



Speed of convergence to market efficiency for NYSE-listed foreign stocks

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ABSTRACT

This paper contributes to the cross-listing literature by documenting the speed of convergence to market efficiency for foreign stocks listed on the NYSE. We find that, on average, it takes 30–60 minutes for a foreign stock to achieve market efficiency. For a comparable US stock, it takes only 10–15 minutes. The significant difference between foreign and US stocks remains robust when the speed is measured by the number of transactions rather than in calendar time. After relevant firm characteristics are controlled for, the time that it takes for foreign stocks to reach efficiency is significantly negatively related to the quality of their home country institutions. We find that one possible channel through which institutions affect the speed is through their impact on information asymmetry.

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1. Introduction

In addition to listing on a domestic exchange, a firm may choose to cross-list its shares on a foreign stock exchange. The NYSE is one of the most important listing destinations for foreign firms. At the end of 2005, the number of foreign stocks listed on the NYSE reached 453, a 472% increase from 96 in 1990. During the same period, the number of domestic listings on the NYSE only increased by 34%. Foreign firms accounted for about 17% of all NYSE-listed companies and their market capitalization represented approximately 37% of the total market capitalization of all NYSE companies at the end of 2005.¹

Given the increasing importance of foreign stocks on the NYSE, our first motivation in this study is to seek to contribute to the cross-listing literature by providing evidence on the speed of convergence to market efficiency for foreign stocks traded on the NYSE. Efficient stock prices are vital to economic growth, because stock prices provide investors with signals of investment opportunities. Efficient stock prices enable investors to distinguish between good investments and bad ones through a mechanism like Tobin's Q (Wurgler, 2000). Consequently, allocation of capital to the most efficient uses is accomplished through efficient stock prices, which in turn contributes to economic growth. The growth

in cross-listings motivates a vast amount of literature on cross-listings (see Karolyi, 2006 for a survey).² Among all the studies, to the best of our knowledge, only two papers study the efficiency of ADRs.³ Rosenthal (1983) conducts serial correlation and runs tests on weekly, biweekly, and monthly returns for 54 ADRs over the period from 1974 through 1978. The results are consistent with weak-form efficiency. Webster (1998) studies the market efficiency of three ADRs using the Dickey–Fuller unit-root test and daily stock prices. The results show that the market for these ADRs is efficient over the daily horizon. Given the finding that the ADR market is efficient over the daily horizon, a natural question to ask is how fast the ADR market becomes efficient within a day. The answer to this important question requires an intraday analysis using high-frequency data. Rosenthal (1983) and Webster (1998) use daily or lower-frequency data and are therefore silent on this issue. The growing presence of foreign stocks on the NYSE and the essential role of efficient prices in capital allocation and economic growth demand an answer. This paper contributes to the existing literature by filling this gap. Following Chordia et al. (2005), we use the short-horizon return predictability from past returns and order imbalances to gauge the degree of efficiency. We analyze intraday data on a sample

² For recent studies, see Ayyagari and Doidge (2009), Chandar et al. (2009), Eichler et al. (2009), Roosenboom and van Dijk (2009), and Silva and Chávez (2008), among others.

³ ADR refers to American Depository Receipts. Most foreign firms list their stocks in the US as ADRs. For the basics of ADRs, please refer to www.adr.com, a website maintained by JP Morgan.

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¹ Data are collected from the NYSE website.

of 320 foreign stocks listed on the NYSE, whose detailed information is presented in Panel A of Table 1, and find that, on average, it takes more than 30, but less than 60, minutes for them to reach efficiency.

Our second motivation is to examine the determinants of the speed of convergence to market efficiency. As Chordia et al. (2008) point out, “The determinants of this short-horizon predictability deserve a thorough investigation by finance scholars”. Chordia et al.

(2008) find that the short-horizon return predictability decreases with bid-ask spreads. Eleswarapu and Venkataraman (2006) examine the determinants of trading costs for ADRs listed on the NYSE. They find that, after controlling for firm-level determinants, effective spreads are significantly lower for ADRs from countries with better legal, judicial, political, accounting, or corporate governance institutions. Based on these findings, we investigate whether and

Table 1
Sample characteristics.

Country/ district	No	Home market share	Price	Volatility	Market cap	Volume	Legal origin	Judicial efficiency	Political stability	Accounting standards	Anti-director rights	Familiarity
<i>Panel A: Sample characteristics</i>												
Argentina	8	0.41	16.94	0.022	3455	1,093,211	1	6	62.5	45	4	0
Australia	7	0.95	57.97	0.015	25,879	6,887,156	0	10	88.5	75	4	1
Austria	1	0.99	40.14	0.013	11,150	161,550	1	9.5	89.5	54	2	0
Belgium	1	0.93	64.26	0.016	6200	1,205,203	1	9.5	87	61	0	0
Brazil	9	0.39	25.55	0.025	18,095	25,597,528	1	5.75	62.5	54	3	0
Canada	56	0.60	28.57	0.019	8794	16,503,557	0	9.25	89.5	74	5	1
Chile	15	0.59	32.67	0.014	3116	1,627,630	1	7.25	77.5	52	5	0
China	15	0.86	29.25	0.017	6226	5,185,359	1	NA	68	NA	NA	0
Denmark	1	0.94	53.21	0.014	16,938	2,336,222	1	10	91	62	2	0
Finland	4	0.91	18.05	0.014	26,041	43,380,758	1	10	95	77	3	0
France	17	0.96	26.92	0.016	33,351	10,924,272	1	8	80.5	69	3	0
Germany	13	0.47	34.68	0.015	33,116	9,036,250	1	9	87.5	62	1	0
Greece	4	0.97	20.64	0.017	8047	2,356,732	1	7	76	55	2	0
Hong Kong	8	0.78	13.48	0.019	13,464	2,207,358	0	10	80.5	69	5	0
Hungary	1	0.93	22.93	0.020	4595	426,892	1	NA	78	NA	NA	0
India	8	0.45	16.60	0.021	6511	5,916,704	0	8	56	57	5	0
Indonesia	2	0.64	23.95	0.020	7570	4,125,181	1	2.5	48	NA	2	0
Ireland	3	0.64	39.15	0.030	13,390	34,455,617	0	8.75	92	NA	4	1
Israel	3	0.58	9.11	0.019	481	281,746	0	10	58.5	64	3	1
Italy	9	0.98	26.00	0.014	28,385	2,464,900	1	6.75	81	62	1	0
Japan	18	0.96	36.80	0.016	45,171	5,994,852	1	10	86	65	4	0
Korea	8	0.77	34.58	0.019	17,599	13,796,687	1	6	76	62	2	0
Luxembourg	1	NA	17.19	0.026	13,517	40,188,123	1	NA	95	NA	NA	0
Mexico	12	0.39	18.14	0.019	7036	15,866,103	1	6	68	60	1	1
Netherlands	15	0.77	19.13	0.016	20,264	7,374,511	1	10	94	64	2	0
New Zealand	1	0.88	34.26	0.011	8009	3,571,383	0	10	91	70	4	1
Norway	3	0.94	15.39	0.019	26,284	4,670,198	1	10	89.5	74	4	0
Peru	2	0.03	22.91	0.021	3020	6,511,498	1	6.75	65	38	3	0
Philippines	1	0.41	28.27	0.013	6051	6,236,541	1	4.75	67	65	3	0
Portugal	2	0.97	19.23	0.011	11,517	1,061,580	1	5.5	84.5	36	3	0
Russia	6	0.11	29.54	0.023	6914	15,283,736	1	NA	61.5	NA	NA	0
Singapore	1	NA	10.66	0.049	277	4,457,165	0	10	90	78	4	0
South Africa	6	0.62	28.81	0.022	10,951	12,544,666	0	6	64	70	5	0
Spain	5	0.98	25.95	0.011	56,063	5,283,428	1	6.25	82.5	64	4	0
Switzerland	12	0.94	33.18	0.014	28,279	14,094,834	1	10	92.5	68	2	0
Taiwan	5	0.70	9.65	0.019	18,236	26,128,244	1	6.75	79.5	65	3	0
Turkey	1	0.78	11.51	0.024	11,403	6,772,770	1	4	58.5	51	2	0
United Kingdom	35	1.00	39.46	0.013	38,186	15,727,054	0	10	90	78	5	1
Venezuela	1	NA	16.95	0.023	875	4,664,194	1	6.5	49.5	40	1	0
Average	NA	0.73	28.78	0.017	19,668	11,442,446	NA	8.50	81.26	66.33	3.62	NA
			Mean		Median		Standard deviation		First quartile		Third quartile	
<i>Panel B: Sample foreign firms and control US firms' characteristics</i>												
Sample firms' characteristics												
Price			28.78		23.22		22.05		13.55			36.35
Volatility			0.017		0.016		0.007		0.012			0.021
Market cap			19,668		8347		31,615		2137			21,708
Volume			11,442,446		2,745,212		23,872,487		580,921			10,552,084
Control firms' characteristics												
Price			30.21		27.36		17.56		17.64			39.78
Volatility			0.017		0.016		0.006		0.012			0.021
Market cap			17,681		8331		28,107		1990			19,924
Volume			82,831,163		43,435,296		103,841,102		14,843,860			122,920,968

Panel A of this table shows by the home country the firm and country characteristics for foreign firms listed on the NYSE. The sample period covers the year of 2005. No is the number of foreign firms from that country that are listed on the NYSE. Firm characteristics are the average across all sample firms from a foreign country. Home market share is the average ratio of the daily trading volume in the home market to the sum of the daily volume on the NYSE and at home. Price is the average daily stock price. Volatility is the standard deviation of daily returns. Market cap is the market capitalization in millions of US dollars at the end of 2005. Volume is the average daily volume in US dollars on the NYSE. Legal origin is a dummy variable that is equal to one if the home country has civil-law legal origin and zero otherwise. The classification of legal origins is based on La Porta et al. (1999). Judicial efficiency, a rating from 0 to 10, accounting standards, a rating from 0 to 100, and anti-director rights, a rating from 0 to 6, are from La Porta et al. (1998). Political stability ranges from 0 to 100 and is from Eleswarapu and Venkataraman (2006). Higher ratings indicate better judicial, accounting, corporate governance, and political institutions in the home country. Familiarity is a dummy variable that equals one if the home country has a common border, language, or culture with the US and zero otherwise. Panel B presents the distribution of firm characteristics for sample and control firms.

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