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Foreign direct investment and macroeconomic risk

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Motivated by the macroeconomic fluctuations and policy regime switches frequently observed in developing countries, this paper provides cross country-industry evidence on the links between a host country's macro risks and foreign direct investment (FDI) activities. For each industry I measure vertical FDI share as a ratio of exports to a parent country relative to local sales by foreign affiliates. Using a panel sample from 1989 to 1999, I find that FDI activities of US multinationals in industries with higher share of vertical FDI respond disproportionately more to negative effects of macro-level demand, supply, and sovereign risks. However, when institutional quality and total FDI share of the host country are sufficiently low, the merits of cross-industry vertical versus horizontal FDI in response to macro risks disappear. *Journal of Comparative Economics* **35** (3) (2007) 509–519. Division of Economics, Nanyang Technological University (NTU), S3-B2A-06, Singapore 639798.

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1. Overview

What is the main driving force of foreign direct investment (FDI)? This paper adds to a series of literatures studying the association between institutions, macroeconomic risks, and FDI.[1]

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[1] Another strand of literature focuses on static conditions under which vertical FDI is more efficient than horizontal FDI. There, vertical FDI arises when a multinational firm fragments its production process internationally, locating each stage of the production in the host country where it can be done at the least cost. Hummels et al. (2001) and Yi (2003)

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Table 1
Share of vertical FDI across industries, US multinationals

Industry	$\frac{\text{Exports back to US}}{\text{Local sales}}$	Industry share in total sales (%)
Utilities^{+}	0.006	1.5
Information^{+}	0.022	3.2
Food and kindred products	0.042	5.0
Services	0.054	3.9
Other industries	0.056	5.3
Wholesale trade	0.066	1.9
Chemicals and allied products	0.077	9.0
Other manufacturing	0.128	8.5
Finance, insurance, and real estate	0.160	5.9
Petroleum^{-}	0.161	16.6
Primary and fabricated metals	0.166	1.9
Machinery^{+}	0.207	2.8
Electronic and other electric equipment^{-}	0.240	1.1
Electrical equipment, appliances, and components	0.320	4.2
Mining^{+}	0.368	2.9
Industrial machinery and equipment^{-}	0.395	9.1
Transportation equipment	0.555	10.9
Computer and electronic products^{+}	0.580	8.8
Difference in Vertical FDI Share	*0.443*	

Notes. $+(-)$ codifies industries started (stopped) reporting in the B.E.A. surveys from year 1999 on. Some industries which the survey started reporting in 1999 are closely related to some pre-1999 industries: "Industrial machinery and equipment" (pre-1999), "Machinery" (post-1999), and "Computer and electronic products (post-1999); "Electronic and other electric equipment" (pre-1999) and "Electrical equipment, appliances, components" (post-1999). Difference in Vertical FDI Share is the average difference between the ratios of industries located below the 25th percentile and the ratios of industries located above the 75th.

In Aizenman and Marion (2004), a simple real-option model of FDI is supported by country-level evidence that macroeconomic volatility has larger effects on vertical FDI than horizontal FDI. Delving into the industry level, I investigate whether a priori FDI structure—vertical versus horizontal—determines the association between FDI activity and macro-level risks. If so, negative effects of risks in a host country on FDI activity ex post then not only exist but are also dependent on the share of vertical FDI across industries.

Using a sample of activity by US multinationals, Table 1 reports for each industry a vertical FDI share, measured by the level exported back to US divided by local sales.[2] To tabulate the numbers, it is assumed that production technology underlying the share of horizontal versus

show that vertical FDI has emerged as another explanation to the growth of world trade. Carr et al. (2001) show that the choice between vertical and horizontal FDI depends on country characteristics, such as relative size, relative endowment, and investment costs. See also Braconier et al. (2005), Davies (2003), Hanson et al. (2005), and Waldkirch (2006) for the comparative-advantage consideration of vertical FDI.

[2] This method follows Hanson et al. (2002) and Aizenman and Marion (2004). I measure the output of vertical production as foreign affiliates' exports to the parent firm, assuming that these exports represent intermediate goods requiring further processing in the parent country. The output of horizontal production is measured by the affiliates' sales in the local market where the affiliates operate, assuming that these are sales of final goods. This measure sums together the affiliates' exports that sent back to the parent firm as in Helpman (1984), but not that sent to other countries (export platform FDI) as in Ekholm et al. (2003). This measure of vertical FDI is a narrow version and coefficient estimates provide a lower bound of its effects.