ECONSTOR
Make Your Publications Visible.

A Service of
ZBW
Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Clare, Gregory; Gang, Ira N.

**Working Paper**

# Exchange rate and political risks, again

Working Paper, No. 2009-03

**Provided in Cooperation with:**
Department of Economics, Rutgers University

*Suggested Citation:* Clare, Gregory; Gang, Ira N. (2009) : Exchange rate and political risks, again, Working Paper, No. 2009-03, Rutgers University, Department of Economics, New Brunswick, NJ

This Version is available at:
https://hdl.handle.net/10419/59459

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

Clare, Gregory and Ira N. Gang (forthcoming, July/August 2010), *Emerging Markets Finance and Trade.* Unpublished appendix included here.

# Exchange Rate and Political Risks, Again*

Gregory Clare
Department of Economics, Rutgers University
gclare@rci.rutgers.edu

Ira N. Gang
Department of Economics, Rutgers University, CReAM, London and IZA, Bonn
gang@economics.rutgers.edu

April19, 2009

**Abstract**
We examine the effects of exchange rate and political risks on foreign direct investment (FDI) for multinationals. Our strategy is to examine FDI by U.S. firms at two levels: in all industries and on the subset of only firms in manufacturing industries. When investing in developed economies the firms appear to take past and present variation in exchange rates into consideration. When investing in less developed nations the past and present variation does not appear to weigh as heavily as the present and future variation. Decreasing political risk increases FDI.

Keywords: Exchange Rates; Foreign Direct Investment.
JEL Classifications: International Investment; Long-term Capital Movements (F210) Foreign Exchange (F310).

Correspondence:
Gregory Clare, Economics Department, Rutgers University, 75 Hamilton St, New Brunswick NJ 08901-1248 USA. email: gclare@rci.rutgers.edu Tel : +1 732-932-8108. Fax : +1 732-932-7416.

Ira N. Gang, Economics Department, Rutgers University, 75 Hamilton St, New Brunswick NJ 08901-1248 USA. email: gang@economics.rutgers.edu Tel : +1 732-932-7405. Fax : +1 732-932-7416.

*Acknowledgements: We thank Peter D. Loeb for extended discussions.

## 1. Introduction

A firm engaged in foreign direct investment (FDI) faces exchange rate risk; the exchange rate between the home and host currencies might change in the future, once transactions are contractually finalized (transactions exposure), and the firm's value might change due to its sensitivity to exchange rate movements (economic exposure). Alternative formulations of exchange rate risk may have different implications for firm FDI; how the firm views exchange rate risk is critical. With operations under the jurisdiction of a foreign government the firm is also exposed to political risk – it must estimate the potential costs it will face due to unstable governments, regime change and/or changes in policies. We examine the effects of three formulations of exchange rate risk and political risk on FDI for U.S. multinationals.

A large number of studies have investigated the relationship between exchange rate risk and FDI.[1] Times series studies include those by Igawa (1983), Cushman (1985, 1988) and Goldberg and Kolstad (1995). These studies examined bilateral FDI flows between the U.S. and a handful of developed countries (U.K., France, Germany, Canada and Japan), generally finding a positive relationship between exchange rate risk and FDI. On the other hand, others argue the greater the exchange rate risk, the less appealing the investment (Kelly and Philippatos, 1982). Cross-country studies as Clare (1992, 1998), Benassy-Quere, Fontagne, and Lahreche-Revil (2001) and Brzozowski (2006) all find a negative relationship between exchange rate risk and FDI. Benassy-Quere, Fontagne, and Lahreche-Revil's (2001) study covers FDI flows from 17 OECD nations to 42 developing countries, finding a negative response to exchange rate risk. Brzozowski's (2006) study covers FDI flows to 32 transition and emerging countries, and shows a relationship which, although not as strong as expected, is still negative. Clare's (1992) study covers the FDI flow from the U.S. to 14 developed and 15 developing countries, and finds a

strong negative relationship for each set of countries as well as across the entire spectrum of countries.

The impact of political risk is addressed in Nigh (1985), Biswas (2002), Bussie and Hefeker (2006) and Carstensen and Toubal (2004), among others. Nigh's (1985) study covers FDI from the U.S to 24 countries (developed and host country developing) over 21 years. For developing countries he finds firms react to host country conflicts as well as between the host and home nation. However, only conflicts between nations mattered for developed country investments. Biswas (2002), using a sample from 44 countries over eight years, finds that firms prefer locations where property rights are respected and democracies over autocracies. However, regimes of shorter duration are preferred to those of longer duration. Using Euromoney's political risk variable Carstensen and Toubal (2003) focus on FDI flows from seven OECD countries to transitioning Central and East European, and finds significant risk-aversion. Bussie and Hefeker (2006) examine the investment flow to 83 developing countries over a number of years. In the cross section portion they find the existence of democracies, religion and government stability significant. Pooling countries over time they find internal conflict, external conflict, law and order, and bureaucratic quality important as well.

Against this background we examine the impact of both exchange rate risk and political risk on FDI, using three alternative formulations of exchange rate risk. We next discuss why exchange rate and political risks matter in the context of a simple illustrative model of a profit maximizing multinational deciding on how to allocate its investment across countries. This is followed by a discussion of the data and the strategy used in our estimation. In our empirical work, we examine effects of the FDI behavior of U.S. multinationals.

## 2. Exchange rate movements and political risk

Consider a U.S. multinational with a foreign subsidiary, the price of all inputs and outputs in all markets are constant, and the randomness of the exchange rate is the sole source of variation in the value of the firm. Given risk-aversion, the firm's objective is to maximize its expected utility of the market value in terms of the home currency in the presence of exchange rate risk. The firm's measure of this risk is the variation in the exchange rate and any transaction occurring in the foreign currency is subject to this risk.

The firm engages in sales ($S_f$) and incurs costs ($C_f$) in the foreign market resulting in foreign currency denominated profits (operating cash flows) which must be converted to dollars at the prevailing exchange rate ($\tilde{e}$). Therefore, ${}^{\$}\tilde{R}_f = \tilde{e}R_f$, where $R_f = (S_f - C_f)$ which is the foreign currency denominated operating cash flows. Given ($\tilde{e}$) is a random variable, the dollar value of the foreign flows (${}^{\$}\tilde{R}_f$) is also random. Since ($\tilde{e}$) is the only random variable, then $VAR({}^{\$}\tilde{R}_f) = \sigma^2 (R_f)^2$ where $\sigma^2$ is the variance of the exchange rate. The variation in ${}^{\$}\tilde{R}_f$ depends only on the variation in ($\tilde{e}$). The more averse the firm is to risk the greater its impact on the investment decision. Assuming the firm's Von Neuman-Morgenstern utility function is $U(V) = -e^{-2\gamma V}$ then $2\gamma$ is the measure of absolute risk-aversion for the firm.

There are two sources of capital, the U.S. ($K$) and the foreign location ($F$). The U.S. parent's contribution ($K$) is purchased and financed in dollars. Its implicit rental cost to the parent is what it could have earned if used in the U.S. ($r$). This price consists of the rate of interest ($i$) multiplied by the price of capital goods in the U.S. ($P_k$). The foreign contribution ($F$) is purchased and financed in the foreign currency and its rental price ($r_f$) defined in the same fashion as that for the U.S. The only source of labor ($L$) is in the foreign country and the

labor is paid in terms of the foreign currency ($w$). The cost of capital goods, labor and the prices of final goods are assumed given in all markets.

We assume that ($a$) is the proportion of output ($g$) which is sold to the U.S. market or negotiated in terms of dollars and $0 < a < 1$, ($a'$) is the proportion of final output ($g$) which is sold in the foreign market or in terms of the foreign currency and $a' = (1-a)$, $P$ is the price of final goods sold in terms of dollars which is assumed constant regardless of destination, $P_f$ is the price of final goods in terms of the foreign currency which is assumed constant regardless of destination, and $R_f = P_f(a')g - wL - r_f F$ is the foreign currency denominated cash flows.

The objective of the firm is to maximize expected utility of profits subject to the constraints imposed by a three factor production function, $g = F^{\varepsilon} L^{\alpha} K^{\tau}$, where $K$ and $F$ are the two sources of capital and $L$ is foreign labor. It should be noted that from the perspective of the multinational $F$ and $K$ are not substitutes. Rather, $F$ is host country capital and contains within it knowledge of host country institutions which the multinational lacks. The production function is homogeneous of degree one. Hence, the goal of the firm is to maximize $E(U(h + R_f \tilde{e}))$ with respect to $K$, $F$, and $L$, where, $h = Pag - rK$, $R_f = P_f a'g - wL - r_f F$, and $g = F^{\varepsilon} L^{\alpha} K^{\tau}$. Assuming $\tilde{e}$ is normally distributed with mean $e$ and $\sigma^2$, then this expected utility maximization problem is equivalent to maximizing $U = \{Pag - (rK)\} + \{eP_f a'g - ewL - e(r_f F)\} - \{\gamma\sigma^2 (R_f)^2\}$ subject to the production constraint, where $U = \{\text{cash flows generated in \$}\} + \{e(R_f)\} - \{\text{cost of the risk}\}$. Therefore $\gamma\sigma^2 (R_f)^2$, the cost of exchange rate risk to the firm, is included in the firm's objective function.

From first order conditions and solving for the optimum level of U.S. parent's participation ($K^*$), $K^* = [P(a)g\tau + eP_f(a')g\tau - 2\gamma\sigma^2 (R_f) P_f(a')g\tau](r)^{-1}$, where $\tau$ is the

elasticity of output with respect to $K$. Thus, the optimum level of U.S. capital ($K^*$) is a function both of sales and exchange rate risk: $K^* = f(S_\$, S_f, ExchRisk)$. It is easy to see that it is practically impossible to ex ante know the nature and extent of transactions and economic exposures of a firm and that the firm's decision about $K^*$ might therefore depend on the firm's perceptions about exchange rate risk. Hence, in our empirical research, we examine the impact of three formulations of exchange rate risk: Variation in the exchange rate in the (1) year in which the investment takes place; (2) recent past as well as the current years'; (3) current and future years' exchange rate. Thus firms may react instantly to movements in the exchange rates, or to current movements in light of recent historical patterns, or perhaps feel that what is most relevant is what is happening now and how they feel about the future, based upon some form of rational expectations. These aspects are emphasized in the illustrative model below. We can illustrate the roles of exchange rate and political risks in FDI.

Independent of exchange rate risk, firms consider political risk in their investment decisions. Host countries may make political decisions that will negatively affect multinational performance. These include corruption, reneging on loans and other agreements and contracts, appropriate risk, and changing tax and other rules. These factors enter into firms' assessment of the political risk. This has the effect of shifting the optimal level of investment. To capture this effect we add a measure of the political stability of the host country ($PolRisk$) to our estimating equation, resulting in $K^* = f(S_\$, S_f, ExchRisk; PolRisk)$. This is the basis of our work.

## 3. Data and Variables

To examine the determinants of a U.S. multinational's allocation of its FDI in the world the data set we create is a cross-sectional time-series panel of 53 countries over the years 1999-2003. The

calculations of some of the variables (foreign market vs. U.S. sales and the exchange rate risk variables) requires use of data only found in certain benchmark years and the 1999 Benchmark survey is when the BEA switched to the NAICS method of classification. The data ends at 2003 because in 2004 there were too many cases where FDI was not available for disclosure reasons.

The data for both "all industries" and "manufacturing" FDI outflows by country were obtained from the BEA's "All Nonbank U.S. Direct Investment Abroad: Capital Outflows by Country and Industry" for the years 1999 to 2003, and covers all foreign affiliates, not just majority-owned. The BEA only makes the yearly sales data available for majority-owned affiliates whereas the FDI is for all foreign affiliates. Our assumption is that the sales of majority-owned affiliates follow the same pattern as for all foreign affiliates; the FDI of majority-owned affiliates account for the lion's share of all FDI, so this less than perfect match should not pose a problem.[2]

We estimate a succinct model with four explanatory variables, overall political risk and three variables that are discounted by $r$: sales in dollars ($S_{\$}$); sales in the foreign market ($S_f$) (denominated in terms of the host country currency and then converted to dollars through the exchange rate, $e$); and the exchange rate risk variable which also includes $S_f$. Since $S_{\$} = S_{total} - eS_f$, and as $S_f$ is also contained in the exchange rate risk variable, to reduce the effects of multicollinearity the $S_{\$}$ and $eS_f$ were combined and $S_{total}$ was used. This was divided by ($r$) to obtain the respective sales variable.

Political risk ($PolRisk$) measures each nation's political stability. The greater the political stability, the larger is this index and the more appealing the location for investment. We employ the "Political Risk Score" from *Euromoney's* March editions of Country Risk Assessment which covers items as risk of non-payment of loans, goods, dividends, and non-

repatriation of profits. This score constitutes 25% of the weight in calculating a country's overall risk factor. The higher the score the less risky (more stable) is the nation. A score of 25 indicates relatively little political risk; a score of 0 indicates the greatest risk.[3]

All sales and exchange rate risk variables are discounted by the rental price of capital $r = P_k(i)$. For $P_k$ (the price of capital goods) the Total Index for Fixed Investment (Table B-7) from the 2006 *Economic Report of the President* (USA) was used and ($i$) is Moody's AAA yearly Average Bond Rate. To convert FDI into real terms and avoid dividing all terms in the equation by the same value ($P_k$) we calculated an index for $P_k$ with base year 1999 value. Changes in $P_k$ were used to compute the index in subsequent years.

Yearly sales data for majority-owned foreign affiliates by country and industry were obtained from the BEA. Affiliates sell to their host country, to other countries in their region, to the United States, and/or to other countries in the world. We view both the host county and its region as the foreign market; all sales in this market are in terms of the host country's currency.[4] Sales to the U.S. and the rest of the world are treated as occurring in dollars.

The construction of the sales variable presents difficulties, because of missing information that varied by country and time. The BEA's 1999 *Benchmark Survey* provides enough detail to obtain host country sales (Table 3F2) and sales to the other countries in the region (Table 3F10). Combining this information provides an estimate of foreign market sales and therefore sales in terms of the host country's currency. Due to disclosure restrictions this method of estimating the breakdown of sales cannot be used for China, India, Malaysia, Thailand, Singapore, Peru, Czech Republic and Poland; sales to their region's were not available (in the case of Thailand, sales to Japan is missing). In these cases by using the *Direction of Trade Statistics Yearbook* for the year 1999 the respective country's exports to its region were

calculated as a percentage of its total exports (for Thailand, exports to Japan).[5] This percentage was applied to the difference between total sales and sales to the host country yielding an estimate of sales to the rest of the region (for Thailand, sales to Japan). By combining these results with sales in the host country (for Thailand, host country and to rest of region other than Japan) an estimate of sales in terms of the host country's currency was obtained – foreign market sales could then be calculated as a percentage of total sales.[6]

This direction of trade approach could not be used because of additional missing information in 1999 for New Zealand, Luxembourg, Saudi Arabia, Denmark, Colombia, Ecuador, Honduras and the Dominican Republic. For these countries the percentage of sales were estimated as follows: New Zealand, because of the close relationship between their economy and Australia's, the percentage for Australia was applied; Luxembourg, the average percentage for Belgium and Netherlands; Saudi Arabia, the percentage for the United Arab Emirates; Denmark, the percentages for Sweden and Finland were averaged; Colombia and Ecuador, the average percentage was for South America; Honduras, the average percentage for Central America; and Dominican Republic, the percentage for the Other Western Hemisphere.

We were able to obtain some preliminary data from the upcoming release of the BEA 2004 Benchmark survey, enabling us to estimate the percentage of total sales accounted for by foreign market sales as we did for 1999. This enabled us to calculate the percentages for all countries except Singapore, New Zealand and Saudi Arabia. These three countries were handled the same way as in 1999. The values for the percentages are given in Appendix Table 2 (available in Clare and Gang, 2009). To estimate the values for the interim years we interpolated the years between 1999 and 2004. Once the percentages for the foreign market sales were obtained, they were multiplied by the total sales in the respective years yielding our estimate of

foreign market sales. The difference between these sales and total sales provides our dollar sales estimate for each year.

End of month exchange rates from the International Monetary Fund's *International Financial Statistics* were used to calculate exchange rates variation. European Union accession during this time posed a unit problem since in some months/years the exchange rates were expressed in terms of their historical currencies and in others in terms of Euros. To resolve this, since all members had to maintain a fixed rate between their historical currencies and the Euro, for all members the rates were converted back to the historical currencies using the fixed rates.

Foreign currency denominated cash flows ($R_f = (S_f - C_f)$), one of the components in the exchange rate risk variable, has two parts: ($S_f$) sales in the foreign market (denominated in the host country currency) and ($C_f$) costs of the foreign affiliate (also denominated in the host country currency). Cost information is available in the BEA's 1977 *Benchmark Survey* and has been used in earlier studies (Clare, 1992). However, the BEA no longer collects data in such detail and it is no longer possible to come up with a reliable estimate of $C_f$. We use *the Value Added of Majority Owned Foreign Subsidiaries by Country and Industry* as a substitute for ($S_f - C_f$). This is available from the BEA for all years in the study.

Exchange rate risk is $2\gamma\sigma^2(R_f)P_f(a')g\tau$, where $\sigma^2$ is exchange rate variation; $P_f(a')g$ is foreign market sales ($S_f$); and ($R_f$) is the foreign currency denominated cash flows ($S_f - C_f$), for which value added was substituted. The firm's absolute risk-aversion is $2\gamma$ and $\tau$ is the elasticity of output with respect to $K$. Because of the lack of data $\tau$ could not be estimated, however, as the study only covers five years it is not be expected to change by much if at all so its absence should not pose a problem. Given the estimates of $P_f(a')g$, ($R_f$) and $\sigma^2$

the risk variable is now ( $2\sigma^2(R_f)P_f(a')g/r$ ) and the estimated coefficient is $\gamma$.

As stated above, we capture the firms' consideration of exchange rate risk in three ways using the end of month nominal rates. (1) ExchRiskP: calculate the variation using the exchange rates in the year in which the investment takes place to see whether firms react instantly to exchange rates movements. (2) ExchRiskPP: use exchange rates for the previous and present year to observe firms' reaction to current movements in light recent historical patterns. (3) ExchRiskPF: use present and next years' exchange rates to examine firms' sensitivity to the present and how they feel about the future, relying on some form of rational expectations.

The time frame of this study is 1999-2003. We include dummy variables for 2001, 2002, and 2003 to capture possible negative impacts on investment which the events of 9/11 in 2001, the 2003 invasion of Iraq and/or other related events may have had (each dummy equals one for the relevant year and zero for all others). We otherwise pooled all available data.[7]

**4. Estimation and discussion**

Our strategy is to examine FDI by U.S. firms at two levels: in all industries and on the subset of only firms in manufacturing. Recall from our illustrative model, the equation we are estimating is $K^* = f(S_\$, S_f, ExchRisk; PolRisk)$ .[8] The all industries sample includes 53 countries (29 developed and 24 developing) from 1999 to 2003 inclusive. A listing of all countries is given in Appendix Table 1 (available in Clare and Gang, 2009) where we provide our classification of each into developed or developing. Due to the absence of political risk data for Israel in 2001 one observation was lost leaving 144 observations for the developed countries. In the case of developing countries, due to disclosure, data on FDI was not available for Indonesia in 2002 and 2003 leaving 118 observations. Disclosure restrictions for Bermuda, Denmark, Luxembourg and

United Arab Emirates reduce the number of observations of FDI by firms in manufacturing. As for "all industries" there was no political risk data for Israel in 2001. In addition, value added data was unavailable and therefore the risk variable could not be calculated for Saudi Arabia in 2000. Data on FDI for New Zealand was not available for 2001 and 2002. Thus, for manufacturing there were 121 observations for the developed countries. In the case of developing countries FDI data was not available for the years 2002 and 2003 for the countries of Costa Rica, Honduras and Indonesia resulting in 114 observations.

Our country data contains both developed and developing economies. Chow tests indicate that it is appropriate to pool the data; [9] however, pooling masks interesting differences. In our discussion we highlight differences of each country groups as well as discuss the pooled sample. Summary statistics are presented in Table 1. Tables 2 and 3 present the regression results for "Manufacturing" and "All Industries", respectively. In the case of manufacturing industries only (Table 2), regardless of sample or method used for capturing exchange rate variation, sales always positively affect FDI and are significant at the 1% level in all cases but one where it is significant at the 5% level. This result is expected. In the case of less developed countries exchange rate risk is negative – the greater the risk the less FDI – and significant in two out of the three cases. In the case of "present" rates it is significant at the 1% level and for "present and future" the 5% level (Clare 1992 found the same pattern in manufacturing). Recall our measure of political risk has political risk decreasing as the index increases. The estimation results show that as political risk decreases, FDI increases, and is significant at the 10% level for two of the cases and the 1% level for the third case. This compliments the findings of Nigh (1985), Biswas (2002), Carstensen and Toubal (2003) and Bussie and Hefeker (2006). The yearly dummy variables are always negative and significant at the 5% level in 5 out of the 9

cases and at the 1% level for the remaining four. Note that the yearly dummy variables coefficients magnitudes consistently increase over the years 2001 to 2003. The increases ranged from 62% to 103%.

For developed countries the coefficient on the exchange rate risk variable is always negative and is significant in two of the three cases (1% level for the "past and present" case and 10% for the present and future, and not significant, but close, for present). Lower political risk positively affects FDI but is never significant. This may reflect a feeling that the factors which are considered in constructing this variable (non-payment of loans, goods, dividends, and the non-repatriation of profits) are not really or no longer an issue of general concern when investing in the developed nations. The dummy variables are all negative but are significant at the 10% level in only two out of the nine cases. This may reflect a more generalized feeling of security (a feeling of less vulnerability) in developed nations.

For the pooled sample of developing and developed countries, in all cases the coefficient for exchange rate risk is negative, but significant only at the 10% level for one case. Lowered political risk again has a positive effect on FDI and is significant at the 10% level in two cases and 5% in the other. Given the factors considered in constructing the political risk variable, this may be revealing greater concern for these issues in the developing countries relative to the developed. The dummy variables all show negative coefficients which are significant in 7 of the 9 cases (5% in 5 cases and 10% in 2). Although the coefficients decreased in magnitude from 2001 to 2002, they then increased from 2002 to 2003 by so much that when compared to 2001 the increases range from 5% to 41%.

Nigh (1985) found firms engaging in manufacturing sector FDI exhibited risk aversion towards conflicts within developing but not in developed countries. Brzozowski (2006) used the

change in a nations international reserve assets as a measure of credit worthiness. In his overall sample he found firms reacted as expected, while his subsample of firms in transition economies showed no reaction (11 of the 13 subsample countries were European).

Our results in manufacturing follow Nigh (1985), and when we look at the countries in the developed sample we find 15 of the 25 are European. The variation in political risk relative to its mean across the countries is 0.11 for developed countries, 0.30 for developing and 0.33 for the entire country group. Keeping in mind that we are studying alternative investment locations of US firms, firms may feel that political stability is not a major issue among developed countries. Once included with developing countries the preference has a chance to be revealed.

In the case of all industries (Table 3), regardless of the sample used (developed, less developed or combined) and regardless of method used for exchange rate variation, sales always has the expected positive coefficient on FDI which is significant at the 1% level. For the less developed sample of countries exchange rate risk always carries a negative coefficient (as expected) which is significant in 2 out of 3 cases at the 1% level. Political risk consistently, but unexpectedly, shows that decreasing political risk decreases FDI. While not significant in two of the cases, it is significant at the 10% level where exchange rate risk is measured using the present variation. This is in contrast to what is found in manufacturing. Included in all industries are mining, utilities, etc., which may not be able to select their location as easily as manufacturing industries.[10] The dummy variables have a negative sign in all but one of the cases and are not significant for 2001. For the years 2002 and 2003 they are significant at the 1% level and during this time the magnitude of the coefficients increased by 58% to 98%.

For developed countries the exchange rate risk coefficients are always negative and significant at the 5% level for the “past and present” case. FDI increases as a result of decreased

political risk and in all cases is significant at the 10% level. The yearly dummy variables always have the expected sign and for the years 2001 and 2003 are significant at the 10% level in one case and the 5% level in all others. For 2002 it was only significant once (10%). The change in the magnitude of the coefficients shows a much wider range of movement in this case from a 21% decrease to a slightly less than 15% increase.

When pooling the developing and developed samples, in all cases as exchange rate risk increases, FDI decreases, and is significant at the 5% level for the "past and present" case and the 10% level for the "present and future" case. Decreased political risk again encourages FDI and is significant at the 10% level in two of the three cases. The yearly dummy variables are always negative and significant at the 10% level in one case and the 5% and 1% levels in all others. They show a slight decrease in magnitude from 2001 to 2002 and then such a large increase from 2002 to 2003 that the overall increase compared to 2001 ranges from 30% to 64%.

## 5. Conclusion

We examine the relationship between foreign direct investment (FDI), exchange rate risk and political risk. Using data for 53 countries during the years 1999 to 2003, we find that exchange rate risk has a significant and negative impact on FDI for all countries, both developed and developing. Furthermore, we find that political stability has a positive effect on FDI, but is only significant for developing countries. Interestingly, when the analysis is moved from "Manufacturing" to encompass "All Industries", the relationship between political risk and FDI for developing countries is positive, which is paradoxical.

Exchange rate risk has a negative impact on the foreign direct investment of U.S. multinationals. When investing in developed nations the firms appear to take past and present

exchange rate variation into consideration. However, when investing in less developed nations, past and present variation does not appear to weigh as heavily as present and future variation. This could be because the firms feel the past movements in the exchange rates may not be as good an indicator of future movements in less developed countries as they are in developed countries. The results of this study are in line with the results of Clare (1992), Benassy-Quere, Fontagne, and Lahreche-Revil (2001), and Brzozowski (2006). With respect to political risk the findings generally compliment those of Nigh (1985), Biswas (2002), Carstensen and Toubal (2003), Bussie and Hefeker (2006). Finally, events from 2001 to 2003 seem to have had not just a negative impact on FDI, but one which grew considerably over time period.

**References**


Benassy-Quere, A. and Fontagne. L. and Lahreche-Revil, A. "Exchange-Rate Strategies in the Competition for Attracting Foreign Direct Investment," *Journal of the Japanese and International Economies* 15, (2001): 178-198.

Biswas, R. "Determinants of Foreign Direct Investment," *Review of Development Economics* 6, no. 3 (2002): 492-504

Brzozowski, M. "Exchange Rate Variability and Foreign Direct Investment Consequences of EMU Enlargement," *East European Economics* 44 no. 1 (January-February 2006): 5-24.

Busse, M. and Hefeker, C., "Political Risk, Institutions and Foreign Direct Investment," *European Journal of Political Economy* 23, (2007): 397-415.

Carstensen, K. & Toubal, F., "Foreign direct investment in Central and Eastern European countries: a dynamic panel analysis," *Journal of Comparative Economics* 32, no. 1 (2004): 3-22.

Clare, G., "The Impact of Exchange Rate Risk on the Foreign Direct Investment of U.S. multinational manufacturing companies," *Open Economies Review* 3, no. 2 (1992): 143-163.

Clare, G., "A Basic Model Incorporating Exchange Rate Risk in the Foreign Direct Investment Decision." *Journal of Economic Development* 23. no.1 (June 1998): 57-75.

Clare, G. and Gang, I.N., "Exchange Rate and Political Risks, Again" Manuscript, *Rutgers Economics Working Papers* (2009): (economics.rutgers.edu).

Cushman, D. "Real Exchange Rate Risk, Expectations, and the Level of Direct Investment," *Review of Economics and Statistics* 67, (May 1985): 297-308.

Cushman, D., "Exchange Rate Uncertainty and Foreign Direct Investment in the United States," *Weltwirtschaftliches Archiv* 124, (June 1988): 322-336.

Goldberg, L.S., and C.D. Kolstad, "Foreign Direct Investment, Exchange Rate Variability and Demand Uncertainty," *International Economic Review* 36, no.4 (November 1995): 855-873.

Igawa, K., "Some Evidence Between Foreign Direct Investments and Foreign Exchange Rates," *Kobe Economic and Business Review* 29, (1983): 21-32.

Kelly, M.E., and G.C. Philippatos, "Comparative Analysis of the Foreign Investment Evaluation Practices by U.S. Based Manufacturing Multinational Companies," *Journal of International Business Studies* 13, (Winter 1982): 19-42.

Nigh, D., "The Effect of Political Events on United States Direct Foreign Investment: A Pooled Time-Series Cross-Sectional Analysis," *Journal of International Business Studies* (Spring 1985), 1-17.

**Notes**

1. There is a difference between the effects of changes in the exchange rate and exchange rate risk. Exchange rates in this literature and throughout the paper are defined in terms of home currency/foreign. Risk is the dispersion of outcomes around some expected value or increased variability in the outcomes; this is the view used here and in the studies cited. As the dispersion increases, risk increases, negatively impacting FDI.

2. Based on tables 2Y1 and 3Y1 from the 1999 benchmark survey, over 96% of the U.S. direct investment position at year-end 1999 was majority-owned as were 99.7% of all FDI outflows for the year. Note, the data in tables 2Y1 and 3Y1 are based on the firms' fiscal year whereas FDI data available from the BEA is based on the calendar year.

3. When we compared Transparency International's Corruption Index with the Political Risk score used in this study we obtained a correlation coefficient of 0.82.

4. In private communication by the BEA to the authors, 76% of firms surveyed responded to this question; of these, 79% said their affiliates books were kept in terms of the host country currency.

5. For this we need to assume that the sales of the affiliate to the Rest of the World follows the host country pattern of trade.

6. For Singapore and Poland when "sales to the rest of the region" (calculated under this approach) were combined with the other sales components a figure was obtained which was larger than total sales reported, indicating overestimation of foreign market sales. To correct for this, sales to the rest of the region were reduced by the appropriate amount.

7. Our data is for only five years, but many countries. Each country may not change much during the period; including country specific dummy variables may hide some important relationship. Because of the wide disparity in variable magnitude across countries the White adjustment was employed to counter the impact of heteroskedasticity on the standard errors of the coefficients.

8. The correlation between political risk and any form of exchange rate risk is never greater than 0.30 in any of our samples.

9. Before combining them into one large sample a Chow test was run to make sure such action was appropriate. Since the exchange rate risk variable is calculated three different ways then the Chow test was run for each of these ways for both the "all industries" and "manufacturing only" samples. In the case of "all industries" for ExchRiskP, ExchRiskPP and ExchRiskPF values for the F statistic of .73, .99, and .79 were obtained respectively which with df of 7, 248 indicate pooling is appropriate at both the 2.5% and 5% level. In the case of "manufacturing only" for ExchRiskP, ExchRiskPP and ExchRiskPF values of .44, 1.30 and .55 were obtained which with df of 7, 211 again indicating pooling is appropriate at both the 2.5% and 5% level.

10. In fact, the correlation between FDI in developing countries for manufacturing and non-manufacturing sectors is only 0.275.

| Table 1<br>Summary Statistics | | | | | | |
|---|---|---|---|---|---|---|
| | All Industries | | | Manufacturing Industries | | |
| | All Countries | Developed Countries | Less Developed Countries | All Countries | Developed Countries | Less Developed Countries |
| Sales ($10^4$) | 69.98<br>(115.96) | 107.72<br>(142.54) | 23.92<br>(34.65) | 37.0<br>(58.55) | 57.87<br>(72.20) | 14.84<br>(25.15) |
| Exchange Rate Risk – present year's variation ($10^7$) | 8.44<br>(30.8) | 13.90<br>(40.2) | 1.80<br>(8.0) | 2.47<br>(7.7) | 4.12<br>(9.9) | 0.73<br>(3.6) |
| Exchange Rate Risk – past and present year's variation ($10^7$) | 18.50<br>(60.9) | 27.90<br>(76.1) | 7.01<br>(31.1) | 5.62<br>(16.9) | 8.54<br>(20.7) | 2.52<br>(10.9) |
| Exchange Rate Risk – present and future year's variation ($10^7$) | 19.81<br>(69.8) | 33.81<br>(91.5) | 2.71<br>(9.4) | 5.98<br>(18.7) | 10.63<br>(25.0) | 1.05<br>(3.8) |
| Political Risk | 18.01<br>(5.76) | 22.36<br>(2.61) | 12.69<br>(3.75) | 17.77<br>(5.84) | 22.51<br>(2.55) | 12.73<br>(3.76) |
| 2001 dummy variable | 0.198<br>(0.399) | 0.194<br>(0.396) | 0.203<br>(0.403) | 0.200<br>(0.400) | 0.180<br>(0.387) | 0.211<br>(0.408) |
| 2002 dummy variable | 0.198<br>(0.399) | 0.201<br>(0.401) | 0.195<br>(0.396) | 0.191<br>(0.393) | 0.198<br>(0.399) | 0.184<br>(0.388) |
| 2003 dummy variable | 0.198<br>(0.399) | 0.201<br>(0.401) | 0.195<br>(0.396) | 0.196<br>(0.397) | 0.207<br>(0.405) | 0.184<br>(0.388) |
| observations | 262 | 144 | 118 | 235 | 121 | 114 |

Table 2
Regression Results, Pooled Cross-Sections 1999 – 2003 Manufacturing Industries
(dependent variable = foreign direct investment)

| | All Countries | | | Developed Countries | | | Less Developed Countries | | |
|---|---|---|---|---|---|---|---|---|---|
| Sales ($10^{-3}$) | 1.99*** (0.29) | 1.97*** (0.32) | 1.83*** (0.34) | 2.12*** (0.34) | 2.24*** (0.32) | 1.97*** (0.40) | 1.41*** (0.55) | 1.13** (0.54) | 1.47*** (0.60) |
| Exchange Rate Risk – present year's variation ($10^{-6}$) | -3.73 (3.01) | | | -4.37 (3.66) | | | -3.58*** (1.18) | | |
| Exchange Rate Risk – past and present year's variation ($10^{-6}$) | | -1.73* (1.14) | | | -2.93*** (1.18) | | | 0.46 (1.30) | |
| Exchange Rate Risk – present and future year's variation ($10^{-6}$) | | | -0.83 (0.80) | | | -1.13* (0.85) | | | -3.40** (1.98) |
| Political Risk | 17.67* (11.97) | 15.54* (11.83) | 20.94** (12.02) | 8.91 (40.41) | 11.35 (39.76) | 11.30 (40.09) | 15.79* (9.96) | 25.30*** (9.67) | 16.00* (10.78) |
| 2001 dummy variable | -357.03** (165.07) | -361.21** (167.86) | -335.92** (169.31) | -455.03* (305.83) | -456.19* (310.26) | -406.71 (320.98) | -258.54** (131.91) | -268.95** (127.60) | -224.25** (123.55) |
| 2002 dummy variable | -168.71 (201.53) | -261.91* (180.81) | -191.73 (176.37) | -39.78 (353.55) | -222.93 (318.91) | -1.00 (326.52) | -273.64** (131.15) | -357.51** (153.74) | -311.84*** (131.68) |
| 2003 dummy variable | -428.02** (244.29) | -381.96* (246.51) | -474.39** (247.21) | -386.68 (459.14) | -162.51 (469.67) | -463.24 (456.20) | -437.90*** (133.57) | -437.26*** (134.33) | -456.42*** (137.85) |
| Observations | 235 | 235 | 235 | 121 | 121 | 121 | 114 | 114 | 114 |

Notes: ***, **, and * denote significance at the 1, 5 and 10 percent respectively, one-tailed test. Standard errors in parentheses are robust to heteroskedasticity. Omitted years for the dummy variable are 1999-2000. Sources: See discussion in the text.

Table 3
Regression Results, Pooled Cross-Sections 1999 – 2003 All Industries
(dependent variable = foreign direct investment)

| | All Countries | | | Developed Countries | | | Less Developed Countries | | |
|---|---|---|---|---|---|---|---|---|---|
| Sales ($10^{-3}$) | 3.89*** (0.97) | 4.13*** (0.80) | 3.88*** (0.72) | 3.77*** (1.07) | 4.19*** (0.92) | 3.80*** (0.80) | 4.51*** (1.09) | 4.10*** (1.05) | 4.60*** (1.18) |
| Exchange Rate Risk – present year's variation ($10^{-6}$) | -2.79 (2.81) | | | -2.63 (3.07) | | | -6.62*** (2.14) | | |
| Exchange Rate Risk – past and present year's variation ($10^{-6}$) | | -2.07** (1.06) | | | -2.54** (1.35) | | | -0.70 (0.87) | |
| Exchange Rate Risk – present and future year's variation ($10^{-6}$) | | | -1.18* (0.81) | | | -1.17 (0.91) | | | -5.46*** (2.08) |
| Political Risk | 62.41* (47.62) | 47.37 (46.62) | 66.46* (42.60) | 181.11* (132.27) | 181.53* (129.74) | 183.08* (129.38) | -31.39* (23.03) | -18.36 (24.03) | -26.60 (24.73) |
| 2001 dummy variable | -1277.74** (759.61) | -1268.53** (734.92) | -1196.55* (738.56) | -2301.40** (1379.27) | -2278.77** (1311.72) | -2183.27* (1326.91) | -62.14 (397.59) | -126.45 (410.98) | 105.93 (418.79) |
| 2002 dummy variable | -982.24** (525.66) | -1169.42** (571.08) | -899.35** (526.76) | -1130.26 (926.88) | -1524.66* (1033.49) | -879.69 (931.18) | -620.24*** (239.94) | -880.00*** (291.28) | -821.96*** (249.51) |
| 2003 dummy variable | -1915.51*** (621.45) | -1651.56*** (564.43) | -1969.48*** (654.07) | -2442.32** (1086.76) | -1783.20** (967.59) | -2510.08** (1145.36) | -1228.65*** (304.90) | -1227.05*** (307.50 | -1302.28*** (323.39) |
| Observations | 262 | 262 | 262 | 144 | 144 | 144 | 118 | 118 | 118 |

Notes: ***, **, and * denote significance at the 1, 5 and 10 percent respectively, one-tailed test. Standard errors in parentheses are robust to heteroskedasticity. Omitted years for the dummy variable are 1999-2000. Sources: See discussion in the text.

## Appendix
(Not to be published.)
## Additional Notes and Thoughts

**Exchange rate movements and the firm**.

Exchange rate movements impact the multinational firm two ways. First, exchange rate movements produce changes in the home country currency value of foreign currency denominated assets and liabilities – accounting or translation exposure. Second, exchange rate movements change the home country value of any foreign currency denominated cash flows (cash flow exposure).

Accounting exposure (translation exposure) occurs when the firm is consolidating its financial statements and finds the exchange rate is different from when they first acquired the foreign asset or incurred the foreign liability. Gains or losses result from the method of translation used, which in turn is determined by accounting standards.

Cash flow exposure has two sources: transaction and operating (economic) exposure.

*Transaction exposure occurs* when there is a time lag between when the firm enters into a transaction and when it makes or receives payment. Any movement in the exchange rate before the completion date will cause a change in the home currency value of the transaction. The firm can cover itself in this case by forward contract or buying an option.

*Operating (economic exposure)* Glaum (1990) illuminated two ways movements in the exchange rate impact the home currency value of the firm's operating cash flows (economic exposure), which he called the *"competitive effect"* and the *"conversion effect"*.

The *"competitive effect"* focuses on the effect exchange rate movements have on the magnitude of the foreign currency cash flows, which depends on the characteristics of the foreign market where a firm sells goods and obtains inputs. The elasticity of demand in the output market, the degree of competition, type of competition (foreign or local firms), etc., will determine if and how much a movement in the exchange rate will impact foreign revenues. For the input market important factors are the supply elasticity, whether the suppliers are purely local or foreign firms themselves, and whether the local suppliers rely on imports to produce the inputs, etc. All of this determines how much, if at all, exchange rate movements will impact the costs of production. These specifics can differ from industry to industry, market to market and even from firm to firm. Now, since the firm is dealing with specific prices of specific inputs and final goods there is no reason to assume that they will move exactly together or with the overall price level (Grant and Soenen (1991) discuss why the firm cannot rely on PPP for protection). Because of this, changes in the exchange rate impact on the magnitude of the foreign currency cash flows themselves. Any attempt by the firm to offset this is constrained by the characteristics of the final good and input markets as well as the production function, which then determines the ability to substitute factors. Given this competitive effect the firm now has to convert these cash flows to the home currency.

The *"conversion effect"* is the impact the change in the exchange rate has when the foreign denominated cash flows are converted to the home currency at the new rate. Since the value of the firm is the discounted value of the future cash flows, the greater the movement in these cash flows the greater the movement in the firm's value. Variation in the exchange rate will

cause variation in the home currency valued cash flows because of the competitive effect and the conversion effect. The greater the variation in these cash flows the less appealing the investment would be to the risk averse firm.

Glaum, M., "Strategic Management of Exchange Rate Risks," *Long Range Planning*, 23, (August 1990): 65-72.

Grant, R., and L.A. Soenen, "Conventional Hedging: An Inadequate Response to Long Term Foreign Exchange Exposure," *Managerial Finance* 17, (1991): 1-4.

| Appendix Table 1<br>Countries Included in the Study | | | |
|---|---|---|---|
| Developed Countries | | Less Developed Countries | |
| All Industries | Manufacturing Only | All Industries | Manufacturing Only |
| Australia | Australia | Argentina | Argentina |
| Austria | Austria | Barbados | Barbados |
| Belgium | Belgium | Brazil | Brazil |
| Bermuda * | - | Chile | Chile |
| Canada | Canada | China | China |
| Denmark | ---- | Colombia | Colombia |
| Finland | Finland | Costa Rica | Costa Rica |
| France | France | Czech Republic | Czech Republic |
| Germany | Germany | Dominican Republic | Dominican Republic |
| Greece | Greece | Ecuador | Ecuador |
| Hong Kong * | Hong Kong | Honduras | Honduras |
| Ireland | Ireland | Hungary | Hungary |
| Israel * | Israel | India | India |
| Italy | Italy | Indonesia | Indonesia |
| Japan | Japan | Malaysia | Malaysia |
| Korea, Republic of * | Korea, Republic of | Mexico | Mexico |
| Luxembourg | ---- | Panama | Panama |
| Netherlands | Netherlands | Peru | Peru |
| New Zealand | New Zealand | Philippines | Philippines |
| Norway | Norway | Poland | Poland |
| Portugal | Portugal | South Africa | South Africa |
| Saudi Arabia * | Saudi Arabia | Thailand | Thailand |
| Singapore * | Singapore | Turkey | Turkey |
| Spain | Spain | Venezuela | Venezuela |
| Sweden | Sweden | | |
| Switzerland | Switzerland | | |
| Taiwan * | Taiwan | | |
| United Arab Emirates * | ---- | | |
| United Kingdom | United Kingdom | | |
| Note: With the exception of the * countries the assignment of developed and developing follows that found in the Direction of Trade Statistics Yearbook 1999 | | | |
| Note: * It was felt these countries more accurately belonged with the developed grouping and since their incomes all reached the “high income” level as defined by the World Bank during the period of study (Saudi Arabia 2004) they were included with the developed countries. | | | |

Appendix Table 2

| Country | ForpPct99 | ForPct04 | Difference |
|---|---|---|---|
| Argentina | 91.78% | 79.09% | -12.70% |
| Australia | 93.87% | 92.04% | -1.83% |
| Austria | 81.76% | 95.14% | 13.38% |
| Barbados | 36.30% | 24.49% | -11.80% |
| Belgium | 90.37% | 88.60% | -1.77% |
| Bermuda | 31.27% | 15.98% | -15.29% |
| Brazil | 90.14% | 87.09% | -3.06% |
| Canada | 70.12% | 74.31% | 4.19% |
| Chile | 83.85% | 83.51% | -0.34% |
| China | 81.30% | 88.24% | 6.94% |
| Colombia | 87.48% | 87.42% | -0.07% |
| Costa Rica | 45.73% | 48.82% | 3.09% |
| Czech Republic | 98.79% | 90.79% | -8.01% |
| Denmark | 87.37% | 93.19% | 5.83% |
| Dominican Republic | 41.59% | 88.75% | 47.16% |
| Ecuador | 87.48% | 78.59% | -8.89% |
| Finland | 93.25% | 90.21% | -3.05% |
| France | 94.44% | 93.25% | -1.19% |
| Germany | 96.04% | 90.19% | -5.85% |
| Greece | 99.39% | 98.47% | -0.91% |
| Honduras | 70.04% | 74.07% | 4.03% |
| Hong Kong | 79.91% | 77.96% | -1.95% |
| Hungary | 87.62% | 93.95% | 6.33% |
| India | 96.24% | 84.05% | -12.19% |
| Indonesia | 80.99% | 90.72% | 9.73% |
| Ireland | 79.65% | 69.52% | -10.13% |
| Israel | 55.86% | 45.16% | -10.70% |
| Italy | 94.63% | 93.99% | -0.65% |
| Japan | 95.59% | 92.98% | -2.61% |
| Korea, Republic of | 95.06% | 93.59% | -1.47% |
| Luxembourg | 92.40% | 80.55% | -11.85% |
| Malaysia | 65.84% | 62.20% | -3.63% |
| Mexico | 69.38% | 75.15% | 5.77% |
| Netherlands | 93.39% | 83.53% | -9.85% |
| New Zealand | 93.87% | 92.04% | -1.83% |
| Norway | 92.29% | 92.44% | 0.15% |
| Panama | 76.55% | 74.93% | -1.63% |
| Peru | 65.81% | 56.75% | -9.07% |
| Philippines | 83.44% | 74.53% | -8.91% |
| Poland | 98.98% | 95.99% | -2.99% |
| Portugal | 98.69% | 96.29% | -2.40% |
| Saudi Arabia | 73.81% | 68.57% | -5.24% |
| Singapore | 68.64% | 77.88% | 9.24% |
| South Africa | 97.03% | 87.60% | -9.43% |
| Spain | 92.02% | 95.70% | 3.67% |
| Sweden | 86.14% | 84.90% | -1.24% |
| Switzerland | 81.92% | 78.89% | -3.04% |
| Taiwan | 93.09% | 91.70% | -1.39% |
| Thailand | 83.17% | 88.38% | 5.21% |
| Turkey | 98.98% | 96.30% | -2.68% |
| United Arab Emirates | 73.81% | 68.57% | -5.24% |
| United Kingdom | 92.50% | 88.73% | -3.77% |