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HOW STOCK EXCHANGE M&AS AFFECT
THEIR COMPETITORS' SHAREHOLDER VALUE?
EVIDENCE FROM THE WORLD AND MENA REGION

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Abstract

This paper empirically investigates the effects of stock exchange M&As on their competitors' shareholder value. The focus first is on the 63 M&As of stock exchanges and their respective competitors in the same region during the 2000-2007 period and investigates the short-run performance (share-price responses) of these public stock exchanges. We observe that when a stock exchange is merged with another exchange, its competitor significantly loses its shareholder value. When the stock exchange is involved in a horizontal transaction instead of a vertical one, its competitor loses more shareholder value. In addition, when the stock exchange is involved in a cross-region transaction instead of a within-region one, its competitor loses more shareholder value. Second, we trace the stock exchanges in the MENA region and conduct a similar analysis for stock exchange M&A and alliance deals in MENA region and find that the above results still hold. We also find that when the stock exchange is involved in a deal with is a M&A instead of an alliance; its competitor loses more shareholder value.

ملخص

تبحث هذه الورقة و بشكل عملي آثار عمليات الدمج و الاستحواذ للبورصات على قيمة حقوق مساهمي منافسيهم. و من هذا المنطلق يتم التركيز أولا على 63 عملية دمج و استحواذ للبورصات ومنافسيهم في نفس المنطقة خلال الفترة من 2000- 2007، ومن ثم يتم بحث أداء هذه البورصات على المدى القصير (و فقا لتغيرات أسعار الأسهم). و نلاحظ أنه عندما يتم دمج بورصة مع أخرى، يفقد منافسه قيمة مساهميه بشكل كبير. و عندما تشارك بورصة الاوراق المالية في صفقة أفقية بدلا من أخرى عمودية، تفقد منافستها المزيد من قيمة مساهميها. و بالإضافة إلى ذلك، عندما تشارك البورصة في معاملات عبر المنطقة بدلا من داخل المنطقة الواحدة ، تفقد منافستها المزيد من قيمة مساهميها. و من ناحية أخرى بتتبع البورصات في منطقة الشرق الأوسط و تحليل لعمليات دمج و استحواذ البورصات والتحالفات في منطقة الشرق الأوسط نجد أن النتائج المذكورة أعلاه ما زالت قائمة . نجد أيضا أنه عندما تشارك البورصة في عملية دمج و استحواذ بدلا من التحالف ، تفقد منافستها المزيد من مساهميها.

1. Introduction

The stock exchange mergers and acquisitions (M&As) have become a trend recently because of capital market globalization, the innovation of technology, and stock exchange demutualization (Knowledge@Wharton, 2006). For instance, the NYSE Group and Euronext merged and became the first trans-Atlantic equities market NYSE Euronext. The competitor of NYSE, NASDAQ recently bought the Nordic stock-exchange operator, OMX. Global exchange integrations such as these may create more competition and increase the efficiency of capital flows (U.S. Securities and Exchange Commission, 2007).

The existing literature has investigated the effects of stock exchange M&As from several dimensions such as stock liquidity (Nielsson, 2009). However, there are many parties, such as investors, firms, financial intermediaries and the overall economy, are involved and affected in such an analysis (Nielsson, 2009). Therefore, the existing literature of the effects of stock exchange M&As has to be selective and incomplete in its coverage. In this paper, we try to examine how stock exchange M&As affect their competitors' shareholder value in order to provide additional insight about the influence of stock exchange M&As.

Specifically, we focus on stock exchanges involved in 63 M&As during the period 2000-2007 and investigate their public competitors' short-run share price responses. We define that two stock exchanges are competitors if they both locate in the same continent or region. We find three ways that stock exchange competitors lose its shareholder value: 1) when a stock exchange is merged with another exchange, 2) when a stock exchange is involved in a horizontal transaction instead of a vertical one and 3) when the stock exchange is involved in a cross-region transaction instead of a within-region one.. We also conduct similar analysis for stock exchange M&A and alliance deals in Middle East and North Africa (MENA) region and assume that they are competing with stock exchanges in Asia Pacific region because we cannot find public stock exchanges in MENA region. In addition, we can trace all stock exchange M&A and alliance deals by focusing on one region. We find the above results still hold. We also find that when the stock exchange is involved in a deal with is a M&A instead of an alliance; its competitor loses more shareholder value.

This study has several contributions to the literature. First, after stock exchanges are demutualized and merged with other stock exchanges, it is an important question about whether these integration events create or destroy shareholder value. However, although more and more stock exchanges are going public, most of stock exchanges are still not traded publicly and cannot provide necessary stock price data. By focusing on their public competitor's share price response, we can overcome this problem and examine how these non-public stock exchanges M&As affect shareholder value from another aspect. Second, the competitors' M&A activities will significantly influence the stock exchange's market share and further its revenues. Thus, this paper can also guide outside investors to value stock exchange shares in response to their competitors' integration activities.

The remainder of the paper is organized as follows: Section 2 presents the related literature and develops our hypotheses. Section 3 describes the sample and provides descriptive statistics. Empirical tests and results are presented in Section 4. Section 5 concludes.

2. Related literature and hypothesis development

The existing literature has shown the benefit of stock exchange M&As. For example, Hasan and Malkamäki (2001) find that economies of scale and scope among the stock exchanges exist. Nielsson (2009) shows that stock-trading liquidity increased after Euronext stock exchange mergers. More importantly, Arnold et al. (1999) show that the merging of US regional stock exchanges attracted market share and led to narrower bid-ask spreads. Thus, shareholders of stock exchanges would benefit from the synergy gains and its competitor will lose the market share. We summarize the related hypotheses as follows:

Hypothesis 1: The competitor's stock price response to the announcement of a stock exchange M&A activity is negative.

Stock exchanges M&A deals can be classified as two types. Specifically, the deal is a horizontal integration if the stock exchange integrates with another exchange with the similar business model and a vertical integration otherwise. M&As between two partners with the same business lines enable stock exchanges to better acquire knowledge, skills and governance mechanisms from partner exchanges than vertical deals (Tasi, 2001; Anand and Khanna, 2000; Dessein, 2005; Gomes-Casseres et al., 2006). The existing literature (e.g., Serifsoy, 2007) has shown that exchanges that diversify into related activities are mostly less efficient than exchanges that remain focused on the cash market. In addition, horizontal M&As can enhance the stock exchange's market power in its own country or other countries and put more market pressure on its competitors. In our paper, we hypothesize that:

Hypothesis 2: if the stock exchanges' integration activities are horizontal, its competitor loses more shareholder value.

Stock exchanges M&A deals can be also classified as cross-region and within-region. Forming a global exchange is an important driver in conducting stock exchange M&As. Thus, we expect that cross-region integration activities can put more market pressure on stock exchange competitors because it can attract more outsider investors. Additionally, the learning effect is more pronounced when the partner stock exchange is located in another region. Thus, the synergy gain in cross-region deals should be much larger and it will attract more market share from the competitors. Our hypothesis can be formalized as follows:

Hypothesis 3: if the stock exchanges' integration activities are cross-region, its competitor loses more shareholder value.

In cross-region deals, the difference in stock market development and investor protection between the partner' country and the sample exchange' country might also influence its competitor's shareholder value. The more developed a stock market is, the more liquidity it can provide. Thus, when the partnering stock exchange locates in the country with a more developed stock market, there should be more synergy gain for the sample stock exchange from increased liquidity. Krishnamurti et al. (2003) argue that small and medium investors would be attracted to the exchange scoring higher on these variables: use of technology, internal control systems, transparency, and investor protection. Thus, shareholders of stock exchanges would benefit from increased revenue by increased trading volume and IPOs and their competitors would lose the shareholder value. Similarly, the stock exchange with relatively low governance standards may benefit from the governance transfer effect in the process of the consolidation. Specifically, they learn how to govern the firms more effectively from partner exchanges (Tasi, 2001; Anand and Khanna, 2000; Dessein, 2005; Gomes-Casseres et al., 2006). Thus, when the partnering stock exchange locates in the country with higher investor protection, there should be more synergy gain for the sample stock exchange from increased governance effects and future put more market pressure on its competitor. In our paper, we hypothesize that:

Hypothesis 4: if the stock exchange is merged with another stock exchange in the country with the better market development, its competitor loses more shareholder value.

Hypothesis 5: if the stock exchange is merged with another stock exchange in the country with the better governance, its competitor loses more shareholder value.

3. Data

3.1 Sample description

To construct our final sample, first we collect stock exchange M&A announcement data during the period from 2000 to 2007 from a series of sources such as the newsletters and press releases from the World Federation of Exchanges and the European Federation of Securities Exchanges, the internet, press archives, and ad hoc announcements of the individual stock exchanges. We obtain 63 completed M&A deals.

Panel A of Table 1 presents the stock exchange M&A events by year of announcement. As shown in Table 1, the number of stock exchange M&As is not evenly distributed over the 2000-2007 sample period. The largest number of announcements of M&A in one year is 14 in 2006, followed by 11 in 2007 and 2002. Panel B shows that 68.25% of total stock exchange M&As are horizontal and 63.49% are cross-region. Panel C presents the M&A events by the type of technological integration and shows that complete system integration dominates our sample.

To examine the share price reaction, we include 14 public stock exchanges with stock price data available in Datastream. As shown in Table 2, these public stock exchanges are located in different regions such as North America, South America, Asia Pacific and Europe.

Then for each stock exchange in our 63 stock exchange M&A deals, we match one public stock exchange competitor using such procedure. First, the corresponding public stock exchange competitor should locate in the same region as our sample exchange. If there is more than one public stock exchange, which locates in the same region as our sample exchange, we select the public stock exchange that has not M&A and alliance activities around the event window of our sample stock exchange. There are several stock exchanges from MENA region. We cannot find their public stock exchange competitors exactly from these regions, thus we will conduct a separate analysis in section for the stock exchanges in MENA region. Our final event study sample includes 116 observations.

3.2 Variable definition and summary statistics

In our regression specification, we include a series of deal characteristics as follows. The variable *Cross_Region* is a dummy variable, which is equal to 1 when the deal is a cross-region transaction, and is otherwise 0. The dummy variable *Horizontal* equals 1 when the deal is a horizontal transaction and 0 otherwise. *Technological_Integration_Dummies* is a series of dummy variables to indicate the type of technological integration (outsourcing, common access, common systems, common operations, complete system integration, and other type of integration).

We also control for a series of exchange characteristics, which are measured at the fiscal year-end prior to the integration announcement. We obtain the data from Worldscope and define the variable *Log (Total_Assets)* as the natural logarithm of total assets. The variable *Tobin's Q* is defined as the ratio of market value of assets over book value of assets. The Variable *Leverage* is defined as total liabilities divided by total assets, and the variable *Cash_Flow* is equal to operating income before depreciation minus interest expenses minus income taxes minus capital expenditures, scaled by total assets.

We employ the natural logarithm of GDP per capita (*Log(GDP_Per_Capita)*) and the natural logarithm of GDP growth (*Log(GDP_Growth)*) to control for the countries' macroeconomic conditions, which are from World Development Indicator database. We also construct two dummy variables: *Same_Language*, which equals 1 when two partnering stock exchanges' countries share the same language reported in atlas and zero otherwise and *Same_Legal_System*, which equals 1 when two partnering stock exchanges' countries share the same legal origin reported in La Porta et al. (1998) and zero otherwise. To measure the

difference in stock market development between the partner stock exchange' country and the sample stock exchange's country, we construct the difference of three variables that are from World Development Indicator: market capitalization of listed stock scaled by GDP, stock traded turnover ratio, and total value of stock traded scaled by GDP (*Difference_Market_To_GDP*, *Difference_Turnover* and *Difference_Stock_Trade_To_GDP*). We took the country-level indices on shareholder rights and accounting standards, and the efficiency of the legal system, from La Porta et al. (1998). Then we use the product of the shareholder rights index and the efficiency of the legal system to construct the index of shareholder protection. The differences of the corresponding indices (shareholder protection index and accounting standards) between the partner stock exchange' country and the sample stock exchange's country (*Difference_Shareholder_Protection* and *Difference_Accounting_Standards*) provide an indication of the difference in investor protection between the partnering stock exchanges' countries.

Table 3 presents the summary statistics. Financial variables are winsorized at the 1st and 99th percentiles to avoid the effect of outliers. The summary statistics of these variables are consistent with what are reported in the existing literature.

4. Tests and results

4.1 Event study findings

We conduct a standard event study to measure the competitor's stock price response associated with the announcement of stock exchange M&As. The model is specified as:

$$r_{it} = \alpha_i + \beta_{1,i} r_{m,jt} + \varepsilon_{it} \tag{1}$$

Where *i* is the exchange competitor index, *j* is the exchange country market index, *t* represents a one-day period time index and $r_{i,t}$ represents the daily rates of return. These variables are calculated for all stocks in our sample using DataStream's total return index (RI), which includes dividends as well as price changes. $r_{m,jt}$ is a domestic market return. The announcement day is day zero, the estimation period for the market model estimate begins on day -150 and ends on day -31.

We construct a standardized parametric test statistic to determine whether the mean abnormal return is significantly different than zero.[1] We also report the results of Wilcoxon signed-rank tests. As shown in Table 4, the stock exchange competitor's three-day cumulative abnormal return is a statistically significant -1.85% (Z-statistic = -3.35) for stock exchange M&As. The non-parametric tests confirm these findings. This evidence suggests that if the stock exchange is involved with an M&A deal, its competitor loses significant shareholder value.

We further classify our sample into different groups to examine the patterns in subsamples. As shown in Table 4, the stock exchange competitor's three-day cumulative abnormal return is a statistically significant -2.08% (Z-statistic = -3.64) for cross-region stock exchange M&As. The stock exchange competitor's three-day cumulative abnormal returns for within-region integration events are a little bit lower, but still significant. This evidence may suggest that if the stock exchange is involved with a cross–region M&A deal instead of a within-region deal, its competitor loses more shareholder value. The non-parametric tests (sign tests) confirm these findings. Table 4 also shows that if the stock exchange is involved with a horizontal M&A deal instead of a vertical deal, its competitor may lose more shareholder value.

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[1] A detailed description of the test statistics and their calculation can been seen in Mackinlay (1997).

4.2 Cross-sectional analysis

4.2.1 Methodology and results

In this section, we examine the cross-sectional differences in the stock exchange competitor's short-run abnormal returns for the stock exchange M&A announcements using regression analysis. The model specification is as follows:

Competitor's CAR[1,1]=α_i+β_1Deal Characteristics +β_2Exchange Charactistics+β_3 Macro Development +β_4 Other Control Variables +ε (2)

where the dependent variable *Competitor's CAR[-1, 1]* is the stock exchange competitor's three-day announcement abnormal return. The deal characteristics include the variables *Horizontal_Integration* and *Cross_Region*. The exchange characteristics include *Log(Total_Assets)*, *Tobin's Q*, *Leverage*, and *Cash_Flow*. The other control variables include *Log(GDP_Per_Capital)*, *Log(GDP_Growth))*, *Technological_Integration_Dummies*, *Same_Language,* and *Same_Legal_System*. Country and year fixed effects are also included in our estimation.

As shown in Table 5, if the stock exchange is involved with a horizontal M&A deal instead of a vertical deal, its competitor loses more shareholder value. We also find that if the stock exchange is involved with a cross–region M&A deal instead of a within-region deal, its competitor loses more shareholder value. These results are not only statistically significant, but also economically significant. Based on the results as shown in Column (1), on average, the stock exchange competitor's three-day cumulative abnormal return if the stock exchange is involved with a horizontal M&A deal is on average 0.310% higher than that if the stock exchange is involved with a vertical M&A deal. the stock exchange competitor's three-day cumulative abnormal return if the stock exchange is involved with a cross–region M&A deal is on average 0.325% higher than that if the stock exchange is involved with a within–region M&A deal.

4.2.2 Market development

In cross-region deals, the difference in stock market development between two partners' countries might also influence its competitor's shareholder value. If the stock exchange is merged with another stock exchange in the country with a more developed stock market, it will put more market pressure on its competitors. In this sub-section, we try to empirically test it.

Specifically, we add another term (*Difference_Market_To_GDP, Difference_Turnover* or *Difference_Stock_Trade_To_GDP*) to the regression respectively. As shown in Table 6, our main results still hold. The coefficients of the variables *Difference_Market_To_GDP, Difference_Turnover or Difference_Stock_Trade_To_GDP* are significantly negative. One percentage of change in the variable *Difference_Market_To_GDP* will lead to a 0.173% decline of its competitor's three-day cumulative abnormal return. These results suggest that if the stock exchange is merged with another stock exchange in the country with a more developed stock market, it will hurt more its competitors' shareholder value.

4.2.3 Governance

Similarly, the difference in governance between two partners' countries might also influence its competitor's shareholder value. If the stock exchange is merged with another stock exchange in the country with higher governance, it will help the stock exchange improve its corporate governance and put more market pressure on its competitors. In this sub-section, we try to empirically test it.

Specifically, we add another term (*Difference_Shareholder_Protection* or *Difference_Accounting_Standards*) to the regression. As shown in Table 8, our main results

still hold. The coefficients of the variables *Difference_Shareholder_Protection* and *Difference_Accounting_Standards* are significantly negative. These results are not only statistically significant but also economically significant. For instance, one percentage of change in the variable *Difference_Shareholder_Protection* will decrease the stock exchange competitor's three-day cumulative abnormal return by 0.021%. These results suggest that if the stock exchange is merged with another stock exchange in the country with higher governance, it will help the stock exchange improve its corporate governance and hurt more its competitors' share value.

4.3 MENA analysis

There are several stock exchanges from the MENA region. We assume that they are competing with stock exchanges in Asia Pacific because we cannot find their public stock exchange competitors exactly from the MENA region. In addition, we trace the details of their M&A and alliance activities. Thus, we can test whether the competitors have different share price responses to various stock exchange integration activities such as M&A and alliances. Specifically, we observe that there are eight stock exchanges in MENA region as shown in Panel A of Table 8. As shown in Panel B of Table 8, these eight stock exchanges involve 19 integration deals including 1 M&A, 2 joint ventures, and 18 non-equity alliances.

For each stock exchange in our 19 stock exchange integration deals in MENA region, we match 4 public stock exchange competitors in Asia Pacific region listed in Table 1. Because there are 4 deals involving 2 stock exchanges in MENA region. Our final event study sample includes 92 observations ((19+4)*4).

Based on this MENA sample, we conduct a cross-sectional analysis with the dependent variable the competitor's three-day abnormal return. Because our MENA sample includes not only M&As, but also alliances, we construct a variable *Intergration_Type*, which is equal to 3 if the deal is an M&A; 2 if the deal is a joint venture; 1 if it is a non-equity alliance. Because we match 4 public stock exchange competitors in Asia Pacific region to each stock exchange involved in our 19 stock exchange integration deals in MENA region, we put a dummy variable *Compititor_Dummy* into the regression. As shown in Table 9, the above results still hold. We also find that when the stock exchange is involved in an M&A instead of alliances; its competitor loses more value. This result suggests that equity-involved integrations can allow stock exchange to get materially involved with the new business and it put more market pressure on its competitors (Arnold et al., 1999).

4.4 Robustness tests

To make sure that our results are robust, we examine another model specification as follows:

1. Because we conduct the event study in a multi-country context, we extend the market model by adding a US market return term to Equation (1) to calculate abnormal return.
2. We use different event window, i.e. [-2, 2] and [-3, 3] to calculate abnormal return.
3. We use different estimation window, i.e. [-120, 30] and [-150, 40] to calculate abnormal return.

Using these different regression specifications, we still find qualitatively same results. Although these results are not reported, it is available upon request.

5. Summary and conclusions

In this paper, we match each stock exchange involved in 63 M&As during the period 2000-2007 to a public stock exchange in the same region and investigate these public stock exchanges' short-run share price responses. We find that when a stock exchange is merged with another exchange, its competitor significantly loses its shareholder value; when the stock exchange is involved in a horizontal transaction instead of a vertical one, its competitor

loses more shareholder value; and when the stock exchange is involved in a cross-region transaction instead of a within-region one, its competitor loses more shareholder value.

We also conduct similar analysis for stock exchange M&A and alliance deals in MENA region and assume that they are competing with stock exchanges in Asia Pacific region. We find the above results still hold. We also find that when the stock exchange is involved in a deal with is M&A instead of alliances; its competitor loses more value.

Recently, although more and more stock exchanges are going public, most of stock exchanges are still not traded publicly. By focusing on their public competitor's share price response, this paper examines how these non-public stock exchanges M&As affect shareholder value from another aspect. In addition, the competitors' M&A activities will significantly influence the stock exchange's market share and further its revenues. Thus, this paper can also guide outside investors to value stock exchange shares in response to their competitors' integration activities.

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Table 1: Announcements of Stock Exchange M&As

This table presents the sample distributions by year and type of integrations.

Year of announcement	Number of announcements	Percentage of total
2000	7	11.11
2001	11	17.46
2002	7	11.11
2003	3	4.76
2004	7	11.11
2005	3	4.76
2006	14	22.22
2007	11	17.46
Total	63	100

Panel A: Annual distribution of stock exchange integration activities

Type of integration activities	Number of announcements	Percentage of total
Horizontal	43	68.25
Vertical	20	31.75
Cross-region	40	63.49
Within-region	23	36.51

Panel B: Distribution of stock exchange integration activities by type

Type of technological integration	Number of announcements	Percentage of total
Outsourcing	2	3.17
Common access	2	3.17
Common systems	8	12.70
Common operation	4	6.35
Complete system integration	35	55.56
Other type of integration	12	19.05

Panel C: Distribution of stock exchange integration activities by type of technological integration

Table 2: The List of Public Stock Exchange

This table describes 14 public stock exchange companies used in our sample, the country and the region in which their headquarters are located, the stock exchanges in which they are listed and their Datastream code.

No.	Public stock exchange company name	The country location of its headquarter	The region of its headquarter	Stock exchange in which its stock is listed	Datastream code
1	Australian securities exchange	Australia	Asia Pacific	Australian securities exchange	675705
2	Chicago board of trade	United States	North America	New York stock exchange	30965P
3	Chicago mercantile exchange	United States	North America	NASDAQ	26393N
4	Deutsche Boerse	Germany	Europe	Frankfurt stock exchange	13454U
5	Euronext	France	Europe	Paris bourse	259413
6	Hong Kong stock exchange	Hong Kong (China)	Asia Pacific	Hong Kong stock exchange	280037
7	London stock exchange	United Kingdom	Europe	London stock exchange	298593
8	NASDAQ	United States	North America	NASDAQ	25735K
9	New York stock exchange	United States	North America	New York stock exchange	28560F
10	OMX exchanges	Sweden	Europe	Stockholm exchange	504592
11	Osaka securities exchange	Japan	Asia Pacific	Osaka securities exchange	28545H
12	Sao Paulo stock exchange	Brazil	South America	Sao Paulo stock exchange	51216L
13	Singapore exchange	Singapore	Asia Pacific	Singapore exchange	280738
14	TSX group	Canada	North America	Toronto exchange	26492L

Table 3: Summary Statistics

This table presents the summary statistics. Performance measures and exchange characteristics are winsorized at the 1st and 99th percentiles. Variable definitions are given in Appendix.

Variable	Obs	Mean	Std. Dev.	Min	Max
Competitor's CAR[-1,1] (%)	116	-1.02	0.37	-6.52	4.23
Panel A: Exchange performance measures					
Horizontal_Intergration	63	0.63	0.48	0.00	1.00
Cross_Region	63	0.68	0.47	0.00	1.00
Panel B: Deal characteristics					
Total_Assets ($ millions)	116	7,125.01	11,356.04	45.76	68,467.36
Cash_Flow	116	0.10	0.11	0.03	0.37
Leverage	116	0.45	0.18	0.41	0.76
Tobin's Q	116	2.98	2.24	1.04	8.47
Panel D: Exchange characteristics					
GDP_Per_Capita ($)	116	23,256.26	7,378.03	998.35	36,478.03
GDP_Growth (%)	116	2.89	2.53	-2.21	10.36
Panel E: Difference in language and legal system					
Same_Language	116	0.51	0.27	0.00	1.00
Same_Legal_System	116	0.29	0.26	0.00	1.00
Panel F: Macroeconomic development					
Difference_Market_To_GDP (%)	116	0.05	0.69	-2.35	2.56
Difference_Turn_Over (%)	116	0.13	0.61	-1.75	1.67
Difference_Stock_Trade_To_GDP (%)	116	0.19	0.89	-2.32	1.99
Panel G: Difference in capital market development					
Difference_Shareholder_Protection	116	1.59	20.90	-40.00	48.00
Difference_Accounting_Standards	116	2.78	11.25	-20.00	56.00
Panel H: Difference in country-level governance					

Table 4: Competitors' Cumulative Return [-1, 1] Around Announcement of Stock Exchange M&A in Full-And Sub-Sample

This table presents the results of the event study in full-and sub-samples. *, ** and *** stand for significance at the 10%, 5% and 1% levels.

Event type	Number of observations	Competitor's CAR[-1,1] (%)	Z-statistic	Proportion of negative value (sign test)
M&A	63	-1.85	-3.35***	75%**
Cross-region M&A	40	-2.08	-3.64***	78%**
Within-region M&A	23	-1.78	-3.13***	71%**
Horizontal M&A	43	-1.99	-2.98***	79%**
Vertical M&A	20	-1.66	-3.11***	81%**

Table 5: Cross-sectional Analysis of CARs upon Announcement

The dependent variable is the stock exchange competitor's three-day cumulative abnormal return (CAR) in percentage points. Variable definitions are given in Appendix. In brackets are t-statistics based on standard errors adjusted for heteroskedasticity and country clustering. *, ** and *** stand for significance at the 10%, 5% and 1% level respectively.

Dependent variable	Competitor's CAR[-1,1]		
	(1)	(2)	(3)
Deal characteristics			
Horizontal_Integration	-0.310**	-0.324*	--0.301*
	(-2.269)	(-1.901)	(-1.903)
Cross_Region	-0.325**	-0.321***	-0.331***
	(-2.078)	(-3.672)	(-3.901)
Exchange characteristics			
Log (Total_Assets)		0.623	0.123***
		(0.801)	(4.314)
Tobin's Q		-0.351	-0.132
		(-0.892)	(-0.101)
Leverage		1.356	0.361
		(1.014)	(0.078)
Cash_Flow		-0.041	-0.054
		(-0.302)	(-1.013)
Macroeconomic variables			
Log(GDP_Per_Capita)			-1.011
			(-0.892)
Log(GDP_Growth)			0.516
			(0.367)
Control for			
Technological_Integration_Dummies	Yes	Yes	Yes
Same_Language	Yes	Yes	Yes
Same_Legal_System	Yes	Yes	Yes
Country effect	Yes	Yes	Yes
Year effect	Yes	Yes	Yes
Adjusted R-squared	0.15	0.18	0.21
No. of observations	116	116	116

Table 6: Cross-sectional Analysis of CARs upon Announcement Controlling for the Difference in Capital Market Development

The dependent variable is the stock exchange competitor's three-day cumulative abnormal return (CAR) in percentage points. Variable definitions are given in Appendix. In brackets are t-statistics based on standard errors adjusted for heteroskedasticity and country clustering. *, ** and *** stand for significance at the 10%, 5% and 1% level respectively.

Dependent variable	Competitor's CAR[-1,1]		
	(1)	(2)	(3)
Deal characteristics			
Horizontal_Integration	-0.324*	-0.361*	-0.367*
	(-1.901)	(-1.878)	(-1.971)
Cross_Region	-0.314***	-0.341***	-0.325***
	(-3.891)	(-3.901)	(-3.999)
Difference in capital market development			
Difference_Market_To_GDP	-0.173***		
	(-4.012)		
Difference_Turnover		-0.160***	
		(-4.103)	
Differecne_Stock_Trade_To_GDP			-0.067***
			(-4.001)
Control for			
Exchange characteristics	Yes	Yes	Yes
Macroeconomic variables	Yes	Yes	Yes
Technological_Integration_Dummies	Yes	Yes	Yes
Same_Language	Yes	Yes	Yes
Same_Legal_System	Yes	Yes	Yes
Country effect	Yes	Yes	Yes
Year effect	Yes	Yes	Yes
Adjusted R-squared	0.21	0.22	0.21
No. of observations	116	116	116

Table 7: Cross-sectional Analysis of CARs upon Announcement Controlling for the Difference in Governance

The dependent variable is the stock exchange competitor's three-day cumulative abnormal return (CAR) in percentage points. Variable definitions are given in Appendix. In brackets are t-statistics based on standard errors adjusted for heteroskedasticity and country clustering. *, ** and *** stand for significance at the 10%, 5% and 1% level respectively.

Dependent variable	Competitor's CAR[-1,1]	
	(1)	(2)
Deal characteristics		
Horizontal	-0.324***	-0.412***
	(-3.999)	(-4.013)
Cross_Region	-0.312***	-0.302***
	(-5.001)	(-4.012)
Difference in capital market development		
Difference_Turnover	-0.035***	-0.036***
	(-3.992)	(-3.783)
Difference in governance		
Difference_Shareholder_Protection	- 0.021***	
	(-3.903)	
Difference_Accounting_Standards		-0.102***
		(-2.981)
Control for		
Exchange characteristics	Yes	Yes
Macroeconomic variables	Yes	Yes
Technological_Integration_Dummies	Yes	Yes
Same_Language	Yes	Yes
Same_Legal_System	Yes	Yes
Country effect	Yes	Yes
Year effect	Yes	Yes
Adjusted R-squared	0.23	0.25
No. of observations	116	116

Table 8 Announcements of stock exchange M&As and alliances in MENA region

This table presents the MENA sample distributions by type of integrations.

No.	Name of stock exchange	Country
1	Amman Stock Exchange	Jordan
2	Cairo & Alexandria Stock Exchange	Egypt
3	Stock Exchange of Tunisia	Tunisia
4	Tel Aviv Stock Exchange	Israel
5	Abu Dhabi Securities Market	United Arab Emirates
6	Dubai International Financial Center	United Arab Emirates
7	Saudi Stock Market Tadawul	Saudi Arabia
8	Bahrain Stock Exchange	Bahrain

Panel A: List of stock exchange in MENA region

Type of integration activities	Number of announcements	Percentage of total
M&A	1	5.26
Joint Venture	2	10.53
Non-equity alliance	16	84.21
Horizontal	16	84.21
Vertical	3	15.79
Cross-region	15	78.95
Within-region	4	21.05

Panel B: Distribution of stock exchange integration activities by type

Type of technological integration	Number of announcements	Percentage of total
Outsourcing	3	15.79
Common access	1	5.26
Common systems	0	0.00
Common operation	1	5.26
Complete system integration	0	0.00
Other type of integration	14	73.68

Panel C: Distribution of stock exchange integration activities by type of technological integration

Table 9: Cross-sectional Analysis of CARs upon Announcement in MENA Region

The dependent variable is the stock exchange competitor's three-day cumulative abnormal return (CAR) in percentage points. Variable definitions are given in Appendix. In brackets are t-statistics based on standard errors adjusted for heteroskedasticity and country clustering. *, ** and *** stand for significance at the 10%, 5% and 1% level respectively.

Dependent variable	Competitor's CAR[-1,1]	
	(1)	(2)
Deal characteristics		
Intergration_Type	-0.147*	-0.133*
	(-1.892)	(-1.901)
Horizontal_Integration	-0.316***	--0.315***
	(-4.892)	(-4.214)
Cross_Region	-0.342***	-0.302***
	(-5.004)	(-4.114)
Difference in capital market development		
Difference_Turnover	-0.051***	-0.041***
	(-4.156)	(-4.561)
Difference in governance		
Difference_Shareholder_Protection	-0.021***	
	(-3.904)	
Difference_Accounting_Standards		-0.132***
		(-3.562)
Control for		
Competitor Dummy	Yes	Yes
Exchange characteristics	Yes	Yes
Macroeconomic variables	Yes	Yes
Technological_Integration_Dummies	Yes	Yes
Same_Language	Yes	Yes
Same_Legal_System	Yes	Yes
Country effect	Yes	Yes
Year effect	Yes	Yes
Adjusted R-squared	0.24	0.25
No. of observations	92	92

Appendix: Definitions of the Variables

Variables	Description
Exchange performance measures	
Competitor's CAR [-1, 1]	The stock exchange competitor's three-day cumulative abnormal return (in percentage points) calculated using the market model as shown in Equation (1)
Deal characteristics	
Intergration_Type	It is equal to 3 if the deal is an M&A, 2 if the deal is a joint venture, and 1 if the deal is a non-equity alliance
Horizontal_Integration	It equals 1 if the deal is a horizontal transaction, otherwise 0
Cross_Region	It is equal to 1 if the deal is a cross-region transaction, otherwise 0
Technological_Integration_Dummies	Dummy variables to indicate the various types of technological integration including outsourcing, common access, common systems, common operations, complete system integration, and other type of integration.
Exchange characteristics	
Total_Assets	The stock exchange's total assets
Cash_Flow	Operating income before depreciation minus interest expenses minus income taxes minus capital expenditures, scaled by total assets
Leverage	Total liabilities scaled by total assets
Tobin's Q	Market value of assets over book value of assets
Macroeconomic development variables	
GDP_Per_Capita	GDP per capita
GDP_Growth	Annual GDP growth
Difference in language and legal environment	
Same_Language,	It equals one when two partnering stock exchanges' countries share the same language and zero otherwise
Same_Legal_System,	It equals one when two partnering stock exchanges' countries share the same legal origin and zero otherwise
Difference in capital market development	
Difference_Market_To_GDP	The difference in the market capitalization of listed stock scaled by GDP between the partner stock exchange' country and the sample stock exchange's country
Difference_Turnover	The difference in the stock traded turnover ratio between the partner stock exchange' country and the sample stock exchange's country
Difference_Stock_Trade_To_GDP	The difference in the total value of stock traded scaled by GDP between the partner stock exchange' country and the sample stock exchange's country
Difference in governance	
Difference_Share_Holder_Protection	The difference in the shareholder protection index (the product of the shareholder rights index and the efficiency of the legal system) between the partner stock exchange' country and the sample stock exchange's country
Difference_Accounting_Standard	The difference in accounting standard index between the partner stock exchange' country and the sample stock exchange's country