Exchange rate regimes, institutional quality and Japanese firms' behavior: a panel data analysis[1]

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Abstract

In this paper we extend our previous study on Japanese outward Foreign Direct Investment (FDI) activities by examining the role of exchange rate (ER) level and volatility together with institutional factors (political environment (PE)) in determining Multinational Companies' (MNCs) investment decisions. We employ a panel data analysis of 56 developed and developing countries for the period of 1995-2011 for the country and industry level. Our benchmark model is constructed on the basis of the knowledge-capital models, and includes traditional control variables such as market potential, wages, skilled workforce endowments, investment cost and openness. An ER level and volatility as well as PE measure are included as additional explanatory variables. Our preliminary results and expectations suggest a non-linear response of Japanese MNCs activities to different ER regimes and to different levels of institutional environment quality depending on the industry and the host country's stage of economic development. These results have important implications for future policy considerations of the host countries and for research on Japanese outward FDI.

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1. Introduction

As reported by the JETRO survey on the International Operations of Japanese Firms (JETRO 2013) the problems that Japanese Multinational Companies (MNCs) are concerned with in their activities in the emerging economies are, among others, a high level of foreign exchange risk, undeveloped legal systems and problems in application of laws, problems in protection of intellectual property rights, political risks and others. In particular a concern of institutional quality and financial stability is of a primary importance for FDI decision.

The main scope of our study is to analyze the effects of exchange rate regime and political environment on the activities of Japanese MNCs when investing in developed and developing countries for a recent period of 1995-2011 years. The main focus of the recent studies on Japanese FDI is their activities within developing countries. We emphasize that in fact activities in developed and developing countries might be complimentary due to the risk factors such as financial risk and institutional quality.

The importance of financial risk (through Exchange Rate (ER) volatility) and institutional quality (proxied by Political Environment (PE)) for Japanese MNCs can be gleaned from the figures 1 and 2 respectively.

**********insert figure 1 and 2 here********

We can observe here that there is a probability of non-linear response of Japanese MNCs to the changes in these risk variables. We postulate in our paper that the reason for such a non-linear effect might be a different perception of financial, business and risk environment by Japanese MNCs that depends on the level of economic development of the host countries. In addition, this non-linear response might depend heavily on the industry in which the company operates.

There is a vast literature on the ER regime and Political Risk effects on FDI (e.g. Guerin and Manzocchi 2009, Lee and Min 2011). The most of the studies suggest that political instability may have a negative effect on the incoming FDI (Busse and Hefeker 2007, Hayakawa, Kimura, and Lee 2011, Wei 2000). Nevertheless, a few opposite evidence note that a role of countries' level of economic development (Peng and Beamish 2008) together with industries as FDI destination (Clare and Gang 2010) should not be neglected.

With regard to Exchange Rate level effect on MNCs activities the theoretical prediction is that home country's currency appreciation is expected to affect positively FDI flows due to relative wealth effect (Froot and Stein 1991) and capital market imperfection (Blonigen 1997) arguments.

ER volatility, however, is a more debatable issue in both theoretical and empirical literature. Several theoretical arguments were emphasized in the literature. First, foreign investors tend to postpone the investment due to the effect of risk aversion (Campa 1993, Dixit 1989). On the other hand, Goldberg and Kolstad (1995) proposed that if uncertainty is correlated with export demand shock in the market that MNCs intend to serve, then risk-averse firms would

tend to increase FDI. Finally, Itagaki (1981) and Cushman (1985) theoretical analysis hypothesized that uncertainty may affect positively FDI if it is used as substitute to exports.
Urata and Kiyota (2004) showed that ER volatility discouraged Japanese FDI to a large number of countries for a period of 1990-2000. However, Takagi and Shi (2011) found evidence that ER uncertainty had a positive impact on Japanese MNCs activities in the nine Asian countries in the period of 1987-2008.
In addition, Takagi and Shi (2011) emphasized the importance of ER expectation and proposed its alternative way of measurement by the third moment of ER changes. They suggested that expectation of yen appreciation will discourage Japanese FDI since it may "reduce expected value of repatriated profits expressed in yen" (2011, 5). This result is somewhat identical to the findings of Chakrabarti and Scholnick (2002) for US FDI flows to OECD countries for a period of 1982-1995. On the other hand, Cushman (1985, 1988) hypothesized an opposite behavior both theoretically and empirically for the case of domestic production with input from foreign subsidiary which might be associated with vertical form of FDI.
Our theoretical analysis is inspired by Clare and Gang (2010) and our empirical analysis is built mainly on three seminal works on the effect of political stability and exchange rate regime on Japanese FDI, namely Urata and Kiyota (2004), Peng and Beamish (2008), and Takagi and Shi (2011). However, our analysis differs in several important ways. First, Clare and Gang's (2010) theoretical model represents only a partial maximization while ours is a full optimization. Second, we employ Euromoney Country Risk (ECR) as an alternative measure of Political Environment stability. Third, we extend the study in two important dimensions: host countries' level of economic development and industry level analysis. By this extension we try to fill the gap in the literature which usually emphasizes only one dimension. And finally we follow Takagi and Shi (2011) approach in measuring ER level, ER volatility and expectation by the first, second and third moment of the ER changes. However, we extend the analysis to a larger number of countries for a period of 1995-2011 and to the industry level dimension.
The remainder of the paper is organized as follows. Section 2 presents our theoretical model. Section 3 describes data and empirical approach. Section 4 presents the empirical results and section 5 concludes.

2. Theoretical model of ER and PE effects on FDI

Consider a Japanese MNC with a foreign affiliate producing a single homogeneous product with inputs at constant prices. The product is distributed to home and foreign market, and the randomness in exchange rate is the only source of random variation in the firm's value. Assume that the firm is a risk averter, and it seeks to maximize its expected utility of profits.
Thus, the following are some essential assumptions:

(2-1) Two-country model: **H**(home) and **F**(foreign)

(2-2) H - The parent company is located in H; F - The foreign subsidiary (the foreign affiliate) is located in F.

(2-3) A single homogeneous product is produced by the affiliate, and is sold by both the parent and the affiliate.

(2-4) The exchange rate (**e**) is measured in units of home currency per unit of foreign currency. This is the only random variable for the baseline model. (PE is considered later).

(2-5) Timing:

1. FDI is carried out by home parent to foreign affiliates. There is no production by the parent.
2. Production by foreign affiliate is done by employing Labor (**L**) and Specific factor (**Z**).
3. The output (**Y**) is distributed to H's and F's markets with no transport costs.
4. H's parent makes profits (**R**) by the sales after paying FDI costs.
5. F's affiliates make profits (**R***) by the sales after paying factor costs.
6. The parent counts the joint profits ($\tilde{Q}$).

(2-6) Risk: Both the parent and the affiliates are "risk averters" in the sense of Arrow-Pratt. This assumption will be considered in more detail later.

(2-7) FDI represents the Capital (**K**) bought in H and sent to F. The cost of K for Parent is the implicit rental cost (**r**) (for example, the opportunity costs).

(2-8) Factor markets for Z and L in Foreign country are competitive. Factor Prices are constant (w* for L and r* for Z).

(2-9) A fixed proportion "a" of output is sold in H's market (0<a<1): The rest (1-a) in F's market.

(2-10) The final prices are P and P* for H and F. The prices are assumed constant throughout the analysis.

(2-11) Production function is Cobb-Douglass with Constant Returns to Scale (CRS) for closed-form solutions.

(2-12) ER and PE are mutually independent

Production: The output (Y) is produced only in F.

$Y=K^{\alpha}Z^{\beta}L^{\gamma}$; $\alpha+\beta+\gamma=1$, (1)

Where K represents FDI, Z is a Foreign Specific factor (cost=r*) and L= Foreign Labor(cost=w*). The MNC's profit is restrained by these three factors. Following Clare and Gang (2010) K and Z are not regarded as substitutes. Z is foreign country capital and "contains within it knowledge of host country institutions which multinationals lack". (2010, 4)

The MNC's Domestic Profits are defined as Domestic Revenue minus Costs:

$R \equiv PaY - rK$ (measured in the Home currency) (2)

Foreign Affiliate's Profits are defined as Foreign Affiliate's Revenue minus Costs:

$R^* \equiv P^*(1-a)Y - r^*Z - w^*L$ (measured in the Foreign currency) (3)

PE is considered to represent "political risk" (PR) for the MNC. Kesternich and Schnitzer (2010) consider three PRs namely:

(1) outright expropriation representing a classical form of political risk when the foreign country government takes the MNC's property without compensation (Buckley 2003, Hill 1998).

(2) creeping expropriation "negatively affects the expected returns on the investment project (e.g. exchange rate restrictions, failure to enforce or respect the agreed property and contract rights)" (Kesternich and Schnitzer 2010, 211).

(3) confiscatory taxation "directly affects the MNC's profits (e.g. corruption, discriminatory taxation)" (Kesternich and Schnitzer 2010, 212).

The baseline model abstracts from any "local taxation" (Kesternich and Schnitzer 2010, 210). Outright expropriation is functionally equal to confiscatory taxation. Thus, we consider (1) and (2). However the derived theoretical model suggests that equations for the optimal K (FDI) are qualitatively the same in both cases. Thus, it is not necessary to distinguish "outright" and "creeping" expropriations. For space considerations we present only the case of outright expropriation here.[2]

The Joint Profits (measured in the Home currency).

We capture this form of political risk by a probability to retain profit after expropriation (s_1). The part of foreign affiliate's revenue is expropriated and, thus is random.

The expected revenue is:

$$E[R^*] = (1- s_1)R^* + s_1R^* = s_1R^* \quad (4)$$

Where, s_1 is probability of retained profit after outright expropriation; $(1- s_1)$ is probability of outright expropriation (a decrease in s_1 is associated with an increase in PR).

This leads to the following form of the MNC's joint profit defined as a sum of H and F profits from equations (2), (3) and (4):

$$\tilde{Q} \equiv R + \tilde{e}\, s_1R^* = (PaY - rK) + \tilde{e}\, s_1[P^*(1-a)Y - r^*Z - w^*L] \quad (5)$$

Where, $\tilde{e}$ is the random exchange rate with the mean **e** and a constant variance. $\tilde{Q}$ represents random joint profits. It is random through the random exchange rate $\tilde{e}$.

Thus, the utility function of the parent firm is

$$U = U(\tilde{Q}) = U(R + \tilde{e}\, s_1R^*) \quad (6)$$

where $U'>0$ and $U''<0$, as implied by (2-6). Expanding the utility function around the neighborhood of zero (Maclaurin's expansion) and approximating it by the second order yields

[2] The details for the case of creeping expropriation are available on request for an interested reader.

$$U(\tilde{Q}) = U'(\tilde{Q})\tilde{Q} + \frac{1}{2}U''(\tilde{Q})\tilde{Q}^2 \quad (7)$$

Since the marginal utility is assumed to be positive, division yields the normalized utility

$$V(\tilde{Q}) \equiv \frac{U(\tilde{Q})}{U'(\tilde{Q})} = \tilde{Q} + \frac{U''(\tilde{Q})}{2U'(\tilde{Q})}\tilde{Q}^2 = \tilde{Q} - \frac{R_A}{2}\tilde{Q}^2 \quad (8)$$

Where R_A is Arrow-Pratt's absolute risk aversion measure (R_A= - U"/U' > 0 and assumed constant).

Then we can derive the expected utility as follows

$$E[V(\tilde{Q})] = Q - \frac{R_A}{2}E[\tilde{Q}^2] \quad (9)$$

where the expected value of joint profit is

$$Q = E[\tilde{Q}] = R + E[\tilde{e}]s_1R^* = R + e\, s_1R^* \quad (10)$$

And the variance is

$$Var(\tilde{Q}) \equiv \sigma_Q^2 \equiv E[(\tilde{Q} - Q)^2] = E[\tilde{Q}^2] - Q^2 = E[\{R + \tilde{e}\, s_1R^* - (R + e\, s_1R^*)\}^2] =$$

$$= (s_1R^*)^2E[(\tilde{e} - e)^2] = (s_1R^*)^2\sigma_e^2 \quad (11)$$

where $\sigma_e^2 \equiv E[(\tilde{e} - e)^2]$ is the variance of the exchange rate, or exchange risk.

$$\text{Therefore, } E[\tilde{Q}^2] = \sigma_Q^2 + Q^2 = (s_1R^*)^2\sigma_e^2 + Q^2 \quad (12)$$

Substituting (12) into (9) yields

$$E[V(\tilde{Q})] = Q - \frac{R_A}{2}Q^2 - \frac{R_A}{2}\sigma_Q^2, \quad (13)$$

or

$$E[V(\tilde{Q})] = Q - \frac{R_A}{2}Q^2 - \frac{R_A(s_1R^*)^2\sigma_e^2}{2} \quad (13')$$

Now we can formally hypothesize how exchange rate risk (σ_e^2) and political risk (s_1) will affect the expected utility from joint profits.

$$\frac{\partial E[V]}{\partial \sigma_e^2} = -\frac{R_A(s_1R^*)^2}{2} \quad (14)$$

is unambiguously negative for a positive R_A. It could be negative only for an unlikely case where MNCs are risk lovers.

In the same way for PR (meaning a change in probability of retained profit s_1):

$$\frac{\partial E[V]}{\partial s_1} = -R_A s_1 R^* \sigma_e^2 \qquad (15)$$

which is unambiguously negative for a positive R_A. But it could be negative for an unlikely case where MNCs are risk lovers. In sum, attitudes towards risk play an important role for the sign.

Now, we turn to derive the Optimal FDI with outright expropriation. Assuming that σ_Q^2 is constant the expected utility function is maximized with respect to the factors of production:

$$\max E[V(\tilde{Q})] = PaY - rK + e\, s_1[P^*(1-a)Y - r^*Z - w^*L] - \frac{R_A}{2}\{ PaY - rK + + es_1[P^*(1-a)Y - r^*Z - w^*L]\}^2 \qquad (16)$$

where $Y=K^{\alpha}Z^{\beta}L^{\gamma}$; $\alpha + \beta + \gamma = 1$

The maximization with respect to K, Z, and L yields the following still incomplete solutions:

(I) FDI (optimum level of capital bought in H and sent to F from partial maximization of the expected utility with respect to K(FDI))

$$K = \frac{\alpha Y}{r/D} \qquad (16\text{-}1)$$

(II) Foreign Labor (optimum level of Foreign Labor from partial maximization of the expected utility with respect to L)

$$L = \frac{\gamma Y}{es_1 w^*/D} \qquad (16\text{-}2)$$

(III) Foreign Specific Factor (optimum level of Foreign Specific Factor from partial maximization with respect to Z)

$$Z = \frac{\beta Y}{es_1 r^*/D} \qquad (16\text{-}3)$$

Where **D** is the expected price defined as $D \equiv Pa + e\, s_1 P^*(1-a)$.

Solving (16-1) with (1) for the optimal K (FDI), given the optimal Z and L yields

$$K = \left(\frac{\alpha Z^{\beta} L^{\gamma}}{r/D}\right)^{\frac{1}{1-\alpha}} \qquad (17)$$

Now we can suggest the sign conditions for the optimal K (FDI) in a reduced form function as follows:

$$\begin{matrix} & - & + & + & + & + & + & + & +/- & +/- \end{matrix}$$

$$K = K(\, r, e; Z, L, P, P^*, \alpha\, ;\, \sigma_e^2, s_1) \qquad (17')$$

where theoretical signs are noted above each variable, and where K is desired amount of FDI.

Thus, the variance of exchange rate (σ_e^2,) can both affect positively and negatively FDI depending on the uncertainty, as well as political risk level (s_1) in the host country. In our empirical setting, we proxy the exchange rate risk by the second moment of real exchange rate changes and political risk by Euromoney Political Environment measure.

3. The variables and the empirical model

Our empirical analysis used panel data of 56 countries over the period 1995-2011 (see appendix 1 for details). To employ the maximum number of observations we use annual real FDI flows in Japanese Yen (FDI), and transform it logarithmically.[3] These data are collected from two main sources: Japanese Ministry of Finance (MOF) and Bank of Japan (BOJ). The data for the period of 1995-2004 years are collected from MOF statistics and the data for the period 2005-2011 are collected from BOJ statistics. The summary statistics of the variables is reported in Appendix 2.

Political Environment

PE_{it} represents political environment for 'country i' at time t that has recently been emphasized as one of the most researchable issues in international economics. The political index is calculated from the ECR index, and has been scored from 0 to 25 with a higher score indicating a lower political risk. According to the conventional wisdom, the coefficient of the PE is expected to have a positive sign as lower political risk might have favorable effects on FDI flows. However, the ECR index includes not only political risk, but also *government* and *institutional assessment* as the qualitative expert opinions. In addition, the ECR index also includes information and policy environment (see Table 1). Thus, it is likely that this multiple dimensionality of a composite index may have different effects on the MNCs' behavior for FDI, depending on the development stages of host countries, as formulated in the previous theoretical section 2, and will be discussed later in more detail.

***** Insert Table 1 around here *****

Exchange Rate variables

Following Takagi and Shi (2011) **Log_Mean_{it}** is the natural logarithm of the average of monthly real exchange-rates around year t (that includes monthly observations for year t and t-1) for 'country i'. It represents the relative price difference between the host country and Japanese aggregated goods.[4] Real Exchange Rate (RER) index is calculated so that an

[3] Negative and zero values are replaced by a negligibly small 0,001 mil. Yen value in order to increase the number of observations in the panel.

[4] The real exchange-rate is calculated as $e^{host}_{it} * P^{host}_{it} / P^{JP}_{t}$, and is normalised assuming a value of 100 in 2005. The nominal exchange-rate, e^{host}_{it}, is defined as the amount of host country currency required to purchase one unit of Japanese Yen. The relative price of country *i* to Japan $P^{host}_{it} / P^{JP}_{t}$, is calculated using the CPI index. Monthly CPI index data are obtained from IMF-IFS database. We use the CPI index rather than GDP deflator or producer price index, since it allows for using a larger number of observations. Exchange-rates of the Yen against the host currencies are obtained from Yen/Dollar rates.

increase (positive sign) is associated with Yen appreciation (host country currency depreciation), and a decrease is associated with Yen depreciation (host country currency appreciation). Following previous studies (e.g. Froot and Stein, 1991) we expect that Yen appreciation will favor Japanese outward FDI. Thus, we expect a positive sign of the Log_Mean.

Volatility$_{it}$ is the natural logarithm of the standard deviation of real monthly exchange rates around year t for country i. Standard deviation is calculated using 24 monthly observations for year t and t-1. The higher value is associated with higher ER volatility. Given our theoretical model and previous literature results the expected sign is ambiguous depending on the host country level of economic development and industry.

Skewness$_{it}$ is a third moment of monthly exchange rates around year t for country i. Skewness is calculated using 24 monthly observations for year t and t-1. Following Takagi and Shi (2010) the third moment is expected to capture ER expectation effect in case we accept that "relatively large ER shocks predominantly in one direction could create expectations of reversal". (2010, p. 5) Thus, we expect that a positive sign is associated with a large number of Yen appreciation shocks which in turn may lead to the expectation of Yen depreciation and thus an increase in the future value of repatriated profits. Hence, FDI is expected to be associated positively with Skewness.

Other control variables

The explanatory variables are selected mostly from those used in many previous empirical studies to test the knowledge-capital model Carr, Markusen, and Maskus (2001). First is **LOG_GDP$_{it}$** representing the market size for country i at time t that has been considered as one of the first principal determinants of FDI. We expect a positive sign of GDP on FDI.[5]

Second, human capital of the host economy is another important factor for FDI flows. Skill endowment for 'country i' at time t is proxied by skill difference **SD$_{it}$=S(J)-S(i)**, where **S(J)** and **S(i)** mean the skill scores for Japan and the i-th host country, respectively.[6] The sign for this variable is expected to be positive if Japanese MNCs are looking for cheap unskilled labor (as the knowledge-capital model predicts can happen for vertical-type FDI), and negative if Japanese FDI flows are attracted by host countries' skilled labor abundance (as can happen for horizontal FDI).

In addition, availability of low cost labor is expected to stimulate FDI of vertical type where the cheap wage is considered to be of high importance (e.g., Sahoo (2006)). Labor cost can be proxied by wage cost (Nunes, Oscategui, and Peschiera 2006). Thus, **W_Real$_{it}$**, which is the employees compensation received in US$ per hour for country i at time t, represents the labor

[5] The GDP data are taken from the World Bank World Development Indicators (WDI) database and are reported in constant 2000 US$.

[6] The data source of the index is the World Competitiveness Yearbook (WCY, hereafter).

cost.[7] The data were deflated using the CPI index.[8] The sign of this variable is expected to be negative as higher labor cost is expected to discourage FDI flows.

The next explanatory variable is **$OPENNESS_{it}$** of the host country which is opposite to trade cost. In general the impact of openness is linked to the type of FDI (Sahoo 2006). The openness is expected to have negative sign for horizontal FDI (implying that trade barriers are high) and positive sign for vertical-type FDI (implying that trade barriers are low).[9]

IC_{it} is investment cost for 'country i' at time t that is regarded as financial, juridical, fiscal and other impediments and difficulties in the operational activity of foreign affiliate in the host country (Carr et al. 2001). The investment cost variable was constructed from various indexes of the WCY on scale from 0 to 10 with higher number indicating lower investment cost.[10] Thus, the sign of the investment cost is expected to be positive.

Cumulative FDI_{it-1} represents the cumulative FDI from Japan to country i with one-year lag. It represents the stock of FDI and is calculated as the natural logarithm of the sum of FDI flows from 1995 to year t-1. It is known that accumulation of FDI may have a positive effect on Japanese MNCs since they tend to invest in a place that is safer. (Urata and Kiyota 2004) This could be captured by the presence of other long term MNCs activities (agglomeration effect) in the host country that could be proxied by FDI accumulation.

Data and Methodology

To test a possible institutional quality and financial risk's effect on direct investment we used Generalized Method of Moments (GMM) analysis. The basic model for GMM is specified in a reduced form as:

$$y_{it} = \delta\, y_{it-1} + X'_{it}\beta + \varepsilon_{it}. \qquad (18)$$

where y_{it} is the logarithm of annual outward FDI from Japan into a host 'country i' at time t and X'_{it} denote an (1xk) vector of exogenous variables which vary in the cross-section and in the time dimension. δ is a scalar. y_{it-1} is a lagged dependent variable. ε_{it} is a stochastic error term, which is assumed to be uncorrelated over all *i* and *t*.

Theoretical model presented in Section 2 suggests a possible ambiguous effect of ER volatility on MNCs activities. For Political Risk (s_1) we proxy it by ECR PE index. Thus the expected joint profit is defined to depend on "PE". The optimal FDI (=K) is shown to depend not only on "PE" (probability of retained profit/revenue), but also "PE^2".

[7]The data source is also the WCY and represents an average salary ($/h) in the host country. However, the data are compiled from US Department of Labor, Bureau of Labor Statistics and National Sources.

[8]CPI price index source is International Monetary Fund (IMF) statistical database. In case of Taiwan we used Taiwan National Statistics (http://eng.stat.gov.tw/mp.asp?mp=5).

[9] Following some previous studies, openness measures come from Penn-World Tables, and are defined as the ratio of the sum of imports and exports to GDP.

[10] The index includes the level of control of foreign companies, restraints on negotiating joint ventures, strict controls on firing and hiring practices, an absence of fair administration of justice, access to local and foreign capital markets, difficulties in acquiring local bank credit, an inadequate protection of intellectual property rights, anti-trust and competition laws, and immigrations laws.

Thus, first, we estimate the following model for a pooled sample of all 56 countries.

$$(LOG\_FDI)_{it} = \delta(LOG\_FDI)_{it-1} + \beta_1 LOG\_GDP_{it} + \beta_2 SD_{it} + \beta_3 LOG\_W_{it} + \beta_4 OPENNESS_{it} + \beta_5 IC_{it} + \beta_6 Cumulative\ FDI_{it-1} + \beta_7 PE_{it} + \beta_8 PE^2_{it} + \beta_9 Log\_Mean_{it} + \beta_{10} Volatility_{it} + \beta_{11} Skewness_{it} + \varepsilon_{it}. \quad (19)$$

Second, in order to distinguish the level of host countries economic development and identify direct effect of institutional quality and financial risks we estimate the following model for developed and developing countries:

$$(LOG\_FDI)_{it} = \delta(LOG\_FDI)_{it-1} + \beta_1 LOG\_GDP_{it} + \beta_2 SD_{it} + \beta_3 LOG\_W_{it} + \beta_4 OPENNESS_{it} + \beta_5 IC_{it} + \beta_6 Cumulative\ FDI_{it-1} + \beta_7 PE_{it} + \beta_8 Log\_Mean_{it} + \beta_9 Volatility_{it} + \beta_{10} Skewness_{it} + \varepsilon_{it}. \quad (20)$$

We employ a panel data analysis in order to capture static and dynamic nature of the FDI flows, accounting for at the same time possible heteroscedasticity, autocorrelation and endogeneity. By including lagged FDI flows as an additional regressor we change a static model to a dynamic panel model. Thus our panel data set consists of two sets and two dimensions: one dimension is cross-section (56 countries, 32 developed countries and 24 developing countries: i = 1,….,N), and the other is time dimension (17 periods: 1995-2011: t=1,…,T). The total number of observations in this context is 952 for all countries, 544 for developed countries and 408 for developing ones, and it can be considered adequate to produce robust estimations for the scope of the analysis.

Generally the problems of autocorrelation, endogeneity and heteroscedasticity are inherent in economic data sets. First, some explanatory variables can be endogenous, and therefore OLS estimators might be biased and inconsistent. Second, unobserved panel-level effects (fixed effects) may be correlated with the explanatory variables. Finally, the inclusion of lagged dependent variable can lead to autocorrelation. In order to deal with all these problems, a commonly used method for dynamic panels is the GMM estimator proposed by Arellano and Bond (1991). As their estimator is set up, the fixed effects are eliminated using first differences, and an instrumental variable estimation of the differenced equation is performed. However, a first difference has a weakness in unbalanced models, since it magnifies gaps in it. Due to the data characteristics our sample contains some missing data particularly for developing countries. Thus, we follow the second common transformation proposed by Arellano and Bover (1995) that is called “forward orthogonal deviations”. In contrast to the “first difference” it subtracts the average of all future available observations of a variable. Next, we use GMM style instruments as proposed by Holtz-Eakin, Newey, and Rosen (1988) in order to account for possible endogeneity of the explanatory variables. We perform the Hansen J-test of overidentifying restrictions for the selected instruments. All the regressions were shown to be robust according to this criterion. Finally, we do not include any additional (external) instruments.

4. Estimation results and discussions

Table 2 gives the results of the GMM estimation of equation (19).

**********Inset Table 2 around here**********

Several interesting features are disclosed, and in what follows, we give some interpretations and evaluations for them.[11]

Does Political Environment have a non-linear effect on Japanese Outward FDI flows?

The coefficient is statistically significant for all industries and for manufacturing industries. Thus, as hypothesized by the theoretical model Japanese MNCs may exhibit a non-linear response to the change in PE. We infer that for developing countries the effect is positive while for developing it is negative.

The next discussion is devoted to offer our interpretation of the new hypothesis regarding difficulties in interpretation for aggregate indices.[12][13]

We first propose our hypothesis as follows: Since the composite index PE is constructed with six different qualitative components (see Table 1), they may have different effects on MNCs behaviour for developed and developing countries. We term these qualitative components as "institutional quality (IQ)", reflecting multiple qualitative characteristics of host countries. Then, if MNCs are more concerned with IQ, there might be a case that an increase in IQ is associated with an increase in FDI positively. Specifically, if the level of "government stability" (item 3 in Table 1) reflects such factors as juridical, bureaucratic and social development in the host country, a higher value of the PE variable means a relatively higher level of IQ, resulting in a lower level of law's and social environment pressure. In other words, Japanese MNCs might expect lower pressure from the government and public sector, which could serve as an incentive for their FDI. From this point of view, starting from a point where PE has been sufficiently high (i.e., IQ has been high enough) as in developed countries, it is likely that Japanese MNCs could tolerate a slightly *lower* IQ (i.e. a slightly lower PE) to undertake additional FDI if profitable. Several reasons could be put forth. The first reason for it may be that, starting from a level of IQ far above what is necessary for FDI, a decrease in PE (a decrease in IQ) means a slightly *higher* level of law's and social environment pressure, which could be perceived as a good sign by Japanese MNCs, as it might imply *"more*

[11] For space considerations we do not discuss other control variables results in details. Nevertheless, note that not all of them showed predicted signs that could be explained by the difficulty in empirical modeling of all FDI affecting determinants.

[12] It is interesting to note that we are not the only one FDI research that encounters different and contradicting signs for developed and developing countries samples for PE. A similar sign pattern was reported in a recent empirical research by Peng and Beamish (2008) who discussed difficulties in interpreting the effect of another composite index, a National Corporate Responsibility Index (NCRI) on the Japanese outward FDI.

[13] It is also interesting to note that a fact that effects of some composite indices may be ambiguous has been found in another area, the choice of the (optimal) exchange rate regime. Alesina and Wagner (2006) used the Business Environment Risk Intelligence (BERI) index and the Composite Indicator Dataset of the World Bank in order to examine the ambiguous effects of institutional quality on the choice of the exchange rate regime. Likewise, Bearce and Hallerberg (2011) used another aggregate index named "Democracy" which was complied by Gurr, Jaggers, and Moore (1990) and scored from -10 (most autocratic) to 10 (most democratic), to investigate the choice of the exchange rate regime.

discipline". The second reason for it may be that, if a decrease in PE (a decrease in IQ) is associated with slightly deteriorated information access within the market (item 4 in Table 1), then some wider and more "profitable business opportunities" could be opened for Japanese MNCs due to the asymmetric information argument. Interestingly, the first reason put forth as above is similar in spirit to Peng and Beamish (2008, p.691) who emphasize MNC's corporate responsibility. They concluded that "(a) *loosening* of (political) environment will attract more FDI" (emphasis added) for developed countries, because "the levels of (political environment) may be far above what is necessary" for MNCs' operations.

Needless to say, when PE is sufficiently low, implying a low level of IQ, as in a case of developing countries, a still lower level of PE (i.e. still lower IQ) is always associated with a lower FDI. This implies that Japanese MNCs may react differently to Political Environment in developing host countries, compared with developed ones. Specifically, observing a composite Political Environment variable, Japanese MNCs may be more sensitive to risk factors such as corruption and government non-payment/non-repatriation, (items 1 and 2 in Table 1) when deciding FDI to developing countries.

We can formalize our hypotheses of the effects of IQ on FDI with the following three steps.[14] First, there is some level of IQ for which Japanese FDI is insensitive. Second, FDI may not be undertaken to countries with a very poor record of IQ. Thus, for a marginally lower IQ, FDI is reduced. Third, for very stable (developed) countries, FDI is undertaken. Moreover, a marginally lower level of IQ (i.e., lower PE) is interpreted as a good sign for a more disciplined economy, and thus more FDI.

The industry level results suggest an additional evidence for this hypothesis and interpretation for Chemical Products, General Machinery, Finance and Insurance, Wholesale and Retail, and Mining industries. The only exceptions are Electric Machinery and Real Estate industries.

Does Japanese Yen appreciation stimulate outward FDI?

We can see that Log_Mean is positive and significant for all industries, manufacturing and nonmanufacturing industries. These results suggest that indeed the theoretical prediction (e.g. Froot and Stein 1991) is confirmed by our analysis. However, industry level results suggest that the sign is negative and significant for food industry, general machinery, finance and insurance, and mining, meaning that Yen appreciation discouraged FDI for these industries. This result is different from the prior hypothesis. We would like to propose the following explanation. It is plausible that Japanese manufacturers have invested as horizontal FDI in, e.g. U.K, for local production and sales. Thus, with Yen appreciation, the sunk cost of (initial) investment increased, and Japanese manufacturers possibly could not tolerate it anymore,

[14]For a similar formulation for exchange rate regimes with IQ, see Alesina and Wagner (2006).

because the future internalization advantage[15] will not be as large as expected. Hence, they cut their FDI. Note that Japanese MNCs activities in the food industry, general machinery, finance and insurance, and mining are horizontally oriented in most cases.

How does ER volatility affect Japanese outward FDI?

Interestingly ER volatility is positive and significant for all industry and for manufacturing sector. Moreover, at the industry level it is consistently positive and significant for food industry, iron, non-ferrous and metals, general machinery, wholesale and retails, and mining industries. The only exception is transportation industry. This overall positive effect of ER uncertainty is consistent with Itagaki (1981) and Cushman (1985) arguing that this higher uncertainty would promote FDI as substitute to exports. This result may suggest an indirect evidence of platform-type FDI by most of Japanese MNCs since it is associated with redistribution of production channel thus replacing direct export activity.

How does ER expectation affect Japanese outward FDI?

The coefficient for skewness is found to be positive and significant for all industries and non-manufacturing industries. Following Takagi and Shi (2011) this result suggests that for overall and non-manufacturing industries the yen's bias toward relatively large appreciation shocks is associated with expectation of reversal and thus yen's depreciation leading to a higher value of future repatriated profits. Thus Japanese MNCs increase their investment. This pattern is observed for food industry, iron, non-ferrous and metals, general machinery, transport equipment, real estate, mining and transportation. However, in case of manufacturing industries the sign is negative and significant, suggesting that yen's bias towards depreciation shocks is more preferable for Japanese MNCs. A plausible explanation is that in this case the manufactures may imply a long-term investment strategy, and thus the profits would be reinvested locally as well as FDI activities would continue in the long run. If it happens then an expectation of future increased wealth effect may stimulate outward FDI. Similarly the coefficient is negative and significant for chemical products, electric machinery, and finance and insurance industries.

Developed and Developing countries, Industry-level analysis

In order to extend our analysis in two dimensions (level of economic development and industry level) we estimate equation (20) for 32 developed countries and 24 developing countries over a period of 1995-2011. Tables 3 and 4 present the results.[16]

**********insert Tables 3 and 4 around here*******

[15] Dunning (1992) suggested in his OLI (Ownership, Location, Internalization) framework that internalization advantage plays an important role in FDI decision by MNCs. However, in view of Itaki (1991), explanation of changes in exchange-rates may be related to sunk costs, and thus affect MNC's "perceived cost of integration".

[16] For space considerations we present only four variables of interest in our analysis: Log_Mean, Volatility, Skewness and Political Environment.

Does Political Environment have a non-linear effect on Japanese Outward FDI flows?

For developed countries indeed PE is negative and significant for all industries case suggesting additional evidence to our theoretical hypotheses and preliminary findings. It is negative significant for wholesale and retail, and mining industries as well.

On the other hand the result is positive and significant for non-manufacturing, finance and insurance, real estate industries. This could be explained by the fact that Japanese MNCs tend to prefer PE stability in these industries at the expense of lower profit opportunities.

For developing countries PE turned out to be positive significant in the case of chemical products, finance and insurance, real estate, wholesale and retail and services industries. This confirms that for developing countries Japanese MNCs prefer lower institutional risk and hence more stable political environment. Nevertheless, note that the sign is negative and significant for general machinery, transport equipment and transportation industries implying that in these industries Japanese MNCs tend to prefer less stable PE possibly in order to enjoy higher profitable opportunities.

Does Japanese Yen appreciation stimulate outward FDI?

For developed countries Japanese Yen appreciation is positively associated with FDI flows in manufacturing and non-manufacturing industries, as well as in finance and insurance, real estate, and wholesale and retail industries. These results confirm the wealth effect hypotheses emphasized for instance by Froot and Stein (1991).

For developing countries, the sign is positive and significant as well for nonmanufacturing sector, real estate, and services industries. Interestingly a contrary evidence is found for all industries and manufacturing sector, as well as for food industry, chemical products, iron, non-ferrous and metals, general machinery, transport equipment, wholesale and retail, and mining industries. This overall negative association of Yen appreciation with outward FDI may be explained partially by sunk cost hypotheses. Alternatively if we believe that Yen appreciation (depreciation) is associated with lower (higher) value of repatriated profits in Yen it may be an additional motivation for Japanese MNCs to decrease (increase) their investments.

How does ER volatility affect Japanese outward FDI?

For developed countries an increase in ER volatility is associated with higher Japanese outward FDI for all industries, as well as for food industry, real estate, wholesale and retail, and mining industries. The only exception is finance and insurance industry where high ER volatility may actually be associated with higher risk for financial operations.

For developing countries again the sign is consistently positive and significant for all industries, manufacturing sector, food industry, chemical products, iron, non-ferrous and metals, general machinery, electric machinery, and finance and insurance industries.

These results confirm our previous findings, suggesting that higher uncertainty may promote FDI as substitute to exports.

How does ER expectation affect Japanese outward FDI?

For developed countries Skewness is positive and significant for all industries and manufacturing sector, as well as for food industry, general machinery, wholesale and retail industries suggesting that an expectation of Yen depreciation (appreciation) would stimulate higher (lower) level of FDI flows. However, a negative and significant sign is observed for nonmanufacturing sector, chemical products, electric machinery, and real estate industries implying Japanese MNCs' preference to long-term FDI strategies in the host countries.

For developing countries skewness is positive and significant for nonmanufacturing sector, real estate, services, mining, and transportation industries. On the hand, it is negative and significant for food industry, iron, non-ferrous and metals, general machinery, transport equipment, and wholesale and retail industries.

Thus the evidence for ER expectation effect on Japanese FDI measured by the third moment of ER changes is mixed for different level of economic development and for different industries.

5. Concluding remarks

In this paper we, first, presented a theoretical model inspired by Clare and Gang (2010) with a complete optimization with respect to the all choice variables and solved it for FDI by taking into account of possible influences from other endogenous variables. The theoretical results suggested a possible non-linear response of Japanese MNCs to institutional quality (political stability) and financial risk (ER volatility).

Second, we empirically examined the outward Japanese FDI activities with a panel data of a total of 56 developed and developing countries for the period 1995-2011. Based on the knowledge-capital model, a number of traditional determinants (GDP, Human capital indicators, Investment cost, Trade cost, Cumulative FDI etc.) are complemented with institutional quality and financial risk determinants for Japanese FDI, namely Political Environment, ER level, volatility and expectation. The main conclusions are based on the GMM specifications.

Political Environment (PE), was differently signed for developed and developing countries as well as for different industries. On this result, we put forth our hypothesis of the existence of non-linearity between Political environment and FDI, following Alesina and Wagner (2006). This finding confirms our theoretical hypotheses as well. A pooled estimation with an included PE squared term suggested evidence to our discussion.

In the general case Yen appreciation proved to have a positive effect on Japanese outward FDI which is consistent with the theoretical prediction. However, when estimated in two

dimensions (by level of economic development and by industries) it showed some contradictory patterns in particular for developing countries.

On the whole ER volatility was signed positively and significantly, suggesting that Japanese MNCs tend to enjoy higher uncertainty due to a possible FDI substitute to exports effect. Nevertheless negative ER volatility effect was also found in a more detailed analysis by level of economic development and by industries.

Finally, skewness as a measure of ER expectation showed contradictory results. A general tendency implied that Japanese MNCs positively respond to an increase of Yen depreciation's expectation due to a possible higher value of future repatriated profits. Nevertheless, an opposite result was also obtained for several cases implying a possible long-term strategic investment behavior of Japanese MNCs. A more detailed study is needed to identify the economic roots for such a behavior of MNCs and this remains on our future agenda.

We conclude that Japanese FDI can be reasonably explained by the proposed independent variables. We successfully found that institutional quality and financial risks are, as expected, significantly associated with Japanese FDI flows. These findings have important implications for future policy consideration by host countries and academic research on Japanese outward FDI.

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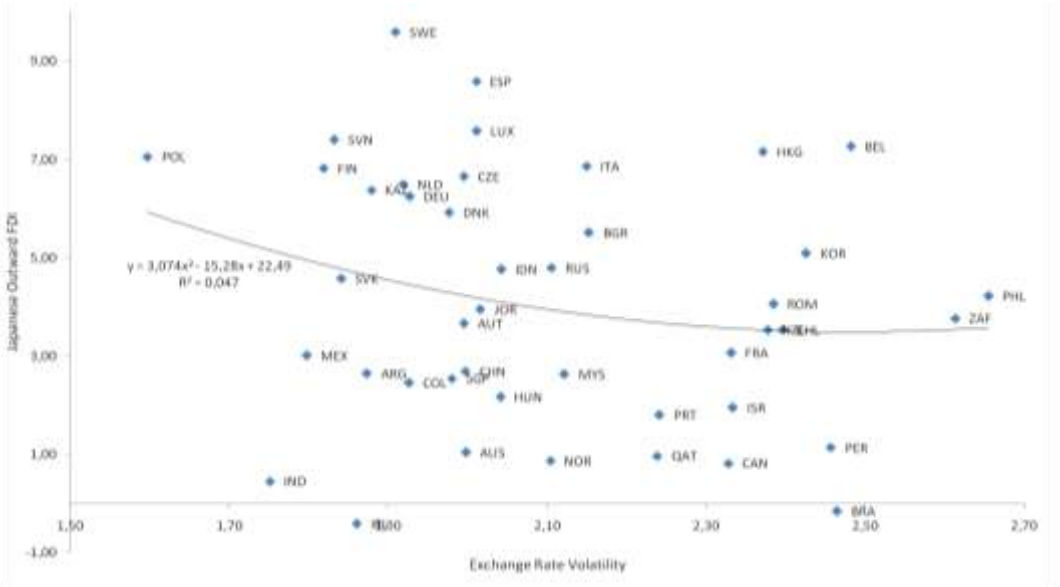

Figure 1. Relationship between ER volatility and FDI. ER volatility (logarithmically transformed second moment of the real ER changes) and FDI (logarithmically transformed real FDI flows in millions of Japanese Yen), 56 countries, 1995-2011. Values are averaged by country from 1995 to 2011. The regression represented by the fitted line yields a coefficient of 3.074 for a squared term and -15.28 for a direct effect, N = 56, R^2 = 0.047. Countries abbreviations are presented in Appendix 1.

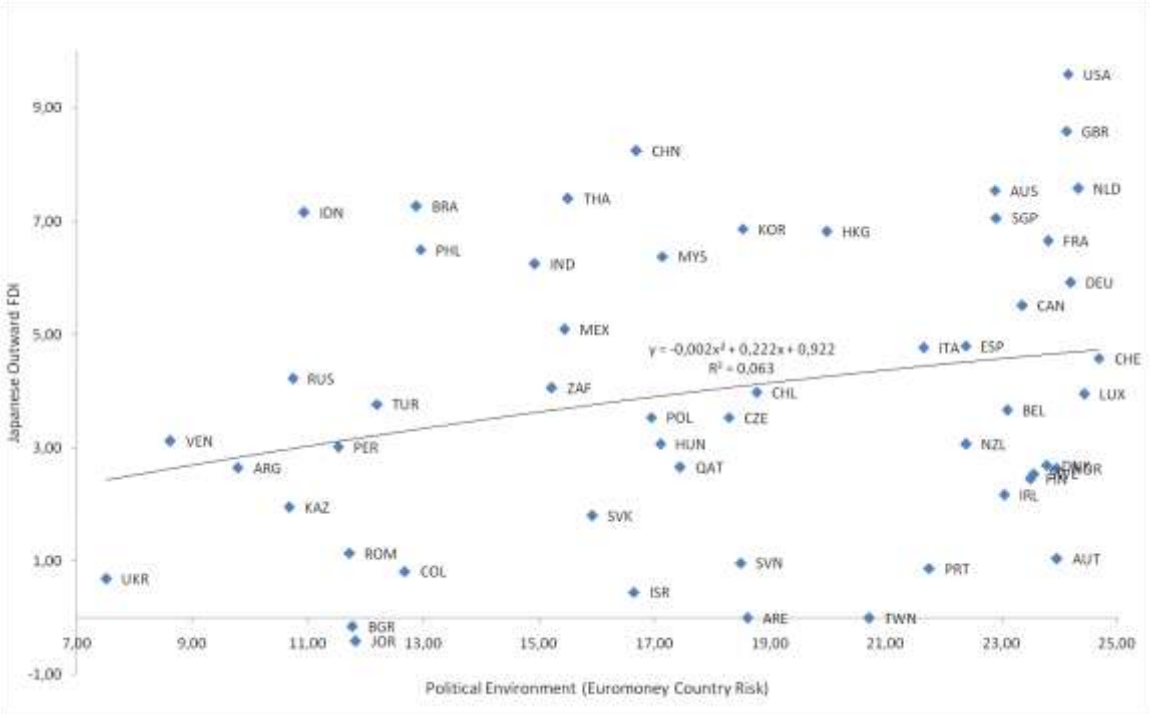

Figure 2. Relationship between PE and FDI. PE ([0,25] scale) and FDI (logarithmically transformed real FDI flows in millions of Japanese Yen), 56 countries, 1995-2011. Values are averaged by country from 1995 to 2011. A higher PE value is associated with lower political risk. The regression represented by the fitted line yields a coefficient of -0.002 for a squared term and 0.222 for a direct effect, N = 56, R^2 = 0.063. Countries abbreviations are presented in Appendix 1.

Table 1 Variables and indicators incorporated into the Euromoney CountryRisk (ECR) index

Political risk	Component	Score (qualitative expert opinions)
1	Corruption	10=no corruption, 0=serious corruption
2	Government non-payments/non-repatriation	10=no government interference, 0=high government interference
3	Government stability	10=stable, 0=highly unstable
4	Information access/transparency	10=unrestricted, 0=totally restricted
5	Institutional risk	10=efficient and independent institutions, 0=no state institution
6	Regulatory and policy environment	10=highly consistent, 0=no regulatory environment exists

Table 2 Institutional and financial risk effects on Japanese outward FDI, Pooled sample, 56 countries

	All Industry	Manufacturing	Nonmanufacturing	Food industry	Chemical Products	Iron, non-ferrous and metals	General Machinery	Electric Machinery
Log_FDI(-1)	-0.002 (-0.05)	-0.23 (-12.09)***	0.68 (11.39)***	0.04 (1.2)	-0.022 (-0.67)	0.09 (4.85)***	-0.07 (-4.04)***	0.07 (2.59)**
Log_GDP	-1.47 (-1.71)*	-1.83 (-2.21)**	-10.47 (-6.34)***	9.62 (7.61)***	-3.54 (-3.84)***	-1.65 (-1.96)*	-4.14 (-6.46)***	-5.99 (-5.74)***
Wages	0.005 (6.78)***	0.005 (6.45)***	-0.001 (-0.97)	-0.02 (-0.49)	-0.14 (-3.44)***	-0.08 (-2.19)**	-0.06 (-3.16)***	-0.004 (-0.08)
Skill Difference	0.03 (0.37)	-0.07 (-0.74)	-0.27 (-1.77)*	0.06 (0.4)	0.23 (1.91)*	0.08 (0.68)	-0.11 (-1.71)*	-0.01 (-0.05)
Investment Cost	0.47 (3.28)***	0.3 (2.13)**	0.97 (3.95)***	-0.84 (-5.73)***	0.5 (2.66)***	0.54 (6.49)***	-0.24 (-1.8)*	1.55 (11.55)***
Openness	0.01 (2.48)**	0.01 (3.29)***	-0.005 (-0.66)	0.04 (7.34)***	0.01 (1.5)	0.01 (2.26)**	-0.02 (-4.9)***	0.02 (3.04)***
Cumulative FDI(-1)	0.1 (0.8)	-0.01 (-0.11)	-0.5 (-3.06)***	-0.44 (-4.78)***	0.16 (1.26)	-0.3 (-2.06)**	0.64 (5.39)***	0.32 (1.99)**
Volatility	0.28 (1.84)*	0.46 (2.98)***	-0.06 (-0.22)	0.91 (4.63)***	0.12 (0.59)	0.31 (2.04)**	0.58 (3.83)***	-0.02 (-0.1)
Log_Mean	2.11 (3.92)***	1.47 (2.47)**	2.42 (2.72)***	-4.39 (-3.9)***	0.37 (0.42)	-0.77 (-1.03)	-1.61 (-2.55)**	1.003 (1.16)
Skewness	0.21 (2.62)**	0.32 (4.25)***	-0.2 (-1.98)**	0.33 (3.15)***	-0.21 (-2.4)**	0.29 (5.02)***	0.19 (3.84)***	-0.18 (-3.37)***
Political Environment	1.06 (3.88)***	0.6 (2.37)**	-0.36 (-0.83)	-0.01 (-0.03)	1.66 (4.34)***	-0.51 (-1.55)	1.22 (3.82)***	-0.87 (-2.41)**
PE squared	-0.03 (-3.73)***	-0.02 (-2.64)***	0.02 (1.46)	-0.003 (-0.33)	-0.05 (-4.28)***	0.01 (1.52)	-0.04 (-3.99)***	0.03 (3)***
SE of regression	2.56	2.48	3.59	2.87	2.89	2.69	2.18	2.77
Hansen J-test (p-value)[a]	0.73	0.13	0.15	0.38	0.59	0.42	0.76	0.22

Note: t-statistics in parentheses. *,**, and *** mean significant at the 10, 5, and 1% level, respectively.

[a] The null hypothesis is that the overidentification restriction is valid

Table 2 Institutional and financial risk effects on Japanese outward FDI, Pooled sample, 56 countries

	Transport equipment	Finance and Insurance	Real estate	Wholesale and Retail	Services	Mining	Transportation
Log_FDI(-1)	0.13 (1.64)	-0.11 (-2.85)***	0.19 (3.66)***	-0.13 (-3.49)***	0.12 (8.11)***	0.01 (0.38)	0.14 (2.37)**
Log_GDP	-1.14 (-1.04)	-5.71 (-3.86)***	-15.26 (-6.34)***	-0.08 (-0.08)	-10.25 (-7.4)***	-10.15 (-7.12)***	-2.36 (-2.11)**
Wages	0.003 (3.69)***	-0.26 (-5.23)***	-0.32 (-3.88)***	0.004 (4.75)***	0.09 (1.76)*	0.1 (2.1)**	-0.03 (-0.77)
Skill Difference	-0.15 (-1.07)	0.22 (1.61)	-0.47 (-2.15)**	0.38 (3.73)***	-0.04 (-0.36)	-0.03 (-0.19)	0.4 (2.27)**
Investment Cost	0.85 (3.05)***	1.26 (5.41)***	0.72 (1.34)	0.91 (6.04)***	1.05 (5.48)***	0.94 (5.4)***	1.76 (4.89)***
Openness	0.01 (2.07)**	0.02 (2.69)***	0.02 (2.04)**	-0.02 (-3.54)***	0.01 (1.48)	0.02 (2.13)**	0.0035 (0.74)
Cumulative FDI(-1)	-0.3 (-2.3)**	0.22 (1.04)	-1.003 (-2.97)***	0.44 (2.99)***	0.12 (0.64)	0.37 (3.17)***	-0.35 (-2.76)***
Volatility	-0.27 (-1.05)	-0.12 (-0.51)	-0.41 (-1.63)	0.38 (2.08)**	0.31 (1.3)	0.89 (5.71)***	-0.75 (-3.2)***
Log_Mean	3.59 (4.32)***	-3.98 (-3.57)***	-1.01 (-0.73)	3.03 (4.12)***	-0.42 (-0.35)	-3.66 (-2.82)***	0.56 (0.5)
Skewness	0.3 (2.3)**	-0.21 (-1.94)*	0.98 (6.87)***	-0.03 (-0.42)	-0.1 (-0.95)	1.02 (15.65)***	0.36 (1.86)*
Political Environment	0.25 (0.62)	0.56 (1.92)*	-0.99 (-3.35)***	1.43 (3.84)***	-0.95 (-1.98)**	2.29 (7.84)***	0 (0)
PE squared	-0.01 (-0.8)	-0.02 (-2.21)**	0.03 (2.47)**	-0.05 (-4)***	0.04 (2.82)***	-0.07 (-10.46)***	-0.002 (-0.16)
SE of regression	3.31	3.09	3.82	2.57	3.21	2.56	3.2
Hansen J-test (p-value)[a]	0.72	0.47	0.31	0.8	0.57	0.43	0.14

Note: t-statistics in parentheses. *,**, and *** mean significant at the 10, 5, and 1% level, respectively.

[a] The null hypothesis is that the overidentification restriction is valid

Table 3 Institutional and financial risk effects on Japanese outward FDI, Developed countries, 32 countries

	All Industry	Manufacturing	Nonmanufacturing	Food industry	Chemical Products	Iron, non-ferrous and metals	General Machinery	Electric Machinery
Volatility	0.49 (1.75)*	0.21 (1.08)	0.26 (0.74)	0.71 (2.64)***	-0.06 (-0.38)	0.03 (0.44)	0.13 (1.34)	-0.23 (-1.47)
Log_Mean	1.06 (1.43)	2.72 (3.93)***	2.32 (2.62)**	-1.38 (-1.64)	0.14 (0.3)	0.38 (1.13)	-0.19 (-0.57)	0.6 (1.08)
Skewness	0.3 (2.95)***	0.31 (2.27)**	-0.59 (-3.63)***	0.36 (2.72)***	-0.22 (-3.69)***	0.01 (0.35)	0.32 (4.33)***	-0.15 (-1.85)*
Political Environment	-0.27 (-1.67)*	0.03 (0.34)	0.61 (4.27)***	-0.09 (-0.88)	0.07 (0.89)	-0.07 (-1.65)	0.01 (0.21)	0.16 (1.99)**
SE of regression	2.64	2.74	3.44	2.87	2.31	1.69	1.73	2.26
Hansen J-test (p-value)[a]	0.47	0.32	0.4	0.6	0.45	0.81	0.43	0.11

	Transport equipment	Finance and Insurance	Real estate	Wholesale and Retail	Services	Mining	Transportation
Volatility	0.03 (0.14)	-0.16 (-2.12)**	0.16 (3.17)***	0.41 (2.32)**	0.16 (1.13)	0.17 (2.66)***	-0.04 (-0.64)
Log_Mean	0.998 (1.65)	0.71 (2.58)**	0.33 (1.69)*	1.79 (3.7)***	-0.04 (-0.1)	-0.19 (-1.33)	0.11 (0.51)
Skewness	0.08 (0.66)	-0.002 (-0.04)	-0.06 (-2.91)***	0.17 (2.34)**	-0.07 (-1.01)	0.03 (1.01)	0.02 (0.65)
Political Environment	0.04 (0.46)	0.09 (2.03)**	0.11 (3.46)***	-0.11 (-1.87)*	0.04 (0.8)	-0.06 (-2.21)**	-0.04 (-1.12)
SE of regression	2.79	1.97	1.92	2.24	2.18	1.28	1.65
Hansen J-test (p-value)[a]	0.42	0.71	0.61	0.14	0.31	0.65	0.31

Note: t-statistics in parentheses. *,**, and *** mean significant at the 10, 5, and 1% level, respectively.

[a] The null hypothesis is that the overidentification restriction is valid

Table 4 Institutional and financial risk effects on Japanese outward FDI, Developing countries, 24 countries

	All Industry	Manufacturing	Nonmanufacturing	Food industry	Chemical Products	Iron, non-ferrous and metals	General Machinery	Electric Machinery
Volatility	0.12 (1.36)	0.69 (4.43)***	-0.47 (-2.52)**	0.63 (3.74)***	0.7 (7.1)***	0.37 (4.18)***	0.26 (2.38)**	0.69 (8.14)***
Log_Mean	-1.81 (-6.38)***	-1.82 (-3.95)***	1.54 (2.5)**	-1.85 (-2.6)**	0.06 (0.24)	0.06 (0.19)	-3.16 (-7.47)***	1.001 (5.01)***
Skewness	0.03 (0.65)	-0.11 (-1.65)	0.3 (4.41)***	-0.21 (-4.8)***	-0.16 (-3.39)***	-0.22 (-3.63)***	-0.14 (-2.63)***	0.03 (0.65)
Political Environment	-0.04 (-1.36)	0.04 (0.82)	-0.01 (-0.22)	0.1 (1.57)	0.09 (2.85)***	0.04 (1.32)	-0.07 (-1.98)*	-0.01 (-0.27)
SE of regression	2.02	2.1	3.21	2.44	1.83	1.49	1.49	2.13
Hansen J-test (p-value)[a]	0.52	0.74	0.52	0.14	0.23	0.12	0.28	0.56

	Transport equipment	Finance and Insurance	Real estate	Wholesale and Retail	Services	Mining	Transportation
Volatility	0.21 (1.49)	0.58 (4.84)***	0.14 (1.35)	0.1 (0.67)	-0.15 (-1.57)	-0.004 (-0.05)	0.02 (0.28)
Log_Mean	-2.49 (-4.01)***	-0.35 (-0.71)	1.12 (3.74)***	-1.15 (-3.22)***	2.91 (6.76)***	-0.85 (-1.89)*	-1.32 (-4.26)***
Skewness	-0.28 (-4.16)***	0.07 (1.4)	0.29 (4.01)***	-0.08 (-1.45)	0.15 (3.44)***	0.24 (3.32)***	0.11 (2.31)**
Political Environment	-0.12 (-2.12)**	0.16 (3.66)***	0.06 (1.82)*	0.07 (1.97)*	0.14 (3.88)***	-0.05 (-0.98)	-0.14 (-4.17)***
SE of regression	2.14	2.3	2.38	2.16	2.45	2.12	2.14
Hansen J-test (p-value)[a]	0.53	0.25	0.77	0.51	0.45	0.18	0.5

Note: t-statistics in parentheses. *,**, and *** mean significant at the 10, 5, and 1% level, respectively.

[a] The null hypothesis is that the overidentification restriction is valid

Appendix 1 List of countries used in the study

Developed countries (32 countries)	Developing countries (24 countries)
Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Chile (CHL), Czech Republic (CZE), Denmark (DNK), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Hungary (HUN), Iceland (ISL), Ireland (IRL), Israel (ISR), Italy (ITA), Korea (KOR), Luxembourg (LUX), Mexico (MEX), Netherlands (NLD), New Zealand (NZL), Norway (NOR), Poland (POL), Portugal (PRT), Slovakia (SVK), Slovenia (SVN), Spain (ESP), Sweden (SWE), Switzerland (CHE), Turkey (TUR), UK (GBR), United States (USA)	Argentina (ARG), Brazil (BRA), Bulgaria (BGR), China (CHN), Colombia (COL), Hong Kong (HKG), India (IND), Indonesia (IDN), Jordan (JOR), Kazakhstan (KAZ), Malaysia (MYS), Peru (PER), Philippines (PHL), Qatar (QAT), Romania (ROM), Russia (RUS), Singapore (SGP), South Africa (ZAF), Taiwan (TWN), Thailand (THA), UAE (ARE), Ukraine (UKR), Venezuela (VEN), Vietnam (VNM)

Appendix 2 Summary statistics

	Developed		Developing		Pooled sample	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Political Environment	21.39	3.59	14.40	4.16	19.64	4.95
Log_Mean	4.80	0.22	4.69	0.23	4.75	0.21
Volatility	2.13	0.52	2.14	0.60	2.10	0.54
Skewness	0.22	0.68	0.26	0.76	0.25	0.69
Log_FDI	3.90	3.73	4.99	3.22	4.87	3.44
Log_GDP	26.61	1.41	25.55	3.29	26.61	1.26
Skill Difference	0.64	0.99	1.22	1.40	0.81	1.19
Wages	18.57	36.11	2.65	2.85	15.90	34.45
Openness	84.87	49.66	117.61	109.98	101.30	83.32
Investment cost	6.72	1.04	5.67	1.18	6.50	1.14
Cumulative FDI	6.37	2.94	7.30	2.16	7.51	2.08