



The Role of Country-of-Origin Characteristics for Foreign Direct Investment and Technical Cooperation in Post-Reform India

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Summary. — The decisions of foreign investors on technical cooperation versus equity engagements and on the degree of ownership in FDI projects are likely to depend on their relative bargaining position vis-à-vis the host country. We perform negative binominal regressions by making use of a unique dataset on about 24,500 technical cooperation and FDI projects in India by investors from 45 countries of origin over the 1991–2004 period. We find that relative market size, relative financial market development, relative risk, relative endowment of human capital, and previous international experience significantly affect the type of engagement by foreign investors in post-reform India.

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1. INTRODUCTION

India hosted a stock of US\$ 164 billion in Foreign Direct Investment (FDI) at the end of 2009, compared to less than US\$ 2 billion prior to the major reform program in 1991 (UNCTAD, 2010a). The country has become one of the most attractive locations among developing economies for multinational corporations from various countries of origin. The opening up of its economy to world markets is widely credited as a major pull factor of booming FDI (e.g., Balasubramanyam & Mahambare, 2003). Push factors have received only scant attention. This is surprising as country-of-origin characteristics are likely to have an important say on the type and form in which multinational corporations engage in India. The decisions of foreign investors on financial engagements versus purely technical cooperation, as well as the degree of ownership in FDI projects, in turn, may affect the macroeconomic benefits of host countries such as India.

India provides an interesting case for analyzing the interplay between country-of-origin characteristics and host-country characteristics and their effects on ownership decisions by foreign investors. The bargaining position of the latter depends on their technical, managerial, and financial capabilities acquired at home. Companies based in economies at the technological frontier may insist on full ownership control, for example, to prevent leakage and protect intellectual property. India is particularly interested in gaining access to superior technologies, and has therefore increasingly relaxed FDI-related regulations that had traditionally constrained ownership

choices for foreign companies (Kumar, 2006; Singh, 2005). Yet the process of opening up may also have strengthened India's bargaining position, for instance by offering more dynamic local markets.

We make use of a unique dataset on about 24,500 approved cases of technical cooperation and FDI during the 1991–2004 period in order to assess the impact of country-of-origin and host-country characteristics on the number of projects involving companies based in 45 countries of origin. The dataset allows us to distinguish between purely technical cooperation (without any foreign equity engagement) and FDI with different degrees of foreign ownership. Performing negative binominal regressions, we find that relative market size, relative financial market development, relative risk, relative endowment of human capital, and previous international experience significantly affect the type of engagement by foreign investors in post-reform India.

2. ANALYTICAL BACKGROUND

Similar to most empirical studies on the determinants of FDI in developing host countries, the recent literature on the driving forces of the FDI boom in India almost exclusively

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focuses on pull factors in the host country. For instance, [Sury \(2008\)](#) employs an OLS regression analysis on quarterly data over the 1991–2003 period and finds that FDI flows to India are determined by national income, the tax rate, openness to trade, and labor costs. [Choi \(2007\)](#) derives similar results through vector error correction estimations, using annual data dating back to the 1970s. [Joshi and Dadibhavi \(2008\)](#) consider various location factors to construct an investment climate index for 19 Indian states; the correlation between this index and approved FDI at the state level during the post-reform era turns out to be high and positive. [Palit and Nawani \(2007\)](#) stress the role of local technological capabilities and supporting infrastructure as increasingly important for host countries such as India to lure multinational corporations.

All these studies assume, at least implicitly, that the host-country characteristics considered are equally important for all foreign investors and for the different types of FDI, ranging from Joint Ventures (JVs) with minor foreign equity stakes to wholly foreign-owned subsidiaries. This assumption is unlikely to hold. For instance, political and economic risk in the host country, as well as the reliability of its institutions, should matter more for foreign investors from home countries where entrepreneurs tend to be risk adverse. [Pan \(1994\)](#) argues that in the Chinese context, risk adverse Japanese investors are less likely than US investors to undertake FDI with potentially high sunk costs and to enter into minority owned JVs with local partners. More generally, [Pauly and Reich \(1997, p. 22\)](#) stress “remarkably enduring divergence” in the behavior of multinational corporations based in major OECD countries. Stylized facts presented by these authors point to “stark national differences” in the willingness to transfer new technology to host countries of FDI and to integrate foreign subsidiaries into intra-firm trade. Likewise, [Harzing and Sorge \(2003\)](#) conclude from survey results for 287 subsidiaries of 104 parent companies based in nine OECD countries, that the strategies of multinational corporations are largely explained by their country of origin.

This suggests that analyses of the determinants of FDI should address the interplay between pull and push factors. The decision to engage in technical cooperation or FDI with varying degrees of foreign ownership can be regarded as the result of bargaining between the host country and foreign investors ([Svejnár & Smith, 1984](#)). Host countries such as India tend to be particularly interested in attracting technologically sophisticated FDI projects in order to maximize spillover and growth effects. Host-country governments may also restrict foreign ownership and insist on JVs with local partners, thereby enabling the host country to appropriate a larger share of FDI-related rents ([Asiedu & Esfahani, 2001](#)).¹ In contrast, risk adverse foreign investors originating from leading industrialized countries may be unwilling to transfer state-of-the-art technology unless they have full control and can prevent leakage ([Desai, Foley, & Hines, 2004](#)).

The bargaining framework can be traced back to Vernon’s obsolescing bargain ([Vernon, 1971](#)). The foreign investor “becomes a potential hostage to the host country” ([Bond & Samuelson, 1989, p. 77](#)) since the host country’s attitude toward FDI is subject to a time inconsistency problem ([Eaton & Gersovitz, 1983](#)). The bargaining position of the host country improves once the foreign investor has realized project-related sunk costs. The host country may exploit the improved relative bargaining position by reneging on earlier commitments and appropriating a larger share of project-related gains. In the international economics literature, this has been coined the hold-up problem (e.g., [Schnitzer, 1999, 2002](#)). Apart from outright expropriation and nationalization

of foreign firms, the host country is tempted to change previously agreed rules. Creeping expropriation may result, inter alia, from changes in tax laws and trade regulations. Foreign firms anticipating creeping expropriation may be reluctant to engage in FDI and, instead, prefer licensing and debt instruments ([Schnitzer, 2002](#)).²

The earlier bargaining literature focused on “vertically integrated, extractive investments characterized by risk, sunk costs, government learning and oligopolistic rivalry” ([Kobrin, 1987, p. 610](#)). Obsolescing bargains are less obvious when the degree of risk and sunk costs are minor compared to extractive industries, as appears to be the case in many manufacturing and services industries ([Eden, Lenway, & Schuler, 2005; Kobrin, 1987](#)). All the same, the bargaining framework offers relevant insights into these industries, too. Some types of creeping expropriation appear to be particularly serious in manufacturing industries. The ex-post violation of intellectual property provides a case in point.³ As concerns sunk costs, [Wint \(2005, p. 334\)](#) notes that projects in infrastructure and utilities involve similarly high capital costs as projects in extractive industries.⁴

More generally, the bargaining framework remains relevant even when relative power shifts over time are less obvious and difficult to capture. For instance, [Kobrin \(1987, p. 636\)](#) argues that “a bargaining framework based on the relative demand for resources and constraints on the implementation of power is an accurate model of MNE-host country relationships in a wide range of sectors” (emphasis added). Similar to our approach below, [Kobrin \(1987\)](#) evaluates the relative strengths and weaknesses of the source and host countries of FDI as possible determinants of foreign ownership shares in FDI projects. He finds for a sample of 75 large US manufacturing parent firms with subsidiaries in developing host countries that “the level of parent ownership of manufacturing subsidiaries of MNCs is determined by relative bargaining power” ([Kobrin, 1987, p. 632](#)).⁵

In a similar vein, the bargaining framework is clearly affected, though not invalidated, by the changing international investment environment. Recent bargaining models explicitly account for increasing capital mobility and outside options that may shift the power balance in favor of foreign investors (e.g., [Schnitzer, 1999, 2002](#)). However, the threat of relocating FDI projects to other host countries must be credible to have an effect on the relative bargaining position. The credibility of threats depends, inter alia, on the motive underlying FDI. In particular, the threat is unlikely to be credible if FDI is meant to serve large and growing local markets such as in India.⁶

The widespread liberalization of FDI restrictions and the fiercer worldwide competition for FDI imply that foreign investors have more options of where to engage ([Ramamurti, 2001](#)). At the same time, the emergence of an ever growing number of foreign investors and multinational enterprises increases the options available to host countries ([Eden et al., 2005](#)).⁷ Against this backdrop, “bargaining power comes from the ability to withhold resources that the other party wants” ([Eden et al., 2005, p. 264](#)). As a result, host countries such as India may be able to insist on joint ventures with limited foreign ownership shares in FDI projects that mainly aim at penetrating local markets.⁸

[Ramamurti \(2001\)](#) adds another dimension to the bargaining framework that is relevant in the context of our analysis. He proposes a two-tier bargaining model that also accounts for political negotiations between the governments of source and host countries. As noted by Ramamurti, the liberalization of FDI restrictions is partly the result of bi- and multilateral negotiations. The conclusion of Bilateral Investment Treaties

(BITs) represents the most obvious example with respect to FDI. This is why we include BITs in our empirical estimations below. More generally, we follow Ramamurti (2001) in that we account for macro-level variables in the source countries. The underlying reasoning is that MNEs based in “strong” source countries with more bargaining power may find it easier to undertake FDI of the type preferred by themselves, rather than the host country.

All in all, the bargaining perspective continues to offer relevant insights, even though classical obsolescing bargains à la Vernon (1971) may have been replaced by the more general hold-up problems stemming from sunk costs in essentially all sectors, though possibly to different degree.⁹ Investment disputes and conflicts of interest between source and host countries persist, even though relations have generally become more cooperative (Eden *et al.*, 2005).¹⁰ For instance, foreign investors tend to regard FDI-related spillovers as a “damage” that they wish to contain by limiting technology transfers, whereas the host country’s “preferred spillover level is strictly positive” (Müller & Schnitzer, 2006, p. 461).

The notion of bargaining between specific foreign investors and authorities of the host country implies that push factors of FDI would optimally relate to firm characteristics. Firm characteristics that strengthen the bargaining position of the foreign investor vis-à-vis the host country include superior technological and managerial knowledge, access to capital, the size of operations, and international experience. Asiedu and Esfahani (2001) hypothesize that such characteristics are associated with higher foreign equity shares in FDI projects. However, the measurement of “ownership specific advantages” (Dunning, 1979) at the firm level typically suffers from serious data constraints. For example, the database we use below offers detailed information on technical cooperation and FDI projects in India (see Section 3 for details), while firm-specific information is lacking on the foreign parent company that is involved in a particular project. Hence, we follow Dunning (1979) who argues that firm-specific ownership advantages can be related to characteristics of the country of origin where the firm is based. In particular, the economic and technological development of the country of origin is supposed to “generate and sustain” (Dunning, 1979, p. 280) the advantages that specific foreign investors might have when bargaining over technical cooperation or FDI with the host country.

Some previous studies have applied a similar approach by focusing on the impact of country-of-origin characteristics on FDI decisions. Characteristics that have received most attention include: GDP per capita as a general measure of economic development, GDP as an indicator of size and economic diversity, political and economic risk factors, wage costs and the cost of borrowing, distance as a proxy of transaction costs, export and import intensity to reflect international experience, and exchange-rate developments.¹¹ As shown in Section 3, we consider a similar set of country-of-origin characteristics in the present analysis. In contrast to most previous studies however, we assess the impact of these characteristics on different types of technical cooperation and FDI projects, rather than overall FDI activity. In other words, the value added of the present paper is that we account for different types of international engagements by a heterogeneous group of countries of origin, rather than extending the list of explanatory variables. Furthermore, we also account for changing local conditions in the host country. This appears to be particularly important in the case of India, where the business environment was affected by major economic reforms in the early 1990s.

In summary, we capture the relative bargaining position of foreign investors vis-à-vis the host country India since its reform program in 1991. A stronger relative bargaining position of foreign investors from a particular country of origin would imply that the share of FDI-related profits to be appropriated by the host country declines (Svejnár & Smith, 1984). As a result, FDI from this source should become more likely; it should also become more likely that FDI takes the form preferred by the multinational corporation, rather than the host country.

3. DATA AND METHOD

(a) Project-related data on FDI and technical cooperation

Our dependent variable is the number of technical cooperation and FDI projects in India undertaken by foreign investors from a particular country of origin in a specific year. We draw on a unique dataset on about 24,500 cases of technical cooperation and FDI approved during the 1991–2004 period. These count data are published in aggregate form by the Ministry of Commerce and Industry (Government of India, various issues). The case-specific information was kindly made available by the Department of Industrial Policy and Promotion (DIPP) of the Ministry of Commerce and Industry.¹²

The country of origin is clearly identified in the database for almost all technical cooperation and FDI projects. The subsequent analysis covers the projects from 45 countries of origin listed in Appendix A. We excluded various countries of origin for which data on the explanatory variables (see below) are lacking. Typically, the excluded countries have undertaken very few projects in India throughout the period of observation.¹³ We also excluded financial centers such as Bermuda and, more importantly, Mauritius. As noted by Kumar (2006, p. 460), FDI has often been channeled through Mauritius in order to take advantage of the double taxation agreement between Mauritius and India. The database includes projects undertaken by NonResident Indians (NRI). In our baseline estimations, NRI projects are also excluded as they cannot be related to country-of-origin characteristics in an obvious way; however, as explained in detail in Section 4(c), we perform additional estimations with NRI projects included. The sample of 45 countries of origin accounted for almost 90% of all projects listed in the database.

The projects included in the database cover technical cooperation agreements (without any equity stakes of the foreign partner) as well as FDI. Furthermore, the database provides information on the foreign equity share in FDI projects. This allows us to distinguish between four types of projects: (i) purely technical cooperation, (ii) minority JVs with a foreign equity share of less than 50%, (iii) majority JVs with a foreign equity share of 50–90%, and (iv) wholly-owned subsidiaries with foreign equity shares above 90%. As discussed in Section 2, we expect foreign investors based in economically and technologically advanced countries to prefer FDI projects with higher equity shares in order to maintain better control over their intangible assets and derive a higher share of project-related profits. In contrast, India traditionally preferred technical cooperation agreements and restricted foreign ownership in FDI projects. Foreign ownership restrictions have been relaxed during the reform process since the early 1990s, however.

Görg, Mühlen, and Nunnenkamp (2010) have shown that in the case of German FDI in India, the liberalization of FDI had two effects: on the one hand, the overall number of FDI

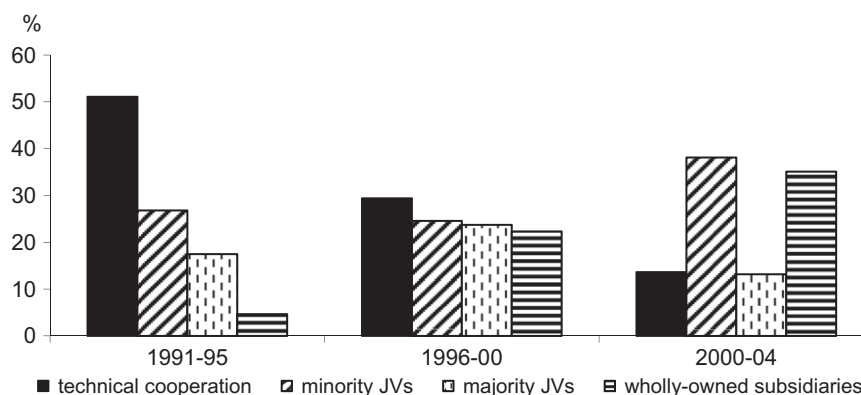


Figure 1. *Changes in the Composition of Technical Cooperation and FDI Projects in India, 1991–2004 (percent of all projects; period average). Source: DIPP database.*

projects increased. On the other hand, the share of projects corresponding to India's preference declined. The much broader database underlying the subsequent analysis offers additional insights. As can be seen in Figure 1, technical cooperation projects accounted for more than half of all projects in the first half of the 1990s, when wholly-owned foreign subsidiaries were clearly exceptional. Technical cooperation played a minor role at the end of our period of observation, while wholly-owned subsidiaries gained tremendously in importance. More ambiguous developments are observed for (minority and majority) JVs.

At the same time, there is considerable variation in the relative importance of the four types of projects between countries of origin. For instance, Table 1 reveals that the share of wholly-owned subsidiaries in all projects by US investors was almost four times the corresponding share for Japanese investors. The distribution of German projects across the types of projects is similar to the Japanese pattern, while the distribution of UK projects is closer to the US pattern.

Figure 2 portrays the composition of project types in selected industries. The relative importance of technical cooperation and FDI projects differs strikingly between industries. The software industry on the one hand and machinery and electrical equipment on the other hand reveal a sharply contrasting pattern. Two thirds of all projects in the software industry are wholly-owned subsidiaries of foreign direct investors, while technical cooperation is clearly an exception in this industry. The opposite holds for machinery and electrical equipment, where technical cooperation accounts for about 60% of all projects and wholly-owned subsidiaries account for less than 6%.

Furthermore, the industry-specific choices of project types differ between major source countries. It appears that the four major source countries have varying preferences in trade and transportation.¹⁴ Japan is mainly engaged through technical cooperation in this industry (46%), while

wholly-owned subsidiaries represent only 11% of all Japanese projects in trade and transportation. The US pattern is exactly the opposite, with 43% for wholly-owned subsidiaries and 11% for technical cooperation. The German and UK engagements in trade and transportation are dominated by majority owned JVs.

Germany and Japan play a minor role in the software industry. This applies to all project types. The United States is clearly the most important player in this industry. This holds particularly for wholly-owned subsidiaries which account for almost 70% of all US projects in the software industry. By contrast, Germany and the United States are similarly important players in machinery and electrical equipment. Technical cooperation dominates the engagement of all four major source countries in this industry, though most significantly so in the case of Japan. Wholly-owned subsidiaries contribute less than 10% to the projects of all four source countries in machinery and electrical equipment.

(b) Estimation approach

We estimate panel regressions for nonnegative count data. As our count data on projects are strongly skewed to the right (with an accumulation of observations at zero) and display significant overdispersion (with the variance being greater than the mean), we estimate our regressions employing the Negative Binomial estimator.

We estimate the following relationship:

$$\#projects_{it} = F(RB_{it}, COC_{it}, \lambda_t), \quad (1)$$

where $\#projects_{it}$ represents the number of approved (technical cooperation and FDI) projects by country of origin i in year t ; RB_{it} comprises variables capturing the relative bargaining position of investors from country of origin i , relative to the host country India; COC_{it} denotes some additional country-of-origin characteristics, and λ_t are time fixed effects.¹⁵

Table 1. *Relative importance of technical cooperation and FDI projects, four major countries of origin (percent of all projects in 1991–2004)*

	Germany	Japan	United Kingdom	United States	NRI
All projects (number)	2606	1635	2580	6100	1588
Technical cooperation (%)	41.7	50.6	33.2	27.3	0.6
Minority JVs (%)	22.4	27.8	26.7	27.8	44.5
Majority JVs (%)	21.5	13.6	19.2	15.6	25.7
Wholly-owned subsidiaries (%)	14.3	8.0	20.9	29.3	29.2

Note: NRI stands for nonresident Indians.

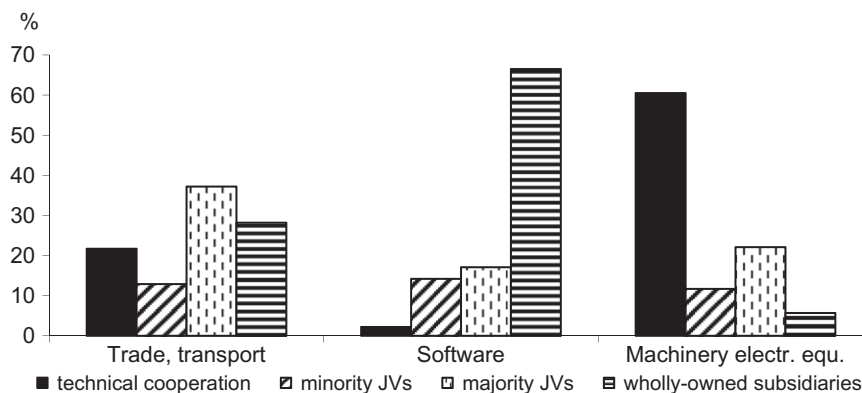


Figure 2. *Composition of Technical Cooperation and FDI Projects in Selected Industries in India, 1991–2004 (percent of all projects in the industry). Source: DIPP database.*

We run pooled regressions for the four types of projects, rather than performing regressions for each individual type and comparing the individual results with each other. Pooling projects increases our flexibility to statistically test for differences and similarities among the various types. Note, however, that we introduce dummies for each individual type of project below. We then interact these dummies with our explanatory variables, mirroring individual regressions for each type of project.

(c) *Explanatory variables*

As noted before, our focus is on a broad coverage in terms of heterogeneous source countries. While this is essential for our analysis, the downside of this approach is that it constrains the choice of possible determinants. A longer list of determinants would be available only for some advanced (OECD) countries of origin, while data limitations are typically more severe for nontraditional and less advanced countries of origin.

Nevertheless, we consider several variables relating to the bargaining framework discussed in Section 2. Relative schooling is supposed to capture the ownership advantages that foreign investors from technologically and economically advanced countries may have over local firms in India. Average years of schooling in the country of origin, relative to India, reflect skill-differences. Foreign investors based in countries with a better endowment of human capital are, in turn, more likely to have command over superior technologies that the host country would like to attract. Yet, higher skill-differences do not necessarily improve the bargaining position of foreign investors vis-à-vis India. They may also reflect differences in labor costs, especially as the data situation does not allow us to control for wage levels in the countries of origin and in India. Consequently, the bargaining position of foreign investors from high-wage countries may tend to be weakened in the case of FDI projects that are mainly motivated by low wages in India.

Market size is one of the most traditional determinants of FDI (e.g., Scaperlanda & Mauer, 1969). From a bargaining perspective, the ratio of the country-of-origin's GDP over India's GDP matters in two respects.¹⁶ On the one hand, the numerator of this ratio is supposed to reflect the potential for economies of scale, and the availability of diversified inputs in the country of origin that tend to enhance the foreign investors' productivity, and thus their bargaining position. On the other hand, the denominator reflects India's attractiveness

in terms of local markets that foreign investors would like to access.

The financing of technical cooperation and FDI projects is easier and less costly for foreign investors if financial markets are well developed in the country of origin. Easier access to financing and lower financing costs are traditionally perceived to be a major source of competitive advantage for firms (Aliber, 1970; Grosse & Trevino, 1996). We proxy financial market development by the amount of domestic credit as a percentage of GDP.¹⁷ This variable is also defined relative to financial market development in India. The reason for this is that India may have better chances to involve local partners in technical cooperation agreements and JVs if the financial constraints of Indian firms become less binding.

The financing of FDI projects also depends on exchange-rate developments. The bargaining position of investors can be expected to improve if they are based in countries with a strong currency. An appreciation of the country of origin's currency, relative to the Indian Rupee, renders it cheaper for foreign investors to acquire assets in India (Froot & Stein, 1991). This wealth effect is therefore likely to result in projects with higher foreign equity shares. However, recent research points to more complex theoretical links and considerable empirical ambiguity. Pain and van Welsum (2003, p. 826) argue that the response of foreign investors to exchange-rate movements "depend[s] on the configuration of the activities undertaken in the different locations."¹⁸ Blonigen (1997) stresses that various types of FDI are likely to respond differently to exchange-rate fluctuations.¹⁹ Empirically, several recent studies have found that a weaker US dollar or a stronger host-country currency were associated with more outward FDI by the United States.²⁰ Busse, Hefeker, and Nelgen (2010) identify different reactions of FDI to exchange-rate developments in developed and developing host countries, possibly because large and sudden exchange-rate swings are more common in developing countries. Large swings may add to exchange-rate uncertainty. Greater uncertainty, in turn, renders the option more attractive for investors to wait, so that exchange-rate effects on current FDI are increasingly blurred (Campa, 1993). In order to capture exchange-rate effects, we construct bilateral real exchange-rate indexes with Indian Rupees per unit of the country-of-origin's currency set equal to one for the year 1990.

Host-country risk is well known for influencing decisions foreign investors take on where to invest (Kobrin, 1980). The impact becomes more complex when defining risk in relative terms, that is, considering the country of origin's political

risk rating relative to India's political risk rating. Arguably, investors from countries of origin characterized by higher risk may be more inclined to invest abroad in order to escape risk at home. The empirical evidence is inconclusive here however.²¹ Furthermore, it is open to question how relative risk conditions affect the preferences for different types of (technical cooperation and FDI) projects. One could suspect that the host country's bargaining position improves when foreign investors have stronger incentives to escape risk at home; this might imply that higher risk in the country of origin shifts the composition of projects toward technical cooperation and minority JVs. On the other hand, the foreign investors themselves may prefer projects with lower equity stakes in order to limit potential sunk costs under conditions of higher risk in the host country.

Similar ambiguity prevails with regard to more specific risk factors which are typically addressed in Bilateral Investment Treaties (BITs), including the risk of expropriation without adequate compensation. The bargaining position of foreign investors tends to improve due to the lower risk that comes with the ratification of a BIT by the host country with a particular country of origin. Nevertheless, the composition of projects may not necessarily shift toward majority JVs and wholly-owned subsidiaries.²² Foreign investors may be more inclined to enter into minority JVs once a BIT is in force; this may happen, for example, if the BIT provides effective dispute settlement mechanisms, thereby mitigating potential conflicts with local partners and discriminatory treatment by host-country authorities. Our BIT dummy is coded as 1 from the year in which it was ratified, and as 0 otherwise.²³

We consider two additional country-of-origin characteristics in the estimations. First, the stock of outward FDI held in all host countries, as a percentage of the country of origin's GDP, is included in order to account for the country of origin's international experience. At the firm level, international experience helps foreign investors to adapt to local conditions and monitor overseas operations, thus being less likely to rely on local partners (e.g., Anderson & Gatignon, 1988). We conjecture that a similar reasoning will hold for foreign investors based in countries of origin with more international experience. Second, we add the country of origin's (logged) per capita income in constant prices as a general proxy of the level of productivity and technological development.²⁴ Finally, we include time fixed effects. Time fixed effects are required primarily to account for the process of FDI liberalization in India, starting with the reform program in 1991. Summary statistics are presented in Appendix B, and detailed definitions and sources in Appendix C.

4. RESULTS

(a) Marginal effects on separate types of projects

Table 2 reports two specifications for each type of project—technical cooperation, minority JVs, majority JVs, and wholly-owned subsidiaries: We show the basic specification in columns (1), (3), (5) and (7), while the extended specification, including the country of origin's per capita GDP, is shown in columns (2), (4), (6) and (8). In addition to the explanatory variables introduced before, we include dummy variables for each of the three types of FDI projects in order to account for the relative differences in frequency compared to technical cooperation projects, which represent the base category. We also allow the slope of the explanatory variables to vary across the types of projects. Specifically, we interact each explanatory

variable with the dummy variables for minority JVs, majority JVs, and wholly-owned subsidiaries. By doing this we can test for significant differences in the reaction of the three types of FDI projects, compared to the reaction of technical cooperation projects, to changes in country-of-origin characteristics and the relative bargaining position of foreign investors vis-à-vis the host country India (see next sub-section).

Estimating an interaction term in a nonlinear model—such as the negative binomial regression estimation used here—is not straightforward however. The coefficient does not correctly reflect the marginal effect (Ai & Norton, 2003; Greene, 2010). Moreover, a simple *t*-test on the coefficient of the interaction term is not appropriate to test for the significance of the interaction. Rather than showing the coefficients of the explanatory variables, Table 2 therefore shows the marginal effects of each explanatory variable and the corresponding *t*-statistic (in parentheses), evaluated at the mean of the explanatory variables.

As can be seen from Table 2, most of our explanatory variables are statistically significant at the 10% level at least, with the expected sign. This applies to all four types of projects. We formally test whether the corresponding marginal effect differs significantly from the base category of technical cooperation by performing a Wald test, showing the *p*-values in square brackets. We return to these differences later. Turning to the specific results, the international experience of investors, reflected in higher outward FDI stocks in all host countries as a percentage of the country of origin's GDP, is associated with a larger number of all four types of projects, at the 1% level of significance. The results suggest that an increase in *FDI outward stock/GDP* by ten percentage points would add about just 0.1 additional technical cooperation agreements, however, compared to 0.2–0.8 FDI projects (depending on the type of FDI). Foreign investors from larger (*Relative GDP*) and richer (*Per capita GDP*) countries of origin engage in a larger number of all types of projects, again at the 1% level of significance. For instance, an increase in relative GDP by 10 percentage points increases the number of projects by about 0.01–0.04. In the basic specification, the same holds for investors based in countries with a better endowment of human capital. An increase in *Relative Schooling* by 10 percentage points leads to an increase in the number of projects by between 0.01 and 0.13. The fact that the impact of *Relative Schooling* weakens in the extended specification, or even loses statistical significance at conventional levels, can be attributed to the high correlation of this variable with the country of origin's GDP per capita ($\rho = 0.64$).

More surprisingly perhaps, two more variables prove to be significantly positive at the 1% level in all estimations shown in Table 2—financial market development (as reflected in *Relative Domestic Credit*) and the existence of a Bilateral Investment Treaty (BIT) ratified by India and the particular country of origin. For *Relative Domestic Credit*, an increase by 10 percentage points increases the number of projects by between 0.01 and 0.07. The existence of a BIT increases the number of TC projects by 0.6–0.7, and the other projects by between 1 and 2.7. The effectiveness of BITs in raising the number of all types of projects is in contrast with the widespread skepticism expressed in several empirical investigations on the impact of BITs on FDI flows (Sauvant & Sachs, 2009). The relevance of financial market development was to be expected for FDI projects, though not necessarily for technical cooperation, which does not involve any foreign equity participation.

The effect of country risk on the number of projects is more ambiguous. Note that higher values for *Relative Political Risk*

Table 2. *All projects, 1991–2004, negative binomial regressions*

	(1) TC	(2) TC	(3) Minority JV	(4) Minority JV	(5) Majority JV	(6) Majority JV	(7) WOS	(8) WOS
FDI outward stock/GDP	0.011*** (3.74)	0.005*** (3.09)	0.075*** (5.07)	0.055*** (4.88)	0.030*** (4.17)	0.020*** (3.94)	0.061*** (4.85)	0.047*** (4.63)
Relative GDP	0.115*** (3.63)	0.077*** (3.70)	0.414*** (4.54)	0.350*** (4.70)	0.159*** (3.89)	0.126*** (3.97)	0.312*** (4.56)	0.280*** (4.70)
Relative Domestic Credit	0.154*** (3.37)	0.112*** (3.33)	0.686*** (3.78)	0.549*** (3.64)	0.266*** (3.35)	0.203*** (3.17)	0.549*** (3.50)	0.453*** (3.34)
Relative Political Risk	−0.060 (0.56)	−0.202** (2.02)	−0.641 (1.15)	−0.888* (1.75)	−0.428 (1.63)	−0.529** (2.20)	−2.439*** (3.18)	−2.460*** (3.47)
Bilateral Investment Treaties	0.738*** (4.08)	0.570*** (4.19)	2.643*** (4.84)	2.355*** (4.97)	1.210*** (4.27)	1.020*** (4.33)	2.721*** (4.88)	2.450*** (4.99)
Real Exchange Rate Index	−0.102 (1.25)	0.036 (0.58)	−1.405*** (2.86)	−0.922** (2.29)	−0.681*** (2.88)	−0.484*** (2.60)	−1.698*** (3.32)	−1.423*** (3.22)
Relative Schooling	0.376*** (3.24)	0.118* (1.81)	1.201*** (3.02)	0.343 (1.07)	0.488*** (2.66)	0.080 (0.59)	1.286*** (3.01)	0.653* (1.79)
Per capita GDP (log)		0.195*** (3.83)		0.678*** (3.81)		0.324*** (3.60)		0.471*** (3.01)
Year 1991	1.210*** (5.90)	1.102*** (5.95)	0.666 (1.08)	0.817 (1.54)	−0.035 (0.10)	0.101 (0.36)	−8.659*** (2.76)	−7.802*** (2.82)
Year 1992	1.486*** (5.67)	1.312*** (5.77)	1.800*** (4.14)	1.850*** (4.86)	1.321*** (6.81)	1.236*** (7.07)	−3.293*** (2.66)	−2.976*** (2.70)
Year 1993	1.416*** (5.76)	1.203*** (5.89)	2.307*** (5.65)	2.232*** (6.09)	1.207*** (6.53)	1.133*** (6.81)	−2.251** (2.27)	−2.055** (2.32)
Year 1994	1.439*** (5.71)	1.221*** (5.85)	2.626*** (6.56)	2.496*** (6.92)	1.366*** (7.01)	1.237*** (7.15)	−1.013 (1.40)	−0.902 (1.40)
Year 1995	1.376*** (5.75)	1.165*** (5.89)	3.032*** (7.14)	2.847*** (7.45)	1.386*** (6.85)	1.246*** (6.96)	−0.629 (0.97)	−0.520 (0.90)
Year 1996	1.170*** (6.03)	0.977*** (6.18)	1.710*** (4.00)	1.625*** (4.26)	1.650*** (7.02)	1.495*** (7.12)	0.518 (1.14)	0.493 (1.21)
Year 1997	0.956*** (6.34)	0.836*** (6.42)	0.600 (1.14)	0.572 (1.22)	1.352*** (6.89)	1.255*** (7.07)	0.403 (0.91)	0.426 (1.08)
Year 1998	0.890*** (6.40)	0.773*** (6.51)	−0.911 (1.21)	−0.757 (1.15)	0.656*** (3.59)	0.607*** (3.89)	0.308 (0.68)	0.335 (0.83)
Year 1999	0.754*** (6.41)	0.674*** (6.57)	0.392 (0.73)	0.460 (0.99)	0.615*** (3.37)	0.597*** (3.87)	−0.123 (0.24)	−0.042 (0.09)
Year 2000	0.714*** (6.30)	0.636*** (6.49)	−0.170 (0.27)	−0.041 (0.08)	0.379* (1.76)	0.367** (2.02)	−0.632 (1.07)	−0.539 (1.04)
Year 2001	0.532*** (5.39)	0.488*** (5.91)	0.080 (0.14)	0.218 (0.43)	0.124 (0.49)	0.191 (0.92)	−0.208 (0.40)	−0.113 (0.25)
Year 2002	0.426*** (4.36)	0.409*** (5.18)	0.343 (0.63)	0.357 (0.75)	0.095 (0.37)	0.151 (0.72)	0.047 (0.10)	0.132 (0.31)
Year 2003	0.529*** (5.41)	0.464*** (5.78)	−0.012 (0.02)	0.050 (0.10)	−0.274 (0.83)	−0.210 (0.76)	0.081 (0.17)	0.122 (0.29)
Number of observations	2520	2520	2520	2520	2520	2520	2520	2520
Number of countries	45	45	45	45	45	45	45	45

Notes: Reports marginal effects at the mean of the explanatory variables. Brackets report *p*-values for tests of equality between the marginal effects with respect to TC projects. *t*-statistics in parentheses.

*Significance at the 10% level.

**Significance at the 5% level.

***Significance at the 1% level.

correspond to lower risk in the country of origin relative to India. A negative coefficient for this variable is thus consistent with the view that higher risk in India discourages foreign investors, while India may attract more projects from

countries of origin where investors are concerned about domestic risk. This effect proves to be significant at the 1% level for wholly-owned subsidiaries. The significance weakens when running the estimations for the other types of projects,

with the coefficients actually losing their significance in the basic specifications.²⁵

Technical cooperation stands out as exchange-rate effects do not appear to have an impact on the number of agreements. This is plausible insofar as the wealth effect of an appreciated currency in the country of origin is not particularly relevant for projects in which the foreign firm does not acquire assets in the host country. However, the coefficients on the index of real exchange rates are significantly negative for all three types of FDI projects. This is in conflict with the traditional view, according to which host countries with weaker currencies should attract more FDI from countries of origin with stronger currencies. Our finding is more in line with the pattern observed recently for outward FDI by the United States (Görg & Wakelin, 2002; Schmidt & Broll, 2009) and inward FDI in developing countries (Busse *et al.*, 2010). The large and sudden depreciation of the Indian Rupee in 1991 may have created considerable uncertainty among foreign investors about future exchange-rate developments. As discussed in Section 2 uncertainty could have prompted wait-and-see attitudes, thus causing a reduction in FDI projects as an immediate reaction to the weaker Rupee.

Finally, the time dummies included in all estimations reported in Table 2 point to changes in the composition of projects that are in line with the increasing liberalization of FDI in India post-1991, notably the relaxation of foreign ownership restrictions. Specifically, the time dummies enter with particularly strong and significantly positive effects for technical cooperation in those earlier years when foreign investors were offered fewer equity-based alternatives. This is in sharp contrast to the negative time dummies at the beginning of the period of observation in the estimations for wholly-owned subsidiaries.

(b) Differences between technical cooperation and FDI

In the next step, we compare the four types of projects by formally testing for differences with a Wald test. We show the *p*-values which indicate whether the corresponding marginal effect differs significantly from the base category of technical cooperation in square brackets in Table 2. The *p*-values reveal that the impact of two variables—*Real Exchange Rate Index* and *FDI outward stock/GDP*—is stronger for all types of FDI projects when compared to technical cooperation. The finding for the exchange-rate variable accentuates the point made above regarding the option value of waiting under conditions of exchange-rate uncertainty. The option of waiting is clearly more appealing in the case of FDI projects. At the same time, foreign investors with more international experience are more likely to engage in FDI projects than in technical cooperation. On the one hand, experience seems to encourage investors to incur higher sunk costs in the case of wholly-owned subsidiaries. On the other hand, experienced investors may be better prepared for cooperating with local partners in JVs.

As for the remaining variables, several hypotheses derived from the bargaining framework in Section 2 are strongly supported when comparing wholly-owned subsidiaries with technical cooperation. In particular, the impact of the size of countries of origin (*Relative GDP*), their economic development (*Per capita GDP*), and their financial market sophistication (*Relative Domestic Credit*) on the number of wholly-owned subsidiaries is clearly more pronounced than the impact of these characteristics on the number of technical cooperation agreements.²⁶ This suggests that foreign investors based in such countries are in a better bargaining position to

make Indian authorities agree to wholly-owned subsidiaries. The picture is less clear for the country of origin's relative endowment of human capital (*Relative Schooling*). The impact of this characteristic on wholly-owned subsidiaries is significantly stronger at the 5% level in the basic specification in column (7), but no longer in the extended specification in column (8). This ambiguity might arise because technical cooperation often draws on qualified local labor. In other words, the Indian licensees may rely on sufficiently qualified labor to a similar extent as do the foreign owners of subsidiaries in India.

Risk factors have a significantly stronger effect on the number of wholly-owned subsidiaries than on the number of technical cooperation agreements. The stronger negative effect of *Relative Political Risk* implies a shift away from wholly-owned subsidiaries with lower risk in the country of origin and, respectively, higher risk in India. This conflicts with the proposition that Indian authorities may have a better opportunity to attract their preferred types of projects when investors have a stronger incentive to escape risk at home. It appears instead that foreign investors avoid wholly-owned subsidiaries projects because of the potentially large sunk costs under conditions of higher risk in India. At the same time, investor protection through BITs encourages wholly-owned subsidiaries more strongly than technical cooperation. This is reasonable as the protection against expropriation and insufficient compensation, typically granted in BITs, should be more relevant for foreign investors who own fixed assets in India.²⁷

International experience and BITs also have a stronger impact on JVs than on technical cooperation.²⁸ In other respects, the evidence is less clear when comparing JVs with technical cooperation. On the one hand, various *p*-values reported in columns (5) and (6) of Table 2 do not point to a significantly different impact on majority JVs compared to technical cooperation. On the other hand, the *p*-values reported in columns (3) and (4) suggest that the differences between minority JVs and technical cooperation are similar to the differences between wholly-owned subsidiaries and technical cooperation.²⁹ We return to this surprising pattern in more detail at the end of this section.

(c) Accounting for nonresident Indians

In addition to the source countries considered so far, the database also lists technical cooperation and FDI projects undertaken by so-called NonResident Indians (NRI). Table 1 shows that the overall number of NRI projects is almost as high as the number of Japanese projects. Regrettably, the database does not specify where the NRI engaging in technical cooperation and investment projects are living. Hence, there is no obvious way to relate these projects to any source-country characteristics. We address this problem as follows: (i) we collected data on the estimated size of the Indian diaspora in each country of our sample of source countries from the Report of the High Level Committee on the Indian Diaspora;³⁰ (ii) we use the size of the Indian diaspora as weights and calculate the weighted average of all explanatory variables for the source countries in which NRI were living; (iii) we assume that these weighted averages represent the relevant source characteristics for projects undertaken by NRI.³¹

Based on this procedure, we replicate the estimations reported in Table 2 with NRI included as another source of projects, in addition to the 45 source countries covered in the standard estimations. We show the results in Appendix E. The results are very similar to Table 2 for most of our explanatory variables. There are two interesting differences, however. On the one hand, FDI projects undertaken by NRI appear to

be discouraged more strongly by higher relative political risk. In some contrast to Table 2, the marginal effect of relative political risk proves to be significant (at the 10% level or better) in all FDI-related estimations with NRI projects included, possibly because NRI are better informed than truly foreign investors about political risk in India. Furthermore, the *p*-values in Appendix E reveal that the marginal effects are significantly greater for all types of FDI projects, compared to technical cooperation. On the other hand, the impact of relative schooling on FDI projects weakens once NRI projects are taken into account. This seems to suggest that FDI projects by NRI are less reliant on skilled local labor than FDI projects from other sources.

(d) *Accounting for changes over time*

In the next step, we replicate the estimations in Table 2 for separate sub-periods. As shown in Figure 1, the composition of projects changed considerably over time. In the following, we distinguish between the 1991–97 period in the immediate aftermath of India's reform program and the 1998–2004 period when the liberalization process was fairly advanced. A clearer picture for our explanatory variables could thus have emerged in the second sub-period since their impact was no longer blurred by regulatory changes. Rather than separating marginal effects in a nested model, Table 3 shows our regressions estimated for the two sub-periods. The coefficients are compared using Seemingly Unrelated Regressions (SUR).

The results for several explanatory variables proved to be fairly stable over time (Table 3).³² For instance, the

coefficients on relative GDP and bilateral investment treaties are significantly positive for all types of projects, similar to the baseline results in Table 2. Moreover, the *p*-values in Table 3 indicate that the coefficients on these variables do not differ significantly between the two sub-periods. The same applies for relative schooling, even though one could have expected an increasing importance of local labor skills over time.

The international experience of the source country, proxied by the ratio of its outward FDI stock over GDP, matters in both sub-periods. However, the impact of this variable has weakened significantly over time for all types of projects. This is plausible considering that international experience is particularly relevant under conditions of uncertainty about the future course of host country policies immediately after a major regime change as in India in 1991. Relative political risk appears to have discouraged technical cooperation and joint ventures only in the second sub-period. This is in contrast to wholly-owned subsidiaries that were discouraged to a similar extent by relative political risk in both sub-periods (*p*-value of 0.32). Finally, the relevance of relative domestic credit has increased over time especially for joint ventures.

(e) *Estimations for sectors and selected industries*

Separating projects in the secondary sector (manufacturing) from those in the tertiary sector (services and utilities) may offer additional insights into whether the underlying motivation of foreign investors tends to differ across sectors. In general, cost motives leading to vertical FDI projects are more likely in manufacturing industries than in (nontradable) services

Table 3. *Decomposition over time, 1991–97 and 1998–2004, negative binomial regressions*

	TC		MJV		MJJV		WOS	
	<1998	>1997	<1998	>1997	<1998	>1997	<1998	>1997
FDI outward stock/GDP	0.041*** (6.46)	0.018*** (5.61) [0.0009]	0.046*** (6.94)	0.026*** (10.99) [0.0036]	0.055*** (8.61)	0.025*** (8.43) [0.0000]	0.057*** (8.57)	0.028*** (11.57) [0.0000]
Relative GDP	0.265*** (3.19)	0.234*** (3.82) [0.7582]	0.171*** (3.76)	0.188*** (9.91) [0.7404]	0.171*** (3.96)	0.183*** (8.29) [0.8096]	0.136*** (9.34)	0.207*** (12.94) [0.0010]
Relative Domestic Credit	0.192 (1.51)	0.443*** (4.34) [0.1242]	0.117 (1.16)	0.454*** (9.24) [0.0026]	0.153* (1.73)	0.397*** (6.07) [0.0271]	0.158** (2.14)	0.323*** (6.21) [0.0671]
Relative Political Risk	0.462 (1.48)	−1.230*** (2.86) [0.0015]	0.563* (1.75)	−1.957*** (5.66) [0.0000]	0.193 (0.62)	−1.657*** (3.75) [0.0006]	−1.175** (2.42)	−1.783*** (4.75) [0.3216]
Bilateral Investment Treaties ratified	1.654*** (6.49)	1.749*** (10.16) [0.7561]	1.334*** (6.57)	1.436*** (12.32) [0.6624]	1.554*** (8.02)	1.471*** (9.13) [0.7391]	1.459*** (7.13)	1.613*** (13.23) [0.5168]
Exchange Rate Index	−0.038 (0.13)	−0.547** (2.04) [0.2019]	−0.077 (0.27)	−1.272*** (5.91) [0.0008]	−0.423* (1.86)	−1.343*** (4.22) [0.0188]	−0.718*** (2.61)	−1.184*** (5.25) [0.1906]
Relative Schooling Years	0.885*** (4.71)	0.631*** (2.76) [0.3911]	0.548*** (2.58)	0.614*** (3.53) [0.8102]	0.537*** (3.02)	0.507*** (2.39) [0.9141]	0.697*** (3.42)	0.702*** (3.94) [0.9864]
Number of observations	315	315	315	315	315	315	315	315
Number of countries	45	45	45	45	45	45	45	45

Notes: Reports coefficients. Dummies for years included. TC stands for technical cooperation; MJV for minority joint venture, MJJV for majority joint venture, WOS for wholly-owned subsidiary. Brackets report *p*-values for tests of equality of coefficients between the two periods of time. *t*-statistics in parentheses.

* Significance at the 10% level.

** Significance at the 5% level.

*** Significance at the 1% level.

and utilities, where local-market-oriented horizontal types of foreign engagement are more likely (e.g., UNCTAD, 1998). Arguably, this traditional view no longer holds in India which has attracted many FDI projects in business and IT services. These projects are mostly motivated by the availability of technically skilled and relatively cheap labor; being part of the recent move toward offshoring of services, most of these projects are clearly export-oriented. All the same, the majority of projects undertaken in India's tertiary sector in the 1991–2004 period can be expected to be oriented toward local markets.

Official statistics for the period covered here suggest that FDI inflows into the tertiary sector were dominated by foreign engagements in transportation, telecommunication, and power generation (see Appendix F for details). It seems safe to assume that projects in these categories are mostly oriented toward serving Indian markets. The same applies to some less important categories such as trading and hotels and tourism. In addition, official statistics comprise a category “service sector” that is not further specified. Even if this category included exclusively export-oriented projects, which appears rather unlikely, these would account for just 19.9% of all FDI inflows into the tertiary sector during the 1991–2004 period.³³

Table 4 replicates Table 2 for the basic specification of our estimation equations, with an overall number of about 12,700 projects in manufacturing (columns 1–4) and 8000 in services and utilities (columns 5–8).³⁴ Table 4 reveals that our explanatory variables are relevant in both sectors. The marginal effects are statistically significant at the 10% level or higher, with very few exceptions. Furthermore, the impact

of all variables works in the same direction for the number of projects in manufacturing and the tertiary sector. All the same, the *p*-values point to striking differences between the two sectors when comparing the impact of a particular variable on FDI projects with the impact of the same variable on technical cooperation.

Several of the variables supposed to capture important elements of the bargaining position of foreign investors vis-à-vis the authorities in India appear to affect the composition of projects in the tertiary sector only. In this sector, the relative size of the country of origin, its financial market development, and its endowment of human capital affect all three types of FDI projects more strongly than technical cooperation. In the manufacturing sector, the impact of these variables on any type of FDI project does not differ significantly from their impact on technical cooperation.

There are several possible explanations for the differences between the two sectors. First, they may be partly explained by market motives in nontradable services and utilities during the period of observation. For instance, the bargaining position of foreign investors tends to improve with increasing *Relative GDP* in the case of local-market-oriented projects in transportation, trading, telecommunication, and power generation. Consequently, the type of projects in these sub-sectors would be more likely to be in line with the preferences of foreign investors. The bargaining position is unlikely to be affected by *Relative GDP* in the case of vertical (cost-oriented) FDI in the manufacturing sector, which could have become more important since the early

Table 4. *Projects in manufacturing and services/utilities, 1991–2004, negative binomial regressions*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Manufacturing				Services/utilities			
	TC	Minority JV	Majority JV	WOS	TC	Minority JV	Majority JV	WOS
FDI outward stock/GDP	0.008*** (3.35)	0.026*** (4.31)	0.012*** (3.53)	0.018*** (4.14)	0.003*** (2.64)	0.043*** (5.34)	0.013*** (4.13)	0.035*** (5.07)
		[0.0060]	[0.3261]	[0.0484]		[0.0000]	[0.0016]	[0.0000]
Relative GDP	0.119*** (3.46)	0.187*** (3.84)	0.070*** (3.29)	0.099*** (3.71)	0.013** (2.55)	0.188*** (4.87)	0.060*** (3.89)	0.174*** (4.76)
		[0.2537]	[0.2242]	[0.6505]		[0.0000]	[0.0043]	[0.0000]
Relative Domestic Credit	0.134*** (3.12)	0.262*** (3.23)	0.118*** (2.94)	0.190*** (3.04)	0.014* (1.88)	0.480*** (4.30)	0.121*** (3.34)	0.357*** (3.80)
		[0.1640]	[0.7833]	[0.4605]		[0.0000]	[0.0040]	[0.0003]
Relative Political Risk	−0.018 (0.17)	−0.168 (0.64)	−0.081 (0.65)	−0.944*** (2.85)	−0.050 (1.59)	−1.435*** (3.28)	−0.513*** (2.98)	−2.054*** (3.82)
		[0.5983]	[0.7050]	[0.0079]		[0.0016]	[0.0082]	[0.0002]
Bilateral Investment Treaties	0.707*** (3.90)	1.254*** (4.28)	0.616*** (3.69)	1.035*** (4.18)	0.084** (2.49)	1.274*** (4.81)	0.464*** (3.96)	1.593*** (4.98)
		[0.1124]	[0.7113]	[0.2856]		[0.0000]	[0.0018]	[0.0000]
Real Exchange Rate Index	−0.147* (1.70)	−0.790*** (2.96)	−0.302** (2.46)	−0.712*** (3.03)	−0.066** (2.02)	−0.382 (1.49)	−0.273** (2.54)	−0.782*** (2.86)
		[0.0218]	[0.3023]	[0.0243]		[0.2196]	[0.0644]	[0.0093]
Relative Schooling	0.373*** (3.11)	0.594*** (2.91)	0.237** (2.45)	0.461** (2.57)	0.049** (1.97)	0.677*** (2.76)	0.226** (2.48)	0.975*** (3.34)
		[0.3502]	[0.3795]	[0.6843]		[0.0109]	[0.0608]	[0.0016]
Number of observations	2520	2520	2520	2520	2520	2520	2520	2520
Number of countries	45	45	45	45	45	45	45	45

Notes: Reports marginal effects at the mean of the explanatory variables. Dummies for years included. TC stands for technical cooperation; JV for joint venture, WOS for wholly-owned subsidiary. Brackets report *p*-values for tests of equality between the marginal effects with respect to TC projects. *t*-statistics in parentheses.

*Significance at the 10% level.

**Significance at the 5% level.

***Significance at the 1% level.

Table 5. Industry-specific estimations, 1991–2004, negative binomial regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Trading and transportation				Software				Machinery and electrical			
	TC	Minority JV	Majority JV	WOS	TC	Minority JV	Majority JV	WOS	TC	Minority JV	Majority JV	WOS
FDI outward stock/GDP	−0.003 (0.34)	0.027 ^{**} (4.96)	0.029 ^{**} (6.83)	0.029 ^{**} (8.42)	0.021 [*] (1.69)	0.028 ^{**} (6.98)	0.026 ^{**} (7.05)	0.033 ^{**} (9.87)	0.017 ^{**} (4.15)	0.025 ^{**} (4.02)	0.027 ^{**} (4.84)	0.016 ^{**} (3.72)
Relative GDP	0.139 ^{**} (2.54)	0.090 ^{**} (2.55)	0.098 ^{**} (4.57)	0.141 ^{**} (5.39)	0.131 ^{**} (3.20)	0.147 ^{**} (6.23)	0.165 ^{**} (7.50)	0.202 ^{**} (10.56)	0.184 ^{**} (4.68)	0.124 ^{**} (4.78)	0.164 ^{**} (4.80)	0.136 ^{**} (4.31)
Relative Domestic Credit	0.431 ^{**} (2.56)	0.374 ^{**} (3.26)	0.324 ^{**} (4.36)	0.345 ^{**} (3.29)	0.224 (1.21)	0.274 ^{**} (2.74)	0.249 ^{**} (3.06)	0.248 ^{**} (4.01)	0.250 ^{**} (3.07)	0.349 ^{**} (3.36)	0.248 ^{**} (2.56)	0.445 ^{**} (3.70)
Relative Political Risk	−0.879 (1.13)	−2.306 ^{**} (3.51)	−1.423 ^{**} (3.22)	−2.327 ^{**} (3.52)	−0.702 (0.43)	−2.001 ^{**} (3.08)	−1.978 ^{**} (3.48)	−2.302 ^{**} (4.58)	0.234 (0.67)	0.077 (0.17)	−0.843 [*] (1.81)	−3.245 ^{**} (3.54)
Bilateral Investment Treaties	1.798 ^{**} (4.90)	0.970 ^{**} (3.20)	1.200 ^{**} (5.83)	1.381 ^{**} (5.69)	1.446 ^{**} (2.39)	0.565 ^{**} (2.24)	0.897 ^{**} (4.44)	1.227 ^{**} (7.73)	1.874 ^{**} (9.81)	1.158 ^{**} (4.60)	1.780 ^{**} (8.30)	2.107 ^{**} (6.02)
Real Exchange Rate Index	−1.394 ^{**} (3.68)	−0.129 (0.45)	−0.313 (1.28)	−0.735 ^{**} (2.88)	−0.218 (0.40)	−0.397 (1.56)	−0.609 ^{**} (2.30)	−0.579 ^{**} (2.79)	−0.692 ^{**} (2.54)	−0.187 (0.61)	−0.573 ^{**} (2.10)	−1.224 ^{**} (3.17)
Relative Schooling	0.689 [*] (1.81)	0.331 (0.98)	0.278 (1.12)	0.113 (0.30)	1.322 ^{**} (2.66)	1.027 ^{**} (2.80)	1.128 ^{**} (3.81)	1.290 ^{**} (5.12)	0.936 ^{**} (5.84)	0.082 (0.34)	0.659 ^{**} (3.28)	0.756 (1.55)
		[0.4824]	[0.3673]	[0.2796]		[0.6331]	[0.7372]	[0.9538]		[0.0033]	[0.2819]	[0.7266]
Number of observations	630	630	630	630	630	630	630	630	630	630	630	630
Number of countries	45	45	45	45	45	45	45	45	45	45	45	45

Notes: Reports coefficients. Dummies for years included. TC stands for technical cooperation; JV for joint venture, WOS for wholly-owned subsidiary. Brackets report *p*-values for tests of equality of coefficients with respect to TC projects. *t*-statistics in parentheses.

* Significance at the 10% level.

** Significance at the 5% level.

*** Significance at the 1% level.

1990s. The reduction of trade barriers, a cornerstone of India's reform program, strengthened the incentives to use India as an export platform and a cost effective location for intermediate production.³⁵

Second, part of the explanation for the contrasting findings in Table 4 could be the higher concentration of projects in the tertiary sector in recent years. The ratio of projects in services and utilities to those in manufacturing increased markedly from 0.23 in 1991–95 to 1.46 in 2001–04. Even though we control for time fixed effects, this shift implies that projects in services and utilities benefited over-proportionally from the process of FDI liberalization in India and the increasingly wide range of options of foreign ownership. This could also explain why risk-related factors, *Relative Political Risk* and *Bilateral Investment Treaties*, have a significantly stronger impact on FDI projects than on technical cooperation in the tertiary sector, but generally not in the manufacturing sector.

Third, the sector perspective may hide important shifts in the composition of projects at a more disaggregated level. As noted above, this is most likely in the tertiary sector where FDI projects in business and IT services gained considerable importance more recently. As explained in detail in Appendix H, industry-specific estimations can be performed only for selected industries for which individual projects can be coded in a reasonable way. Table 5 presents the results of this exercise for projects in machinery and electrical equipment (representing a prominent example within the

manufacturing sector), trading and transportation (representing market seeking projects in the tertiary sector), and software (representing the recent focus on offshoring of business services).³⁶

Similar to the sector perspective before, our explanatory variables are typically relevant in all three industries and the signs of coefficients indicate that the effects work in the same direction in all industries. The *p*-values reported in brackets rarely reject the equality of coefficients with respect to technical cooperation projects. While machinery and electrical equipment tends to resemble the whole manufacturing sector in this regard, this finding is more surprising for the two industries belonging to the tertiary sector. However, in particular for the software industry, the small number of technical cooperation projects underlying the estimations renders the test of equality of coefficients less relevant.

All the same, Table 5 supports the view that the more aggregate perspective may blur important insights at the industry level. Most notably, the two industries belonging to the tertiary sector differ in an important respect. Relative schooling proves to be insignificant at conventional levels as a determinant of FDI projects in trading and transportation, independent of whether FDI takes the form of joint ventures or wholly-owned subsidiaries. In sharp contrast, relative schooling is significant at the 1% level for all types of FDI projects in the software industry, which underscores that projects in this industry are strongly motivated by the availability of technically skilled and relatively cheap labor.

Table 6. FDI projects, 1991–2004, negative binomial regressions

	(1) Minority JV	(2) Minority JV	(3) Majority JV	(4) Majority JV	(5) WOS	(6) WOS
FDI outward stock/GDP	0.075*** (5.38) [0.0034]	0.054*** (5.15) [0.0023]	0.029*** (4.40)	0.019*** (4.12)	0.061*** (5.13) [0.0218]	0.046*** (4.87) [0.0100]
Relative GDP	0.414*** (4.82) [0.0058]	0.347*** (4.98) [0.0028]	0.155*** (4.10)	0.122*** (4.17)	0.312*** (4.83) [0.0361]	0.278*** (4.96) [0.0134]
Relative Domestic Credit	0.679*** (4.00) [0.0237]	0.540*** (3.83) [0.0243]	0.260*** (3.52)	0.196*** (3.32)	0.548*** (3.69) [0.0821]	0.450*** (3.51) [0.0717]
Relative Political Risk	−0.662 (1.26) [0.7088]	−0.926* (1.91) [0.4748]	−0.445* (1.80)	−0.544** (2.40)	−2.511*** (3.40) [0.0079]	−2.528*** (3.70) [0.0059]
Bilateral Investment Treaties	2.649*** (5.12) [0.0125]	2.350*** (5.24) [0.0069]	1.195*** (4.49)	1.000*** (4.54)	2.726*** (5.16) [0.0097]	2.447*** (5.26) [0.0049]
Real Exchange Rate Index	−1.377*** (2.98) [0.1647]	−0.900** (2.37) [0.2995]	−0.665*** (3.01)	−0.468*** (2.70)	−1.694*** (3.50) [0.0534]	−1.412*** (3.37) [0.0372]
Relative Schooling	1.195*** (3.18) [0.0853]	0.325 (1.07) [0.4491]	0.483*** (2.80)	0.077 (0.61)	1.308*** (3.19) [0.0636]	0.668* (1.91) [0.1120]
Per capita GDP (log)		0.696*** (4.07) [0.0533]		0.326*** (3.83)		0.482*** (3.22) [0.3672]
Number of observations	1890	1890	1890	1890	1890	1890
Number of countries	45	45	45	45	45	45

Notes: Reports marginal effects at the mean of the explanatory variables. Dummies for years included. TC stands for technical cooperation; JV for joint venture, WOS for wholly-owned subsidiary. Brackets report *p*-values for tests of equality between the marginal effects with respect to majority JVs. *t*-statistics in parentheses.

*Significance at the 10% level.

**Significance at the 5% level.

***Significance at the 1% level.

(f) *Differences between types of FDI*

In the following, we return to the baseline approach underlying Table 2. However, we exclude all technical cooperation projects from the estimations and focus on identifying differences across the three types of FDI related to the impact of our explanatory variables.³⁷ Table 6 presents the results for the FDI projects in both sectors combined, whereas Appendix G separates FDI projects in manufacturing from those in services and utilities.

The *p*-values reported in columns (5) and (6) of Table 6 largely support our hypotheses derived from the bargaining framework in Section 2. Several variables capturing country-of-origin characteristics that could have improved the bargaining position of foreign investors vis-à-vis the authorities in India exert a significantly stronger impact on the number of wholly-owned subsidiaries than on the number of majority JVs. This holds for international experience (proxied by *FDI outward stock/GDP*), relative market size (*Relative GDP*), relative financial market development (*Relative Domestic Credit*), and relative endowment of human capital (*Relative Schooling*), though only in the basic specification in column 5). A ratified BIT tends to shift the composition of FDI toward wholly-owned subsidiaries, at the expense of majority JVs. In addition, *Relative Political Risk* affects the number of wholly-owned subsidiaries more strongly than the number of majority JVs. The implication is similar to the finding in Table 2 above: Foreign investors tend to avoid wholly-owned subsidiaries because of the potentially large sunk costs under conditions of higher risk in India. Finally, the stronger negative effect of the exchange-rate variable suggests that uncertainty about currency developments and the option of waiting affect wholly-owned subsidiaries first and foremost.

Exchange-rate effects are not significantly different between majority and minority JVs, as can be seen from the *p*-values in columns (1) and (2) of Table 6. Likewise, the impact of political risk is similarly strong for both types of JVs. However, the remaining variables typically have a significantly stronger impact on the number of minority JVs, a result similar to the comparison between wholly-owned subsidiaries and majority JVs. This appears to be in conflict with the pattern which would be expected from the bargaining framework. The gradual liberalization of FDI regulations in the 1990s provides a possible explanation. Minority JVs often remained the only alternative to technical cooperation in the immediate aftermath of the 1991 reform program, when many restrictions on foreign majority ownership were still in place. Hence, the strong impact of various variables on minority JVs may be a “legacy” of the preferences of investors for minority JVs over technical cooperation before a wider range of options became available.

This explanation is consistent with the findings in columns (3) and (4) of Table 2. However, the concentration of projects on wholly-owned subsidiaries and minority JVs shown for the years 2000–04 in Figure 1 suggests that constrained choices have remained an issue in the more recent past. This is indeed the case in important segments of the tertiary sector. FDI in trading activities represents the most prominent example: Wholly-owned subsidiaries are allowed in wholesale trade, whereas foreign ownership limits persist in so-called single-brand retailing and FDI is still prohibited in multi-brand retailing.³⁸ This helps explain the sector-specific estimation results for projects in the tertiary sector. As shown earlier in Table 4, the impact of our explanatory variables tended to be significantly stronger on the number of FDI projects in services and utilities with technical cooperation as the base category. At the same time, the results for the tertiary sector

in Appendix G show a significantly stronger impact of essentially all explanatory variables on both the number of wholly-owned subsidiaries and minority JVs when considering majority JVs as the base category (and omitting technical cooperation projects). Once it is taken into account that foreign investors are still constrained in their ownership choices in some segments of the tertiary sector, this pattern fits in with the bargaining framework.

5. CONCLUSION

India's opening-up to world markets in the early 1990s has widely been credited as a major pull factor of booming FDI. At the same time, the comprehensive overhaul of traditional restrictions and regulations has offered foreign investors more options in their type of engagement in India. This may have improved the bargaining position of foreign investors, notably those based in countries operating at the technological frontier, vis-à-vis the Indian authorities. Foreign investors tend to prefer full ownership control in order to prevent leakage and protect intellectual property, while India is particularly interested in spillovers from technical cooperation and joint ventures with local partners.

The interplay between country-of-origin characteristics and host-country characteristics has received limited attention in the previous literature on the determinants of FDI, even though the ownership decisions by foreign investors are relevant to the macroeconomic benefits that host countries can reap. We have made use of a unique dataset on about 24,500 approved cases of technical cooperation and FDI in India during the 1991–2004 period, in order to assess the impact of these country characteristics on the number of projects carried out by investors from 45 countries of origin. The dataset allowed us to distinguish between purely technical cooperation and FDI with different degrees of foreign ownership. We performed negative binomial regressions and tested for different effects of our explanatory variables on specific types of projects.

Various variables derived from a bargaining framework prove to be relevant in shaping the decisions on technical cooperation versus equity engagements, and on the degree of foreign ownership in FDI projects. Market size, the sophistication of financial markets, and human capital endowment—all defined for the country of origin relative to India—are typically associated with more projects of all types. The same applies to the country of origin's international experience, its general level of economic development, and the protection of foreign investors through bilateral investment treaties.

This does not imply, however, that the impact of our explanatory variables is the same across different types of projects. In fact, the impact on the number of technical cooperation projects tends to be significantly weaker than the impact on the number of FDI projects. In particular, we find that foreign investors from larger and richer countries of origin with more sophisticated financial markets are in a better position to make the Indian authorities agree to wholly-owned subsidiaries. On the other hand, our results also suggest that foreign investors avoid the potentially large sunk costs of wholly-owned subsidiaries under conditions of relatively high political risk in India. In contrast to the traditional view on exchange rate-related wealth effects, we find stronger currencies of the countries of origin to be associated with fewer FDI projects—probably because large and sudden currency fluctuations lead to considerable uncertainty.

The differences in the impact of country-of-origin characteristics on specific types of FDI are less clear. The bargaining

framework is supported insofar as the impact of almost all characteristics proves to be stronger on wholly-owned subsidiaries than on majority JVs. However, the impact of several characteristics is also stronger on minority JVs than on majority JVs. This could be partly because foreign investors preferred minority JVs in the immediate aftermath of the reform program of 1991, as they were the only real alternative to technical cooperation at the time. However, the impact of several variables proved to be surprisingly stable over time when splitting the period of observation into two sub-periods. Constrained choices may have remained an issue in the more recent past, notably for projects in some segments of the tertiary sector.

Future research may address this issue by refining the industry classification of FDI projects, and by re-assessing the interplay between country-of-origin and host-country characteristics once ownership restrictions have been relaxed in industries which are still regulated, such as retail trade. More generally, a broader set of industry-specific estimations could offer better insights into the relative bargaining power of

multinational enterprises and host country governments by accounting for technological sophistication and absorptive capacity at the industry level. While disaggregated analyses are clearly warranted, data constraints remain a limiting factor.

Unless more data become available, it is also difficult to overcome another limitation of the present study which employs a simple bilateral source–host country framework. Such a framework appears to be most appropriate for horizontal FDI and as long as foreign investors are mainly interested in penetrating the local markets of host countries (see also Schnitzer, 2002). However, as Kobrin (1987, pp. 635–636) noted already 25 years ago, global integration may have “enormous significance for future shifts in bargaining power.” Specifically, the increasing complexity of transnational operations and the integration of various host countries into vertical FDI and global value chains may weaken the bargaining position of any single host country. Addressing these implications empirically should figure high on the future research agenda once current data limitations become less binding.

NOTES

1. Indeed, Javorcik and Spatareanu (2008) find stronger spillovers from partially-owned affiliates of multinational corporations.
2. For a recent theoretical analysis of FDI departing from “investors’ fear of future confiscatory taxation” as a major obstacle to mutually beneficial FDI, see Konrad and Lommerud (2001, p. 490).
3. See Nunnenkamp and Spatz (2004) and the literature given there. See also Müller and Schnitzer (2006) on the fear of technological spillovers.
4. As detailed below, utilities play an important role in FDI projects in India.
5. By contrast, “conclusions about obsolescence are speculative” (Kobrin, 1987, p. 635) since, again similar to our approach below, Kobrin cannot formally test the hypothesis that bargaining power shifts to host countries over time.
6. According to Schnitzer (2002, p. 53), “if production is for the domestic market, withdrawal is not much of an option.” See also Doyle and van Wijnbergen (1994) for a bargaining model in which foreign investors can threaten to break off negotiations (e.g., over taxation after entry) and leave for another host country; the present host country is aware, however, that the execution of the threat would impose a cost to the foreign investor, namely the sunk costs of relocating the project.
7. As stressed by Doyle and van Wijnbergen (1994), each player has an outside option; the foreign investor could relocate, while the host country could choose another firm.
8. For a similar line of reasoning, see Kobrin (1987, p. 616).
9. The existence of sunk costs is an essential element of the seminal Melitz model (Melitz, 2003). Specifically, the assumption of sunk costs is crucial to predict the self-selection of more productive firms into exporting and FDI (see also Helpman, Melitz, & Yeaple, 2004). Bernard and Jensen (2004) find sunk costs to be highly significant in US manufacturing.
10. According to Wint (2005, p. 319), the relationship between host country governments and foreign investors has become “transactional rather than attitudinal.”
11. Most of the earlier empirical literature focuses on FDI in China. For details, see the overview in Appendix D.
12. The data are described in more detail in Nunnenkamp and Stracke (2008).
13. The most important countries of origin that had to be excluded because of missing data are Hong Kong (about 350 projects), Taiwan (150), and Russia (110).
14. The industry-specific composition of projects is not shown for the major source countries. However, detailed statistics are available from the authors on request.
15. Note that we do not include fixed country effects. In unreported estimations with fixed country effects, several explanatory variables proved to be insignificant at conventional levels. This applies especially to variables with limited annual variation such as relative schooling, relative political risks, and bilateral investment treaties. It is reasonable, in our view, not to include country fixed effects which tend to take away most of the variation in the variables of interest. Recent literature offers support to this view. According to Temple (1999, p. 132), “too often researchers use fixed effects approaches” to analyze the effects of variables that will affect outcomes only with a relatively long lag. Clemens, Radelet, Bhavnani, and Bazzi (2012) argue that hypothesis tests will then suffer from low power. See also Islam (2003). In this paper, we are interested in the consequences for FDI and technical cooperation of countries’ relative bargaining power with respect to India, in line with Kobrin (1987); see also Section 2. Including fixed country effects, instead, would show us how within-country-changes of bargaining power over time affect FDI and technical cooperation. Given that most variation is between rather than within countries we prefer to exclude fixed effects.
16. Population was used as an alternative measure (see Section 4).
17. Alternatively, we used the (real) interest rate in the country of origin, relative to the (real) interest rate in India, as a measure of the relative cost of borrowing.
18. For instance, an appreciation of the host country’s currency may result in higher FDI by foreign investors “who plan to produce and sell output in that location and use imported intermediate inputs from their

- home country” (Pain & van Welsum, 2003). The earlier contribution of Cushman (1985) reveals complex interactions between exchange-rate developments, trade links, and the financing options the foreign investor may have.
19. According to Deichmann (2004), local market-oriented FDI generally prefers host countries with strong currencies.
20. Examples include: Görg and Wakelin (2002), Egger, Egger, and Ryan (2005), and Schmidt and Broll (2009).
21. Tallman (1988) finds that firms operating in a high-risk environment at home tend to invest more abroad. In contrast, de Brito and de Mello Sampayo (2005) dismiss the notion of FDI as a risk-diversification tool.
22. It is even debated whether BITs result in more FDI, independent of its type; see Tobin and Rose-Ackerman (2011) for a recent analysis and Sauvart and Sachs (2009) for a collection of related articles.
23. Alternatively, we considered Double Taxation Treaties (DTTs).
24. We also experimented with more specific indicators that reflect the country of origin’s level of technological development. However, there are insufficient data with regard to measures such as spending on R&D (in percent of GDP), the number of scientific and technical publications (per head of the population), and the share of high-technology exports. For instance, the data on R&D spending are completely missing for 12 countries in our sample and there are major data gaps for various other sample countries.
25. Quantitatively, an increase by ten percentage points decreases the number of projects by between 0.02 and 0.25.
26. In an unreported robustness test, we measured the size of countries by relative population (instead of *Relative GDP*) and replaced *Relative Domestic Credit* with real interest rates as a proxy for the cost of borrowing in the country of origin (relative to India). The population variable resembled the GDP variable in that (i) the number of all types of projects was affected significantly positively at the 1% level, and (ii) the pattern of the *p*-values was essentially the same. In contrast, our proxy for the cost of borrowing proved to be insignificant at conventional levels in almost all estimations, and the *p*-values did not reveal any significant differences across the four types of projects. This may be partly because of incomplete data on real interest rates for the sample of countries of origin. More importantly, it appears that negative (annual) real interest rates in several countries of origin are often the result of macroeconomic instability, rather than reflecting more persistent advantages of foreign investors with respect to the costs of borrowing.
27. In an unreported robustness test, we replaced the dummy variable on BITs by a dummy variable on Double Taxation Treaties (DTTs). It turned out that DTTs were as effective as BITs in raising the number of all types of projects. Furthermore, the impact of DTTs was also stronger on JVs than on technical cooperation.
28. However, the difference in the impact of BITs is not significant at conventional levels in the basic specification for majority JVs in column (5) of Table 2.
29. The major exception concerns *Relative Political Risk*, for which the difference between minority JVs and technical cooperation is not significant at conventional levels.
30. <http://www.indiandiaspora.nic.in/contents.htm> (accessed: July 2012).
31. As an alternative to the approach described above, we also performed estimations by simply assuming that all NRI were living in North America and using the source-country characteristics of Canada and the US for NRI projects. The results were very similar to the preferred option and are not reported to reduce clutter.
32. Time dummies are no longer shown for the sake of brevity. Moreover, we only show the estimations without per capita GDP in Table 3. Per capita GDP enters significantly positively, at least at the 5% level, in all unreported estimations using the extended specification. At the same time, schooling typically loses its significance when extending the specification (similar to the results for the whole period of observation in Table 2). It may also be noted that the coefficients on per capita GDP do not differ significantly between the two sub-periods 1991–97 and 1998–2004.
33. Note that software and IT services are not listed as a separate item in the 2005 issue of the DIPP statistics. This is in contrast to more recent issues which contain a separate entry “computer software and hardware.”
34. The results for the extended specification are not shown for the sake of brevity; they are available on request.
35. Nevertheless, Agarwal (2001) suspects FDI in India to be still oriented toward the local market.
36. When we try to estimate the regressions in a nested model most of the regressions fail to converge. We therefore show the coefficients of the individual regressions and compare the coefficients relying on Seemingly Unrelated Regression (SUR).
37. We performed two sets of estimations with pooled FDI projects by setting either minority JVs or majority JVs as the base category. Obviously, this choice does not affect the impact of the explanatory variables on the number of any particular type of projects. However, the interpretation of the *p*-values is more intuitive when setting majority JVs as the base category (see below). The *p*-values with minority JVs as the base category are available on request.
38. For details, see: <http://www.legalindia.in/foreign-direct-investment-in-indian-retail-sector-%E2%80%93ananalysis> (accessed: June 2011).

REFERENCES

- Agarwal, D. R. (2001). Foreign direct investment and economic development: A comparative case study of China, Mexico and India. In R. K. Sen (Ed.), *Socio-economic development in the 21st century* (pp. 257–288). New Delhi: Deep and Deep.
- Ai, C. C., & Norton, E.-C. (2003). Interaction terms in logit and probit models. *Economics Letters*, 80(1), 123–129.
- Aliber, R. (1970). A theory of direct foreign investment. In C. Kindleberger (Ed.), *The international corporation* (pp. 17–34). Cambridge, MA: MIT Press.
- Anderson, E., & Gatignon, H. (1988). The multinational corporation’s degree of control over foreign subsidiaries: An empirical test of a transaction cost explanation. *Journal of Law, Economics and Organization*, 4(2), 305–336.
- Asiedu, E., & Esfahani, H. S. (2001). Ownership structure in foreign direct investment projects. *Review of Economics and Statistics*, 83(4), 647–662.
- Balasubramanyam, V. N., & Mahambare, V. (2003). FDI in India. *Transnational Corporations*, 12(2), 45–72.

- Barro, R., & Lee, J.-W. (2010). *A new data set of educational attainment in the world, 1950–2010*. NBER Working Paper 15902, Massachusetts, MA. <<http://www.cid.harvard.edu/ciddata/ciddata.html>> Accessed June 2011.
- Bernard, A. B., & Jensen, J. B. (2004). Why some firms export. *Review of Economics and Statistics*, 86(2), 561–569.
- Blonigen, B. A. (1997). Firm-specific assets and the link between exchange rates and foreign direct investment. *American Economic Review*, 87(3), 447–465.
- Bond, E. W., & Samuelson, L. (1989). Bargaining with commitment, choice of techniques, and direct foreign investment. *Journal of International Economics*, 26(1–2), 77–97.
- Busse, M., Hefeker, C., & Nelgen, S. (2010). *Foreign direct investment and exchange rate regimes*. Hamburg Institute of International Economics, HWWI Research Paper 2-17, Hamburg.
- de Brito, J. B., & de Mello Sampaio, F. (2005). The timing and probability of FDI: An application to US multinational enterprises. *Applied Economics*, 37(4), 417–437.
- Campa, J. M. (1993). Entry by foreign firms in the US under exchange rate uncertainty. *Review of Economics and Statistics*, 75(4), 614–622.
- Clemens, C., Radelet, S., Bhavnani, S., & Bazzi, S. (2012). Counting chickens when they hatch: The short term effect of aid on growth. *Economic Journal*, 122(561), 590–617.
- Cushman, D. O. (1985). Real exchange rate risk, expectations, and the level of direct investment. *Review of Economics and Statistics*, 67(2), 297–308.
- Choi, Y. J. (2007). The determinants of foreign direct investment in India. *International Studies Review*, 8(2), 79–90.
- Deichmann, J. I. (2004). Origins of foreign direct investment in Poland, 1989–2001. *Journal of Business and Economic Studies*, 10(1), 12–28.
- Desai, M. A., Foley, F., & Hines, J. R. (2004). The costs of shared ownership: Evidence from international joint ventures. *Journal of Financial Economics*, 73(2), 323–374.
- Doyle, C., & van Wijnbergen, S. (1994). Taxation of foreign multinationals: A sequential bargaining approach to tax holidays. *International Tax and Public Finance*, 1(3), 211–225.
- Dunning, J. H. (1979). Explaining changing patterns of international production: In defence of the eclectic theory. *Oxford Bulletin of Economics and Statistics*, 41(4), 269–295.
- Eaton, J., & Gersovitz, M. (1983). Country risk: Economic aspects. In R. E. Herring (Ed.), *Managing international risk* (pp. 75–108). Cambridge: Cambridge University Press.
- Economic Research Service. (2011). *International macroeconomic data set*, Washington, DC. <<http://www.ers.usda.gov/Data/Macroeconomics/>> Accessed June 2011.
- Eden, L., Lenway, S., & Schuler, D. A. (2005). From the obsolescing bargain to the political bargaining model. In R. Grosse (Ed.), *International business and government relations in the 21st century* (pp. 251–271). Cambridge: Cambridge University Press.
- Egger, H., Egger, P., & Ryan, M. (2005). *Exchange rate effects on complex FDI: Theory and evidence*. <http://www.socialpolitik.de/tagungshps/2005/Papers/Egger_h.pdf> Accessed June 2011.
- Froot, K., & Stein, J. (1991). Exchange rates and FDI: An imperfect capital markets approach. *Quarterly Journal of Economics*, 106(4), 191–217.
- Görg, H., & Wakelin, K. (2002). The impact of exchange rate volatility on US direct investment. *Manchester School*, 70(3), 380–397.
- Görg, H., Mühlen, H., & Nunnenkamp, P. (2010). FDI liberalisation, firm heterogeneity and foreign ownership: German firm decisions in reforming India. *Journal of Development Studies*, 46(8), 1367–1384.
- Government of India (various issues). *Handbook of industrial policy and statistics*. New Delhi: Ministry of Commerce and Industry, Department of Industrial Policy and Promotion.
- Greene, W. (2010). Testing hypotheses about interaction terms in nonlinear models. *Economics Letters*, 107(2), 291–296.
- Grosse, R., & Trevino, L. J. (1996). Foreign direct investment in the United States: An analysis by country of origin. *Journal of International Business Studies*, 27(1), 139–155.
- Harzing, A.-W., & Sorge, A. (2003). The relative impact of country of origin and universal contingencies on internationalization strategies and corporate control in multinational enterprises: Worldwide and European perspectives. *Organization Studies*, 24(2), 187–214.
- Helpman, E., Melitz, M. J., & Yeaple, S. R. (2004). Export versus FDI with heterogeneous firms. *American Economic Review*, 94(1), 300–316.
- Henisz, W. J. (2002). The institutional environment for infrastructure investment. *Industrial and Corporate Change*, 11(2), 355–389. <<http://www-management.wharton.upenn.edu/henisz/>> Accessed June 2011.
- IMF. (2009). *International financial statistics indicators*, Washington, DC.
- Islam, M. N. (2003). Political regimes and the effects of foreign aid on economic growth. *Journal of Developing Areas*, 37(1), 35–53.
- Javorcik, B. K., & Spatareanu, M. (2008). To share or not to share: Does local participation matter for spillovers from foreign direct investment? *Journal of Development Economics*, 85(2), 194–217.
- Joshi, S., & Dadibhavi, R. V. (2008). An analysis of the regional distribution of foreign direct investment (FDI) in India during post-liberalisation (1991–2003). *Indian Economic Journal*, 55(4), 116–132.
- Kimino, S., Saal, D. S., & Driffield, N. (2007). Macro determinants of FDI inflows to Japan: An analysis of source country characteristics. *World Economy*, 30(3), 446–469.
- Kobrin, S. J. (1980). Foreign enterprise and forced divestment in LDCs. *International Organization*, 34(1), 65–88.
- Kobrin, S. J. (1987). Testing the bargaining hypothesis in the manufacturing sector in developing countries. *International Organization*, 41(4), 609–638.
- Konrad, K. A., & Lommerud, K. E. (2001). Foreign direct investment, intra-firm trade and ownership structure. *European Economic Review*, 45(3), 475–494.
- Kumar, N. (2006). Liberalization, FDI flows, and economic development: The Indian experiment in the 1990s. In S. Urata, C. S. Yue, & F. Kimura (Eds.), *Multinationals and economic growth in East Asia* (pp. 453–487). London: Routledge.
- Liu, X., Song, H., Wei, Y., & Romilly, P. (1997). Country characteristics and foreign direct investment in China: A panel data analysis. *Review of World Economics*, 133(2), 313–329.
- Melitz, M. J. (2003). The impact of trade on aggregate industry productivity and intra-industry reallocations. *Econometrica*, 71(6), 1695–1725.
- Müller, T., & Schnitzer, M. (2006). Technology transfer and spillovers in international joint ventures. *Journal of International Economics*, 68(2), 456–468.
- Nunnenkamp, P., & Spatz, J. (2004). Intellectual property rights and foreign direct investment: A disaggregated analysis. *Review of World Economics*, 140(3), 393–414.
- Nunnenkamp, P., & Stracke, R. (2008). Foreign direct investment in post-reform India: Likely to work wonders for regional development? *Journal of Economic Development*, 33(2), 55–84.
- Pain, N., & van Welsun, D. (2003). Untying the Gordian knot: The multiple links between exchange rates and foreign direct investment. *Journal of Common Market Studies*, 41(5), 823–846.
- Palit, A., & Nawani, S. (2007). *Technological capability as a determinant of FDI inflows: Evidence from developing countries and India*. ICRIER Working Paper 193. New Delhi: Indian Council for Research on International Economic Relations.
- Pan, Y. (1994). Entering China through equity joint ventures: A comparison of Japanese, U.S., European, and Hong Kong approaches. *Journal of Asian Business*, 10(2), 97–108.
- Pan, Y. (2002). Equity ownership in international joint ventures: The impact of source country factors. *Journal of International Business Studies*, 33(2), 375–384.
- Pan, Y. (2003). The inflow of foreign direct investment to China: The impact of country-specific factors. *Journal of Business Research*, 56(10), 829–833.
- Pan, Y., & Tse, D. K. (2000). The hierarchical model of market entry modes. *Journal of International Business Studies*, 31(4), 535–554.
- Pauly, L. W., & Reich, S. (1997). National structures and multinational corporate behavior: Enduring differences in the age of globalization. *International Organization*, 51(1), 1–30.
- Ramamurti, R. (2001). The obsolescing ‘bargaining model’? MNC-host developing country relations revisited. *Journal of International Business Studies*, 32(1), 23–39.
- Roberts, B., & Almahmood, A. (2009). Source country characteristics and the inflow of foreign direct investment into Saudi Arabia. *World Economy*, 32(12), 1730–1746.
- Sauvant, K. P., & Sachs, L. E. (Eds.) (2009). *The effect of treaties on foreign direct investment: Bilateral investment treaties, double taxation treaties, and investment flows*. Oxford: Oxford University Press.
- Scaperlanda, A. E., & Mauer, L. J. (1969). The determinants of US direct investment in the EEC. *American Economic Review*, 59(4), 558–568.

- Schmidt, C. W., & Broll, U. (2009). Real exchange-rate uncertainty and US foreign direct investment: An empirical analysis. *Review of World Economics*, 145(3), 513–530.
- Schnitzer, M. (1999). Expropriation and control rights: A dynamic model of foreign direct investment. *International Journal of Industrial Organization*, 17(8), 1113–1137.
- Schnitzer, M. (2002). Debt v. foreign direct investment: The impact of sovereign risk on the structure of international capital flows. *Economica*, 69(273), 41–67.
- Singh, K. (2005). *Foreign direct investment in India: A critical analysis of FDI from 1991–2005*. New Delhi: Centre for Civil Society, <<http://129.3.20.41/eps/dev/papers/0511/0511013.pdf>> Accessed June 2010.
- Sury, N. (2008). Determinants of foreign direct investment in India. *Foreign Trade Review*, 42(4), 24–41.
- Svejnar, J., & Smith, S. C. (1984). The economics of joint ventures in less developed countries. *Quarterly Journal of Economics*, 99(1), 149–167.
- Tallman, S. B. (1988). Home country political risk and foreign direct investment in the United States. *Journal of International Business Studies*, 19(2), 219–234.
- Temple, J. (1999). The new growth evidence. *Journal of Economic Literature*, 37(1), 112–156.
- Thomas, D. E., & Grosse, R. (2001). Country-of-origin determinants of foreign direct investment in an emerging market: The case of Mexico. *Journal of International Management*, 7(1), 59–79.
- Tobin, J. L., & Rose-Ackerman, R. (2011). When BITs have some bite: The political-economic environment for bilateral investment treaties. *Review of International Organizations*, 6(1), 1–32.
- UNCTAD (1998). *World investment report 1998*. Geneva and New York: United Nations.
- UNCTAD (2010a). *World investment report 2010*. Geneva and New York: United Nations.
- UNCTAD. (2010b). *Country-specific lists of BITs and BDTTs*. Geneva. <<http://www.unctad.org/Templates/Page.asp?intItemID=2344&lang=1>> Accessed June 2010.
- UNCTAD (2010c). *Statistics overview*. Geneva. <<http://www.unctad.org/Templates/Page.asp?intItemID=1584&lang=1>> Accessed June 2010.
- Vernon, R. (1971). *Sovereignty at bay: The multinational spread of US enterprises*. New York: Basic Books.
- Wint, A. G. (2005). Has the obsolescing bargain obsolesced? Negotiating with foreign investors. In R. Grosse (Ed.), *International business and government relations in the 21st century* (pp. 315–338). Cambridge: Cambridge University Press.
- World Bank. (2010). *World development indicators*. Washington, DC.
- Zhao, H. (2003). Country factor differentials as determinants of FDI flow to China. *Thunderbird International Business Review*, 45(2), 149–169.

APPENDIX A. SAMPLE OF COUNTRIES OF ORIGIN

Argentina, Australia, Austria, Bahrain, Bangladesh, Belgium, Brazil, Bulgaria, Canada, China, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Indonesia, Iran, Ireland, Israel, Italy, Japan, Jordan, Kenya, Kuwait, Malaysia, Mexico, Netherlands, New Zealand, Norway, Philippines, Poland, Portugal, Republic of South Africa, Romania, Singapore, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Thailand, United Kingdom, United States

APPENDIX B. SUMMARY STATISTICS

Variables	Mean	Standard deviation	Minimum	Maximum	Observations
Per capita GDP (log)	8.97	1.30	5.57	10.59	630
FDI outward stock/GDP	14.70	19.35	−0.61	109.32	630
Relative Schooling	1.81	0.54	0.49	3.19	630
Relative GDP	1.48	3.69	0.02	25.77	630
Relative Domestic Credit	2.00	1.19	0.24	8.08	630
Relative Political Risk	0.60	0.27	0.00	1.69	630
Bilateral Investment Treaties	0.26	0.44	0.00	1.00	630
Real Exchange Rate Index	1.27	0.41	0.12	3.91	630
Wholly-owned subsidiaries, number	7.15	24.80	0	309	630
Majority JVs, number	6.33	14.40	0	115	630
Minority JVs, number	9.62	23.04	0	241	630
Technical Cooperation, number	11.69	26.33	0	210	630
Wholly-owned subsidiaries, number in manufacturing	2.27	5.48	0	51	630
Majority JVs, number in manufacturing	3.47	8.21	0	63	630
Minority JVs, number in manufacturing	4.86	9.54	0	66	630
Technical Cooperation, number in manufacturing	9.41	21.46	0	161	630
Wholly-owned subsidiaries, number in services/utilities	4.61	19.55	0	236	630
Majority JVs, number in services/utilities	2.52	6.55	0	59	630
Minority JVs, number in services/utilities	4.07	14.19	0	162	630
Technical Cooperation, number in services/utilities	1.29	3.94	0	41	630

Note: FDI outward stock/GDP takes a negative value for three observations (two in the case of Iran and one in the case of Bulgaria). This is because UNCTAD estimates some stocks by accumulating net outward flows, which may be negative. In unreported robustness tests, we set the three observations equal to zero. The results were not affected.

APPENDIX C. DESCRIPTION OF VARIABLES AND SOURCES

Variables	Definition	Source
Technical cooperation and FDI projects	Number of approved projects: <ul style="list-style-type: none"> • Technical cooperation (no foreign equity stake) • Minority JVs (foreign equity stake of <50%) • Majority JVs (foreign equity stake of 50–90%) • Wholly-owned subsidiaries (foreign equity stake of >90%) 	Ministry of Commerce and Industry, Department of Industrial Policy and Promotion (DIPP)
Per capita GDP (log)	Average GDP per head in the country of origin, US\$ in constant prices of 2005; logged	Economic Research Service (2011)
FDI outward stock/GDP	Outward FDI stock of the country of origin in percent of GDP	UNCTAD (2010b)
Relative Schooling	Years of secondary schooling in the country of origin, relative to years of secondary schooling in India. The data were available in 5-year intervals until 2000. The gaps between data points were interpolated and the data were extrapolated until 2004	Barro and Lee (2010)
Relative GDP	GDP of the country of origin, relative to the GDP of India, US\$ million, constant prices of 2000	World Bank (2010)
Relative Domestic Credit	Total domestic credit provided by banks in the country of origin, in percent of GDP, relative to domestic credit in percent of GDP in India	World Bank (2010)
Relative Political Risk	Political Constraints Index III, coded on a scale of 0–1, with higher values reflecting stricter constraints on the executive branch of the state	Henisz (2002)
Bilateral Investment Treaties	Dummy value, set equal to 1 if a country of origin ratified a bilateral investment treaty with India, and 0 otherwise	UNCTAD (2010c)
Real Exchange Rate Index	Real exchange rate index (1990 = 1), Indian Rupees per unit of country-of-origin currency. Nominal exchange rates were adjusted for by consumer price indexes	IMF (2009)

APPENDIX D. OVERVIEW OF SELECTED STUDIES ON COUNTRY-OF-ORIGIN CHARACTERISTICS

Study	Dependent variable	Major determinants (+/– if significantly positive/negative; ? if insignificant or ambiguous)	Host country	Method
Grosse and Trevino (1996)	(a) FDI flows and (b) foreign affiliate sales from 23 source countries in 1980–91	Source country size(+); percapita GDP of source country(?); source country exports to US(+) and imports from US(–); source country political risk(?); source country currency/US\$(–); relative cost of borrowing(?); distance(–?); <i>note: signs in parentheses relate to estimations for (a) FDI flows; estimations for (b) differ in some respects</i>	United States	Pooled time-series, cross-section regression
Thomas and Grosse (2001)	Annual FDI flows from 11 source countries in 1980–95	Source country size(?); bilateral trade(+); source country political risk(?); source country currency/peso(?); cost of borrowing in source country(–); wage costs in source country(?); distance(+?)	Mexico	Pooled time-series, cross-section GLS regression

Appendix D. (*continued*)

Study	Dependent variable	Major determinants (+/– if significantly positive/negative; ? if insignificant or ambiguous)	Host country	Method
Kimino, Saal, and Driffield (2007)	Annual FDI flows from 17 source countries in 1989–2002	Source country size(?); source country export(–); exchange rate (appreciation of source country currency)(?); relative borrowing costs(+?); relative labor costs(?); source country credit rating(+)	Japan	Fixed effects panel regressions
Deichmann (2004)	# firms with FDI from 34 source countries (total of 906 firms)	GDP(+); EU membership(+); Polish diaspora in source country(+); bilateral trade(+); distance(–)	Poland	OLS
Roberts and Almahmood (2009)	(a) FDI flows and (b) # FDI projects from 33 source countries in 1980–2005	Differs between (a) and (b); for (b): source country size(+); distance measures(–); economic freedom(+); bilateral trade(?)	Saudi Arabia	Tobit; Heckman; negative binominal regression
Liu, Song, Wei, and Romilly (1997)	Contracted (realized) FDI flows from 22 (17) source countries in 1983–94 (1984–94)	Ratio host/source wages(–); ratio host/source GDP(+?); RMB/source country currency(+); bilateral trade(+); ratio host/source cost of borrowing(?); ratio host/source risk(?); distance(?)	China	Panel, random-effects GLS regressions
Pan and Tse (2000)	Entry mode (equity versus nonequity; wholly-owned subsidiary versus JV) of >10,000 entry decisions by foreign firms in 1979–98	Host country risk(+/+); risk aversion of source-country management(–/?); degree of inequality and hierarchical distance in source country(+/?); bilateral trade(+/?); diplomatic ties(–/?); <i>note</i> : the authors stress that these factors have an important say in the decision on equity versus nonequity entry (first entry in brackets), but are hardly relevant for deciding on WOS versus JV (second entry in brackets); the direction of effects is not always clear due to ambiguity in the specification of variables	China	Binary and ordered logistic regression
Pan (2002)	Foreign equity share in 8078 JVs from six source countries in 1979–96	Exports of source country to China(+?); cost of borrowing in source country(–); RMB/source country currency(+); risk aversion of source-country management(+)	China	Ordered logistic regression; Tobit
Pan (2003)	Annual FDI inflows from 30 source countries in 1984–96	Source country GDP(–); source country's total trade and bilateral trade with China(+); cost of borrowing in source country(–?); RMB/source country currency(?); risk aversion of source-country management(–?); risk in China(+); distance(?)	China	Pooled OLS
Zhao (2003)	Annual FDI flows from 21 source countries in 1983–99	Source-host difference in GDP(+); source-host growth difference(?); export market share in China(+); source-host difference in cost of borrowing(–); RMB/source country currency(+); source-host difference in political(+) and operating(?) risk	China	Pooled cross-country, time series regression

APPENDIX E. TABLE 2 INCLUDING NRI, 1991–2004, NEGATIVE BINOMIAL REGRESSIONS

	(1) TC	(2) TC	(3) Minority JV	(4) Minority JV	(5) Majority JV	(6) Majority JV	(7) WOS	(8) WOS
FDI outward stock/GDP	0.010 ^{***} (3.56)	0.005 ^{***} (3.01)	0.087 ^{***} (4.84)	0.054 ^{***} (4.55)	0.031 ^{***} (3.99)	0.018 ^{***} (3.70)	0.061 ^{***} (4.60)	0.038 ^{***} (4.31)
Relative GDP	0.109 ^{***} (3.45)	0.075 ^{***} (3.55)	0.593 ^{***} (4.34)	0.428 ^{***} (4.51)	0.195 ^{***} (3.70)	0.138 ^{***} (3.82)	0.375 ^{***} (4.31)	0.295 ^{***} (4.51)
Relative Domestic Credit	0.157 ^{***} (3.24)	0.118 ^{***} (3.25)	0.812 ^{***} (3.51)	0.592 ^{***} (3.36)	0.289 ^{***} (3.19)	0.207 ^{***} (3.01)	0.600 ^{***} (3.43)	0.427 ^{***} (3.16)
Relative Political Risk	−0.037 (0.33)	−0.168 [*] (1.66)	−1.330 [*] (1.85)	−1.460 ^{**} (2.36)	−0.626 [*] (2.07)	−0.675 ^{**} (2.51)	−2.974 ^{***} (3.44)	−2.766 ^{***} (3.67)
Bilateral Investment Treaties	0.736 ^{***} (3.92)	0.585 ^{***} (4.05)	3.022 ^{***} (4.61)	2.530 ^{***} (4.76)	1.202 ^{***} (4.09)	0.981 ^{***} (4.16)	2.725 ^{***} (4.65)	2.278 ^{***} (4.78)
Real Exchange Rate Index	−0.069 (0.84)	0.056 (0.84)	−2.164 ^{***} (3.28)	−1.221 ^{**} (2.56)	−0.854 ^{***} (3.08)	−0.556 ^{***} (2.75)	−2.056 ^{***} (3.51)	−1.479 ^{***} (3.31)
Relative Schooling	0.402 ^{***} (3.17)	0.164 ^{**} (2.19)	0.684 [*] (1.73)	−0.485 (1.46)	0.246 (1.57)	−0.214 (1.60)	0.343 (1.13)	−0.519 [*] (1.82)
Per capita GDP (log)		0.180 ^{***} (3.61)		1.027 ^{***} (4.33)		0.415 ^{***} (3.79)		0.786 (4.05)
Year 1991	1.174 ^{***} (5.66)	1.084 ^{***} (5.79)	0.838 (1.13)	1.029 [*] (1.74)	0.154 (0.46)	0.253 (0.95)	−6.092 ^{***} (2.63)	−5.259 ^{***} (2.70)
Year 1992	1.464 ^{***} (5.44)	1.315 ^{***} (5.59)	2.034 ^{***} (3.88)	2.103 ^{***} (4.91)	1.443 ^{***} (6.65)	1.319 ^{***} (6.89)	−2.089 ^{**} (2.12)	−1.845 ^{**} (2.19)
Year 1993	1.392 ^{***} (5.53)	1.208 ^{***} (5.71)	2.824 ^{***} (5.81)	2.650 ^{***} (6.40)	1.359 ^{***} (6.58)	1.243 ^{***} (6.79)	−0.685 (1.02)	−0.693 (1.17)
Year 1994	1.415 ^{***} (5.48)	1.226 ^{***} (5.67)	3.150 ^{***} (6.54)	2.898 ^{***} (7.01)	1.524 ^{***} (6.83)	1.343 ^{***} (6.99)	−0.169 (0.30)	−0.171 (0.35)
Year 1995	1.343 ^{***} (5.52)	1.163 ^{***} (5.71)	3.588 ^{***} (6.94)	3.218 ^{***} (7.31)	1.548 ^{***} (6.67)	1.348 ^{***} (6.80)	0.180 (0.35)	0.180 (0.41)
Year 1996	1.144 ^{***} (5.78)	0.977 ^{***} (5.99)	2.139 ^{***} (4.32)	1.956 ^{***} (4.68)	1.793 ^{***} (6.67)	1.588 ^{***} (6.81)	0.995 ^{**} (2.52)	0.871 ^{**} (2.54)
Year 1997	0.941 ^{***} (6.06)	0.839 ^{***} (6.21)	0.645 (1.03)	0.625 (1.20)	1.439 ^{***} (6.64)	1.310 ^{***} (6.83)	0.746 [*] (1.85)	0.711 ^{**} (2.08)
Year 1998	0.873 ^{***} (6.12)	0.775 ^{***} (6.30)	−0.942 (1.09)	−0.674 (0.96)	0.754 ^{***} (4.02)	0.676 ^{***} (4.30)	0.552 (1.29)	0.553 (1.54)
Year 1999	0.743 ^{***} (6.11)	0.678 ^{***} (6.33)	0.291 (0.45)	0.456 (0.87)	0.701 ^{***} (3.75)	0.665 ^{***} (4.29)	0.147 (0.31)	0.230 (0.59)
Year 2000	0.710 ^{***} (6.01)	0.644 ^{***} (6.26)	0.048 (0.07)	0.210 (0.38)	0.568 ^{***} (2.82)	0.507 ^{***} (3.01)	−0.237 (0.45)	−0.191 (0.43)
Year 2001	0.528 ^{***} (5.16)	0.493 ^{***} (5.68)	0.054 (0.08)	0.272 (0.49)	0.167 (0.64)	0.232 (1.13)	−0.110 (0.21)	0.024 (0.06)
Year 2002	0.420 ^{***} (4.14)	0.409 ^{***} (4.92)	0.177 (0.26)	0.250 (0.46)	0.147 (0.57)	0.196 (0.94)	0.060 (0.12)	0.208 (0.53)
Year 2003	0.523 ^{***} (5.15)	0.468 ^{***} (5.54)	−0.210 (0.29)	−0.070 (0.12)	−0.090 (0.30)	−0.075 (0.29)	0.135 (0.29)	0.187 (0.48)
Number of observations	2576	2576	2576	2576	2576	2576	2576	2576
Number of countries	46	46	46	46	46	46	46	46

Notes: Reports marginal effects at the mean of the explanatory variables. Dummies for years included. TC stands for technical cooperation; JV for joint venture, WOS for wholly-owned subsidiary. Brackets report *p*-values for tests of equality between the marginal effects with respect to TC projects. *t*-statistics in parentheses.

* Significance at the 10% level.

** Significance at the 5% level.

*** Significance at the 1% level.

APPENDIX F. ACCUMULATED FDI INFLOWS IN INDIA'S TERTIARY SECTOR, BY SUB-SECTOR IN 1991–2004

Sub-sector	US\$ million	Sub-sector	US\$ million
Transportation	2924.5	Consultancy	407.3
Telecommunication	2674.5	Trading	345.8
Power, <i>etc.</i>	2458.9	Hotels and tourism	244.7
Service sector	2255.7	All	11311.4

Note: Power includes oil refinery; "service sector" not specified in the source.

Source: Government of India, various issues: 2005, Table 5.15.

APPENDIX G. FDI PROJECTS IN MANUFACTURING AND SERVICES/UTILITIES, 1991–2004, NEGATIVE BINOMIAL REGRESSIONS

	(1)	(2)	(3)	(4)	(5)	(6)
	Manufacturing			Services/utilities		
	Minority JV	Majority JV	WOS	Minority JV	Majority JV	WOS
FDI outward stock/GDP	0.026 ^{***} (4.54) [0.0338]	0.012 ^{***} (3.69)	0.018 ^{***} (4.34) [0.2587]	0.043 ^{***} (5.42) [0.0003]	0.013 ^{***} (4.18)	0.035 ^{***} (5.14) [0.0025]
Relative GDP	0.186 ^{***} (4.06) [0.0181]	0.068 ^{***} (3.45)	0.099 ^{***} (3.90) [0.3295]	0.188 ^{***} (4.94) [0.0018]	0.060 ^{***} (3.93)	0.174 ^{***} (4.83) [0.0036]
Relative Domestic Credit	0.262 ^{***} (3.41) [0.0885]	0.116 ^{***} (3.08)	0.193 ^{***} (3.19) [0.2837]	0.480 ^{***} (4.36) [0.0019]	0.121 ^{***} (3.38)	0.356 ^{***} (3.85) [0.0177]
Relative Political Risk	−0.174 ^{***} (0.69) [0.7622]	−0.090 ^{***} (0.76)	−0.981 ^{***} (3.02) [0.0100]	−1.459 ^{***} (3.34) [0.0443]	−0.518 ^{***} (3.03)	−2.071 ^{***} (3.89) [0.0055]
Bilateral Investment Treaties	1.264 ^{***} (4.50) [0.0426]	0.610 ^{***} (3.85)	1.046 ^{***} (4.38) [0.1287]	1.277 ^{***} (4.88) [0.0045]	0.464 ^{***} (4.01)	1.595 ^{***} (5.05) [0.0008]
Real Exchange Rate Index	−0.784 ^{***} (3.08) [0.0842]	−0.301 ^{***} (2.58)	−0.718 ^{***} (3.16) [0.1024]	−0.382 ^{***} (1.51) [0.6895]	−0.272 ^{***} (2.57)	−0.780 ^{***} (2.89) [0.0796]
Relative Schooling	0.590 ^{***} (3.04) [0.0976]	0.234 ^{***} (2.55)	0.470 ^{***} (2.69) [0.2328]	0.682 ^{***} (2.80) [0.0792]	0.226 ^{***} (2.51)	0.980 ^{***} (3.38) [0.0129]
Number of observations	1890	1890	1890	1890	1890	1890
Number of countries	45	45	45	45	45	45

Notes: Reports marginal effects at the mean of the explanatory variables. Dummies for years included. JV stands for joint venture, WOS for wholly-owned subsidiary. Brackets report *p*-values for tests of equality between the marginal effects with respect to majority JVs. *t*-statistics in parentheses.

** Significance at the 5% level.

*** Significance at the 1% level.

APPENDIX H. CODING OF SELECTED INDUSTRIES

The project-specific information on FDI and technical cooperation in India from the Department of Industrial Policy and Promotion of the Ministry of Commerce and Industry does not specify unambiguously to which industry the project belongs. However, the database offers a short description of planned activities (so-called "item of manufacture"). We draw on this information to code three major industries: (i) trading and transportation, (ii) software, and (iii) machinery and electrical equipment. The first industry stands for a more traditional focus of (local market seeking) activities of foreign investors in India's tertiary sector. The second industry represents the recent focus of foreign activities in the tertiary sector, which has received a lot of attention in the context of offshoring of business services to India. However, the descrip-

tion of projects in the software industry indicates that some foreign investors are motivated by local markets in this sector, too. A case in point is the provision of software for the media industries in India. The third industry figures prominently among manufacturing industries.

We proceeded as follows to identify projects in the selected industries. First, we searched the entries under "item of manufacture" for the terms "trade," "transport," "software," "machine," and "electrical." Second, the project descriptions including these terms were checked carefully, in order to reduce the risk of inappropriate coding. For instance, we avoided in this way to code a project to belong to transportation if the project description stated something like "production of trucks for the transportation of goods."

Nevertheless, our coding is far from perfect. The project descriptions range from a single word (such as software) to

various lines of text covering activities in several industries. In the latter case, it often proves hard to identify the main line of business. Furthermore, there is no guarantee that we identify all projects in the selected industries. For instance, we may miss projects in transportation if the project description does not contain this term, but states something like “delivering goods.” A careful check of the database suggests that this risk is relatively low for the three selected industries. However, this risk appears to be considerably higher for other industries. Note that we also attempted coding projects in the chemical industry. Observations in this industry proved to be insuffi-

cient for being used in the estimations. This appears to be at least partly because many project descriptions did not contain “chemical” but rather listed specific products in this highly diversified industry. Similarly, searching for “food” would probably miss various projects producing specific items in the food industry. Hence, it is almost impossible to code all projects in a reliable way and run a comprehensive set of industry-specific estimations.

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