1) FE	(2) 2SLS (FDI^{GRF} instr.)	(3) 2SLS ($FDI^{M\&A}$ instr.)	(4) 2SLS (Both FDI instr.)	(5) BB
Initial GDP per capita	-0.385	-0.0472	-0.0745	-0.0434	-0.121
	(-6.075)***	(-2.549)**	(-3.536)***	(-2.395)**	(-3.087)***
Greenfield FDI/GDP	1.662	2.678	2.363	2.654	2.002
	(2.379)**	(2.189)**	(3.465)***	(2.375)**	(1.841)*
M&A sales/GDP	-1.265	-0.166	5.692	3.030	-0.240
	(-1.286)	(-0.183)	(1.417)	(0.816)	(-0.183)
Investment profile	0.0362	0.0224	0.0264	0.0193	0.0446
	(2.816)***	(2.550)**	(2.419)**	(1.909)*	(3.771)***
Second. schooling	0.00415	0.0316	0.0297	0.0276	0.0421
	(0.0947)	(2.719)***	(2.200)**	(1.922)*	(2.027)**
Investment/GDP	0.346	0.165	0.392	0.180	0.438
	(0.932)	(1.114)	(2.234)**	(1.126)	(1.471)
Population growth	-1.065	-4.227	-2.291	-3.648	-4.237
	(-0.485)	(-2.805)***	(-1.605)	(-2.163)**	(-2.409)**
Log(inflation rate)	-0.0388	-0.0285	-0.0347	-0.0315	-0.0493
	(-3.377)***	(-3.512)***	(-3.310)***	(-3.615)***	(-3.656)***
Trade openness	0.137	-0.102	-0.137	-0.120	-0.128
	(2.432)**	(-3.193)***	(-3.404)***	(-3.173)***	(-2.323)**
Observations	264	213	252	210	264
Adjusted R-squared	0.485	0.438	0.391	0.482	
First-stage F-statistic		7.78	7.188	6.49/2.81	
Underidentification (p-value)		0.000	0.000	0.001	
Exogeneity instruments (p-value)		0.268	0.913	0.356	0.948
Exogeneity regressor (p-value)		0.221	0.054	0.19/0.40	
Robust coefficient/t-stat.		3.090	5.66		
		(2.46)**	(1.43)		
Second-order autocorr.(p-value)					0.214

Notes: Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1; regressions contain regional dummies and time dummies.

Table 3: Subsamples (Dependent Variable: Growth of Real GDP Per Capita)

	(1) Without upper middle income	(2) Without low income	(3) Incl. small countries	(4) Only 1991-2005	(5) Only Inflation < 40%
Initial GDP per capita	-0.0762	-0.0925	-0.0753	-0.0875	-0.0882
	(-3.566)***	(-2.799)***	(-3.969)***	(-4.328)***	(-4.168)***
M&A sales/GDP (OLS)	-1.064	-1.213	-0.401	-0.885	-1.204
	(-0.864)	(-1.298)	(-0.452)	(-1.023)	(-1.456)
Greenfield FDI/GDP	2.699	1.459	2.083	2.369	2.231
	(3.415)***	(2.217)**	(4.079)***	(3.511)***	(3.915)***
Second. schooling	0.0233	0.0440	0.0352	0.0254	0.0398
	(1.844)*	(3.497)***	(3.140)***	(2.200)**	(2.888)***
Investment/GDP	0.227	0.167	0.158	0.269	0.266
	(1.177)	(1.060)	(1.072)	(1.579)	(1.816)*
Population growth	-3.746	-4.488	-2.888	-2.656	-5.125
	(-2.470)**	(-2.119)**	(-2.014)**	(-1.441)	(-3.751)***
Log(inflation rate)	-0.0404	-0.0280	-0.0342	-0.0502	-0.0113
	(-3.234)***	(-2.369)**	(-3.078)***	(-3.562)***	(-1.348)
Trade openness	-0.111	-0.0596	-0.114	-0.114	-0.0400
	(-2.826)***	(-1.571)	(-3.265)***	(-3.333)***	(-1.353)
Investment profile	0.0460	0.0390	0.0411	0.0375	0.0289
	(4.487)***	(3.492)***	(4.779)***	(4.010)***	(3.423)***
M&A sales/GDP (2SLS)	5.086	4.334	5.18	2.611	3.717
	(1.05)	(1.02)	(1.20)	(0.91)	(1.05)
Observations	207	195	273	201	224
Adjusted R-squared	0.440	0.438	0.440	0.462	0.453

Notes: Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1; regressions contain regional dummies and time dummies.

Appendix: Proofs

Proof of Lemma 1: To show the result stated in Lemma 1, we need to demonstrate that $Y_{t+1}^{GRF} / FDI_t^{GRF} > Y_{t+1}^{M\&A} / FDI_t^{M\&A}$.

Using the expressions in (5) to (8) we see that this is the case if

$$\frac{\gamma \int_{\hat{A}}^{1} A\, dA + \gamma \int_{\tilde{A}}^{\hat{A}} \theta^F A\, dA}{\int_{\tilde{A}}^{\hat{A}} \kappa^F\, dA} > \frac{\gamma \int_{\hat{A}}^{1} \theta^F A\, dA}{\int_{\hat{A}}^{1} \frac{\theta^F A}{r}\, dA}$$

Simplifying these expressions and solving the integrals on the LHS yields

$$\frac{0.5\left[1-\hat{A}^2+\theta^F\left(\hat{A}^2-\tilde{A}^2\right)\right]}{\hat{A}-\tilde{A}} > r\kappa^F$$

Invoking (2) we can rewrite this as

$$\frac{0.5\left[1-\hat{A}^2+\theta^F\left(\hat{A}^2-\tilde{A}^2\right)\right]}{\hat{A}-\tilde{A}} > \theta^F \tilde{A}$$

Using standard algebra yields

$$0.5\left[\frac{1-\hat{A}^2}{\hat{A}-\tilde{A}}+\theta^F\left(\hat{A}+\tilde{A}\right)\right] > \theta^F \tilde{A}$$

which is equivalent to

$$\frac{1-\hat{A}^2}{\hat{A}-\tilde{A}} > \theta^F\left(\tilde{A}-\hat{A}\right)$$

Given the critical assumption that $\hat{A} > \tilde{A}$, the LHS is strictly positive, while the RHS is strictly negative. This concludes the proof.

Proof of Proposition 1: We assume that $m \leq n$ sectors adopt the greenfield FDI regime, while the remaining (n - m) sectors adopt the M&A regime. Denoting sector i's growth rate between periods t and $t+1$ by $g_{i,t}^k = Y_{i,t+1}^k / Y_{i,t}$ with $k \in \{GRF, M\ \&\ A\}$ and invoking the initial symmetry of all sectors we can write the growth rate of aggregate output $g_{y,t}$ as

$$g_{y,t} = \frac{1}{n}\left(\sum_{i=1}^{m} g_{i,t}^{GRF} + \sum_{i=m+1}^{n} g_{i,t}^{M\&A}\right)$$

Combining this expression with the fact that

$$g_{i,t}^k = \beta^k \frac{FDI_{i,t}^k}{Y_{i,t}}$$

yields

$$g_{y,t} = \frac{1}{n}\left[\sum_{i=1}^{m} \beta^{GRF} \frac{FDI_{i,t}^{GRF}}{Y_{i,t}} + \sum_{i=m+1}^{n} \beta^{M\&A} \frac{FDI_{i,t}^{M\&A}}{Y_{i,t}}\right]$$

Aggregating across sectors and invoking symmetry results in

$$g_{y,t} = \beta^{GRF} \frac{FDI_{t}^{GRF}}{Y_{t}} + \beta^{M\&A} \frac{FDI_{t}^{M\&A}}{Y_{t}}$$

Lemma 1 stated that $\beta^{GRF} > \beta^{M\&A}$. Hence, the marginal impact of greenfield FDI (relative to GDP) on the economy's growth rate is higher than the marginal impact of M&A sales. This concludes the proof.

Data Appendix

Main variables

Growth of real per-capita GDP: Growth rate of GDP per capita in constant international dollars over five-year period. Source: Heston et al. (2009), series RGDPCH.

Initial GDP per capita: Natural logarithm of initial GDP per capita in constant international dollars. Source: Heston et al. (2009), series RGDPCH.

FDI/GDP: Net FDI inflows in US dollars divided by GDP (Five-year average). Source: UNCTAD (2008).

GDP: Gross Domestic Product in current US dollars. Source: World Bank (2010).

M&A sales/GDP: Mergers and acquisitions sales in US dollars divided by GDP (Five-year average). Source: UNCTAD (2007).

Greenfield FDI/GDP: Difference between FDI/GDP and M&A sales/GDP.

Other capital: Direct Investment Other Capital in Reporting Economy, net. Source: IMF (2010).

Equity: Direct Investment Equity in Reporting Economy, net. Source: IMF (2010).

Grf. FDI without other cap.: Difference between Greenfield FDI and Other Capital divided by *GDP* (five-year average).

Grf. FDI based on equity: Difference between Equity and M&A sales divided by GDP (five-year average).

Population: Population (Five-year average). Source: Heston et al. (2009), series POP.

M&A sales/Pop.: Ratio of M&A sales and Population.

Greenfield FDI/Pop.: Ratio of Greenfield FDI and Population.

Secondary schooling: Number of years of secondary schooling of total population age 15 and older (initial value for five-year period). Source: Barro and Lee (2010).

Investment/GDP: Investment Share of Real Gross Domestic Product per Capita, current price (Five-year average). Source: Heston et al (2009), series CI.

Population growth: Growth rate of population over five-year interval. Source: Heston et al. (2009).

Log(inflation rate): Logarithm of CPI inflation rate (Five-year average). Source: World Bank (2010).

Trade openness: Sum of exports and imports of goods and services divided by GDP (Five-year average). Source: World Bank (2010).

Investment profile: Rating of the government's attitude to inward investment as the sum of three sub-components, each with a maximum score of four points (very low risk) and a minimum score of 0 points (very high risk). The subcomponents are risk of expropriation or contract viability, payment delays and barriers on the repatriation of profits (Five-year average). Source: Political Risk Services (2008).

Oil: Dummy for 28 oil-exporting economies, referring to the period of 1970 - 2006, using the World Economic Outlook (WEO) and World Development Indicators (WDI) as well as data on oil production and reserves obtained from BP Statistical Review of World Energy June 2007 as data sources. Source: Morsy (2009).

Instruments

Initial number of telephone main lines per 1,000 inhabitants. Source: World Bank (2010).

Initial *stock* of FDI relative to GDP. Source: Lane and Milesi-Ferretti (2007).

Lagged growth rate of a weighted average of trading partners' GDP (five-year average). Source: World Bank (2010) and IMF (2010).

Fraser Institute index of legal structure and the security of property rights (five-year average). Source: Fraser Institute (2010).

International Country Risk Guide's measure of corruption (five-year average). Source: Political Risk Services (2008).

Domestic credit to the private sector as percentage of GDP. Source: World Bank (2010).

Initial urban population as percentage of total population. Source: World Bank (2010).

Freedom House index of civil liberties. Source: Freedom House (2010).

Summary statistics

Note: All summary statistics refer to the 264 observations that are included in the benchmark regression of column (3) in table 1.

Variable	Mean	Std. Dev.	Min	Max
Growth	0.0874	0.1819	-0.7465	0.5769
Log(initial GDP per capita)	8.3534	0.7992	5.7431	10.1827
FDI/GDP	0.0224	0.0228	-0.0388	0.1140
M&A sales/GDP	0.0066	0.0101	0.0000	0.0580
Greenfield FDI/GDP	0.0158	0.0180	-0.0412	0.0986
Secondary schooling	1.7825	1.0566	0.0676	5.5851
Investment/GDP	0.1773	0.0897	0.0060	0.4701
Population growth	0.0169	0.0119	-0.0148	0.0541
Log(inflation rate)	2.4634	1.3927	-1.6197	8.7822
Trade openness	0.6811	0.3501	0.1395	2.3833
Investment profile	6.5450	2.0081	1.5000	11.6167