

**Are Multinationals Afraid of Social Violence in Emerging Markets?
Evidence from the Indonesian Provinces**

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Abstract

The existing empirical work on the determinants of foreign direct investment (FDI) suggests no controversy regarding the effects of the economic policy- and the rule-of-law-related variables on FDI, while the examination of the political turmoil-FDI relationship yields conflicting results. In this paper, we further investigate the social violence-FDI relationship in an ethnically heterogeneous and resource-rich country, Indonesia. Based on the neoclassical theory of the multinational firm, we examine the relationship between the different types of social violence and FDI flows in 26 provinces of Indonesia during the period 1992-2001. In terms of the ethnic and social violence-related characteristics of the provinces, our results indicate that only certain types of social violence are detrimental to FDI in that multinational firms seem to differentiate among the several types of social violence and respond only to those that may affect their expected future profits. These results confirm theoretical prediction that social violence reduces FDI flows only when it interrupts the production process, reducing the present value of the firm's expected profits.

1. Introduction

The examination of foreign direct investment (FDI) has remained as a hardy perennial for more than three decades. The initial determinants of FDI in the host country have been related to the economic characteristics of the country, such as labor market-, industrialization-, and fiscal policy-related variables. There has not been much controversy regarding the effects of economic variables on FDI flows. Table 1 provides a comprehensive list of the determinants of FDI based on the existing literature. In almost all studies, variables such as labor cost and quality, GDP growth, industrialization, industrial diversification, the tax system, etc. affect FDI flows in a predictable fashion. Lower labor cost, higher labor quality, higher growth rates, higher degree of industrialization and industrial diversification, and lower taxes promote FDI flows. An extensive review of related studies summarized in Table 1 confirms these findings.

In recent years, institutional and qualitative variables are introduced to FDI research as well. Variables that are related to the rule of law, such as corruption, accountability, and transparency, have been included in estimations, which also yield predictable results. While corruption decreases FDI flows, accountability and transparency increase them (Table 1).

Another group of new variables consists of political instability and political risk, which are our main focus in this paper. In the existing literature, political instability is measured in the average number of assassinations and revolutions, armed conflict, social unrest, and ethnic tensions (Asideu, 2002; Campos and Nugent, 2002 and 2003; Globerman and Shapiro, 2002). Political risk is defined by an index that includes not

only political turmoil such as linguistic, ethnic, and religious fractionalization, demonstrations, and street violence, but also the economic variables such as the extent of foreign debt (Asideu, 2002; Carstensen and Toubal, 2004; Globerman and Shapiro, 2002; Habib and Zurawicki, 2002; Sethi *et al.*, 2003; Singh and Jun, 1995; Sun, Tong and Yu, 2002; Wei, 2000). As Table 1 shows, the effects of political risk and instability on FDI are not as clear-cut as in the case of the economic or rule-of-law-related variables. The limited existing research suggests negative, positive, or statistically insignificant relationships between the political instability-related variables and FDI flows (Table 1). This finding motivates us to further investigate this issue.

To examine the social violence-FDI relationship, we choose Indonesia for several reasons. First, the advantage of focusing on the provinces of a country as opposed to conducting a multi-country study is that, in a single-country analysis, some of the risks multinational firms face remain constant across the provinces of the country, such as the restrictions on the repatriation of profits, the threat of expropriation of private investment, corruption in the government, inadequate legal enforcement of contracts, etc. Second, Indonesia is an ethnically heterogeneous and resource-rich country that suffered greatly from political risk and economic crises during our sample period (1992-2001). A unique data set that includes the types of social violence and associated human and physical damage in 26 provinces of Indonesia is readily available. Therefore, by taking the regulations-related variables constant across the provinces, we focus on the violence-type related differences among the provinces and their effects on the FDI flows. Third, FDI constitutes an important source of external financing in Indonesia. As shown in Figure 1, starting in the early 1980s, the net FDI

flows steadily increased over time, reaching about 3.6 percent of Indonesia's GDP in 1997. Around the same time, other sources of foreign private capital, such as commercial bank-, bonds-, and equity-related net flows were about 2 percent, 2.5 percent, and 2.7 percent of GDP, respectively. Therefore, the relevance of FDI in Indonesia constitutes an important motivation for us to investigate the variables that may affect these flows.

Our contribution to the existing literature lies in the explanation of contradictory results regarding the effects of social violence on FDI. We argue that social violence may hurt FDI flows only when violence affects a multinational firm's expected profits. Our results indicate that, among the various violence types, ethnic and industrial-relations violence coupled with physical damage decrease provincial FDI flows in Indonesia. The contradictory results regarding the FDI-social turmoil relation may stem from a lack of a common theoretical framework that links social violence to FDI flows. Using a neoclassical theory of the firm, we show that not all types of social violence, but only those that alter the multinational firm's production process may affect the firm's investment decisions.

The paper is organized as follows. Section 2 discusses the effects of social violence on the multinational firm's investment decisions and therefore FDI flows based on the neoclassical theory of the firm. Section 3 constitutes the empirical part of the paper, in which ethnic and economic characteristics of the Indonesian provinces as well as provincial social violence are used to predict FDI flows. Section 4 concludes.

2. The Multinational Firm's Investment Decisions and the Role of Social Violence

Our predictions regarding the impact of social violence on FDI flows are based on Stevens (2000) and Biswas (2002) who integrate the political turmoil-related variables into the neoclassical theory of the firm. Their treatment of the multinational firm implicitly assumes certain characteristics of FDI. In the literature, two types of multinational firms are identified: horizontal and vertical firms. While *horizontal* FDI models imply that multiplant firms duplicate approximately the same activities in many countries (headquarter and plants in one country and plants in other countries), *vertical* FDI models imply that firms geographically separate activities by stages of production (headquarter in one country and plants in other countries (Dunning, 1981; Helpman, 1984; Helpman and Krugman, 1985; Rugman and Verbeke, 2001).¹ Because Stevens (2000) and Biswas (2002) treat the multinational firm as a horizontal FDI, the following discussion is mostly based on this assumption. However, toward the end of this section, we revise our predictions for a vertical FDI.

Stevens (2000) and Biswas (2002) assume that the multinational firm maximizes the expected present value of the firm, given the prices of its output and inputs. Additionally, the firm incorporates the probability of the repatriation of profits and the expropriation of private investment, corruption in the government, inadequate legal enforcement of contracts, disruption in the production process caused by social violence, etc. into its profit function. Because our data focus on the provincial FDI flows to a country, Indonesia, the mentioned factors except for social violence remain

¹ See Carr, Markusen, and Maskus (2001) and Markusen and Maskus (2002) for an empirical test of horizontal and vertical models.

constant. Therefore, in the following, we discuss the Stevens-Biswas framework with respect to the effect of social violence on the multinational firm's profit function.

The labor-capital ratio is assumed to be constant ($L/K = h$), either because of fixed relative factor prices or fixed coefficients in production. Additionally, constant returns to scale are assumed ($Q = fK$). The expected present value of the firm at time t is

$$V(t) = \sum_{i=0}^{\infty} D^i E_t \left\{ p(Q_{t+i}) \cdot Q(K_{t+i}, L_{t+i}) - wL_{t+i} - qI_{t+i} - \left(dI_{t+i}^2 / 2 \right) \right\}, \quad (1)$$

subject to: $I_{t+i} = K_{t+i} - K_{t+i-1} + \delta K_{t+i-1}$,

where Q , I , K , D , δ , $p(Q)$, w , q , $d/2$ are output, investment, capital, the discount factor ($1/1+\rho$), the depreciation rate, the real price of output, the real wage rate, the real cost of investment goods, and the coefficient of the nonlinear real cost of adjusting the rate of investment, respectively.

If the multinational firm is assumed to face a downward-sloping demand curve, that is

$$p = a_{t+i} - bQ,$$

where a_{t+i} is the stochastic, time-dependent intercept for any future period. The expected profits can be defined as

$$V(t) = \sum_{i=0}^{\infty} D^i E_t \left\{ (a_{t+i} - bfK_{t+i}) \cdot fK_{t+i} - w_{t+i}hK_{t+i} - q_{t+i}I_{t+i} - dI_{t+i}^2 / 2 \right\}. \quad (2)$$

The firm maximizes Equation (2) subject to the constraint in Equation (1) that expresses the flow of investment in future periods. The investment equation becomes as

$$I_t = \lambda_1 / [d / (1 - \delta)] \left\{ \sum_{i=0}^{\infty} (1 / \lambda_2)^i E_t [fa_{t+i} - hw_{t+i} - c_{t+i}] \right\} - (1 - \lambda_1 - \delta)K_{t-1}, \quad (3)$$

where c_{t+i} stands for the cost of capital and defined as

$$c_{t+i} = E_{t+i} \left\{ -q_{t+i} / (1 + \rho) [\rho + \delta q_{t+i+1} / q_{t+i} - \Delta q / q_{t+i}] \right\}.$$

The Stevens-Biswas framework analyzes the impact of social violence on the firms' investment decisions in the form of a shift in the production function. For example, a one-time social unrest may lead to a single period interruption of production. Assuming no sales out of inventories, revenues will be zero. If the firm continues with its previous investment plan during the period of interruption of production operations, the firm's profits can be written as

$$\Pi_{t+i} | S_{t+i} = -q_t I_{t+i} - d / 2 I_{t+i}^2. \quad (4)$$

Because firms have no ex-ante knowledge of an interruption of normal production operations in a particular period with absolute certainty, one needs to attach probabilities to each state of the world to assess the expected profit in a future period $t+i$. Assume two states of the world: normal (N) and shutdown (S) that implies zero production. These probabilities are assumed to be functions of exogenous political variables. Assuming a nonzero probability of a single period interruption of normal production operations, the expected profits of a foreign affiliate in the period $t + i$ will be

$$\begin{aligned}
E_t(\Pi_{t+i}) &= P(S_{t+i})E_t(\Pi_{t+i} | S_{t+i}) + P(N_{t+i})E_t(\Pi_{t+i} | N_{t+i}) \\
&= P(S_{t+i})E_t(\Pi_{t+i} | S_{t+i}) + [1 - P(S_{t+i})E_t(\Pi_{t+i} | N_{t+i})], \tag{5}
\end{aligned}$$

where P indicates the probability associated with two different states of the world (N, S).

Because both states of the world (N, S) contain identical terms for investment-related costs, the firm's expected profit function incorporating the possibility of periodic interruptions is indicated by

$$V(t) = \sum_{i=0}^{\infty} D^i E_t \left\{ [1 - P(S_{t+i})] [(a_{t+i} - bfK_{t+i})fK_{t+i} - w_{t+i}hK_{t+i}] - q_{t+i}I_{t+i} - dI_{t+i}^2 / 2 \right\}. \tag{6}$$

Equation (6) relates the probability of no interruption of normal production operations to the exogenous political variables. The previous investment expression, Equation (3), can be changed to include the firm's perception of the probability of shutdown, that is

$$I_t = \lambda_1 / [d / (1 - \delta)] \left\{ \sum_{i=0}^{\infty} (1 / \lambda_2)^i [1 - P(S_{t+i})] E_t [fa_{t+i} - hw_{t+i} - c_{t+i}] \right\} - (1 - \lambda_1 - \delta) K_{t-1}. \quad (7)$$

As indicated by Equations (6) and (7), an increase in the probability of social violence that is expected to interrupt the production process reduces the dollar value of the net revenue stream, which will reduce FDI flows.

Even though our data do not distinguish between a horizontal and vertical multinational firm, we want to note that the type of the multinational firm may affect the risk awareness of the firm when assessing the probability of social violence. In the case of a horizontal multinational firm, the output that is produced in country i is produced in other countries as well. If social violence interrupts the production process in country i , the profits of the i^{th} firm will be lower, reducing the multinational's overall profits, everything else constant. However, it may be possible that production facilities in other countries may help to reduce the decline in overall profits, especially if the multinational firm makes use of host countries as production places from which it exports the product to other countries.² In contrast, a vertical multinational firm may be more risk averse than a horizontal firm supplying the host country's domestic market

² Some multinationals primarily serve the host country's domestic market. In this case, when social violence interrupts the production process in country i , assuming a horizontal firm, it is theoretically possible to get the product from the sister-firms operating in other countries. However, inability of sister-firms to raise their output on a short notice, transportation costs, and possible trade restrictions in host countries would make this option not feasible.

with respect to social violence. If a multinational firm in country i produces an intermediate good to be used in the next stage of the production in country j , an interruption in the production process in country i will lead to a shutdown in the production process in country j as well. Therefore, social violence may be associated with higher costs in the case of a vertical firm.

We test the Stevens-Biswas framework by differentiating between different types of social violence and associated human and physical damage in the Indonesian provinces. By doing so, we are able to predict which violence and damage types more detrimental to FDI flows and whether social violence has persistent effects on FDI flows.

3. Empirical Analysis

In this section, we first discuss the relevant regional characteristics of Indonesia. Second, we define our data and report the results of our empirical analysis.

Regional, Economic, and Ethnic Characteristics of Indonesia and Types of Violence

With its population of over 230 million, Indonesia represents the largest Moslem country in the world. 88 percent of the Indonesian population is Moslem, 8 percent is Christian, and the remaining population is mostly Hindu or Buddhist. More than half of the population lives on the island of Java. Currently Indonesia has 27 provinces, two special regions, and one special capital city district. Even though social violence became an issue starting in the early 1990s, increased violence during the late

1990s and the early 2000s was triggered by the financial crisis of 1997, which initiated the 1998 riots and lootings in several regions of Indonesia.³

In terms of their destructive effects, there are two major types of violence in Indonesia: self-determination conflicts that arise from the demands for independence or autonomy (such as those in Aceh and Papua) and communal conflicts that involve violent conflicts among the groups typically organized along the ethnic, religious, and cultural lines. Both types of conflicts may reflect grievances over the distribution of economic resources, the transmigration program, and perceived political repression. The Suharto regime has been described as one that imposed the president's decisions on all provinces without allowing the decisions to be challenged by the political opposition. It has been argued that the growing resentment toward the central government fuelled social violence especially in Aceh, Papua, and Maluku (Cassing, 1999; Gershman, 2002).

Even though it has been continuing since 1976, the separatist movement in *Aceh* has escalated dramatically since the fall of President Suharto in 1998, which can be described as a reaction to the Javanese control of Aceh's resources. The inhabitants of *Papua* showed a strong opposition to being part of Indonesia, after the Dutch authorities handed over the control of Papua to the Indonesian government in 1962. Considering the fact that almost 75 percent of Papuans are Christian, this may be a case of the combination between the communal and the separatist violence. The conflict in

³ Because these riots and lootings were triggered by the shortage and price hikes in basic goods, they are referred to as "food riots." However, these riots may have been ethnically motivated against the Chinese, because they were thought to be behind the shortage of food. The anti-Chinese sentiment in Indonesia stems from the Dutch colonization period, during which the Chinese-Indonesians were thought to had been given economic privileges, which in turn has been used to explain the significant role of the Chinese-Indonesians in the Indonesian economy. Eventually, May 1998 riots led to the end of the Suharto regime (Tadjoeddin, 2002a).

Maluku has been described as a religious conflict between the Christians and the Moslems. Even though Maluku islands were overwhelmingly Christian, the transmigration program has led to an inflow of Moslem settlers from Java and Sulawesi to Maluku in the past 30 years, which eventually increased the share of Moslems up to 50 percent.

Communal and separatist violence caused maximum fatalities, accounting for 77 percent and 22 percent of total fatalities, respectively.⁴ Among communal violence, ethnic group-, religion-, migrants-related violence alone contributed to around 52 percent of total deaths in social violence. In 1992-2001, social violence caused at least 6208 deaths, mostly in Aceh and Papua. Communal violence has the widest regional distribution. The incidence of this type of violence is found in 166 out of 295 districts/cities spreading over 22 provinces (Tadjoeddin, 2002a).

Data Description

Our FDI data includes the dollar value of monthly FDI projects approved in 26 Indonesian provinces, which is obtained from the website of Bank Indonesia (www.bi.go.id/web/en/Data+Statistik). We use approved FDI data, because monthly or quarterly data on realized FDI are not available. However, the annual conversions of monthly FDI projects approved and the actual net FDI flows per annum showed high correlation (.75), which was statistically significant at the 1 percent level. Additionally,

⁴ The data do not include the violence in East Timor. Indonesia invaded East Timor in 1975, when the former colonial power Portugal left without any formal agreement for the transfer of power. The Indonesian press was highly restricted in reporting the East Timor violence. Some reports suggest 100,000 deaths (out of a population 700,000) in the period 1980-1984 (Tadjoeddin, 2002a). The population of East Timor is 90 percent Roman Catholic. East Timor gained its formal independence in 2002.

our data include the monthly version of the daily social violence data at the province level compiled by Tadjoeuddin (2002b). Data on the economic and ethnic characteristics of the provinces are obtained from Tadjoeuddin (2003). Using this data, we examine the relationship between FDI and social violence in 26 provinces of Indonesia during the period 1992:1 and 2001:12.⁵

Tadjoeuddin (2002a) divides social violence in Indonesia into four categories: communal, separatist, state-community, and industrial relations. *Communal violence* takes place between two groups in the community, which can stem from ethnicity, religion, social class, political affiliation, etc. For example, communal conflicts include religion and ethnic violence in South and North Maluku provinces, which quickly polarized into a Christian-Moslem conflict. Because of their relevance in communal violence, we use ethnic, political, and civic violence under the communal violence. *Separatist violence* is motivated by the desire of people in an area who want to become an independent country. For example, the provinces Aceh and Papua have demanded to be an independent country. *State-community violence* is linked to protests against the central government and state institutions, such as May 1998 riots that expressed major disappointment of the masses with the policies of the central government. *Industrial relations violence* refers to the community-company or workers-company conflict (Tadjoeuddin, 2002a). Violence type-related dummies (ethnic, political, civic, separatist, state-community, and industrial) take a value of 1 in the months when they occur and zero otherwise. We also use variables that indicate the extent of the destruction and damage. Our data include the number of death, injured, and physical damage in terms of cars and buildings damaged.

⁵ Monthly FDI data are not available for Bangka Belitung, Banten, Gorontalo, and North Maluku.

Economic and ethnic characteristics of provinces include the size of the population (“population”), the share of migrants (“migrants”), the share of Christians (“Christian”), the share of Moslems (“Moslem”), the share of people living in poverty (“poverty”), province-level GDP per capita, and a dummy variable that takes the value of 1 in provinces that have oil and natural gas and zero otherwise (“oil-natural gas”).

Even though monthly FDI flows, types of and damage associated with social violence change over time, the economic and ethnic characteristics of the provinces do not. The values of the latter variables are based on Tadjoeeddin (2003). Table 2 provides the summary of descriptive statistics of our data.

Generalized least squares estimations

We apply generalized least squares regression (GLS) to our pooled data. Because the Cook and Weisburg test failed to reject the null hypothesis of no heteroscedasticity, the GLS model is estimated using homoscedastic panels (Wooldridge, 2002). We estimate the following regression:

$$FDI_{i,t} = X_i\beta_1 + V_{i,t}\beta_2 + L_{i,t}\beta_3 + C\beta_4 + \varepsilon_{i,t}, \quad (8)$$

where:

FDI = the U.S. dollar value of monthly FDI projects approved in 26 provinces

X = a vector of province-specific economic and ethnic characteristics

V = a vector of province-specific social violence types

L = up to 12-month lags following the initial violence to test for the persistence of social violence on FDI

C = a post-crisis dummy variable that takes the value of 1 for the year 1998 and beyond

ε = the error term with the usual properties

To check the sensitivity of our results to different specifications, we estimate three models, as shown in Table 3. Model I includes economic, ethnic, and violence-related variables. Model II, uses a damage index instead of the extent of specific damages (physical and human). Model III includes interaction variables that are created among the economic, ethnic, and social violence-related variables. The selection of the level and interaction variables in Models I, II, and III are based on the statistically significant pair-wise correlations at the 10 percent level or better, which are not reported in the paper for space considerations but available upon request from the authors.

In the following, only statistically significant results that are at 10 percent or better are reported, unless indicated otherwise. We first summarize the general observations based on all three models. The results indicate that the crisis dummy is negative, which means that FDI has declined in all provinces since the Indonesian crisis in 1997. The estimated models show that FDI flows during the post-crisis period declined \$5.5 to \$8 millions. Lags associated with violent events are included in all three models (not shown in Table 3 for space considerations); however, the results of the F-test indicated that they are jointly not statistically significant, indicating no persistent effects of social violence on FDI. To address the problem of endogeneity,

lagged FDI flows are also included in all three models, which are small, but statistically significant.

Next, we discuss the results from each model in Table 3 separately. Model I indicates that the size of the population, the share of Christians, the share of people living in poverty, GDP per capita, and the availability of oil-natural gas increase FDI flows. While the effect of *population* and *GDP per capita* are rather small, the effect of other explanatory variables is larger. For example, one percent increase in the share of the *Christians* increases FDI flows by \$406,943, while a one percent increase in poverty increases these flows by about \$1.9 million. The availability of *oil-natural gas* increases FDI flows by over \$10 million. The variables that affect FDI flows adversely are the share of migrants and the Moslems in a province. A one percent increase in the share of migrants and Moslems decreases FDI flows by \$263,168 and \$322,110 respectively. With respect to the social violence-related variables in Model I, while the presence of *ethnic violence* decreases FDI flows by over \$9 million, *separatist* and *state-community violence* increase FDI flows by almost \$28 million and \$18 million, respectively. Human and physical damage decrease FDI flows by approximately \$200,000.

The difference between Model I and II lies in the violence type- and damage-related variables. While Model I includes violence types as well as human and physical damage, Model II introduces a damage index that measures the changes in the extent of physical and human damage in a province over time. To construct the damage index, first, we add physical and human damage for each observation in all provinces to get total damage. Then, in any given province, the first nonzero total damage was

designated as the base observation. For all other observations in a province, the current damage index was calculated as the ratio of the current total damage to the total damage in the base year, multiplied by 100. Estimated coefficients in Model II have the same signs as those in Model I and their values are close as well. The damage index, however, is not statistically significant. The results of Model II are interesting for two reasons. First, the effects of ethnic and economic characteristics of provinces on FDI flows remain the same, which reinforces the results of Model I. Second, the results of Model II demonstrates that without the specific types of violence and damage, the relation between FDI flows and the damage index becomes statistically insignificant. The latter result demonstrates the relevance of our theoretical framework that suggests a differentiation between different types of violence and damage.

Motivated by the above results, in addition to the main effects of the explanatory variables, we add interaction variables into Model III as well. We want to motivate the use of interaction terms based on the results of Model I and II. In these models, the results indicate that increasing shares of Moslems in a province tend to decrease FDI flows, while increasing shares of Christians increase FDI flows. Additionally, while ethnic violence decreases FDI flows, separatist and state-community violence increases them. A possible explanation for these results may be that some of these variables may interact with each other and, therefore, their total effect on FDI flows cannot be solely measured by estimating the level effect. Clearly, multinational firms are not expected to prefer one ethnic group or violence type to the other so that the above results may suggest the possibility that the effects of ethnic groups, violence types, and the extent of damage on FDI flows correlate. If Moslems

are known to engage in certain violence types that are associated with extensive physical damage that may interrupt the production process, the negative coefficient on the share of Moslems in a province makes economic sense.

The results in Model III (also shown in Table 3) are obtained from running a series of models, starting with the basic model (all statistically significant pair-wise correlations) and excluding variables with high p-values. We kept a variable whose main effect is statistically insignificant in our model, as long as at least one of its interaction terms is statistically significant. As far as the interpretation of the estimated coefficients in Model III is concerned, we have interaction variables between continuous and indicator variables, as well as between two continuous variables. In order to interpret the coefficients associated with the interaction term between two continuous variables, we use the centiles of the continuous variables associated with the 25th, 50th, and 75th percentiles, as shown in Table 4. In short, we use three tables to interpret the effects of the explanatory variables on FDI flows in Model III. Table 3 summarizes the estimated coefficients of Model III. The centiles of our continuous variables are shown in Table 4. The total effect of the explanatory variables (both level and interaction) on FDI flows are shown in Table 5. In the following, we discuss the results of Model III based on Table 5.

The effect of *population* on FDI flows interacts with GDP per capita and the share of Christians. As GDP per capita and the share of Christians in a province increase (from the 25th to the 75th percentile), higher GDP per capita lead to higher FDI flows. However, the size of the coefficient is very small.

The effect of *GDP per capita* on FDI flows interacts with the share of Christians, the size of the population, the share of people living in poverty, and the availability of oil-natural gas. When the sign of the coefficients are considered, the signs associated with the main effect of GDP per capita and the availability of oil-natural gas are negative, while the signs of the other interacting variables are positive. If a province has no oil-natural gas, increasing shares of the Christians, poor people, and the size of the population is expected to increase FDI flows from \$13,100 to \$79,354. If, however, a province has oil-natural gas, FDI flows are expected to change from a decline of \$7,587 to an increase of \$58,667. The relevance of provincial GDP per capita lies in the fact that a higher-income province may have, among other things, better infrastructure and a better-educated labor force, which multinational firms may value; however, the estimated effect is small. This result is consistent with the estimations of models without the interaction variables (Models I and II).

The effect of *poverty* interacts with provincial GDP per capita and the availability of oil, where both coefficients are negative. Assuming no oil-natural gas, as GDP per capita increases, the effect of poverty on FDI flows becomes increasingly negative (from -\$841,586 to -\$3,522,086). The availability of oil-natural gas makes these results more pronounced (from -\$1,886,658 to -\$4,567,158). It seems that poverty in higher-income provinces and provinces with oil-natural gas tends to decrease FDI flows. This result is not consistent with the results of Models I and II, where poverty increases FDI flows. One can argue that, while Models I and II pick up on the possibility that an increasing share of poor people in a province may indicate the availability of cheaper workforce, Model III highlights the possibility that a higher

share of poor people in richer provinces may have a destabilizing effect and decrease FDI flows.

The availability of *oil-natural gas* affects FDI flows through poverty, the share of indigenous people, GDP per capita, and the presence of state-community violence. The coefficients of poverty and GDP per capita are negative, while the coefficients on the share of indigenous people and state-community violence are positive. In the absence of state-community violence, lower levels of poverty, indigenous population, and GDP per capita, the availability of oil-natural gas increases FDI flows (\$11,822,842). Because the coefficients of poverty and GDP per capita are negative, in higher levels of these variables, the availability of oil-natural gas decreases FDI flows. If state-community violence is present in a province, 25th and 50th percentiles of poverty, indigenous population, and GDP per capita increase FDI flows by \$30 million and almost \$23 million, respectively. However, in 75th percentiles of these variables, FDI flows become negative by almost \$3 million. It is interesting to note that, in the models without interaction terms (Models I and II), the availability of oil-natural gas in a province increases FDI flows. The results of Model III, however, indicate that the availability of oil-natural gas in higher-income provinces with a higher representation of poor people (pronounced income equality) may decrease FDI flows.

With respect to the explanatory variables associated with demographic and ethnic characteristics of the provinces, the effect of the share of *indigenous* people on FDI flows interact with oil-natural gas. If these resources are available, then one percent increase in the share of indigenous people increases FDI flows by \$623,662. The results of Model I and II indicate that the increasing share of migrants in a region

decreases FDI flows. As discussed before, the government-encouraged migration of Moslems into the regions with a larger Christian community over the years has created social unrest. Therefore, especially in provinces with oil-natural gas availability, FDI flows increase with the increasing share of indigenous people.

The effect of the share of *Christians* on FDI interacts with GDP per capita, the size of the provincial population, and human damage. While the sign of GDP per capita is positive, the coefficients of population and human damage are negative. In 25th percentile of GDP per capita, population and human damage, one percent increase in the share of Christians increases FDI flows by \$177,725. However, in higher percentiles of GDP per capita, population, and human damage, an increase in the share of Christians in a province decreases FDI flows up to \$887,224. In contrast to Models I and II that predict higher FDI flows with an increasing share of Christians in a province, Model III with interactions terms indicate a more subtle relation between FDI flows and the share of Christians in a province. As discussed before, Indonesia is a largely Moslem country. Christians may be represented as small numbers especially in provinces with larger population. Additionally, if human damage is higher in a province, it seems that having a Christian minority in such a province decreases FDI flows. One can argue that multinational firms may attach higher probabilities of shutdown to these provinces.

As far as the social violence-related variables are concerned, *ethnic violence* interacts with both physical and human damage. Ethnic violence interacts negatively with physical damage and positively with human damage. In the 25th and 50th percentiles of human and physical damage, ethnic violence increases FDI flows

(\$1,651,470 and \$1,730,604, respectively). However, in the 75th percentile of human and physical damage, it decreases FDI flows by \$878,091. Consistent with the Stevens-Biswas framework, the coefficient of physical damage is negative, which contributes to declining FDI in higher levels of physical damage.

The effect of *industrial relations violence* on FDI interacts with physical damage only, where the sign of the coefficient on physical damage is negative. As the percentile of physical damage increases, industrial relations violence decreases FDI flows from \$1,222,997 to \$7,192,505. Again, based on the Stevens-Biswas framework, this result is important, because industrial relations-related violence with the capacity of physical damage is likely to interrupt the production process.

The effect of *state-community violence* interacts with the availability of oil-natural gas, where the sign of the coefficient on oil-natural gas is positive. In provinces with oil-natural gas, state-community violence increases FDI flows by almost \$ 22.5 million, which is consistent with the results in Models I and II. The large effect of state-community violence on FDI especially in provinces with oil-natural gas availability can be explained based on the nature of this kind of violence. Participants in this kind of violence are expected to express their frustrations with the local and state governments and probably demand more efficiency from the government, which in turn makes them less likely to cause physical or human damage.

As far as the damage-related variables are concerned, the effect of *human damage* on FDI flows interacts with ethnic violence and the share of Christians, where the signs of the coefficients are positive and negative, respectively. In the absence of ethnic violence, human damage decreases FDI flows from \$41,911 to \$178,677, as the

share of Christians increases in a province. The presence of ethnic violence makes the ethnic violence-FDI relation positive; however, the positive coefficient becomes smaller (from \$173,784 to \$37,018), as the share of Christians increases in a province. The results indicate that, because Christians are a minority in Indonesia, multinational firms may view increasing human damage in provinces with larger shares of Christians as destabilizing; however, the effects are rather small.

Physical damage interacts with ethnic and industrial relations violence, where the coefficients on both violence types are negative. In the absence of these violence types, physical damage increases FDI flows by \$53,393, while their presence decreases them by \$55,869. Even though the effects are small, the results suggest that increasing physical damage associated with ethnic and industrial relations violence tend to decrease FDI flows.

Table 4 reports the results of the diagnostic tests associated with each model. The Wald statistic provides a test of the coefficients along the conceptual lines of the usual F-statistic. In the presence of heteroscedasticity-robust standard errors, the usual F-statistic is not valid for testing multiple linear restrictions. In the Wald statistic, the null hypothesis is that the linear combinations of the coefficients are equal to a vector of constants (Wooldridge, 2002). The results of our Wald statistic indicate that the null hypothesis is rejected at a significance level better than 1 percent.

Implications of the empirical results

Our results demonstrate the relevance of interaction terms to examine the overall effect of social violence on FDI flows. First, the inclusion of interaction

variables changes the sign of the relationship. Second, the inclusion of interaction terms affects the size of the impact of social violence on FDI flows. We show that all types of violence are not detrimental to FDI flows. The presence of ethnic violence and especially state-community violence increases FDI flows considerably. In contrast, industrial violence associated with higher levels of physical damage decreases FDI flows. The results confirm our theoretical prediction that only those types of violence that are likely to lead to an interruption in the production process negatively affect FDI flows.

The current research can be extended by using sector-specific FDI flows at the province level to observe the differences among the sector-specific FDI flows in their response to province-specific violence and damage. This type of data was not available from the authorities. In addition to the sector-specific data, firm-level data would be helpful to predict the differences between the responses of a horizontal or vertical multinational firm to social violence- and damage-related variables.

Additional research using firm-level FDI data may explain our results that the decline in FDI flows due to social violence is not very large. The existing research that uses firm-level data indicates an interesting aspect of the relationship between FDI flows and social and political turmoil in the host country. For example, Delios and Henisz (2003a) find that political uncertainty plays a less pronounced role in investment decisions of Japanese manufacturing firms, if the host country demonstrates a close cultural proximity. It has also been shown that Japanese manufacturing firms' investment sequence start with a joint venture entry in countries with high levels of policy uncertainty (Delios and Henisz, 2003b). The relatively small negative effect of

social violence on FDI flows may be explained by the fact that multinational firms may have already taken the effects of social violence on their production into account, before they become involved in the host country by choosing the host country with closer cultural proximity or having a domestic partner. Firm-level data at the province level may be helpful to investigate these issues.

4. Conclusions

The motivation of this paper is based on the conflicting findings in the existing literature regarding the social violence-FDI relationship, which indicates that social violence may not be detrimental to FDI flows in all circumstances. In this paper, we provide an explanation for this outcome. We utilize the Stevens-Biswas framework to illustrate under which circumstances social violence is expected to decrease FDI flows. Social violence that leads to an interruption in the production process and therefore decreases the present value of the firm's future profits produces the negative relationship between FDI and social violence. In our empirical analysis, we provide evidence about the validity of this theoretical framework by identifying violence types, ethnic groups, and economic characteristics of the provinces.

Our results suggest that only industrial relations and, to a lesser extent, ethnic violence adversely impact FDI flows. Additionally, the effect of these types of social violence on FDI interacts with physical damage, where physical damage further increases the negative impact of these violence types on FDI. These results are consistent with the Stevens-Biswas framework and they provide an explanation for the inconsistent findings in the literature that social violence may have positive, negative,

or insignificant impact on FDI flows. Besides a suitable theoretical framework, the findings indicate the importance of using relevant types of violence for the multinational firms' decisions and the inclusion of interaction terms to make correct inferences about the effects of social violence on FDI flows.

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Figure 1: Shares of Net Private Capital Flows in GDP, 1970-1998

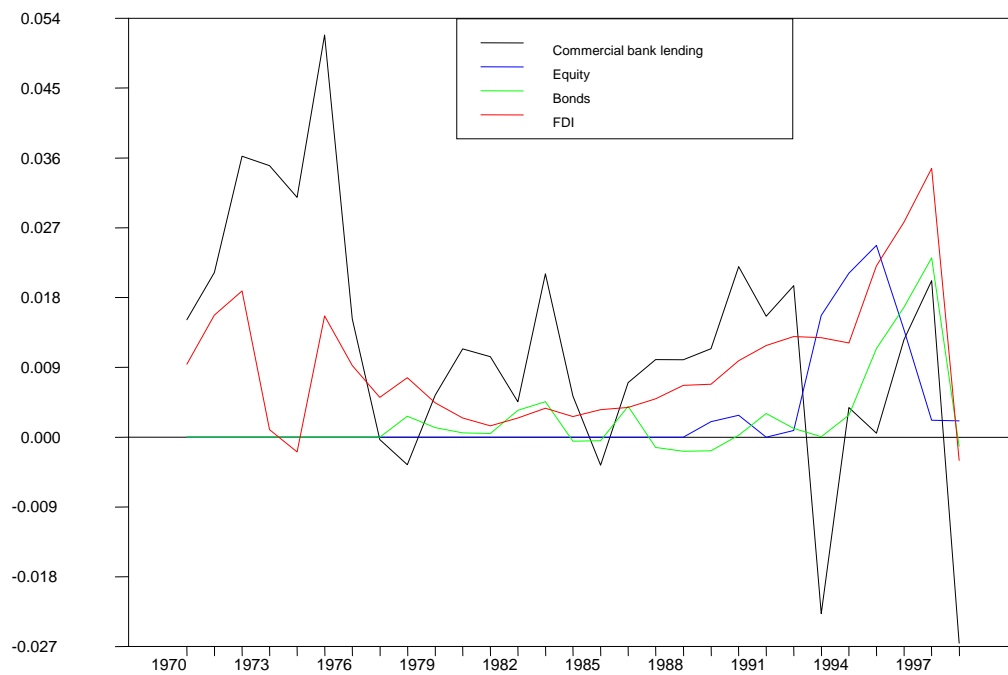


Table 1: Determinants of FDI flows

Independent variables ¹	Signs of coefficients ²	Source
<i>FDI-related</i>		
FDI (-1)	+	Cerstensen; Cheng-Kwan; Singh & Jun
FDI level	NS	Sun et al.
FDI/GDP	+	Noorbakhsh et al.
FDI stock	+	Sethi et al.; Deichman et al.
FDI substitutes	NS	Sun et al.
<i>Geographic</i>		
Population (host country)	+	Habib & Zurawicki; Mody et al.; Sethi et al.;
Population (source country)	+	
Distance (host and source country)	-, NS	Markusen & Markus; Mody et al.; Smarzynska & Wei; Wei
<i>National income</i>		
GDP	+	Cheng-Kwan; Globerman & Shapiro; Habib & Zurawicki; Sethi et al.; Singh & Jun; Smarzynska & Wei; Wei; Schneider & Frey
GDP growth	+	Habib & Zurawicki; Noorbakhsh et al.; Singh & Jun;
<i>Labor</i>		
Growth of labor force	+	Noorbakhsh et al.
Labor cost	-	Cerstensen; Cheng-Kwan; Noorbakhsh et al.; Sun et al.
Labor quality	+	Singh & Jun; Wei; Deichman et al.
Relative factor endowment	+	Deichman et al.; Sethi et al.
Unemployment	NS	Cerstensen; Deichman et al.; Habib & Zurawicki
<i>Industrialization</i>		
Share of agriculture	-	Deichman et al.
Firm size	+	Smar et al.
Market size	+	Cerstensen; Sun et al.
Infrastructure	+	Asiedu; Biswas; Cheng-Kwan; Deichman et al.; Sun et al.
Return on investment	+	Asiedu; Sun et al.
Industrialization	NS	Smarzynska & Wei; Sun et al.
Diversification (SIC codes)	+	Smarzynska & Wei
Privatization	+	Cerstensen
Share of private business	+	Cerstensen
Research & development	NS	Habib & Zurawicki; Smarzynska & Wei; Sun et al.
<i>Fiscal</i>		
Public investment/GDP	NS	Deichman et al.
Fiscal deficit	-	Chen, Schneider & Frey
Income tax rate	-	Chen
Sales tax	+	Chen
Taxes on FDI	-	Wei
Corporate tax rate	+	Cerstensen; Smar et al.
Tax credit	NS	Wei
Government effectiveness	-	Globerman & Shapiro
Regulatory burden	-	Globerman & Shapiro

Table 1 cont'd

Independent variables ¹	Signs of coefficients ²	Source
<i>Trade and exchange rates</i>		
Economic ties	+	Habib & Zurawicki
Trade openness	+	Asiedu; Habib & Zurawicki; Mody et al.; Noorbakhsh et al.; Singh & Jun; Smarzynska & Wei
Taxes on trade	-	Cerstensen; Markusen & Markus
Energy import	-	Noorbakhsh et al.
Export credits	+	Chen
Special economic zones	+	Chen; Cheng-Kwan
Transportation costs	-	Chen
Exchange rate	-	Singh & Jun
Financial market development	+	Deichman et al.
<i>Economic development</i>		
Life expectancy	+	Globerman & Shapiro
Education	+	Cheng-Kwan; Globerman & Shapiro; Noorbakhsh et al.
Education expenditures	+	Chen
<i>Political risk , property rights, and cultural similarity</i>		
Cultural difference	- , NS	Habib & Zurawicki; Sethi et al.; Wei
Political risk	- , +, NS	Asiedu; Cerstensen; Globerman & Shapiro; Habib & Zurawicki; Sethi et al.; Singh & Jun; Sun et al.; Wei
Interregional differences	-	Singh & Jun; Schneider & Frey
Corruption	-	Globerman & Shapiro; Habib & Zurawicki; Smarzynska & Wei; Wei
Accountability	+	Globerman & Shapiro;
Property rights; rule of law	+	Biswas; Globerman & Shapiro
Corporate transparency	+	Mody et al.
Environmental sustainability	+	Globerman & Shapiro

¹ Most variables describe host-country characteristics, unless indicated otherwise.

² -, +, and NS indicate the negative, positive, and statistically nonsignificant relationship between FDI flows and the relevant variable, respectively.

Table 2: Descriptive statistics of the panel data

Variable	Mean	Standard deviation	Minimum	Maximum
<i>FDI</i>				
overall	12.5	5.47	0	89.8
between		3.23	.134	16.3
within		4.46	1.1	74.7
<i>GDP</i>				
overall	1394	1325	356	6461
<i>Population</i>				
overall	7.5	9.9	1.2	35.7
<i>Indigenous</i>				
overall	69.8	22.1	13.5	99
<i>Migrants</i>				
overall	17	15.2	1	73.2
<i>Moslem</i>				
overall	79.9	24.8	10.3	97.8
<i>Christian</i>				
overall	14.5	20.3	.41	74.8
<i>Poverty</i>				
overall	18.7	8.7	3.42	41.8
<i>Death</i>				
overall	1.89	26.9	0	1195
between		3.4	0	10.4
within		26.7	0	1186
<i>Injury</i>				
overall	1.96	15.1	0	375
between		4.2	0	20.7
within		14.6	0	356.2
<i>Building</i>				
overall	9.8	155.8	0	5702
between		14.9	0	47.7
within		155.1	0	5664.1
<i>Vehicle</i>				
overall	1.3	36.5	0	1948
between		3.3	0	16.6
within		36.3	0	1932.8

Notes: Panels indicate provinces. Overall, between, and within imply the pooled data (3146 observations), the province data (26 provinces), and the observations in each province (121 observations), respectively. The overall, between, and within information is not provided for provincial GDP per capita, population, the percentage of indigenous people, migrants, Moslems, Christians, and poverty, because values of these variables do not vary over time. FDI is expressed in millions of US\$. GDP indicates the provincial GDP per capita in US\$. Provincial population is expressed in millions of people. The share of indigenous people, migrants, Moslems, Christians, and poverty in provinces are expressed in percentage. Death and injury indicate the number of deaths and injuries during violent events. Building and vehicle indicate the number of buildings and vehicles damaged during violent events.

Table 3: Results of the cross-sectional time-series GLS regressions (Dependent variable: monthly FDI flows)

Explanatory variables	Model I	Model II	Model III
Constant	-13,300,000 **	-9,659,122 *	-6,040,013
FDI(-1)	.208 ***	.301 ***	.152 ***
Population	.717 ***	.526 ***	-2.38 ***
Migrants	-263,168 ***	-189,309 *	
Indigenous			71,906
Moslem	-322,110 ***	-232,129 **	
Christian	406,943 ***	283,822 ***	-125,643
Poverty	1,846,048 ***	1,317,694 ***	-90,086
GDP per capita	7,289 ***	4,526 ***	-8,973
Oil / natural gas	10,100,000 ***	7,962,140 *	5,272,425
Crisis dummy	-8,036,346 ***	-4,532,981 ***	-5,833,976 ***
<i>Violence types</i>			
Ethnic violence	-9,036,793 ***		-1,592,889
Political violence	9,348,102		
Civic violence	-1,694,491		
Separatist violence	27,900,000 ***		
State-community violence	18,000,000 ***		4,186,557
Industrial violence	1,187,945		-1,062,403
Physical damage	-200,978 **		53,393 **
Human damage	-193,368 **		-38,072
Damage index		-10.34	
<i>Interaction variables</i>			
Population * GDP per capita			.003 ***
Poverty * GDP per capita			1500 ***
Poverty * Oil-Natural Gas			-1,045,072 ***
Indigenous * Oil-Natural Gas			551,756 ***
GDP per capita * Oil-Natural Gas			-20,687 ***
Christian * GDP per capita			313 ***
Christian * Population			-.112 ***
State-community violence * Oil-Natural Gas			18,300,000 **
Ethnic Violence * Physical Damage			-63,378 **
Ethnic Violence * Human Damage			215,695 *
Industrial Violence * Physical Damage			-45,884 **
Christian * Human Damage			-4,986 **
Number of observations	3146	3146	3146
Number of groups	26	26	26
Average observations per group	121	121	121
Log likelihood	-28059.5	-60092.5	-59798.7
Wald χ^2	$\chi^2(29) = 884.9$	$\chi^2(22) = 1122.9$	$\chi^2(34) = 1708.6$
Pr > χ^2	.0000	.0000	.0000

Table 4: Centiles of the continuous explanatory variables

Explanatory variable	Centiles		
	25 th	50 th	75 th
Population	877,220	7,524,827	14,200,000
GDP per capita (in US\$)	501	1,394	2,288
Poverty (%)	12.8	18.7	24.6
Indigenous (%)	54.9	69.8	84.6
Christians (%)	.77	14.5	28.2
Human Damage	1.3	3.9	27.8
Physical Damage	3.5	11.1	133.6

¹ The data are assumed to be normally distributed. Centiles are calculated as the addition of the sample mean plus k standard deviations, where k is determined from the centiles of the standard normal distribution.

Table 5: Effects of the estimated coefficients in Model III on FDI flows

Explanatory variable	Estimated effects
Population (POP)	-2.38 + .003 GDP - .112 CHR
25 th percentile ¹	-\$.97
50 th percentile	\$.22
75 th percentile	\$1.32
GDP per capita (GDP)	
if OIL = 0	-8,973 + .003 POP + 1,500 POV + 313 CHR
25 th percentile	\$13,100
50 th percentile	\$46,191
75 th percentile	\$79,354
if OIL = 1	-8,973 + .003 POP + 1,500 POV - 20,687 OIL + 313 CHR
25 th percentile	-\$7,587
50 th percentile	\$18,141
75 th percentile	\$58,667
Poverty (POV)	
if OIL = 0	-90,086 - 1500 GDP
25 th percentile	-\$841,586
50 th percentile	-\$2,181,086
75 th percentile	-\$3,522,086
if OIL = 1	-90,086 - 1500 GDP - 1,045,072 OIL
25 th percentile	-\$1,886,658
50 th percentile	-\$3,226,158
75 th percentile	-\$4,567,158
Oil-natural gas (OIL)	
if SCV = 0	5,272,425 - 1,045,062 POV + 551,756 IND - 20,687 GDP
25 th percentile	\$11,822,848
50 th percentile	-\$4,595,343
75 th percentile	-\$2,108,398
if SCV = 1	5,272,425 - 1,045,062 POV + 551,756 IND - 20,687 GDP + 18,300,000 SCV
25 th percentile	\$30,122,848
50 th percentile	\$22,895,343
75 th percentile	-\$2,789,398
Indigenous (IND)	71,906 + 551,756 OIL
if OIL = 0	\$71,906
if OIL = 1	\$623,662
Christian (CHR)	125,643 + 313 GDP - .112 POP - 4,986 HD
25 th percentile	\$177,725
50 th percentile	-\$300,261
75 th percentile	-\$887,224
Ethnic violence (ETHV)	-1,592,889 - 63,378 PD + 215,695 HD
25 th percentile	\$1,651,470
50 th percentile	\$1,730,604
75 th percentile	-\$878,091
Industrial violence (INDV)	-1,062,403 - 45,884 PD
25 th percentile	-\$1,222,997
50 th percentile	-\$1,571,715
75 th percentile	-\$7,192,505

Table 5 cont'd

Explanatory variable	Estimated effects
State-community violence (SCV)	4,186,557 + 18,300,000 OIL
if OIL = 0	\$4,186,557
if OIL = 1	\$22,486,557
Human damage (HD)	
if ETHV = 0	-38,072 - 4,986 CHR
25 th percentile	-\$41,911
50 th percentile	-\$110,369
75 th percentile	-\$178,677
if ETHV = 1	-38,072 + 215,695 ETHV - 4,986 CHR
25 th percentile	\$173,784
50 th percentile	\$105,326
75 th percentile	\$37,018
Physical damage (PD)	53,393 - 63,378 ETHV - 45,884 INDV
if ETHV = 1	-\$9,985
if INDV = 1	\$7,509
if ETHV = 1 & INDV = 1	-\$55,869
if ETHV = 0 & INDV = 0	\$53,393

¹ Percentile refers to the percentiles of the relevant continuous variables, which are used in the interpretation of the coefficient on the interaction term between two continuous variables. For example, the effect of the size of the population on FDI flows works through provincial GDP per capita and the share of Christians in a province. Using the centiles of the relevant variables in Table 4, the effect of the size of the population on FDI flows assuming the 25th percentiles of provincial GDP per capita and the share of Christians in a province is $-2.38 + .003*501 - .112*.77 = -.97$.