Have structural factors influenced German FDI in Latin America? A panel-econometric analysis for the 1990s

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Abstract

Unlike many studies dealing exclusively with direct investment between industrialized countries, this paper focuses on German FDI in emerging markets of Latin America, with particular emphasis on the role of non-traditional variables such as country risk and agglomeration effects. An FDI "flow" variable, constructed from year-to-year differences in stocks adjusted for certain otherwise distorting factors, is empirically regressed on exogenous variables identified as influential in the FDI literature. Methodically, the paper employs the SUR technique allowing for contemporaneous correlation of disturbances, first-order autocorrelation and cross-sectional heteroskedasticity. German FDI in Latin America are found to have been market-seeking as tariff barriers and agglomeration effects play an important role. Moreover, German investors reacted strongly to variations in country risk and public governance.

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I. Introduction

With hindsight, the 1990s were the decade of initial emerging market exuberance and subsequent disillusionment. Foreign direct investment flows to prospering regions such as Latin America and, most prominently, Asia grew by leaps and bounds – from about the mid-1980s to the second half of the 1990s

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average annual worldwide FDI flows to developing countries increased eightfold[1] – nourishing hopes for sustainable growth by transforming the host countries' infrastructure and enhancing their ability to withstand global economic downturns. As a matter of fact, German FDI stocks (at book values) in the six largest Latin American economies more than doubled between end-1989 and end-1997. However, with the Asian crisis the long-held belief of emerging economies' invulnerability was shattered, and it became apparent that warning signs such as overvaluation of the currency, high foreign indebtedness and the absence of long-overdue structural reforms may not have been heeded by a majority of foreign enterprises.

The question then is: were those "red flags" in the sense of worsening country and/or political risk assessments – representing a subjective probability of certain adverse outcomes[2] – perceived by international investors? This study aims at identifying the determinants of German FDI in the emerging economies of Latin America throughout the past decade, and, in particular, those relating to "governance" aspects, measured by indices of country or political risk. Governance issues have consistently been, and still remain a major challenge for emerging market economies. Despite having undertaken substantial stabilization or liberalization efforts[3] and pursuing appropriate fiscal and monetary policies, many of these countries are suffering from a wide range of political and regulatory deficiencies which need to be tackled to appease investors. At first glance, emerging economies feature proper investment regimes when in fact obscure licensing procedures and discretionary administrative regulations characterize the true nature of the country's investment policy. Even willing governments are often unable to convey credible signals to foreign investors.[4]

Most empirical research using German FDI data has been undertaken with respect to industrialized economies. Only a few studies are devoted exclusively to the investment behavior of German enterprises in developing countries or emerging markets. Hubert and Pain (1999) find in regressions restricted to non-EU countries, i.e. essentially developing countries, that only stocks of research & development, unit labor costs in Germany relative to the host country and real exchange rate volatility turn out to be significant with the expected signs. Similarly, only some German FDI studies employ political risk variables. Agarwal et al. (1991), in a very comprehensive study of the traditional and risk-related determinants of German investment abroad, generally find no deterring effect of political risk (composite risk and, separately, strikes and lockouts) on FDI flows to developing countries in the 1980s. Moore (1993) identifies an index of labor unrest in the 17 OECD countries examined. Surprisingly, the number of days lost in strikes is mildly significant and *positively* correlated with FDI flows. Jost and Nunnenkamp (2002) run cross-section and pooled regressions for German FDI in more than 60 developing countries between 1989 and 2000. Apart from the usual results for host

[1] See Nunnenkamp (2001), p. 4, who presents UNCTAD data.
[2] Definition by Lehmann (1999), p. 22.
[3] Lora (2001) provides cross-country evidence on structural reforms in Latin America (see section 2.2.2).
[4] See Lehmann (1999), p. 21.

country per-capita GDP and population, they find good scores for country risk as measured by the Euromoney index and an openness measure (adjusted for country size) as well as, in separate regressions, low political risk and a skill variable (rate of secondary schooling) to exert a strong positive influence on FDI stocks.

The paper is organized as follows. The subsequent section first explains how the FDI flow variable used in this study is derived. It then gives an overview of the literature on determinants of FDI in emerging markets, and, particularly, those factors relating to risk aspects. Section three provides details on the econometric approach and the selection process used for identifying robust variables among a pool of exogenous variables. The regression results are presented in section four, with a distinction being made between the country, sector and sub-sector level. Section five has the concluding remarks.

II. Data

II.1 Endogenous variable

There is no unanimously agreed method of measuring FDI. Different studies proceed in different ways. It, therefore, seems important to make as clear as possible how FDI has been defined here and why this particular definition has been chosen. In this study, the endogenous variable is the net inflow or outflow of direct investment capital of German investors into emerging market economies during a given calendar year. Depending on how one looks at it, foreign direct investment may be understood purely as a flow variable or as a stock variable. The IMF Balance of Payments Manual does not exclusively recur to the cumulative stock of FDI capital but defines direct investment as comprising "not only the initial transaction establishing the relationship between the investor and the enterprise but also all subsequent transactions between them and among affiliated enterprises, both incorporated and unincorporated".[5]

The direct investment capital flows used in the estimations are derived from the direct investment stock statistics compiled by the Deutsche Bundesbank since 1976 as an annual complete survey and published on a partly aggregated basis in Special Statistical Publication No. 10 ("*Kapitalverflechtung mit dem Ausland*" – "International capital links"). These data are now also available in the form of a computer-aided microdatabase for the years 1989 to 2000.[6] During the sample period, German enterprises reported minority interests (of at least 10% but less than 50%) in foreign enterprises if the balance-sheet total of the investment target exceeded DM 10 million (in 1999: €5 million). Controlling interests (50% or more) had to be reported if the investment target's balance-sheet total exceeded DM 1 million (in 1999: €0.5 million). Indirect participating interests likewise must be reported if a "dependent" (i.e. majority-owned) enterprise itself holds a stake of at least 10% in another enterprise. It should be stressed, therefore, that foreign

[5] IMF (1997), p. 86. "Direct investment capital transactions include those that create or dissolve investments as well as those that serve to maintain, expand, or reduce investments"; ibid., p. 88.

[6] In the 1989 reporting year methodological changes were made which eliminated the comparability of the stocks with those in the years 1976 to 1988.

direct investment merely represents the provision of financial capital – in this case by German enterprises to their foreign subsidiaries.[7]

The direct investment stocks included in the database are book values and are calculated as the sum total of the investor's share in the nominal capital of the investment target, the capital reserves, and the retained profits and profits brought forward (cumulative reinvested earnings). Loans granted by the capital owners or affiliated enterprises are added to this equity capital. To finally obtain the direct investment stock pursuant to the IMF's "directional principle", the subsidiary's lending to or claims on the parent company must be subtracted.[8] It should be noted that the stock data quoted in foreign currency by the enterprise subject to reporting requirements have to be converted into German currency at the current exchange rate on the balance-sheet date (as mandated by the OECD Benchmark Definition).[9]

II.1.1 Stocks Versus Flows

In the Bundesbank's stocks statistics the acquisition of assets is recorded in the form of balance-sheet book values. However, in the case of takeovers, an additional amount (goodwill) is frequently paid on top of the pure book value of the assets. These additional sums were particularly significant in recent years in cases of technology company takeovers. Therefore, evaluating the transaction data, which are recorded at market values in the balance of payments, would be preferable – yet this raises other problems (see below). However, as advanced developing countries rather than industrialized countries are at the heart of this study, it may be assumed that, owing to the relatively uncertain profit expectations and a political environment which is often difficult to gauge, the difference between market and book values may not be substantial. In the case of newly established subsidiaries (i.e. greenfield investment) these problems do not arise to begin with.

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[7] Thus, the term "direct investment" has to be clearly distinguished from the neo-classical concept of investment which is based on the change in value of capital goods (i.e. property, plant & equipment) on the assets side of the balance sheet; see also Lehmann (1999), p. 10, Hausmann and Fernández-Arias (2001), p. 33, or Razin (2002), p. 2.

[8] See Lipponer (2003), p. 219. The "directional principle" requires the direct investments to be separated according to the direction of the capital flow. Loans from subsidiaries to the investor therefore have to be deducted from the direct investment capital; see IMF (1997), p. 81. This practice contrasts with the asset liability principle, which presents such assets as autonomous – counterbalancing – direct investments.

[9] There is also the question of whether or not the stock data and thus also the FDI stock differences (which, after suitable correction, are interpreted as flow data), should be adjusted for inflation in the host country – as is done by Moore (1993), who deflates the stock differences using foreign price indexes for capital goods – or for exchange rate effects as recommended by Wagner (1991), who eschews Bundesbank stock data for these implicit effects. Accordingly, previous-year FDI stocks or, more correctly, the stocks of fixed assets and other long-term assets, would have to be adjusted for both inflation and the change in the bilateral exchange rate in the reporting year. Alternatively, one might rightfully assume that relative purchasing power parity holds and the inflation differential between Germany and the host country in question is absorbed by the exchange rate, having both distorting factors cancel each other out. To be sure, most empirical studies do not test nominal values but either deflate the FDI variable or relate it either to GDP or some other scaling factor (see section 2.1.3).

While transaction-based balance of payments data in this respect seem superior for studying FDI flows, they have other serious shortcomings. Only immediate direct investment relationships (as to equity capital) are recorded under participating interests in the German balance of payments statistics, but not indirect ones, i.e. those held via a holding company, which likewise compulsorily fall under the FDI definition. Nor are reinvested earnings stemming from indirect capital links included. On balance, and leaving accounting issues aside, merely considering balance of payments data means failing to use a fully consolidated system encompassing indirect ownership and, therefore, in all likelihood greatly understating actual FDI capital.[10] Therefore, in measuring the investment activity of German multinationals, the only "relevant" flow variable – if there is one to be had – should be derived from (adequately modified) differences in stocks and not by using flows recorded in the balance of payments. Accordingly, this study uses a modified FDI "flow" variable, i.e. the difference in FDI stock from one year to another, adjusted for actual participation rates, deviating reporting years, balance-sheet depreciation and repatriated profits. This variable nevertheless corresponds – apart from the distortions mentioned above – to the basic definition of direct investment capital transactions contained in the IMF's Balance of Payments Manual.[11]

The balance-sheet values are shown in the stock statistics at the respective reporting date of the direct investment enterprise concerned, which sometimes differs from the end of the calendar year. For practical reasons the unadjusted figures are not divided between the two calendar years included in the reporting year of such enterprises.[12] Instead, all balance-sheet values of enterprises whose reporting date falls *before* June 30 – i.e. whose reporting year therefore mostly does not coincide with the current reporting year of the stock statistics – are included in the preceding calendar year.

II.1.2 Adjustment for Participation Rates, Balance-Sheet Depreciation, Repatriated Profits

The FDI microdatabase contains participation rates for indirectly owned interests (usually held via a holding company) which need to be adjusted for the share of FDI capital that German investors effectively hold. That is, the "real"

[10] See OECD (1996), p. 11.

[11] "The components of direct investment capital transactions ... are equity capital, reinvested earnings, and other capital associated with various intercompany debt transactions"; IMF (1997), p. 87. Hausmann and Fernández-Arias (2001) explicitly adhere to the flow concept: "FDI is defined as the increase in the equity position of a non-resident owner..." (p. 33).

[12] This applies to 1,451 of 10,629 reports (13.7%) or 11.1% of the total direct investment capital for the six countries considered here. Theoretically, it would be possible in these cases to include the balance-sheet values in the previous year linearly with the period not coinciding with the year under review (for example, if May 31, 1999, were the reporting date, seven-twelfths of the balance-sheet values originally included in 1999 would be assigned to the 1998 reporting/calendar year, with the value for 1999 being adjusted accordingly). For technical reasons – this breakdown would require a "matching" of the reporting numbers of the investor and the investment target over all of the sample years at the microdata level, which is not feasible – this is not an option.

participation rate is calculated as the product of the vertical ownership shares. Doing so is necessary to account for multiple ownership in holding companies.[13]

As the assets are recorded as book values and are depreciated by a certain rate mandated by foreign tax regulations, the left-hand side of the balance sheet does not correspond to the actually existing (historical) capital stock. This pure taxation effect needs to be removed. Accordingly, by using a perpetual inventory model, FDI stocks are adjusted for the original tax depreciation undertaken when calculating the profit of the subsidiary; the aim of this adjustment is to determine which fixed assets are available for production each year. To this end, the net capital stock (fixed assets) of the investment target is marked up for each year using a notional depreciation rate of 8%,[14] which is multiplied by the share of FDI capital in total assets. The resulting gross capital stock of the following period is adjusted for increases or decreases in productive capital. By contrast, write-downs of financial assets, especially those of service providers, are not adjusted because the depreciation rate is uncertain. The inflow of direct investment capital in a given period therefore is the difference of the stocks[15] between the current year's stocks and preceding years' stocks plus the imputed depreciation of the adjusted capital stock.[16]

The resulting flow variable still includes the total annual surplus rather than merely the profits remaining in the investment target after transferring the parent company's share of the profit – i.e. reinvested profits. Accordingly, the profits of the previous year repatriated in the current year would need to be deducted from this flow variable.[17] As this information cannot be extracted directly from the FDI stock statistics, a suitable approximation is called for: in the case of *direct* participating interests, the item "income from dividends and other profits" relating to German outward FDI (as recorded in the German balance of payments statistics[18]) is used. For *indirect* participating interests, unfortunately, no such

[13]For example, if a holding company has a 50% stake in a direct investment company and is itself equally owned by two German investors, the adjusted participation will be 25% for each parent.

[14]The rate of 8% is used by Chennells and Griffith (1997), p. 92, calculated as the average of economic depreciation rates for "industrial buildings" (3.6%) and for "industrial plant and machinery" (12.3%).

[15]In this connection it should be noted that, in the case of direct participating interests, those in dependent holding companies which themselves hold at least a 10% stake in another company have to be excluded from the stock of direct investment capital in order to avoid double counting – these own participating interests are recorded separately as indirect FDI. This approach is not applied to dependent holdings without participating interests required to be reported or to minority-owned holdings with their own participating interests; see Lipponer (2003), p. 218.

[16]To give an example, the inflow (exclusive of repatriated profits) for the year 1991 is calculated as follows:

$\text{FDI Flow}_{1991} = \Delta\text{FDI}_{1991} + (\Delta\text{FA}_{1991} + (\Delta\text{FA}_{1990} + \text{FA}_{1989} * (1+\delta)) * (1+\delta)) * \delta,$

where

ΔFDI = difference between the "original" direct investment stocks in the reporting year and the previous year

FA = fixed assets * percentage share of assets (i.e. investor's share of capital)

δ = notional depreciation rate (8%)

[17] As was done, for instance, by Singh and Jun (1995), p. 11.

[18] Deutsche Bundesbank, Statistical Supplement No. 3, Table 5b "Factor income – income from direct investment", column 2.

information is available. For simplicity, a full profit transfer from the investment target to the holding company (by virtue of a corresponding agreement) is assumed. Accordingly, total profits are subtracted from the indirect FDI capital in each year, yielding reinvested earnings as the difference between the following year's retained profits/profits brought forward and those of the current year. This difference is already reflected in the variation of FDI stocks across years.[19] A comparison of the flows derived from "raw" and adjusted differences in FDI stocks illustrates that while these deviations may not dramatically alter the econometric outcome, they can cause individual variables to gain or lose significance.[20]

II.1.3 Absolute and Normalized FDI Flows

The study uses a principal endogenous variable, *FDIGDP*, defined as outflows of German foreign direct investment to a given host country as a percentage of its GDP (both in nominal values (D-Marks)). The countries comprise the largest emerging market economies[21] in Latin America: Argentina, Brazil, Chile, Colombia, Mexico and Venezuela. Given that larger economies have consistently been shown to receive larger FDI inflows (see section 2.2.1, market size), the above normalization is performed to eliminate size effects and thus to determine the linkage between FDI flows and the variations in external factors over and above absolute market size as implied by GDP. Correspondingly, estimations are centered on deviations from an implied average value of FDI flows and size of host countries.

Apart from log-linearizing FDI stocks, use of normalized FDI variables (FDI inflows as share of GDP) is relatively widespread in the literature on foreign direct investment. Froot and Stein (1991), Singh and Jun (1995), Barrell and Pain (1999), Hausmann and Fernández-Arias (2001), Nookbakhsh et al. (2001), Mody and Murshid (2002) and Razin (2002) use the FDI to GDP ratio proposed in this study. Similarly, Pistoresi (2000), Chakrabarti (2001) and Nunnenkamp (2001) link their FDI variable to host country population, i.e. per-capita FDI, while Lehmann (1999) computes country shares in total U.S. capital expenditures as an investment variable. Wheeler and Mody (1992) relate FDI in a given sample country to investment in an arbitrarily chosen numeraire country. Desai et al. (2003), while incorporating absolute GDP in their regressions, do not even bother to report the estimates for the market size variable because of the intuition that larger economies tend to receive greater volumes of foreign direct investment.

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[19] In principle, retained profits/profits brought forward would have to be subtracted in the case of newly acquired direct investment companies. However, it is only for 1997-1999 that such positions can be identified in the microdata by checking whether an investment target surfaces in the database the following year. This is no longer possible for the years 1989-1996 as data prior to 1996 have already been rendered anonymous. In order to avoid additional bias due to incomplete adjustments, these equity positions are left unchanged.

[20] Referring to regressions in section 4, the trade taxation variable drops from a 1% level of significance (unadjusted flows) to the 5% level (adjusted flows) while the reverse is true for the agglomeration variable.

[21] Selection criterion: ½ * (real $GDP_{i,1990}$ + real $GDP_{i,\ 1999}$), at constant 1995 US dollars (World Development Indicators). The cut-off point was arbitrarily set at an average GDP of US$ 60 billion (next in line was Peru ($ 50.0 billion)).

II.2 Exogenous Variables

In the vast FDI literature a great many explanatory variables are employed to explain cross-border capital flows. Over time, however, a distinctive set of factors frequently used in econometric modeling has emerged. Lim (2001), surveying the FDI literature, comes up with a list of seven important factors: size of the host market, agglomeration effects, factor costs, fiscal incentives, business/investment climate, trade barriers/openness, and economic distance/transport costs. The latter factor can be neglected in this study as the host countries included are all located overseas and thus more or less equally far away from the country of FDI origin, Germany. Theory and empirical evidence on the determinants cited above are reviewed in the following section.

II.2.1 Traditional Variables

Due to space constraints, the description of the so-called traditional variables is kept rather brief. Empirical evidence on these factors is omitted but can be found in Wezel (2003).

Market Size/Level of Income

Among the traditional variables, GDP or GDP per capita is widely used in the literature as a proxy for market size or purchasing power. Lim (2001) finds market size in terms of the size of the whole economy (absolute real GDP) or the level of income (GDP per capita) to be the most robust determinant, although both factors depict quite different market characteristics. In virtually all the studies surveyed, either indicator of market size is highly positively significant (for an overview see the survey by Chakrabarti (2001)).

Since the endogenous variable is already scaled to GDP and as absolute real GDP, by virtue of favoring large populations, is a rather poor indicator of market potential, the paper includes GDP per capita, *GDPCAP*, following Chakrabarti (2001) who finds this variable strongly positively related to scaled (per-capita) FDI for a sample of 135 countries.

Wage Competitiveness

Cost competitiveness – especially relevant for efficiency-seeking FDI – is probably best expressed by productivity-adjusted real wages, assuming that labor is largely immobile and labor costs therefore differ across countries, while other cost drivers such as capital and intermediate goods are traded on international markets with price-equalizing effects.[22] Moreover, measuring capital productivity is more difficult than deriving unit labor costs, due to the widespread unavailability of capital stocks at market values and capital goods price indices as suitable deflators.[23] Here, the wage variable is *unit labor costs, ULC, which is defined as the labor costs per worker in manufacturing divided by the gross value added per*

[22] See Turner and Golub (1997), p. 7.

[23] See Lipsey (2002), p. 36. Barrell and Pain (1996) were forced to leave out the Latin American region due to lack of reliable time series data on indigenous costs (p. 203).

worker in manufacturing.[24] Ideally, weighted labor costs for all sectors of the economy should be used, but it is only for the manufacturing sector that data are available across all countries in the sample. Still, such a generalization is not uncommon in FDI research.[25] Barrell and Pain (1999) also use manufacturing unit labor costs for their *country-level* estimations, and later in their paper run a separate regression for Japanese FDI flows to *manufacturing* sectors abroad.

Trade Barriers/Openness of the Economy

Traditionally, direct investment was used by foreign firms to circumvent trade barriers ("tariff-hopping") and thus to establish market presence by physically erecting production facilities or buying existing ones abroad. It has been argued that host country governments will be more likely to establish trade barriers if a particular domestic industry facing import penetration is still at an infant stage or if the product life cycle is already beyond the hump.[26] On the other hand, incipient trade restrictions may prompt anticipatory or "quid pro quo" direct investment. In that sense, the possibility of FDI, or "threat of FDI", may limit the level of trade protection that the government can impose.[27] In the past, import protection instituted by host governments promised such high rates of return to foreign investors that the efficiency of the subsidiaries was not viewed as a major concern. However, as the majority of emerging economies have chosen to ease restrictions on imports, so-called "market-seeking" or "horizontal" direct investment is likely to have fallen over time, giving way to "efficiency-seeking" or "vertical" direct investment that requires a liberal trade environment. This newer form of direct investment aims at exploiting sources of competitiveness such as lower (unit) labor costs, a skilled workforce or a more conducive business environment.[28] In sum, the overall impact of trade barriers is uncertain and depends on the nature of FDI (horizontal versus vertical) in each case.

While the case for trade barriers fostering FDI inflows appears quite convincing, the relationship between traditional openness measures and FDI is less clear. The "natural" openness or outward orientation of an economy can be thought of as the trade intensity absent any interventionist policy measures. Thus, the

[24] This measure conforms to the definition recommended by the Federal Statistical Office (Statistisches Bundesamt). Yet, there are also other definitions. For example, Turner and Van 't dack (1993, pp. 87, 136-137) compute unit labor costs on the basis of total earnings of labor in manufacturing expressed in US dollars divided by value added in manufacturing at current prices expressed in constant purchasing power parity (PPP) rates. This ratio allows for relating labor costs to output per unit of time, with the resulting unit labor costs being expressed in terms of a common currency. The merit of this approach is that currency fluctuations influencing the value added are excluded. However, computing unit labor costs on this basis would require data on pure host country output (i.e. units produced per year) which is generally not available for less developed countries; see Turner and Van 't dack (1993), p. 91.

[25] Unit labor costs are not widely available for services despite that sector's growing importance in emerging markets; see Turner and Golub (1997), p. 7.

[26] See Stehn (1992), p. 73.

[27] See Konishi et al. (1999), pp. 290-291.

[28] See Nunnenkamp (2001), pp. 12-13, and also Mallampally and Sauvant (1999) who, in addition, list a third category: "resource/asset-seeking" FDI trying to capture host country advantages in raw materials, skilled labor, innovative assets or physical infrastructure.

ordinary openness proxy, trade intensity in terms of either share of imports or exports (or both) in GDP, constitutes a trade flow outcome measure. Some authors propose that this type of openness measure be adjusted for structural, non-policy determinants of trade intensity such as geographic size, per-capita income or resource endowment.

This study uses as a measure of trade barriers the *share of taxes on international trade in current government revenue*, *DUTY*, whereby a positive coefficient can be expected for horizontal FDI. This very definition is used by Singh and Jun (1995), who report it as significantly positively correlated to relative FDI inflows for a set of 31 developing countries. A similar measure, namely the average level of tariffs (UNCTAD data), is tested by Pritchett (1997) in regressions for 72 developing countries. It is the only variable to be significantly correlated to both the openness measure by Leamer (1988)[29] and an indicator of non-tariff barriers.[30] In addition, this study checks the validity of a *conditioned openness variable*, *OPEN*, i.e. modified trade intensity measured by the residuals of regressing the logs of GDP per capita and population on a given host country's trade intensity (imports and exports as share of GDP). The coefficient should be positive for vertical FDI.

External Indebtedness

Despite being an important indicator of a country's solvency often foreshadowing an imminent financial crisis, measures of foreign indebtedness are used in FDI research less often than for analyzing other capital flows. At the theoretical level, Ghura and Goodwin (2000) argue that a rising external debt ratio, indicating a debt overhang, induces economic agents to anticipate future tax liabilities to service the debt. If the integration of capital markets is rather low, the ensuing capital flight would then raise the domestic cost of capital. Apart from conceivable political reverberations, this effect is likely to negatively impact the overall profitability of foreign subsidiaries. Arguments from corporate finance theory[31] may be transposed to the macro level in the sense that a relatively high degree of risky debt may weaken a country's ability to realize growth possibilities via new investment. A valuable real option may be forgone if the additional investment and payments to bondholders (in case the option is exercised) exceed the value of the investment. On the other hand, if the debt level of the host country is still below a certain level perceived critical by investors, this consideration may not apply and FDI flows may actually increase with rising external indebtedness. Among the few empirical studies to consider the level of external debt, Pistoresi (2000) reports a significantly negative coefficient for emerging markets' foreign debt per capita which is especially relevant for the Latin American sub-sample.

[29] Leamer (1988) constructs both an openness and a trade distortion index that measure deviations from trade flows predicted by a modified Heckscher-Ohlin-Vanek model, using data from 1982.

[30] See Pritchett (1997), pp. 318, 320, 324-325. The author uses as indicator or non-tariff barriers the import-weighted percent of tariff codes lines covered by various types of non-tariff barriers (licenses, quotas, prohibitions) as a percentage of all tariff code lines within the aggregate (p. 314).

[31] See, for example, Myers (1977), and there in particular pp. 155, 164-165.

Thus, a variable, *DEBT*, measuring the ratio of host country external debt to GDP, was added to the regressions, recognizing the postulated impact of rising indebtedness on FDI.

II.2.2 Non-Traditional Variables

This section gives an overview of the literature on non-traditional factors, with emphasis on the research previously undertaken in the area of governance.

Country Risk/Political Risk

Most studies reviewed here control for specific measures of host country political risk. Only some refer to a broader definition of country risk, as is the case in the aforementioned study by Jost and Nunnenkamp (2002). For example, Mody/Srinivasan (1998) find a strong correlation between country safeness (measured by the Institutional Investor index) and host country share of U.S. FDI outflows by means of the within estimator.

The issue of political risk has attracted more interest among researchers. In a pioneering paper Schneider and Frey (1985) furnish evidence that in emerging markets political and socioeconomic factors are relevant on top of the "classical" macro factors. As the authors show, estimation results for FDI inflows into industrial as well as developing countries are significantly improved if also controlling for governance variables such as political instability and the ideological thrust of government. Stevens (2000), investigating plant and equipment spending of U.S. corporations in Mexico, Brazil and Argentina, shows that the inclusion of political factors affecting the operations and earnings of U.S. investors improves the goodness-of-fit for Argentina greatly (R-squared rises from 0.19 to 0.90).[32]

"Headline" political risk, or rather the absence thereof, is found to be a driving factor of developing country FDI inflows by Singh and Jun (1995). Brunetti and Weder (1997) examine the most prominent uncertainty measures in investment regressions, finding a number of categories (with individual variables) – government instability (revolutions), political violence (political executions/war casualties), political uncertainty (black market premium on foreign exchange, variation of real exchange rate distortion) – consistently significant at least at the 5 percent level and thus robust to changes in specification.

Within the set of political risk measures one can distinguish between corruption alias administrative deficiencies and governmental instability in the host country. The question of how devastating corruption can be is investigated by Wei (2000) who evaluates OECD data on industrial countries' FDI flows to 45 economies: higher taxation and higher corruption reduce inward FDI by 4.8% and 26%, respectively. Studying the impact of wide-spread corruption on the rate of private investment in developing countries, Everhart and Sumlinski (2001) find an indirect negative effect of corruption via the quality of public investment. Put differently, any given level of public investment will be characterized by a higher quality than would be the case with a higher degree of corruption present. As

[32] The regression for Brazil shows a lesser improvement; for Mexico the adjustment is only slightly positive.

Lehmann (2002) argues, poor governance introduces asymmetric information, thereby raising agency costs of market participants incurred in dealing with supervisory agencies. Consequently, increasing capital costs obstruct inflows of FDI substantially.

Bubnova (2000) contends that corruption acts to prevent democratic development and results in poor infrastructure. In relating governance to risks facing private infrastructure investment (measured by spreads of emerging market infrastructure bonds) she identifies four clusters of strong positive relationships in the set of explanatory variables: in addition to economic performance and religion-induced tensions, which play a lesser role in the sample countries here, political factors include regulatory risk (corruption/bureaucratic delays/contract enforceability) and political disorder risk (domestic conflict/expropriation risk). Corruption and autocracy risk account for most of the bond spread variation.

By contrast, Singh and Jun (1995) and Hubert and Pain (1999) fail to find significance for the occurrence of strikes[33] in developing and non-EU countries, respectively. The same goes for German FDI flows to developing countries in the 1980s, as shown by Agarwal et al. (1991). Singh and Jun do, however, report a significantly negative coefficient for strikes in a sub-sample of "low FDI countries" where standoffs are more frequent.

In light of this overwhelming evidence, the bottom line of research on governance issues is that high country/political risk does represent an obstacle to higher inflows of FDI capital. Accordingly, *several measures of country and, more specifically, differentiated political risk* are used here. The risk data were obtained from two professional providers of country risk estimates, the Political Risk Services Group (in short: PRS) with its International Country Risk Guide[34] and the business magazine Euromoney with its bi-annual country risk surveys.[35] Both indices assign high scores to "safe" countries. Far from being the only sources of country risk information,[36] these publications enjoy a good reputation among researchers (ICRG[37] used by Brunetti and Weder (1997), Lehmann (1999), Wei

[33] Number of work days lost in each of the host countries through strikes (Hubert and Pain) or industrial and civic strife (Singh and Jun); see Hubert and Pain (1999), p. 173, and Singh and Jun (1995), p. 16.

[34] The PRS Group uses estimates based on information collected by its own staff which results in the publication of 22 variables in three subcategories for 140 countries on a monthly basis.

[35] See, for example, Euromoney (2000), pp. 106-109. As a political risk rating was added only in September 1992, no such variable could be derived from the Euromoney data. The country risk score is calculated using nine individual, weighted categories; for explanation of the different categories see Euromoney (1997), pp. 60-62. The individual scores are based on a survey of economists at leading financial and economic institutions.

[36] There are in fact many more, such as Freedom House, Business International, Transparency International, to name just a few professional ones. Furthermore, risk indices have been developed by academics and international development institutions (such as the World Bank's Country Policy Institutional Assessment). Some of the risk indices could not be used in the first place, either because the period covered did not match this study's time frame or because the index did not report data for the emerging markets examined in this study.

[37] For example, Brunetti/Weder (1997) find PRS' corruption measure more comprehensive (and more significant) than that of Business International because the former does not focus on narrow business transactions but rather "asks whether high government officials are likely to demand special payments

(2000), and Everhart and Sumlinski (2001); Euromoney data used by Ramcharran (1999) and Jost and Nunnenkamp (2002)) and supply continuous data for the relevant time period.[38]

To isolate genuine macroeconomic risk, which, incidentally, could also be picked up by the variation in other variables, the variable *PRSERISK* was formed. Following the approach of Bubnova (2000) described above, in this paper the political risk dimension is further divided into subcategories of orderly business dealings, i.e. corruption and autocracy risks, called *PRSADMIN*, and of political disorder risks, *PRSSTAB*.[39] Grouping corruption and "red tape" due to their connectivity was brought up by Mauro (1995) as a more precise measure of corruption than corruption alone.[40]

Accordingly, the variable *PRSADMIN* can be thought of as a measure of administrative uncertainty surrounding official decisions that immediately affect foreign investors (at the "micro-level"). It involves subjective assessments of the degree of corruption (with a high rating meaning a low degree of "sleaze"), the quality of the bureaucracy (high score for countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services), and the so-called investment profile (measuring risk of expropriation, restrictions on profit repatriation[41] and payment delays, again with high points for low-risk countries). This exact specification was tested by Pistoresi (2000) who, as expected, finds a significantly negative relationship between FDI inflows to a similar set of emerging markets and this combined administrative quality variable, which, in that case, depicts an inefficient and undependable bureaucracy. The same result holds true in Pistoresi's estimations for a measure of political instability.

In this study, the corresponding variable *PRSSTAB* is composed of "macro-level" factors foreign firms have to put up with: the stability of the government (assessing both of the government's ability to carry out its declared programs and

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and whether illegal payments are generally expected throughout lower levels of government" (p. 14). Conversely, Wei (2000) criticizes that PRS does not reveal how the ratings are derived (p. 3).

[38] Inevitably subjective, the survey data often provide the best information available on the less visible aspects of governance, and such perceptions are frequently as important as hard-to-obtain evidence; see Bubnova (2000), p. 11. Inherent subjectivity makes comparisons of individual risk assessments difficult, inspiring Kaufmann et al. (1999) to embark on aggregating indicators from several sources into a meta index.

[39] Other subcategories of PRS' political risk measure – external conflict, socioeconomic conditions, military in politics, religion in politics, ethnic tensions, democratic accountability – were omitted because they largely pertain to developing countries and do not seem to play a decisive role in the countries assessed in this study.

[40] Wide-spread corruption may lead to further bureaucratic delay as a result of officials "dragging their feet" until receiving the expected bribe.

[41] The issue of repatriation restrictions facing multinational enterprises, a specific facet of political risk, is touched upon by Ihrig (2000) in a case study of US subsidiaries in Brazil between 1977 and 1991. The model she employs is able to capture the effect of such restrictions on capital investment and technology transfer to the Brazilian subsidiaries. Partial remittance restrictions are shown to cause multinationals to remit funds to the home country, whereas full blocking, logically, prompts reinvestment of funds. However, the Brazilian case suggests that countries who notoriously impose restrictions or threaten to do so can increase foreign capital investment if they credibly abolish these restrictions.

its ability to stay in office), the aspect of law and order (evaluating the strength and impartiality of the legal system as well as the degree of popular observance of the law), and the prevalence of internal conflict.

Agglomeration Effects

There is considerable disagreement in the literature as to what exactly constitutes agglomeration. Some authors equate clustering effects of that kind with the size of the existing FDI stock (perhaps lagged) or "herding" of foreign firms, whereas others perceive the quality of the host country's infrastructure as a suitable proxy.[42] Positive spillover effects through the widespread establishment of foreign subsidiaries play a prominent role. Commonly, once a large multinational corporation sets up shop in one location, others will quickly follow suit ("follow-the-leader" effect). This is because foreign firms unable to enter in the same period as the leader does will incur a large welfare loss compared to a scenario where all firms enter more or less simultaneously. In the extreme, potential late entrants may not get a foothold in the market because of the productivity advantage already attained by the first mover.[43] Well-known examples of such positive agglomeration effects are typified by automobile production in Mexico or the Asian electronics industry.[44]

In an innovate study on that issue, Wheeler and Mody (1992) check both factors – clustering of FDI inflows and quality of the infrastructure – on their validity for 42 developing *and* industrialized countries. Both coefficients are of the same magnitude and highly significant for the manufacturing sector. The quality of infrastructure seems especially important for developing countries, and specifically the electronics industry. Mody and Srinivasan (1998) examine data on U.S. FDI to 35 countries and posit that the stock of past FDI is strongly positively correlated with current FDI inflows in all estimations, whereas the infrastructure variable (output of electricity per GDP) is found to be significant only if measured by the "between" estimator, having the authors conclude that only major infrastructure investment may act to attract investors. Lehmann (1999) uses lagged U.S. total investment as proxy for agglomeration and finds it to be significantly positive in all regressions. A first-mover effect is observed by Mody et al. (1999) in a strong partial correlation between a Japanese firm's plans to invest in elsewhere in Asia and its expectation of competitors having similar plans.

The agglomeration variable used here, *AGGLO*, is defined *as the moving-three year average of contemporary and lagged total FDI inflows relative to respective host country GDP*. Note that this is not simply a partially lagged endogenous variable since it recurs to FDI flows from the rest of the world and not just Germany. The variable aims at capturing both first-mover advantage effects (by including contemporary flows) and the magnitude of privately supplied infrastructure abroad over the past couple of years.

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[42] See Lim (2001), p. 7. As an example for quality-of-infrastructure-proxies, Razin (2002) finds a high positive significance of developing country telephone density for FDI inflows (p. 10).
[43] See Markusen (1990), p. 2
[44] See Lim (2001), pp. 5-6.

Corporate Financing Conditions

Rarely used in empirical research, the varying availability of relatively low-cost internal financing should intuitively play a fundamental role in the magnitude and timing of corporate investment decisions, particularly with respect to efficiency-seeking FDI. Cushman (1985) includes a corporate cash flow variable which he lags by one year and finds significantly positively correlated to U.S. FDI to industrialized countries. Barrell and Pain (1996) add to their regressions for outward U.S. FDI lagged corporate profits (significantly positive). The relevance of the level of corporate profits for Germany is underscored by Heiduk and Hodges (1992) in a case study of the investment activity of German multinationals. The authors purport that, given the higher volatility of foreign compared to domestic investment, German firms facing financial distress tend to trim FDI before they decrease domestic investment.

As using cash flows generated within the firm is arguably the most inexpensive way of financing investment, this study incorporates the *lagged aggregated cash flow of German firms normalized to total corporate assets*, *CFLOW*. Note that there is logically no variation across host countries such that the variable can be rendered significant only by fluctuations over time. Put differently, *CFLOW* resembles a time dummy of changeable magnitude.

Real Exchange Rate (Volatility)

There are opposing views on the impact of the real exchange rate (RER) on FDI inflows. An upward movement in the host country's RER may stir fear of protectionism among foreign investors and lead them to invest abroad in anticipation of additional trade barriers.[45] Conversely, Froot and Stein (1991) show that under credit rationing, i.e. imperfect capital markets, a (real) exchange rate depreciation induces foreign investors' wealth to rise, enabling them to outbid their competitors abroad for information-intensive assets having monitoring costs. Therefore, aggregate FDI flows will increase in proportion to a depreciation of the domestic currency.[46] Yet, as Ghura and Goodwin (2000) point out, the overall impact of a real depreciation is uncertain, as imported inflation raises the price of investment goods and consequently depresses investment.[47]

[45] See Kosteletou and Liargovas (2000), p. 139

[46] See Froot and Stein (1991), p. 1202. This shift in relative wealth is caused by nominal exchange rate movements that not matched by domestic price level adjustments, rendering deviations from purchasing power parity possible. Razin (2002) illustrates a similar wealth effect: foreign firms would be put at an advantage over domestic borrowers by being able to post more valuable collateral in borrowing from domestic banks. This effect naturally applies mostly to mergers and acquisitions and less to greenfield investment. However, the latter can be expected to grow, too, as (nominal) exchange rate depreciations – according to the 'relative labor cost theory' – give foreign production a competitive edge in labor costs over domestic output and will thus lead to higher FDI inflows; see Kosteletou and Liargovas (2000), p. 139, and Goldberg and Klein (1997), p. 12.

[47] Generally speaking, a widely-perceived deviation of the real exchange rate from its estimated equilibrium level may affect long-run investment decisions via a shift in relative production costs; see Barrell and Pain (1996), p. 202.

To avoid colinearity with the unit labor cost variable,[48] the main model forgoes a particular exchange rate variable in levels. However, the significance of the *bilateral real exchange rate, RER,* is tested in a separate regression excluding labor costs.

It is, however, quite justified to look beyond pure *level* effects. The expectation of short-term changes in exchange rates may influence the timing of investment transactions: for example, firms may precipitate payments in currencies expected to appreciate.[49] In the area of exchange rate *volatility*, several theoretical studies show that higher variability is positively correlated with outward direct investment flows (Cushman (1985), Aizenman (1991, 1992)[50], Goldberg and Kolstad (1995), and Sung and Lapan (2000)). In a theoretical model based on the view taken in the real options literature, Sung and Lapan demonstrate that by erecting more than one production facility, i.e. opening another plant abroad, and postponing the decision as to where to produce, a multinational firm acquires a real option whose value increases with greater exchange rate fluctuations.[51] They posit that more volatile exchange rates induce the relative value of opening the foreign plant to rise.[52] Depending on the degree of volatility, firms will open only the foreign plant or both. Therefore, high exchange rate variability will promote FDI outflows to alternative production sites.[53]

In this study, exchange rate volatility is therefore modeled along the lines of Hubert and Pain (1999) by constructing a *two-year moving average of past real exchange rate fluctuations*. It is important to note that, contrary to some of the previously mentioned studies that simply first-difference the exchange rate, here

[48] This would expressly apply to those countries with fixed exchange rate regimes or de facto nominal exchange rate stability over the sample period.

[49] See Barrell and Pain (1996), p. 205.

[50] Aizenman (1992) shows that under a flexible exchange rate higher volatility of monetary shocks induces disparities in the real wage at home and abroad, and thus induces geographic diversification via foreign direct investment, while concurrently lowering aggregate investment (pp. 909, 914).

[51] The real option's value is calculated as the expected value of additionally opening the plant abroad, i.e. value of the firm with both plants exclusive of the value of merely the home plant, minus the sunk cost incurred by opening the foreign plant. It is shown that the differential profits increase with higher exchange rate volatility; see Sung and Lapan (2000), p. 415, and, similarly on the real options argument, Aizenman (1992), p. 897.

[52] See Sung and Lapan (2000), p. 415. This contradicts the traditional view that firms would then reconsider foreign investment to reduce their risk exposure; see Goldberg and Kolstad (1995), pp. 856-857.

[53] This hypothesis is confirmed by several empirical studies. Stockman and Vlaar (1996) observe that higher exchange rate volatility significantly increases the growth rate of Dutch FDI outflows. A similar result is found by Hubert and Pain (1999) who test both real and nominal exchange rate fluctuations separately for German data and find that nominal exchange rate volatility negatively impacts FDI outflows, whereas the reverse holds for the real exchange rate. The latter finding is, as the authors point out, consistent with the production shifting hypothesis. Love and Lage-Hidalgo (2000), testing whether past volatility in the US$-peso rate affects FDI flows to Mexico, also report a strongly positive coefficient. Furthermore, Barrell and Pain (1996) find that an expectation of a depreciation in the host country's currency will postpone US investment. Cushman (1985) reports rising U.S. FDI to G7-countries in response to an increase in the standard deviation of the expected change in the real exchange rate. By contrast, Sin and Leung (2001) do not find a strong impact of the nominal exchange rate on flows to developing countries up to 1992.

volatility is measured as the variance of the indexed real exchange rate over past years, i.e. regardless of the direction of the individual change:

$$RERVOL_{i,t} = \sqrt{0.5\sum_{k=1}^{2}\log\left(\frac{RER_{i,t-k} - RER_{i,t-k+1}}{RER_{i,t-k+1}}\right)^2} \quad \text{where}$$

$RER_{i,t}$ is the real exchange rate between Germany and the i[th] country in a given year.[54]

Structural Reforms

Recent studies have been increasingly incorporating structural reform measures in FDI host countries. The intuition is that current or envisaged reforms in the regulatory realm will positively affect investment conditions for foreign firms over the longer term. However, during such adjustment periods FDI flows may actually dwindle, as is shown by Tuman and Emmert (1999) for Japanese FDI in 12 Latin American countries for the period 1979-1992. During a given year of implementing economic adjustments, the sample countries received an average of roughly $30 million less in FDI.

A genuine measure of structural reform has been developed by Lora (2001, drawing on earlier work of 1997). This unique meta-index for Latin American countries consists of five subcategories (trade, financial, tax and labor market reforms, and privatization) measured by individual indices and now covers the period from 1985 to 1999. Lora himself does not subject his data to econometric testing, but Fernández-Arias and Montiel (2001) do so, exploring how structural effects, which the index measures, relate to growth in Latin America up to 1995. Reassuringly, they find that Lora's structural policy index contains independent information not already captured by four other stabilization regressors.[55] In fact, the index's coefficient is significantly positive and eliminates the unexplained excess of Latin American growth (low growth despite reforms)[56] observed in their baseline regressions. To test whether this holds true for the impact of structural reforms on FDI flows, Lora's recently updated index, called *STRUCT*, is included in the estimations for the Latin American sub-sample.

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[54] Real exchange rates computed using consumer price indices. The RER itself is normalized to base year 1990. An increase in the RER denotes a real appreciation of the host country's currency. The variances are measured as the squared annual differences relative to the previous year. One could have used unit labor costs as indicator of the real exchange rate as proposed by Hubert and Pain (1999), p. 174, but doing so would mean neglecting changes in the nominal exchange rate and thus a greater degree of noise; see Barrell and Pain (1996), p. 202.

[55] These are: lower public consumption (relative to GDP), lower inflation, financial deepening (broad money to GDP), exchange rate unification (black market premium), and, allegedly, trade intensity (imports and exports to GDP, estimates not given); see Fernández-Arias and Montiel (2001), pp. 526, 529.

[56] This often-voiced "puzzle" is discarded by the authors "in the sense that unidentified region-specific factors depressed growth in Latin America during the 1990s, offsetting the large positive growth impetus of the reforms". They conclude that "the growth response of recent reform in Latin America – that is, its marginal effect – was adequate"; Fernández-Arias and Montiel (2001), pp. 543, 535.

III. Methodology

III.1. Estimation Method

In principle, the parameters for each country could be estimated, however inefficiently, by ordinary least squares (OLS). Given the geographic proximity of the countries in question to one another, it would be a strong assumption that each cross section behaves entirely independent of the others, particularly given the fact that the model assigns the same parameter vector to all units (countries).[57] Therefore, the error terms in the FDI equations are likely to include factors common to all sample countries and thus to be correlated between cross sections at a given time.

The SUR[58] technique allows for integrating contemporaneous correlation by estimating the full variance-covariance matrix of the system's disturbance vector; the individual equations are linked only by their disturbances, hence "seemingly unrelated regressions." This, of course, requires that the panel be balanced.[59] This supposition renders a pooled analysis of FDI data using the SUR estimation method more efficient than applying OLS to each country separately since the common, immeasurable influences are accounted for. An efficiency gain exists because the pooling approach takes account of correlation between the error vectors and uses information on explanatory variables included in the system but excluded from the individual equation.[60] The greater the correlation of the disturbances, the greater the efficiency gain obtained by applying the SUR technique.

In addition, the SUR estimation with the econometric software STATA provides for including a first-order autoregressive process. With this, SUR contains, in a sense, dynamic elements which would substitute for a full-fledged dynamic estimation if the common AR(1) coefficient were sufficiently small (less than 0.2, for example).

III.2. Statistical Properties

Following a "general-to-specific" approach, first a model that includes all explanatory variables is estimated. Subsequently, the list of variables is narrowed down to the ones found robust in an Extreme Bounds Analysis following Leamer (1983, 1985) and Levine and Renelt (1992); for detailed explanation see Wezel (2003). In addition, alternative variables for risk, cost, and openness measure are estimated separately. The estimation outcome contains standardized coefficients $\beta_j^* = \beta_j (s_{xj}/s_y)$ with s_{xj} being the standard deviation of the j^{th} exogenous variable and s_y the standard deviation of the endogenous variable.[61] As a double-log linear model

[57] See Greene (2003), p. 333.

[58] Seemingly Unrelated Regressions. For a good overview on SUR techniques see Dielman (1989), pp. 29-47, Judge et al. (1988), pp. 444-468, or Greene (2003), pp. 340-362.

[59] Larger sets of countries will therefore usually preclude using the SUR technique which fortunately is not the case in this study as T=10 (years) and N=6 (countries). Another prerequisite for using SUR estimation is that T be greater than N, otherwise the feasible GLS estimator cannot be calculated.

[60] See Judge et al. (1988), p. 450.

[61] For further reference see Pindyck and Rubinfeld (1981), pp. 90-91.

allowing the coefficients to be interpreted as elasticities was not feasible due to the occurrence of negative FDI flows, this standardization allows for comparing the "weights" with which the individual variables enter the equation. The measure of goodness-of-fit has to be derived from the Wald test statistic and is therefore usually called "pseudoR^2".[62]

IV. Empirical Evidence

IV.1 Econometric Results

The regression results for the sample provides a number of valuable insights (see below). First and most importantly, it is shown that country risk clearly matters in the region. Both risk indices, *PRSCRISK* in (1) and *EMCRISK* in (2), are strongly significant with the expected sign and carry the greatest weight among variables. Further decomposition reveals that the economic risk measure, *PRSERISK*, if chosen instead of headline country risk is strongly positively significant (coefficient = 0.3132, z-ratio = 4.68) as opposed to *PRSPRISK* (ß = 0.0606, z = 0.84). Among the political risk components, administrative quality, *PRSADLEA* (replacing headline political risk) is significant and correctly signed (ß = 0.2084, z = 2.37), whereas *PRSSTAB*, measuring domestic stability, is negatively correlated with FDI inflows.

Second, German FDI in that region seems to have been geared towards tapping markets protected against imports over the sample period since the tariff variable, *DUTY*, is robustly positively significant while *ULC*, an indicator of efficiency-seeking FDI, is not. In addition, agglomeration effects have clearly spurred German FDI flows with a view to securing market access in the face of strong competition from abroad. The other non-traditional variables – cash flows of German parent companies and real exchange rate volatility – cannot be shown to have a significant impact on FDI flows. An alternative model using the real exchange rate, *RER*, and the conditioned openness measure, *OPEN*, instead of unit labor costs and taxation of trade, respectively, worsens the fit of the regression compared to (1) as both alternative variables end up being insignificant. The parsimonious model (4) includes country risk, taxation of trade and agglomeration effects – variables significant in (1) that were found to be robust to the inclusion of the certain combinations of other exogenous variables.

[62] See Greene (2003), p. 97, for derivation. Verbeek (2001), p. 182, discussing alternative measures to R^2, makes use of the likelihood ratio statistic which is asymptotically equivalent to the Wald test statistic.

SUR Estimation for six Latin American Emerging Market Economies

Regression with individual country effects, heteroskedastic with cross-sectional correlation; observations: 60

	(1)	(2)	(3)	(4)
GDPCAP	-0.086 (-0.62)	-0.084 (-0.56)	-0.572 (-2.23)**	
PRSCRISK	0.294 (5.75)***		0.222 (3.28)***	0.273 (6.02)***
EMCRISK		0.265 (2.55)**		
ULC	0.118 (1.05)	0.159 (1.12)		
RER			-0.090 (-0.71)	
DUTY	0.174 (2.09)**	0.202 (2.45)**		0.225 (4.12)***
OPEN			0.269 (1.04)	
DEBT	0.028 (0.38)	0.038 (0.35)	-0.304 (-1.95)*	
AGGLO	0.183 (2.31)**	0.168 (2.08)**	0.361 (2.94)***	0.182 (6.63)***
CFLOW	0.028 (0.41)	0.084 (1.72)*	-0.039 (-0.56)	
RERVOL	0.076 (1.23)	0.105 (1.49)	-0.044 (-0.66)	
PseudoR^2	0.65	0.41	0.40	0.54

Z-values in parentheses; ***=significant at the 1% level, **=significant at the 5% level, *=significant at the 10% level

Lastly, an unexpected result is found for Lora's structural reform index (not shown here): contrary to the intuition, *STRUCT*, turns out to be significantly negative (z-value: -4.75) if added to regression (1), and its inclusion improves the regression's fit considerably (pseudoR^2 rises to 0.75), leaving room for interpretation.[63] Closer inspection of the data series reveals that there is a persistent

[63] Coinciding with the results of Tuman and Emmert, current crisis conditions might overshadow structural reforms whose beneficial impact may only take root in later periods. On the other hand, as illustrated in section 1, even *expectations* of structural reforms suffice to prompt investment decisions. Therefore, one can expect actual reforms depicted in the index to contemporaneously affect decision-making. Incidentally, lagging *STRUCT* by one period does not change the picture greatly (it remains significantly negative at the 1 percent level).

improvement in index scores for almost all of the countries which contrasts sharply with the relatively high volatility of German FDI flows to the region. The negative correlation between FDI and the reform index could also owe something to the fact that index scores rose excessively in the early 1990s when a wave of privatization set in.[64] Soaring scores are, however, not mirrored by German FDI flows in the early 1990s, presumably because German firms participated less in privatization than did investors from other nations.[65]

IV.2. Specification Tests

Specification tests for the imposed restrictions – individual country effects, heteroskedastic error terms, cross-sectional correlation and within-group autocorrelation – were run one by one, with each additional restriction being compared to the one marginally less restrictive (e.g. merely heteroskedastic error terms). The statistics of a likelihood ratio test with the null hypotheses of no individual country effects, solely homoskedastic error terms and no cross-sectional correlation consistently exceeded the critical values for the χ^2-distribution, thus rejecting the null hypotheses. By contrast, the null hypothesis of no autocorrelation could not be rejected, unsurprisingly so as the autoregression coefficient was generally less than 0.10.

V. Conclusion

This study, using an innovative definition of an investment flow variable embodying first differences of FDI stocks corrected for effective participation rates, previously included balance-sheet depreciation and subsequently repatriated profits, affirms that the issue of country risk does matter for German FDI flows to Latin America in the 1990s. The regression outcome for this FDI "flow" variable normalized to GDP confirms the widely-held hypothesis that a high degree of economic and certain elements of political risk is detrimental to cross-border equity participation. Aiming to put this verdict on a broader foundation, the study uses two professional country risk indices, both of which turn out to be highly significant. This finding thus confirms the presumption that international investors indeed perceive impending changes in the macroeconomic and regulatory environment. Subdividing country risk into its components, it is found that economic risk represents the main driving force behind this unequivocal result, whereas the evidence for headline political risk is best described as erratic owing to its disparate individual elements. While the measure of administrative quality alias corruption and malfeasance by the host government is consistently strongly associated with marginal FDI inflows, the variable of host country political stability turns out insignificant or even displays a negative sign.

Furthermore, FDI inflows to Latin America throughout the last decade are to be called "market-seeking" in that German firms were apparently impelled to establish a presence abroad by the necessity to overcome critical host country tariff

[64] This is true of all sample countries with the exception of Chile, whose privatization had already begun in the early 1980s; see Birch and Braga (1993), pp. 122-123 and 126.
[65] See Nunnenkamp (1998), pp. 25-26.

barriers and, in a sense, to react in a timely manner to rising direct investment on the part of foreign competitors.

In sum, researchers studying foreign direct investment in emerging market economies ought to take increased account of non-traditional variables such as country risk or agglomeration effects. The econometric results of this study affirm that the discernible trend towards factoring in measures of the regulatory environment facing foreign investors is clearly called for. As "soft" locational factors become more material in the eyes of investors, analyses incorporating qualitative assessments of host countries are likely to gain further prominence in FDI research.

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