

# **Impact of Cross-Border Mergers and Acquisitions on Shareholders' Wealth: Does Idiosyncratic Risk Matter!**

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**Abstract:** This paper explores the extent to which Idiosyncratic risk of the target increases acquires' shareholders wealth in cross-border takeovers. Using a sample on 15,619 cross-border takeovers, we find that cross-border add value to target firms stockholders. Our results show that the well documented superior acquirer gains in cross-border deals do not persist for firms with low idiosyncratic risk. We point out a transfer of risk from the target firm to the bidder, mainly in deals involving private target. We suggest that under information asymmetry concerning the bidder, the market reaction to a cross border deal is mainly led by the fact that acquirer's stock is underpriced, rather than deal's synergy potential.

**JEL classification:** G32, G34, F36.

**Keywords:** Mergers and acquisition, Cross-border, Idiosyncratic risk.

## 1. Introduction

Financial markets have enjoyed spectacular growth in cross-border (CB) mergers and acquisitions during the last three decades. These operations are part of companies' external growth strategies and are often motivated by the search for synergies and the conquest of new markets. Mergers and acquisitions are often considered in theory and practice as events that increases short term and long term wealth of acquirers'. Recent evidence suggests that the announcement of an external growth operation leads to a strong reaction of the markets in response to changes in the information available on the target and foreign markets (Moeller, Schlingemann, and Stulz, 2007; Pontiff, 2006; Muller, 2011). Particularly, CB mergers and acquisitions involve high information asymmetry between the acquiring and target firms since not all investors have the same information on the target.

While our focus is on the relation between cross border mergers and acquirers abnormal returns, most previous studies find evidence that CB takeovers create more value to shareholders than domestic mergers and risk assessment problem raised as one of the factors determining the involving in a CB takeover. This study extends this debate in different ways. First, we test the impact of idiosyncratic risk on the likelihood of involving in CB takeover. Second, we examine whether idiosyncratic risk increase bidders short-term wealth. We use propensity score matching to control selection bias and to explore the important characteristics of cross-border acquisitions (CBAs).

The aim of this paper is to test the impact of acquiring firm's information environment on the short-run wealth effects of CB M&A deals. In accordance with the internalization theory, we show that CB acquisitions can, under certain conditions, achieve significant synergies and create short-term value to bidders. Unlike their domestic performance, these companies are able to generate sufficient value to meet the expectations of the financial markets, given the risks involved, and to achieve higher levels of return than those made on the same domestic market.

Our study contributes to a growing literature exploring the importance of finance in cross-border investment. In previous studies, the examinations on the determinants of cross-border mergers and acquisitions are mainly focused on the aggregate or country factors, such as taxation advantage (Manchin, 2004), favorable foreign government policy (Harris and Ravenscraft, 1991), credit and market expansion (Gonzalez, Vasconcellos, Kish and Kramer, 1997), exchange rate appreciation (Erel, Liao, and Weisbach, 2012; Vasconcellos, Madura, & Kish, 1990), low geographical distance, or similar cultural background (Erel et al., 2012; Uysal, et al., 2008). This study fills the gap and provides international evidence of the impact of idiosyncratic risk on the likelihood of involving in CB takeovers. In so doing, it is the first to explore the effects of the acquiring firm's information environment on CB deals.

Interestingly, our results show that the well-documented superior acquirer gains in CB deals relative to domestic deals is more significant for increased idiosyncratic volatility in the

acquiring firm's equity value. In contrast, under low idiosyncratic volatility the above effect is insignificant.

The rest of the paper is organized as follows. Section 2 reviews the literature related to idiosyncratic risk and stockholders wealth in CB deals and develops hypotheses. Section 3 introduces our research method and present main factors affecting CB acquisitions. Section 4 describes the sample and presents our univariate analysis findings. Section 5 presents our multivariate analysis results. Lastly, Section 6 concludes.

## **2. Does idiosyncratic risk affects Stockholders wealth in CB deals?**

In this study we hypothesize that involving in CB takeovers is a non-neutral choice. Cross-border deals involve high information asymmetries and entail higher risks for stakeholders' compared to domestic deals (Moeller, Schlingemann, and Stulz, 2007). Information asymmetries consistently increase acquirer's shareholders risk and must consequently be rewarded for the risk they take. The asymmetries of information explain the risk-sharing attitudes of the buyer and the seller, and consequently the choice of CB merger (Berkovitch and Narayanan, 1990).

### *2.1. CB takeover and short term stockholders wealth*

The announcement of a CB takeover may be source of random market reaction according to the quality of information available on the target. Furthermore, foreign markets imperfection may explain the decision of CB mergers or acquisition. Eun et al. (1996) point out that cross-border takeovers generate value to bidders shareholders, especially when the managers of the acquiring company are able to take advantage of foreign market imperfections. Based on the hubris hypothesis as explanation of corporate takeover, Roll (1986) highlights the pride of the acquirer's manager and his arrogance in being convinced that his generous assessment of the target is only a correction of the undervaluation of the markets. Consequently, there will be an excess of payment and therefore a loss for the shareholders of the acquiring firm because of the "myopia" of its leaders (Berkovitch and Narayanan, 1993).

Hu and Yang (2016) find that cross-border M&As affect the value of shareholders of acquirers and target companies in different ways. They show that Acquirers usually earn positive short-term abnormal returns and negative long-term abnormal returns. Lodrer and Martin (1992) analyzed 304 mergers and 155 acquisitions between 1965 and 1986 to try to ascertain whether the long-term underperformance of CB acquirers is a real phenomenon or whether this result is due to methodological considerations. After controlling for the size effect, they find significant negative abnormal returns for the 3 years following the transaction and negative abnormal returns but not significant for the years. In the same context, Gugler et al. (2003) find that cross-border acquisitions have a significant impact on post-acquisition operational performance. In light of the above discussed arguments, we draw the following hypothesis.

**H1.** Shareholder wealth increases the likelihood of CB takeover.

## *2.2. CB takeover, high Idiosyncratic risk and short term stockholders wealth*

In mergers and acquisitions literature idiosyncratic risk is supposed to reflect the quantity of private information incorporated into stock prices. Moeller, Schlingemann, and Stulz (2007) make evidence that the acquiring firm's idiosyncratic stock return volatility constitutes a reliable observable reflecting the extent of information asymmetry between managers and outside investors. It has been recognized in the literature that idiosyncratic volatility has something to do with private information being impounded in stock prices.

Using a five factors model, Roll (1988) documents that idiosyncratic changes in stock price are affected more by information than by noise, even on days with no identifiable public information. He suggests that idiosyncratic volatility is an adequate proxy of private information of the firm.

In this study we hypothesize that if the market's reaction to Cross Border deals is sensitive to the release of acquirer-specific information, the comparative performance of CB deals to domestic deals should differ across high and low sigma. Specifically, high sigma acquirers should enjoy greater short-run abnormal returns when announcing CB deals relative to domestic deals financed. As increased asymmetric information over small acquiring firms is likely to imply undervaluation, the above suggest that CB deals with high sigma acquirers may also serve their managers' unwillingness to mitigate the inherent valuation risk with underpriced equity. Furfine and Rosen (2011) show that increase in wealth of CB deals is partially explained by a transfer of risk from the target firm to the bidder. Maqueira, Megginson and Nail (1997) argue that the risk transfer is more likely to occur when the target belong to an industry that is more risky than the bidder's industry.

As increased asymmetric information over small acquiring firms is likely to imply undervaluation, the above suggest that the release of information during their announcement reduces information asymmetry and enables market participants to better assess the acquiring firm's true value and growth prospects. Accordingly, acquirers' announcement period abnormal equity gains should represent 'the economic benefit of the acquisition for the shareholders of the acquiring firm together with the stock-price impact of other information released or inferred by investors when firms make acquisition announcements' (Moeller, Schlingemann and Stulz, 2004). Focusing on US markets, Durnev, Morck, and Yeung (2004), and Wurgler (2000) show that stock prices of firms with high levels of idiosyncratic volatility are more indicative about future firm incomes.

Higher idiosyncratic volatility would be associated with higher stock price transparency and more informative earnings prospect of the company. Thus, private information explanation conjectures a positive relationship between acquirer firms' idiosyncratic volatility and short term shareholders abnormal returns. Better information transparency, resulting from the incorporation of private information into the stock price of the target firms may yield to higher premium to acquiring firms. Following from the foregoing and the stock price informativeness and informed trading argument, we present the following hypothesis on acquisition premium.

**H2:** CBA deals outperform domestic deals under high acquirer idiosyncratic risk.

### 2.3. CB takeover, private target and short term stockholders wealth

Cross border mergers and acquisitions of private targets have not been widely studied in the literature. Though, they form a substantial part of M&A markets that distinguish by their specific financial reporting that differ from public companies' reporting quality (Ball and Shivakumar, 2005; Hope, Thomas and Vyas, 2013).

The literature provides evidence that idiosyncratic risk is higher for private companies which should increase significantly abnormal returns of acquirer stockholder in cross border merger. Muller (2011) investigates whether the owners of private companies require a compensation for their risk exposure. Idiosyncratic risk is measured as the share of the owner's net worth invested in the company. She found a positive and significant influence of exposure to idiosyncratic risk. Heaton and Lucas (2000) used consumption-based model to argue that private company are less likely to have access to informal information when they contract with other parties. Jones and Rhodes-Kropf (2004) propose a theoretical model to analyze the role of idiosyncratic risk for the pricing of investments. They suggest that the opportunity to create value via cross-border deals with private target should be substantially more important for acquirers with high idiosyncratic risk.

Most previous studies argue that private firms, on average, have higher information asymmetry than public firms. They are usually more closely held, and stockholders of the firms play an important role in management, leading to stricter monitoring of the managers (Ball and Shivakumar, 2005). Furthermore, private companies are less likely to have access to private information when contracting with other parties. Therefore, private companies entail higher information asymmetry between managers and investors by providing insider access. Based on the above our third hypothesis is the following:

**H3:** The positive reaction of the market to cross border merger is stronger in the case of high acquirer idiosyncratic risk of private target.

### 3. Research approach and methods

In this section we present the measurement of Abnormal Returns of acquirers and we present in details the determinants of short term abnormal returns from Cross Border Mergers and Acquisitions.

#### 3.1. Measurement of Abnormal Returns and Univariate Analysis

To examine the impact of CB merger and acquisition on short term stockholders wealth we use the event study methodology. It consists of calculating the abnormal returns in a window of observation around the event studied. Brown and Warner (1985) show that the calculation of abnormal returns is robust to the choice of the generating model. Thus, the abnormal returns can be estimated by three different models: *the mean adjusted excess return model*, *the market adjusted excess return model* and *the market model adjusted excess return model*. Consistent with several previous studies (Fuller et al., 2002; Faccio et al., 2006), we estimate abnormal returns of the acquiring firms' shareholders using the market-adjusted model:

$$AR_{i,t} = R_{i,t} - R_{m,t}$$

Where  $AR_{i,t}$  is the abnormal return of the acquirer firm  $i$  at  $t$ ,  $R_{i,t}$  is the return of the stock of firm  $i$  at  $t$ .  $R_{m,t}$  is the value market return of the market index at  $t$ .

To calculate abnormal returns (CAR), we aggregate the abnormal returns in the 5- day window in the announcement period, we consider day  $t = 0$  as the announcement date.:

$$CAR_i = \sum_{t=-2}^{t+2} AR_{i,t}$$

Our study is conducted on a univariate and multivariate analysis. In the univariate analysis we examine mergers and acquisitions by types of takeovers and payment method (ALL, CB, domestic, CASH, STOCK) and target listing status (private-PRV, public-PUB, subsidiary-SUB). The analysis is further expanded by examining the above interactions within high and low sigma.

To determine whether the impact of CB announcement period abnormal returns also reflects the acquisition's expected synergy potential, and not solely the effects of acquirer-related release of information we use logistic based propensity score matching approach. This approach helps us address these concerns and enhance our understanding of the wealth implications of CB mergers and acquisitions. The multivariate analysis use OLS regression to test the impact of idiosyncratic risk on acquirers' wealth.

### *3.2. Determinants of short term abnormal returns from Cross Border Mergers and Acquisitions*

In our multivariate analysis we explore the determinants of abnormal returns from CB deals. We based our analysis on a set of specific variables of the deal and acquirers.

#### *Acquirer's idiosyncratic risk*

In this study we hypothesize that CB's decision is not arbitrary and involve risk assessment of the target. In literature only few studies have been conducted to explore the direct impact of idiosyncratic volatility on abnormal bidders' returns. Pontiff (2006) find that rational arbitrageurs are likely less encouraged to invest in securities with high idiosyncratic risk even if their capital is not limited. Therefore these securities are more disposed to mispricing. Focusing on the US market, Ang et al (2006) find a strong negative relationship between idiosyncratic volatility and average long term returns. Muller (2015) demonstrates the significance of a firm's sigma in shaping the distribution of announcement period abnormal returns accrued to the acquiring firms' shareholders. She shows that short selling constraints, proxied by the idiosyncratic volatility of the acquirer's shares, explain significantly the wedge in shareholder gains.

We estimate sigma as the standard deviation of the residuals from a market model regression estimated from 205 days before the announcement to six days before the announcement of the deal.

### *Deal size*

Most previous studies find evidence that the relative size of the target have significant effect on short term gains of CB deals acquirers. But the debate is not yet concluded whether the impact is positive or negative. Markides and Ittner (1994) and Erel, Liao and Weisbach (2012) find that the deal size has significant and positive impact on the gains of foreign bidders. On the other hand, Eun, Kolodny, and Scheraga (1996) find a significant and negative relationship between deal size and acquirer abnormal returns during the announcement period.

### *Acquirer's age (AGE):*

Most previous studies noticed a positive relationship of firm age with abnormal return (Sapienza, Autio, George and Zahra, 2006; Gubbi et.al., 2009, ...). The firm age has been evoked in previous studies in terms of experience and expansion potential, as it may have an impact upon survival and growth of the firm. With age, the firms develop relationships, and strategies necessary to efficiently involve in international expansion policies. Alternatively, young firms have limited willingness to engage in international expansion. In this study we measure the firm age as the difference between the year of deal announcement and the year of creation of the firm.

### *Target status*

Most previous studies suggest that mergers or acquisitions of private firms significantly add value to acquires stockholders (Conn, Cosh, Guest and Hughes, 2005; Gubbi et. al., 2009,...). This may be explained by the fact that large public firms are better reputed in financial markets. As a result, the cost of the transaction increases affecting returns on the market, which ultimately hurts the wealth of shareholders of the acquiring firm. Contrary, Draper and Paudyal (2006) show that targeting a private firm is more likely to reduce agency problems and strengthen negotiation power of the target. The private target company extracts a higher price leaving the bidder disadvantaged.

### *Payment mode*

Payment mode is one of the most issues that have interested researchers working on M&As. Several theories and numerous models have been developed by researchers, both to explain the choice of payment method but also its impact on bidders' abnormal returns. The models of information asymmetry were developed by Hansen (1987) and Fishman (1989) and are based on the work of Myers and Majluf (1984). These models therefore predict a positive market response to the announcement of a cash offer and a negative reaction to the announcement of a stock offer. Travlos (1987), Brown and Ryngaert (1991), and Loughran and Vijh (1997) among other, find that when the deal is financed all in cash, short term abnormal returns of bidders increase. These studies also give evidence that all stock mergers fare significantly poorly. Using a sample from

the technology sector Kohers and Kohers (2000) found that cash payment significantly increase abnormal acquirers returns. It is a bit difficult here to make a prediction on whether this will be significant or not for the current sample under study. The studies that found all cash deals to be a significant indicator did not focus on the technology industry, and the study that did found no relation between all cash deals and returns. For this study, a dummy variable called CASH is set equal to 1 if the consideration is all cash and 0 otherwise.

#### *Asset intangibility*

Another characteristic that needs to be noticed is intangibility (Swenson 1993, Moran 2001, Marr et al. 2006,...). Intangibility is seen as the most valuable in the context of a developed acquirer and a developing target transaction. Using the patent intensity as a measure for the intangibility transfer among the two parties Chari et al. (2010) suggest that the positive effect of acquirer intangible asset intensity on abnormal returns indicate that acquirers want to leverage their existing knowledge assets through an acquisition of a developing country firm. A cross border merger may allow multinational firms to establish their brands or monetize their intellectual property in developing markets where competitive intensity is limited relative to developed markets. We include asset intangibility to assess the extent to which cross border mergers are undertaken to leverage acquirer knowledge assets or gain access to the intellectual property of the target.

#### *Cross industry diversification*

The diversification across industries has also been identified as one of the factors affecting acquirers' wealth. It is generally accepted that horizontal alliances create more value than conglomerates. Indeed, the expertise and familiarity of the management team with the industry facilitate productivity gains (Healy, Palepu and Ruback, 1997). Thus, the probability of success of conglomerates is lower given the ignorance of the leaders of the new sector of activity. This explains why conglomerates create less added value to stockholders. Several studies support this hypothesis, notably DeLong (2001) and Moeller and Schlingemann (2005). On the other hand, other works such as Agrawal et al. (1992) argue that diversification across industry benefit from a greater size and visibility of more advantageous access to capital, which reduces the risk of bankruptcy. The empirical results of Kruse et al. (2007) and Ghosh (2001) demonstrated that conglomerates outperformed horizontal deals.

#### *Cash and Firm Leverage*

According to Jensen's Free Cash Flow (FCF) theory (1986), acquiring firms with excessive FCF are more likely to be involved in bad acquisitions, and consequently can lead to low performance post-acquisition Harford (1999) and Moeller and Schlingemann (2004). On the other hand, Carline et al. (2009) find a negative but not significant effect on the long-term performance of bidders.



Jensen (1986), Harris and Raviv (1990) and Stulz (1990) find that debt has a positive impact on abnormal bidders' returns since it reduces agency phenomena and increases supervisory power. The results on the relationship between firm leverage and short term performance remain inconclusive. Harford (1999) and Ghosh and Jain (2001) confirm the positive relationship between firm leverage and post-acquisition performance, while Clark and Ofek (1994), Switzer (1996), Linn and Switzer (2001) find no significant relationship between debt level of the firm and post-acquisition performance.

#### 4. Data, descriptive statistics and univariate analysis of Acquirers' Abnormal Returns

To analyze the relation between cross boarder acquisition and the acquirer's acquisition announcement abnormal return, we collect a sample data on 15619 M&A transaction of US listed acquirers from the Securities Data Company's (SDC) Mergers and Acquisitions Database. Our data consists of 2198 Cross border mergers and acquisition and 13421 domestic mergers and acquisitions. Our sample contains only successful acquisition announcements and covers the period 1986-2015. To ensure consistency our data includes all private and public target transactions and remove firms in the financial (SIC codes 6000-6999) and utility sectors (SIC codes 4900-4999). To avoid the insignificant effects of very small deals, we select only deals with deal value of at least \$1m. To calculate abnormal returns and idiosyncratic risk, all acquires' firms are listed, while no restriction on the listed statue of the target.

Table 1 reports the total number of deals and the total transactions of the completed CBAs in the sample. The number of mergers and acquisitions increased considerably in the period 1996-2010. The deal transaction values substantially increased in mean during the period 1996-2005, suggesting large merger and acquisition transactions during this period. The number of cross border deals decreased since 2011 in number and in deal value. This may reflects the impact of the last financial crisis on the orientation of firms towards internationalization. transactions. However the abnormal returns increased substantially since 1991. They reached their highest level during the period 2011-2015 exceeding 1.8%.

**Table 1. Distribution of Mergers and Acquisitions, Deal values and abnormal returns.** This table displays the distribution of our sample of acquisitions across different periods from 1986 to 2015. The total number of acquisitions is 15,619. Panel A reports the distribution of the full sample as well as the distribution of corss borders M&A across periods. Distribution of deals values are presented in Panel B along with the distribution of CAR(-2,+2). CARs are the aggregate of the abnormal returns in the 5- day window in the announcement period.

Panel A. Number of deals and CBA					Panel B. Deal value and CAR (-2,+2)			
Year	Number of deals		Number of CBA		Deal value		CAR(-2, +2)	
	N	Percent (%)	N	Percent (%)	Mean	Median	Mean	Median
1986-1990	1296	8.30%	211	9.60%	216.74	115.26	0.84	0.52
1991-1995	2187	14.00%	319	14.51%	327.94	205.62	1.12	0.65
1996-2000	3151	20.17%	425	19.34%	782.13	369.67	1.45	0.81
2001-2005	3972	25.43%	472	21.47%	742.49	316.83	1.35	0.76

2006-2010	3514	22.50%	482	21.93%	642.61	225.43	1.29	0.53
2011-2015	1499	9.60%	289	13.15%	528.29	210.86	1.83	0.79
<b>Total</b>	15,619	100.00%	2,198	100.00%				

Table 2 reports descriptive statistics on acquirer, target and deal characteristics for the completed sample. In line with previous studies, the table shows that the majority of US Mergers and acquisitions have private target (Moeller et al., 2004). Acquisitions of privately-held companies account for (49%) of total transactions. Most of previous studies demonstrate that bidders of private firms outperform acquirers of public firms and lead to significantly higher abnormal returns. The announcement of an acquisition of a private firm is generally less exposed to investor enquiry and public control. In contrast, public acquisitions are generally more exposed to public supervision. This could result in either managers' hubris or their fear of a loss of image. In both cases, higher premiums are paid, driving poor acquisitions. This attitude is less likely to occur in private bids.

Consistent with previous studies on cross-border deals, we observe that most of deals are domestic deals (85.93%), while, only 14.07% of deals are cross border transactions. Panel A shows that most of cross border deals consists of acquisition of private target (75.39%). Most deals are financed in cash (42.46%) and only 27.83% financed by stocks. Previous researches (Guest et al., 2005; Ruiz, and Requejo, 2011; Barbopoulos et al. 2012,...) suggest that the low environment of the target matters in cross-border transactions. Our sample shows that more than 90% of CB deals consist of acquisition in countries using common law.

Panel B of table 2 shows that the cumulative average abnormal return is positive for 2 days event windows (1.28). In line with our main hypothesis, we find that bidders earn higher abnormal returns in cross-border than in domestic acquisitions' in our event window. CB deals have higher cumulative abnormal return (1.97%) than Non CB mergers (1.16%). This result is consistent with the information asymmetry hypothesis (Bhagat, Malhotra and Zhu 2011, Durand, Laing, and Ngo 2016,...). This is in line with previous result of Doukas and Travlos (1988) and Francis et al. (2008) who find US bidders outperform cross-border acquisitions. Moreover, bidding firm shareholders gain more in equity (1.26%) than in cash offers (0.76%).

Acquirer Idiosyncratic risks are higher for CB deals (3.37%) than for domestic merger (2.96). This supports our hypothesis that idiosyncratic risk increases the likelihood of CB mergers and Acquisitions. Panel B shows also that cross borders transaction are made on firms with higher market to book value.

**Table 2. Acquirer, Target and Deal Characteristics.** Panel A reports descriptive statistics of deals and targets for all deals, cross border and domestic M&As, cash deals (CASH) and stock deals (STOCK). *DV* is the deal's transaction value (in \$mil.); *RS* corresponds to the relative size of the deal (=deal value/acquirer's market value 20 days prior to the deal's announcement); *IND* is a dummy variable that stands for cross industry deals, it takes 1 if bidder and target do not share the same two-digit SIC code and = 0 otherwise. *PRV*, *PUB* and *SUB* correspond to deals involving private targets, public or subsidiary targets, respectively. *INT* is a dummy variable, 1 if the deal involving targets operating in intangible-rich sectors and 0 otherwise. *COMMON* is a dummy variable, 1 if the deal involving target operating under a Common Law legal framework and 0 otherwise. Panel B reports acquirer characteristics under CB and domestic acquisition type as in Panel A. *MV* is the acquiring firm's market capitalization (measured 20 days prior to the deal's announcement); *MTBV* is the acquiring firm's market-to-book ratio (measured 20 days prior to the deal's announcement); *CASH RATIO* is cash and cash equivalents to total assets ratio. *DEBT* is the acquirer's debt to equity ratio; *AGE* corresponds to the Age of the acquirer; *SIGMA* corresponds to the acquirer firm's idiosyncratic stock return volatility (measured as in Moeller et al., 2007); *HIGH SIGMA* is a dummy variable that takes 1 if the deal is in the fourth quartile levels of sigma; *LOW SIGMA* is a dummy variable that takes 1 if the deal is in the first quartile levels of sigma; *CAR* stands for the 5-day (-2,+2) announcement period acquirer cumulative abnormal return.

**Panel A: Deal Characteristics**

	All		CB		Non CB		CASH		STOCK	
	Mean	Median (% of N)	Mean	Median (% of N)	Mean	Median (% of N)	Mean	Median (% of N)	Mean	Median (% of N)
Deal Value (DV)	567.12	73	204.74	82	621.93	63.4	291.72	63	619.85	72.9
Deal's relative size (RS)	32.17	8.2	21.94	12	34.15	9.2	19.26	7.21	36.05	9.5
Cross Industry (IND)	7,219	43.12%	549	42.13%	6,670	41.93%	2,386	37.12%	1,453	39.61%
Private target (PRV)	7,318	49.13%	914	75.39%	6404	42.40%	2619	43.84%	2027	52.15%
Subsidiary target (SUB)	4,198	29.37%	291	23.12%	3,907	31.18%	2,614	36.72%	315	9.33%
Public target (PUB)	4103	27.31%	993	26.40%	3,110	31.00%	1,287	21.64%	1,742	45.61%
Target in intangible sector (INT)	6,417	42.73%	713	11.11%	5,704	41.22%	2,819	42.79%	1,610	42.81%
Target in Common law (COMMON)	14,892	95.35%	1,981	90.13%	12,911	96.20%	6,018	94.56%	3,703	97.19%
Number of observations (N)	15,619	100%	2,198	14.07%	13,421	85.93%	6,364	42.46%	3,810	27.83%

**Panel B: Acquirer Characteristics**

Market value (MV)	6,819.1 2	738.19	4,287.92	891.64	3,969.13	432.26	3,312.34	497.13	4,104.8 1	732.92
market-to-book value (MTBV)	3.925	2.38	4.02	2.98	3.71	2.45	3.75	2.51	4.86	2.39
Liquidity (CASH_RATIO)	0.28	0.12	0.31	0.18	0.29	0.18	0.24	0.11	0.58	0.27
Debt-to-equity ratio (DEBT)	129.81	54.87	119.56	24.75	134.84	76.98	127.45	61.24	126.92	49.21
Acquirer (AGE)	4,932	3,810	4,321	3,372	4,912	3,921	5,429	3,893	4,319	3,197
Idiosyncratic volatility	2.89	2.16	3.37	2.98	2.96	2.13	2.83	2.17	3.58	2.18
CAR	1.28	0.53	1.97	0.96	1.16	0.52	0.74	0.43	1.26	0.67

**Univariate analysis of acquirers' abnormal returns**

Panel A of Table 3 report main results of our univariate analysis according to the method of payment and the target firm's listing status for all deals.

The results show that CB mergers create on average higher abnormal returns, relative to domestic mergers and acquisitions, extending the well-documented evidence regarding the suitability of CB deals subject to substantial valuation risk. Involving private targets, CB M&As

are illustrated to significantly outperform their CASH-financed counterparts by 0.75%. Furthermore, consistent with information asymmetry models (Ruiz, , and Requejo 2011), panel B shows that high sigma stock acquirers of public targets have very low abnormal returns. In contrast, high sigma acquirers of private and subsidiary targets and high sigma cash acquirers of public targets enjoy important abnormal returns during the announcement of the deal.

Deals with high sigma target have higher abnormal returns (3.09%) than deals with low sigma target (1.61%).

The results reported in Panel B are consistent with Hypothesis H2 and show that under high sigma, CB deals generate significantly more value to stockholders', relative to domestic, CASH and STOCK counterparts. Specially, our results illustrate that under high acquirer sigma the well-documented superior performance of CB deals over domestic deals becomes more pronounced. Similarly, CB deals subject to increased valuation risk (i.e. involving private targets) significantly benefit acquirers' shareholders, relative to low risk targets.

Therefore, the joint analysis of panel B and Panel C reveals that under high sigma, CB deals of private targets appear to be heavily influenced by the extent of information on the under-valued equity of the acquiring firm. This involves a positive market reaction, which matches that of similar cases in which the market would also infer that the acquirer's equity is undervalued, such as cash- or stock- financed deals involving private targets.

Panel C shows that under low acquirer sigma, cross border takeovers significantly outperform domestic deals by 1.36%. Moreover, under low sigma, CB acquisitions of private targets significantly outperform Cash and Stock takeover deals by 0.67% and 0.85%, respectively. Evidently, Cross border deals of private targets expose the acquirer to substantial valuation risk. For this type of takeovers acquirer-specific information release is not expected to be substantial. Specifically, our results suggest that CB takeover significantly enhances acquirers' gains under low information asymmetry over the acquiring firm. The above suggest that the market acknowledges the deal's increased synergy prospects resulting in positive reaction to the deal announcement.

Panel D reports differences in mean between abnormal returns deals involving high and low sigma acquirers. It's shown that private target deals generate greater announcement period gains for high sigma acquirers than for low sigma acquirers. This finding reveal the notable effect of information, leading the market to infer that the acquiring firm's equity is underpriced. However, our results suggest that high sigma <sup>2</sup>acquirers gain more from CB takeovers, relative to low sigma acquirers. Similarly, CB deals involving private targets generate greater returns for high sigma acquirers, than for low sigma acquirers. It is therefore likely that the positive wealth effect associated with the release of acquirer-specific information at the announcement of CB deals by high sigma acquirers is matched by the positive wealth effect of the revelation of expected synergies when low sigma acquirers announce domestic mergers and acquisitions.

**Table 3. Univariate Analysis of Announcement Period Abnormal Returns.** Panel A reports mean announcement period 5-day (t-2, t+2) cumulative abnormal returns for all acquisitions. The sample is distributed by target listing status (ALL, PRIVATE, PUBLIC SUBSIDIARY) and method of payment (ALL, CASH or STOCK). Panel B and Panel C present univariate analysis for High and Low Sigma, respectively. Panel D reports differences in mean abnormal returns between high and low acquirer sigma deals. *SIGMA* corresponds to the acquirer firm's idiosyncratic stock return volatility; The statistical significance of differences in returns between groups of acquirers is tested using the t-test for equality of means. \*\*\*, \*\*, and \* indicate significance at 1%, 5% and 10%, respectively.

<b>Panel A: ALL Deals</b>									
		ALL	CB	NCB	CASH	STOCK	CB vs NCB	CB vs CASH	CB vs STOCK
<b>ALL</b>	Mean	1.28	1.97***	1.16	0.74*	1.26	0.96***	0.83**	1.57***
N		15,619	2,198	13,421	6,364	3,810			
<b>PRIVATE</b>	Mean	1.85	2.61	1.74	1.38	2.21	0.75***	0.94**	0.12*
N		7,318	914	6404	2619	2027			
<b>PUBLIC</b>	Mean	0.04	1.74**	1.15	0.62***	0.17***	0.16***	-0.02	-0.27
N		4103	993	3,110	1,287	1,742			
<b>SUBSIDIARY</b>	Mean	2.23***	2.34***	1.42***	1.92***	2.49***	-0.19*	1.03	0.06
N		4,198	291	3,907	2,614	315			
<b>Panel B: HIGH SIGMA deals</b>									
<b>ALL</b>	Mean	3.09***	3.41***	2.82***	2.48***	3.98***	0.17**	0.31	0.96
N		729	324	405	275	361			
<b>PRIVATE</b>	Mean	3.63***	3.49***	3.19***	2.39***	2.97***	0.34	-0.37***	0.82
N		521	217	304	164	295			
<b>PUBLIC</b>	Mean	0.12**	1.56**	1.06*	1.04***	1.73***	-1.96***	-0.62	0.37
N		82	23	59	21	42			
<b>SUBSIDIARY</b>	Mean	3.71***	3.84**	1.72***	2.71***	3.10***	0.62	-0.29	-1.41
N		126	49	77	25	84			
<b>Panel C: LOW SIGMA deals</b>									
<b>ALL</b>	Mean	1.61***	1.92***	0.37***	0.86***	1.05***	1.36***	1.16***	1.75**
N		594	211	383	371	86			
<b>PRIVATE</b>	Mean	1.83***	1.37***	0.62*	0.43**	0.97***	0.93**	0.67b	0.85b
N		317	106	211	228	41			
<b>PUBLIC</b>	Mean	0.79**	0.16*	0.45***	0.63**	0.95*	0.26	0.08	0.31
N		115	39	76	43	51			
<b>SUBSIDIARY</b>	Mean	1.35***	2.65**	0.53***	0.62***	1.63**	0.77***	1.37**	1.18
N		162	64	98	102	37			
<b>Panel D: HIGH vs LOW</b>									
<b>ALL</b>	Mean	2.24***	2.46***	1.53***	1.45***	2.52***			
<b>PRIVATE</b>	Mean	2.76***	2.84	1.38***	1.54***	2.63***			
<b>PUBLIC</b>	Mean	1.21	0.93***	0.55	1.72***	1.36**			
<b>SUBSIDIARY</b>	Mean	2.45***	2.78	1.98***	2.14***	2.36			

### ***Propensity score matching***

To deduce inferences on the causal impact of cross border takeovers decision on the wealth of acquirers' shareholders, it is common to compare the latter by pairs of groups of treated and untreated sample units.

In an experimental setting, these groups are randomly selected. However, in a non-experimental context, deductions of the causal effect of a decision (treatment) may be biased due to systematic self-selection of the sample. Thus, the effect of the type of merger on abnormal short-term returns of acquirers may be due to the pre-treatment characteristics of the treated groups rather than to the treatment per se. In addition, Moeller et al. (2004) and Draper and Paudyal (2006) suggest that the distribution of acquires' short-term wealth gains reflects not only the dissemination of information about the buyer and the revelation of expected synergistic gains. It is therefore necessary to determine how they affect the wealth gains generated by a CB merger in the context of a high and low acquirer sigma.

To address this concern, we apply PSM that allows for an unbiased causal inference by pairing treated (CB deals) and comparison sample units (domestic deals) based on observable pre-treatment characteristics and reviewing changes in gains during deal announcement period as the response random variable. We employ one-to-one nearest neighbor matching with replacement.

Figure 1 displays the distribution of propensity scores. It's shown that most of the unmatched individuals were in the lower (0.0 to 0.2) part of the propensity scores. However, there were a few unites in a higher range (0.2-0.4).

**Figure 1.** Propensity score distribution.

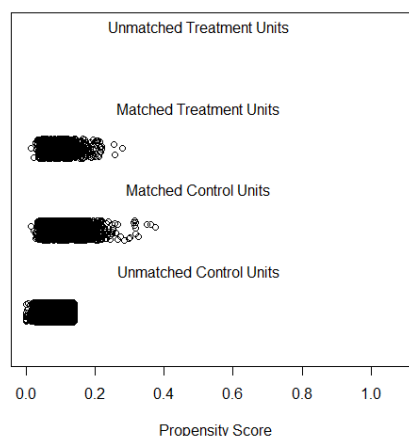


Figure 2 plots the Quantile-quantile (QQ) plots for the different covariates. It can be observed that expect, market to book value and deal relative size, most of covariate are balanced.

**Figure 2.** Q-Q plots of covariates from before and after propensity score matching.

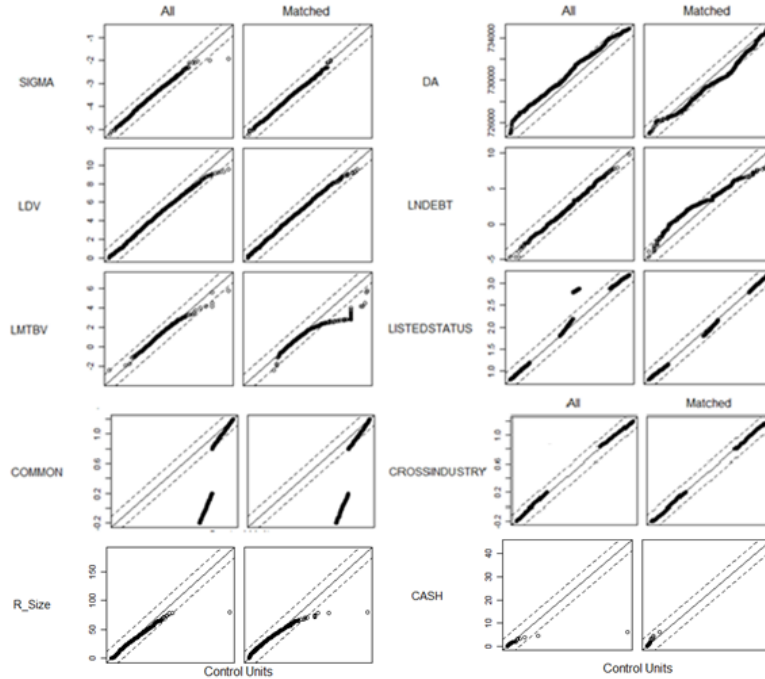


Table 4 reports main results of our PSM sequences on the treatment effect of CB within all deals, as well as within high and low acquirer sigma deals. Panel A illustrates the output of the logistic regression methodology with dependent variable CB takeover (1 if the deal is CB and 0 if the deal is a domestic deal) and by considering a set of explanatory variables. Our logit models are based on nested reduced-form estimations with various combinations of covariates. To capture variation due to the time period, we run year fixed effects regression.

The results of model 1 are consistent with Feinberg (1985) as well as Guest et al. (2005), suggesting that CB acquirers are more interested in private targets or targets operating in intangible-rich sectors and revealing the acquirer to substantial valuation risk. Furthermore, CB mergers with risky M&As is further verified as relative deals size increases the likelihood of CB takeovers and expose acquirers to substantial valuation risk and post-merger integration difficulties, which may lead to disagreements and affect the achievement of CB acquisition. The impact of deal size is more significant for high idiosyncratic risk acquirers. Leverage coefficient appears negatively significant implying that engagement in CB takeovers is less likely to occur for highly leveraged acquiring firms. This result illustrates potential targets' hesitation towards engaging in such CB deal under considerable leverage considerations. Furthermore, the estimations show that the acquiring firm's cash ratio has an insignificant effect on the probability of CB mergers. However, the target firm's legal framework appears to affect significantly and positively the occurrence of CB takeover. The idiosyncratic risk appears significantly positive in the three models, offering further credence to the suggestion that firms with high information

asymmetry are more likely to involve in CB deals because acquirers' stockholders will probably be rewarded by a significant increase in their market stock values.

Panel C illustrates the treatment effect (difference in average abnormal returns between treated and control groups) of CB deals. Model 1 shows that implementing a CB takeover yields, on average, 0.72% greater announcement period abnormal returns to acquirers' shareholders compared to domestic deals. Moreover, it appears that once reducing, to a great extent, selection bias considerations, the univariate effect of CB merger on acquirers' gains (Table 3, Panel A) is corrected downwards.

The balance of covariates between treated and control deals in our two matching sequences are reported Panel B. The results show good matching since the distribution of covariate become insignificant.

Panel C shows that, within high sigma, treated CB deals significantly outperform their matched counterparts. Evidently, once employing PSM and, hence, substantially reducing potential self-selection bias considerations, the insignificant difference in announcement period abnormal returns between CB deals and domestic deals, under high acquirer sigma (Table 3, Panel B), is further corrected downwards and rendered weakly statistically significant. In contrast, under low sigma, the above observation reverses as treated CB deals significantly outperform controlled domestic deals.



**Table 4. Propensity Score Matching.** Panel A reports the results of the logistic regression models of the occurrence of cross border acquisitions. Panel B illustrates the balance of covariates between treated and control deals in our matching sequences. Panel C presents mean 5-day announcement period cumulative abnormal returns (CAR) for treated and matched deals. \*\*\*, \*\*, and \* indicate significance at 1%, 5% and 10%, respectively.

<b>Panel A: Logistic Regression</b>			
	<b>CB ALL deals</b>	<b>CB HIGH SIGMA deals</b>	<b>CB LOW SIGMA deals</b>
Intercept	-7.231a	-6.736a	-11.893a
Acquirer volatility (SIGMA)	3.096a	0.039	4.531a
Relative size of deal (RS)	0.843***	0.934***	0.443*
Acquirer market-to-book (MTBV)	-0.174	-0.938a	-0.255b
Acquirer's trading history (AGE)	0.234	-0.836	0.732
Acquirer debt-to-equity (DEBT)	-0.678***	-0.519**	-0.03***
Private target (PRV)	0.937***	1.048***	1.721***
Cash ratio	0.179	0.042	0.125
Target in intangible-rich sector (INT)	0.471***	0.321	0.124
Cross Industry (IND)	0.265b	0.714a	0.056
Target Common Law (COMMON)	0.073***	0.128***	0.033*
Year fixed effects (YFE)	Yes	yes	yes
R-Squared (in %)	21.16	17.27	13.52
H-L Goodness of Fit test	12.95	16.72	8.95
Mean VIF	1.23	1.27	1.24
N	15,619	729	594

<b>Panel B: Covariate Balance</b>									
	<b>CB ALL deals</b>			<b>CB HIGH SIGMA deals</b>			<b>CB LOW SIGMA deals</b>		
	CBA Treated	NCBA control	Diff. treated vs control	CBA treated	CBA control	Diff. treated vs control	CBA treated	NCBA control	Diff. treated vs control
Acquirer volatility (SIGMA)	0.162***	0.173***	0.013	0.218***	0.126***	0.001	0.014***	0.014***	0.000
Relative size of deal (RS)	-1.837***	-1.982***	-0.154	-1.766***	-1.956***	-0.044	-3.121***	-3.102***	-0.019
Acquirer market-to-book (MTBV)	1.912***	1.792***	0.135	1.392**	0.592***	0.015	0.868***	0.874***	-0.006
Acquirer's Age (AGE)	1.035	1.522	0.002	4.372***	5.842***	-0.002	4.483***	3.431***	0.052
Cross Industry (IND)	1.384	1.497	0.000	1.432	1.905***	0.021	2.452	1.239	0.071
Acquirer debt-to-equity (DEBT)	4.963***	66.288***	-0.027	1.257	0.253***	0.000	1.329	0.031	0.000
Private target (PRV)	214	873	0.000	523***	124***	0.013	237***	291	0.120
Target in intangible-rich sector (INT)	0.452	0.135***	0.000	255***	186***	0.193	98***	65	0.052
Target Common Law (COMMON)	1297***	1231	0.082	492	504	0.134	176	225	0.000

<b>Panel C: Differentials Treated VS Matched M&amp;A Deals</b>			
	<b>CB ALL deals</b>	<b>CB HIGH SIGMA deals</b>	<b>CB LOW SIGMA deals</b>
Mean CAR Treated (in %)	1.95***	2.35***	1.19***
N	1231	698	385
Mean CAR Control (in%)	1.24***	2.69***	1.16***
N	1231	698	385
Mean (in%) Difference (Treated VS Control)	0.72**	-1.95***	1.07*

## 5. Multiple Regression Analysis of Short-Run Abnormal Returns

The multiple regression results of short-run abnormal returns of acquirers' shareholders are reported in table 5. By taking into consideration the impact of several factors, we test the impact of acquirer idiosyncratic risk on the announcement period market reaction to Cross Border takeovers.

The results confirm our initial hypothesis and show that acquirers earn a positive and significant increase in wealth when implementing Cross industry mergers and Acquisitions. Consistent with the results of Asquith, Bruner and Mullins (1983) and Fuller, Netter and Stegemoller (2002), the first five models show that large bidders' stockholders generally earn a significant positive return at the announcement of the deal. Deals involving private targets add values also to stockholders. In line with findings of Draper and Paudyal (2008), estimates suggest that young firms with a short trading history increase shareholders' value gains during announcement period of the deal. However, High market-to-book acquirers are found to decrease shareholders wealth. In line with Moeller et al. (2005), estimates show that firm leverage and liquidity ratio do not affect significantly acquirers' short-run wealth returns. Cash ratio appears significantly positive only for high sigma acquirers (model 6).

Furthermore, estimates reported in Model 2 illustrate that in deals exposing the acquirer to substantial valuation risk, as approximated by the relative size of the deal, the additional value gain earned by stockholders from CB is more significant. Model 3 shows that the cross border effect appears to be significant for private target companies. Consistent with Chang, 1998 and Fuller et al., 2002, the model indicates also that the positive effect of cross industry becomes insignificant for cross border deals.

To test the effect of idiosyncratic risk on cross border deal's market reaction, we include in our regression two dummy variables (HIGH\_SIGMA and LOW\_SIGMA). High\_sigma dummy variable equals one if the firm belong to the third quarter quartile of sigma distribution and zero otherwise. Low\_sigma take one if the firm belong to the first quartile and zero otherwise. The results of estimates are reported in models 4 and 5. It can be observed that acquirers' stockholders earn significant gains, when implementing a cross border merger under high idiosyncratic risk. However, acquirers earn positive but not significant gains when CB deals have low idiosyncratic risk. This result provides evidence that, in contrast to domestic deals, implementing a CB mergers and acquisitions increases information asymmetry on the acquiring firm and provide acquirers' shareholders an additional value gains for taking more risk. Model 5 shows that CB deals with low acquirers idiosyncratic risk has less significant impact on abnormal stockholders returns.

In order to examine more in depth the impact of idiosyncratic risk on shareholders wealth of CB deals, we run the estimations on two separate subsamples; high and low acquirer sigma deals. Results are reported in models 6-7. Model 6 shows that acquirers of foreign targets enjoy a significant increase their wealth under high sigma. In contrast, under low sigma, cross border deals create positive but an insignificant wealth gains to stockholders. Specifically, low sigma liquid acquirers, unlike their high sigma counterparts, appear to generate greater short-run wealth gains. This indicates that engaging in an M&A transaction while highly liquid constitutes a favorable condition to market participants when information asymmetry over the acquiring firm is not substantial.

**Table 5. Multivariate Analysis.** The table reports empirical results of the regression model examining the impact of cross border on the wealth of acquirer stockholders. For all models regressed, the dependent variable is the announcement period market adjusted 5-day (t-2,t+2) excess returns of acquirers. Regression outputs are estimated using ordinary least squares with the coefficients adjusted for possible heteroscedasticity using White (1980) heteroscedasticity-consistent standard errors and covariance. The intercept measures the excess returns to acquirers after accounting for the effects of all explanatory variables. \*\*\*, \*\*, and \* indicate significance at 1, 5, and 10 percent, respectively respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Sample Range	ALL	ALL	ALL	ALL	ALL	HIGH SIGMA	LOW SIGMA
Intercept	0.263**	0.174***	0.097**	0.196***	0.212*	0.106***	0.031***
Cross Border	0.371***	0.129***	0.424**	0.719***	0.653***	0.382***	0.176
Relative size of deal (RS)	0.118**	0.123**	0.258***	0.178***	0.331*	0.129***	0.094**
Acquirer's market-to-book (MTBV)	-0.162***	-0.148**	-0.068	-0.120***	-0.095*	-0.115***	-0.042***
Acquirer's trading history (AGE)	-0.054***	-0.127**	-0.096***	-0.143**	-0.108**	-0.129***	-0.093
Cross Industry (IND)	0.213***	0.421	0.129***	0.424	0.325	0.252	0.214*
Acquirer's debt-to-equity (DEBT)	0.026	0.029	0.035	0.177	0.063	0.102	0.054
Acquirer's liquidity (CASH_RATIO)	0.058	0.021	0.040	-0.039	0.101	-0.007*	0.348
Private (PRV)			0.127***				
HIGH_SIGMA				0.235***			
LOW_SIGMA					-0.764***		
CB x RS		0.836***					
CB x PRV			0.162***				
CB x Cross Industry			0.018				
CB x HIGH_SIGMA				0.028***			
CB x LOW_SIGMA					0.109*		
Adjusted R-squared (in%)	19.21	23.87	25.51	19.65	20.48	18.30	20.76
F-stat	36.64	47.21	23.81	39.04	258.40	12.82	14.39
N	12,411	12,411	12,411	12,411	12,411	4,641	3,548

## 6. Conclusion

This study tests the impact of idiosyncratic risk on the short-term performance of Cross Border acquirers. Using a sample of 15,619 completed acquisitions in US during the period 1986-2015, we find that stockholders' wealth is positively related to idiosyncratic volatility of CB acquirers firms. Our analysis also shows that acquirer's idiosyncratic volatility is positively related to the likelihood of CB acquisition of private target. CB acquisition of private target encompasses asymmetry of information between the two parties of the deal that stimulate strong reaction of financial markets.

Specifically, we demonstrate that the well-documented short term increase in CB bidders' wealth is mainly sourcing from high idiosyncratic acquirers' risk. In addition, relative to domestic deals, cross border acquisitions of private targets are showed to generate higher short-run value only under high acquirer idiosyncratic risk.

Interestingly, in this study we used Propensity score matching approach to construct an appropriate control group in the univariate analysis. Our results show that CB acquisitions significantly outperform their domestic matched counterparts under high acquirer idiosyncratic risk. In contrast, under low acquirer specific volatility the effect appears insignificant. Our multivariate analysis confirms most previous results, while controlling for other factors influencing cross border acquisitions. Particularly, we find evidence that young firms with a short trading history increase shareholders' value gains during announcement period of the deal. Nevertheless, High market-to-book acquirers are found to decrease shareholders wealth.

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