

The Impact of Brexit Referendum on Mergers and Acquisitions of UK Firms

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This paper analyzes domestic (UK firms acquiring other UK firms) and cross-border (UK firms acquiring foreign firms) mergers and acquisitions announced between 2012 and 2018 and investigates the micro and macro factors that impact announcement effects, deal completion likelihood, and long-term stock performance after the Brexit Referendum. For domestic deals, micro-level factors show that the relative size of the target has a stronger negative impact on the probability of deal completion after the Referendum. However, acquirers with previous M&A experience can moderate this negative effect. In the long run, larger relative size deals announced after the vote have better performance for completed deals and acquirer's experience enhances long-term stock returns for non-completed deals. By comparison, macro-level factors explain the characteristics of cross-border deals announced after the vote. These results show that UK firms acquiring target firms domiciled in countries with EU membership to maintain their access to European markets after the Brexit Referendum are more likely to complete the deals.

Key Words: *Brexit Referendum, mergers and acquisitions, micro and macro factors, performance, deal completion probability.*

Introduction

The Brexit Referendum was held on June 23, 2016 to decide whether the United Kingdom (UK) should remain in or leave the European Union (EU). Those who wanted to leave the EU argued that it would enable better control of immigration and refugee problems, reducing public services costs. Those who wanted to remain in the EU argued that due to the UK's reliance on trade with the EU,

leaving the EU would negatively affect the economy. The vote showed that 51.9% supported leaving while 48.1% supported remaining in the EU. These results defied expectations and roiled financial markets, causing the British pound to depreciate by 8% to its lowest level against US dollar since 1985 and the FTSE 100 to fall more than 8% within the first few minutes of trading and close down 3% on June 24.

With 28 member countries in 2018, the EU is the largest political and economic integrated union on earth. The complete legal system and introduction of single currency enhances the flows of goods, services, people, and capital within the entity. Studies have found that EU has a positive effect on economic growth (Guiso, Jappelli, Padula & Pagano, 2004) and increases foreign direct investment (FDI) flows either from outside or intra-EU

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(Bevan & Estrin, 2004). Leaving the EU would result in higher trade barriers and transformations of legal frameworks, increasing transaction and investment costs, which are important determinants of corporate activities. Steinberg (2019) quantifies the impact of uncertainty about post-Brexit trade policies, finding that the total consumption-equivalent welfare losses for Brexit are between 0.4 and 1.2%, equivalent to about £7000 and £19,000 per person.

Mergers and Acquisitions (M&As), widespread corporate activities since the 20th century, are means of reallocating the factors of production by restructuring corporate control to maximize production efficiency. Under the risk of potential uncertainty, how firms respond to M&As has important implications. Nguyen and Phan (2017) and Bonaime, Gulen, and Ion (2018) show that policy uncertainty is negatively related to M&A likelihood. Despite a large early literature, to our understanding, no scholars have investigated the impact of the Brexit Referendum on M&As, especially those involving UK firms. This paper addresses that gap.

The Brexit Referendum was a bombshell with global implications. The UK itself is the first to bear the brunt of the results. Firms may respond through corporate activities to reduce the negative impact once the UK leaves the EU. Merger and acquisition is one strategy that these firms may adopt to diversify their risks. Thus, two types of M&As involving UK acquirers are investigated: domestic (UK firms acquiring other UK firms) and cross-border (UK firms acquiring foreign firms) deals.

Domestic and cross-border deal are driven by different incentives. In domestic deals, firms focus on micro-level factors, such as deal and firm characteristics. Under the risk of potential uncertainty, acquirers tend to consider large domestic targets with which they share synergies to diversify the risks of leaving the EU. Moreover, experienced acquirers more carefully evaluate transaction values in response to the unpredictability of the UK's political, economic, and social situations. By comparison, firms acquiring foreign targets are motivated by macro-level factors, such as country characteristics. Upon leaving the EU, the UK encounters higher trade

barriers within European markets, motivating UK firms to acquire firms domiciled in the EU to avoid losing connections to European markets. Therefore, the focus of the domestic deal factors in this paper is at the micro level, including relative size and acquirer's experience. For cross-border deals, the focus is at the macro level, including whether the target firm is located in the EU and the characteristics of the target firm's country.

This paper treats the Brexit Referendum as an exogenous shock for firms and examines the impact of the event from the following perspectives. First, we calculate cumulative abnormal returns (CARs) over various windows around M&A announcement dates to investigate the short-term announcement effect and compare announcement effects for deals announced before and after the vote. Second, we examine the likelihood of deal completion and test what factors play a role in the probability of deal completion. Third, we examine factors that affect the long-term performance of the deals by measuring buy-and-hold abnormal returns (BHARs) for both completed and non-completed deals.¹

For domestic deals, the results show that the impact of micro-level factors is significant. The relative size of the target has a stronger negative impact on the probability of deal completion after the Brexit Referendum. When uncertainty is high, deals involving large targets may potentially impact the performance of acquirers due to new integration and organizational costs (Bertrand & Betschinger, 2012). Moreover, the uncertainty of the market gives the acquirer less bargaining power (Lee, 2018). However, acquirers with previous M&A experience can moderate the negative effect. These findings are consistent with Dikova, Sahib, and van Witteloostuijn (2010) who show that past acquisition experience increases the likelihood of a subsequent deal completion.

The results for long-term performance show that for completed domestic deals, the relative size of the target has a stronger positive impact on the acquirer's long-term performance after the Brexit Referendum. Acquirers take advantage of assets such as market position or the

¹ We are grateful to the referee for the valuable comments.

distribution network of large targets to bulk up against the uncertainty, leading to better performance than smaller targets. For non-completed domestic deals, the acquirer's experience has a stronger positive impact on the acquirer's long-term performance after the Brexit Referendum. When uncertainty is high, experienced acquirers will more carefully evaluate transaction values and drop unprofitable deals.

As for cross-border deals, macro-level factors play a significant role. We find that UK firms acquiring foreign firms domiciled in countries with EU membership are more likely to complete the deal if it is announced after the Brexit Referendum. This result is consistent with the argument that UK firms encounter higher trade barriers within European markets after the vote, motivating them to acquire firms domiciled in the EU to avoid losing connections to European markets.

This paper contributes to literature in multiple ways. First, this is, thus far, the first study which adopts the Brexit Referendum as an exogenous event to examine its impact on corporate activities, in this case, mergers and acquisitions. The government's Brexit bill has completed its passage through the House of Commons. Empirical findings in this paper shed light on the impact of the Brexit Referendum on the M&As of UK firms. Second, the sample covers the deals announced between January 1, 2012 and December 31, 2018, the most recent dataset for Brexit Referendum empirical analysis. Third, we identify factors at both the micro and macro levels to investigate the impact of the Brexit Referendum on the M&As of UK firms. We are able to distinguish different levels of factors that affect different types of deals. The sample is sorted by deal type and announcement date. In the long run, we further analyze completed and non-completed deals individually. The settings of this paper enable us to not only investigate the impact of the vote on different types of deals sampled individually, but also allow us to compare pairs of sample groups.

The remainder of the paper is organized as follows. Section 2 discusses the literature and develops testable hypotheses. Section 3 describes data and methodology, providing the variable definitions and methods employed

in the empirical analysis. Section 4 reports empirical results. Finally, Section 5 concludes the paper.

Literature Review and Hypotheses

In this section, we review the literature and develop hypotheses for domestic and cross-border deals. For domestic deals, we focus on micro-level factors. For cross-border deals, macro-level factors are the main interest.

Domestic deals

Theoretically, a number of micro factors determine the performance and probability of completion of M&As, such as the relative size of the target (Grinstein & Hribar, 2004; Moeller, Schlingemann, & Stulz, 2004) and acquirer's experience (Collins, Holcomb, Certo, Hitt & Lester, 2009; Field & Mkrtychyan, 2017). Theories suggest that deals of relatively large deal size are likely to bring financial and operating advantages, leading to better performance than with smaller targets (Moeller et al., 2004). However, the new integration and organizational costs of acquiring relative large target may impact the performance of acquirers (Bertrand & Betschinger, 2012). In the literature, the sign of the coefficient of the relative size variable varies across studies. For instance, relative size is positive in Moeller et al. (2004) but negative in Travlos (1987).

The size of the target is a critical factor in the success of the deal. Grinstein and Hribar (2004) find that compensation and bonuses will incentivize CEOs to choose targets that are large relative to their own firms. By contrast, Sudarsanam (1995) posits that large targets may adopt defensive strategies to prevent takeover bids, reducing the likelihood of deal completion. Empirical findings suggest that the relation between target size and deal completion is ambiguous. Caiazza and Pozzolo (2016) find that larger deals and deals with small acquirers account for a higher probability of failed deals in the banking sector, while Henry (2004) does not find any relation between target size and takeover success in

Australian deals.

Examining M&A experience, Field and Mkrtchyan (2017) find that firms with experienced directors are positively related to subsequent acquisition performance using both short- and long-term measures. These results demonstrate that firms appropriately value director's previous acquisition experience. Porrini (2004) investigates whether a previous alliance between an acquirer and a target affects post-acquisition performance and finds that a previous alliance between an acquirer and a target correlates positively with acquisition performance.

Past completion experience can be transferred, increasing the probability of subsequent deal completion. Collins et al. (2009) indicate that previous acquisition experience increases the probability of engaging in subsequent M&As. Dikova et al. (2010) show that past experience with completed acquisition deals increases the likelihood of subsequent deal completion in institutionally closer environments. However, Han, Park, and Kang (2016) investigate the M&A experiences in China and report a negative effect on the probability of deal completion.

Cases may be more complex after the Brexit Referendum, which adds unpredictability to the political, economic, and social situation in the UK and globally. The UK daily Economic Policy Uncertainty (EPU) Index developed by Baker, Bloom, and Davis (2016) surged from 478.32 to 2350.45 one day after the referendum. Since the announcement effect of M&As on shareholder value reflects changes in the expected future cash-flows to shareholders due to the effects emerging from a deal, we expect that after the Brexit Referendum, the impact of micro-level factors, including relative size and experience, on the domestic deal announcement effect remains unchanged. We thus hypothesize:

H1: For domestic deals, the impact of micro-level factors, including relative size and experience, on the deal announcement effect remains unchanged after the Brexit Referendum.

For probability of domestic deal completion, when uncertainty is high, acquirers will carefully evaluate

transactions involving targets that are large relative to their own firms since the new integration and organizational costs of acquiring large targets may impact the performance of acquirers (Bertrand & Betschinger, 2012). Moreover, the uncertainty of the market gives the acquirer less bargaining power (Lee, 2018). However, acquirers with previous M&A experience can moderate the negative effect on deal completion probability (Dikova et al., 2010).

H2: For domestic deals, the relative size of the target has a stronger negative impact on the probability of deal completion after the Brexit Referendum. However, acquirers with previous M&A experience can moderate the negative effect.

Rao-Nicholson, Salaber, and Cao (2016) investigate acquirers located in the ASEAN region and document that during a crisis, it is beneficial for acquirers to focus on large targets with which they share synergies. In the long run, we expect that for completed deals, UK firms acquiring large target firms outperform. Acquirers take advantage of assets such as market position or distribution network of large targets to bulk up against uncertainty, leading to better performance than smaller targets. However, we do not expect this relation to hold for non-completed deals. Instead, the acquirer's experience may play a positive role in the long-term performance of non-completed deals since when uncertainty is high, experienced acquirers will more carefully evaluate transaction values and drop unprofitable deals.

H3: For completed domestic deals, the relative size of the target has a stronger positive impact on the acquirer's long-term performance after the Brexit Referendum.

H4: For non-completed domestic deals, the acquirer's experience has a stronger positive impact on the acquirer's long-term performance after the Brexit Referendum.

Cross-border deals

Trade volume between two countries may be a motive for firms to engage in M&As. According to Office for National Statistics, approximately 45% of UK's

exports and 53% of UK's imports were with countries in the EU, signifying a high trade dependence on the EU. Rossi and Volpin (2004) provide evidence that bilateral trade is significant and positively correlated to cross-border M&As. Erel, Liao, and Weisbach (2012) use the maximum value of exports and imports to control for bilateral business between two countries and find similar results.

Cross-border M&As are a means of FDI. Dunning (2000) proposes an eclectic paradigm to explain international business activities, arguing that FDI and foreign activities by multinational enterprises result from ownership advantage, locational advantage, and internalization advantage. Among these, locational advantage involves production factors which are more specific to foreign locations than to domestic. Firms can exploit their ownership advantage jointly with locational advantage to increase FDI. Bevan and Estrin (2004) indicate that EU membership offers firms located in EU countries the opportunity to relocate production to countries with lower labor costs, increasing FDI flows.

In trade costs, whether firms choose to engage in M&As depends on the cost tradeoff between exporting products from the home country and investing in production lines in the host country. After leaving the EU, the UK may encounter higher trade barriers within European markets, motivating UK firms to acquire firms domiciled in the EU to avoid losing connections to European markets. Furthermore, EU member countries share similar cultural backgrounds and better economic development, increasing the likelihood of deal success. However, we do not expect any change in the short- or long-term performance of cross-border deals based on macro-level factors. UK firms react to the negative impact of leaving the EU by acquiring foreign firms domiciled in countries with EU membership to maintain their access to European markets rather than pursuing performance enhancement. Thus, the following hypotheses are proposed:

H5: For cross-border deals, the impact of macro-level factors on the deal announcement effect remains

unchanged after the Brexit Referendum.

H6: For cross-border deals, UK firms acquiring foreign firms domiciled in countries with EU membership to maintain access to European markets after the Brexit Referendum are more likely to complete their deals.

H7: For cross-border deals, the impact of macro-level factors on long-term deal performance remains unchanged after the Brexit Referendum.

Data and Methodology

Data and sample

To investigate the determinants of deal completion before and after the Brexit Referendum, the sample includes deals announced between January 1, 2012 and December 31, 2018 retrieved from the Securities Data Corporation (SDC) platinum. We collect deals in which the acquiring firm is from the UK. The deal value must be greater than or equal to \$1 million. Further, the acquirer's status must be public, while no restrictions are imposed on targets. The acquirer is required to hold less than or equal to 50% of the shares at the announcement date and own greater than or equal to 50% after the transaction, if it is completed. Following the literature, we exclude leveraged buyouts, spinoffs, recapitalizations, self-tenders, exchange offers, repurchases, minority stake purchases, acquisitions of remaining interest, and privatization. These filters yield an initial sample containing 1,670 domestic deals and 944 cross-border deals.

We obtain relevant data items from the SDC, including the announcement date, completion date if the deal is completed, acquirer's and target's name, acquirer's and target's nation, acquirer's and target's four-digit primary standard industrial classification (SIC) code, acquirer's and target's public status, acquirer's Datastream code, percentage of payment method, transaction value, competing bidders, and attitude. We further filter out cross-border deals in which the target nation is from Bermuda, the British Virgin Islands, the Cayman Islands, the Falkland Islands, Gibraltar, Guernsey, the Isle of Man,

and Jersey. Since these entities are either British Overseas Territories or British Crown Dependencies, including them may bias the analysis. This leaves 1,670 domestic deals and 924 cross-border deals in the sample.

We match acquirers of the remaining sample with Datastream to obtain the acquirer's market value four weeks prior to the announcement date and the acquirer's stock price data. The exchange rate and the GDP per capita of acquirer's and target's nation are also collected from Datastream. Therefore, given the above selection criteria and omitting deals for which the acquirer's market value and stock price are unavailable, the final sample contains 1,638 domestic deals and 910 cross-border deals.

Variable definitions

In this section, variables of deal characteristics, firm characteristics, country characteristics, and stock return control are defined.

For deal characteristics, variable Complete equals 1 if the deal is completed and 0 otherwise. A dummy variable of interest, Vote, equals 1 if the transaction is announced after the Brexit Referendum, June 23, 2016, and 0 otherwise. Since there is a sharp rise in the policy uncertainty index after the Brexit Referendum, this paper uses Vote to proxy for policy uncertainty, which is shown to have negative effects on M&As in the previous literature. Nguyen and Phan (2017) and Bonaime et al. (2018) indicate that policy uncertainty reduces the willingness to execute M&As and extends the time necessary to complete transactions.

Some control variable regarding characteristics are considered. Target firms may adopt defensive strategies against hostile bids, decreasing the probability of success for the deal. (Sudarsanam, 1995; Muehlfeld, Sahib & van Witteloostuijn, 2007) Therefore, a Friendly variable is defined as a dummy variable equaling 1 for friendly bids and 0 otherwise. Several potential bidders also affect the probability of deal completion. Thus, the variable Competed is included, defined as a dummy variable equaling 1 if there is more than one potential acquirer and 0 otherwise. Huang, Officer, and Powell (2016) and Caiazza and Pozzolo (2016) show that deals with stock

payment are not likely to be completed. Dikova et al. (2010) find that cash-financed deals are positively correlated to successful deals. To control for the payment method, the variable Cash is employed, defined as a dummy variable equaling 1 if the transaction is paid fully in cash and 0 otherwise. The relatedness of the acquirers and targets can also have effect on the success of the deals (Lim & Lee, 2016). If the acquirer and target are in the same industry, they have better understanding of each other's value and risks and fewer integration problems afterwards. The dummy variable Relatedness thus equals 1 if the acquirer and target share the same 3-digit SIC code.

For firm characteristics, Deal size, either in absolute terms or relative to bidder's size, is likely to determine the completion or abandonment of an M&A. The variable Deal Size is measured as the logarithm of the deal value. Further, Relative Size is used, which is defined as the deal value divided by the acquirer's market value four weeks prior to the current deal announcement.

Past completion experience can be transferred, increasing the probability of subsequent deal completion (Dikova et al., 2010). Collins et al. (2009) indicate that previous acquisition experience increases the probability of engaging in subsequent M&As. Experience is a dummy variable, which equals 1 if the acquirers have conducted M&As within three years prior to the current deal announcement.

Similarities between acquirer nations and target nations may matter in the transaction (Erel et al, 2012). Rossi and Volpin (2004) show that cultural similarities smooth the negotiation process, increasing the probability of deal success. A dummy variable, EU Target, equals 1 if the target firm is headquartered in countries with EU membership to specify targets in cross-border deals. Target status is widely discussed in M&As. Dikova et al. (2010) and Muehlfeld et al. (2007) show that public targets are unlikely to be completed and also take more time to complete. To capture the target status, a dummy variable Public Target is used, which equals 1 if the target status is public and 0 otherwise.

Regarding country characteristics, research findings suggest that changes in exchange rate motivate mergers

and acquisitions (Collins et al., 2009) yet also affect the likelihood of takeover completion (Huang et al., 2016). Thus, we use the variable Euro, the monthly return of the British Pound against one Euro at the announcement date.

The gravity model suggests that trade volume and FDI flows are proportional to the size of the two economies but inversely proportional to the geographical distance (Bevan & Estrin, 2004; Di Giovanni, 2005; Buch & DeLong, 2004). This paper employs the natural logarithm of GDP per capita to scale the economy size of the target nations in cross border transactions, denoted GDP Target.

Table 1 presents the summary statistics of the variables. Domestic sample deals are reported in Panel A and cross-border sample deals are reported in Panel B. In addition to the results for the full sample (Columns 1 and 2), the sample is segregated by announcement date as pre-vote (announced before the vote, Columns 3 and 4) or post-vote (announced after the vote, Columns 5 and 6). Differences in means are reported in Column 7.

The results show that domestic deals announced after the Brexit Referendum are less likely to be completed. The completion rate for domestic deals is 86.62% before the vote and 83.81% after the vote, although the mean difference is not statistically significant. Relative size is smaller if deals are announced after the vote. However, the mean difference is also not significant. Interestingly, domestic deals announced after the vote have better acquirer's experience, with a statistically significant mean difference of 5.53%, indicating that acquirers announcing deals after the vote tend to have more M&A experience.

For cross-border deals, the completion rate is 83.95% before the vote, while it is only 75.79% after the vote. The mean difference in completion rate for cross-border deals is -8.17%, significant at the 1% level. These results indicate that cross-border deals announced after the vote are less likely to succeed. We observe an increase in the rate of deals with EU targets if the deals are announced after the vote. The mean difference is 5.94%, statistically significant and consistent with our expectation that UK firms react to the negative impact of leaving the EU by acquiring foreign firms domiciled in countries with EU

membership to maintain access to European markets.

For control variables, all cash are less likely to be used as payment method after the Brexit Referendum across all deals involving UK acquirers. Specifically, the mean differences are -27.44% for domestic deals and -23.02% for cross-border deals, both statistically significant at the 1% level. Interestingly, domestic deals announced after the Brexit Referendum involve fewer public targets, -1.83%, which is statistically significant. Moreover, the proportion of intra-industry transactions declines from 36.00% to 27.71% for domestic deals.

Methodology

In this section, the methods for calculation of the announcement effect, determinants of deal completion, and the examination of long-term performance are discussed.

Announcement effect

To study the short-term announcement effect, this paper follows the standard event study methodology to calculate cumulative abnormal returns (CARs). We collect acquirers' stock daily returns 180 days before announcement date and construct a 151-day estimation window (-180, -30). There should be less than 30 missing daily returns to prevent estimation bias. These criteria reduced sample to 728 domestic deals and 640 cross-border deals. A market model is used to regress firms' daily returns. The market index is proxied by the Datastream UK market index, the total return for the total UK market from the Datastream database.

Abnormal returns are defined as the difference between actual daily returns and predicted daily returns derived from the market model. We compute abnormal returns ranging from five days before to five days after the deal announcement and apply various event windows for CARs, including (-5,+5), (-3,+3), (-1,+1), (0,0), (0,+1), (0,+3) and (0,+5).

To investigate the announcement effects, we run regression models using the CARs of various event windows as the dependent variables. Furthermore, this paper multiplies variables of interest with Vote to generate

Table 1 Summary Statistics of Variables

Variable	Full sample			Pre-vote			Post-vote			Mean Difference (7)=(5)-(3)
	N	Mean	Std	N	Mean	Std	N	Mean	Std	
	(1)	(2)	(4)	(3)	(4)	(5)	(6)			
Panel A: Domestic Deals										
Complete	1638	0.8559	0.3513	1039	0.8662	0.3406	599	0.8381	0.3687	-0.0282
Relative Size	1638	0.1807	0.3713	1039	0.1749	0.3659	599	0.1666	0.4090	-0.0083
Experience	1638	0.7295	0.4443	1039	0.7093	0.4543	599	0.7646	0.4246	0.0553**
Friendly	1638	0.9927	0.0853	1039	0.9962	0.0620	599	0.9866	0.1149	-0.0095*
Competed	1638	0.0043	0.0653	1039	0.0048	0.0692	599	0.0033	0.0577	-0.0015
Cash	1638	0.1874	0.3904	1039	0.2878	0.4529	599	0.0134	0.1149	-0.2744***
Public Target	1638	0.0366	0.1879	1039	0.0433	0.2037	599	0.0250	0.1564	-0.0183**
Relatedness	1638	0.3297	0.4702	1039	0.3600	0.4802	599	0.2771	0.4480	-0.0828***
Deal Size	1638	2.7310	1.4510	1039	2.8011	1.4685	599	2.6795	1.4203	-0.1216*
Panel B: Cross-border Deals										
Complete	910	0.8110	0.3917	592	0.8395	0.3674	318	0.7579	0.4291	-0.0817***
EU Target	910	0.2758	0.4472	592	0.2551	0.4363	318	0.3145	0.4650	0.0594*
GDP Target	910	10.6009	0.5718	592	10.5371	0.6212	318	10.7156	0.4748	0.1785***
Euro	910	-0.0007	0.0183	592	-0.0020	0.0173	318	0.0024	0.0219	0.0044***
Relative Size	910	0.3609	0.8055	592	0.3353	0.6663	318	0.3263	0.9010	-0.0090
Experience	910	0.6879	0.4636	592	0.7044	0.4567	318	0.6572	0.4754	-0.0472
Friendly	910	0.9890	0.1043	592	0.9899	0.1002	318	0.9874	0.1116	-0.0024
Competed	910	0.0077	0.0874	592	0.0118	0.1082	318	0.0000	0.0000	-0.0118*
Cash	910	0.2473	0.4317	592	0.3277	0.4698	318	0.0975	0.2971	-0.2302***
Public Target	910	0.0681	0.2521	592	0.0625	0.2423	318	0.0786	0.2696	0.0161
Relatedness	910	0.4286	0.4951	592	0.4426	0.4971	318	0.4025	0.4912	-0.0401
Deal Size	910	3.6120	1.7686	592	3.5733	1.7195	318	3.6883	1.8675	0.1150

The table presents summary statistics for the sample of M&As involving UK firms announced during the period between January 1, 2012 and December 31, 2018. The sample is further sorted by deal type and announcement date. Domestic deals refer to transactions in which UK firms acquire other UK firms. Cross-border deals refer to transactions in which UK firms acquire foreign firms. Deals announced before Brexit Referendum are classified as pre-vote and those announced after are classified as post-vote. Mean and standard deviation of each variable are reported. Statistical tests for differences in means between pre-vote and post-vote groups are also presented. All variables are winsorized at the 1st and 99th percentiles of their distributions, except dummy variables. Variable definitions are reported in the appendix. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

an interaction term, which denotes the differences between deals announced before and after the Brexit Referendum. Further, various control variables are considered which may affect the likelihood of deal success. Variable definitions are provided in detail above.

To examine announcement effects in domestic deals, we include relative size and acquirer's experience as explanatory variables. Relative size and acquirer's experience are further interacted with the Vote dummy variable to examine whether deals announced after the Brexit Referendum involving larger relative size or experienced acquirers affect the CARs. We also include variables to control for firm and deal characteristics. Year and industry fixed effects are included. Control Variables_{*i,t*} is a vector of control variables. β_6 is the vector of the coefficients of control variables. β_6^T is the transpose of β_6 . The White (1980) test is applied to control for heteroscedasticity. Thus, the following ordinary least squares (OLS) regression model is employed for firm *i* on day *t*:

$$\text{CARs}_{i,t} = \beta_0 + \beta_1 \text{Vote}_t + \beta_2 \text{Relative Size}_{i,t} + \beta_3 \text{Relative Size}_{i,t} * \text{Vote}_t + \beta_4 \text{Experience}_{i,t} + \beta_5 \text{Experience}_{i,t} * \text{Vote}_t + \beta_6^T \text{Control Variables}_{i,t} \quad (1)$$

For cross-border deals, this paper examines the effect of macro-level characteristics on short-term announcement effect before and after the Brexit Referendum. We include EU target and GDP target as macro-level explanatory variables. The interaction terms of these two variables and Vote are included as well. We add firm, deal, and country characteristics, as well as year and industry fixed effects, in the regressions. Control Variables_{*i,t*} is a vector of control variables. β_8 is the vector of the coefficients of control variables. β_8^T is the transpose of β_8 . White (1980) test is applied to control for heteroscedasticity. The following regression model is used for firm *i* on day *t*:

$$\text{CARs}_{i,t} = \beta_0 + \beta_1 \text{Vote}_t + \beta_2 \text{EU Target}_{i,t} + \beta_3 \text{EU Target}_{i,t} * \text{Vote}_t + \beta_4 \text{GDP Target}_{i,t} + \beta_5 \text{GDP Target}_{i,t} * \text{Vote}_t + \beta_6 \text{GDP Target}_{i,t} * \text{EU Target}_{i,t} + \beta_7 \text{GDP Target}_{i,t} * \text{EU Target}_{i,t} * \text{Vote}_t + \beta_8^T \text{Control Variables}_{i,t} \quad (2)$$

Determinants of deal completion

In order to investigate the determinants of deal completion probability, we run logit models in which the dependent variable Complete equals 1 if the deal is completed and 0 otherwise. We include micro-level factors, relative size, acquirer's experience, and their interaction terms with Vote, as explanatory variables. We also include variables to control for firm and deal characteristics, as well as year and industry fixed effects. Control Variables_{*i,t*} is a vector of control variables. β_6 is the vector of the coefficients of control variables. β_6^T is the transpose of β_6 . White (1980) test is applied to control for heteroscedasticity. Thus, the following regression model is employed for firm *i* on day *t*:

$$\text{Pr}(\text{Complete} = 1 \mid x_{i,t}) = \frac{e^{x'_{i,t}\beta}}{1 + e^{x'_{i,t}\beta}} \quad \text{where}$$

$$x'_{i,t}\beta = \beta_0 + \beta_1 \text{Vote}_t + \beta_2 \text{Relative Size}_{i,t} + \beta_3 \text{Relative Size}_{i,t} * \text{Vote}_t + \beta_4 \text{Experience}_{i,t} + \beta_5 \text{Experience}_{i,t} * \text{Vote}_t + \beta_6^T \text{Control Variables}_{i,t} \quad (3)$$

We run the following logit model to capture macro-level factors that may impact the likelihood of cross-border deal completion after the Brexit Referendum. EU target, GDP target and their interaction terms with Vote are included as macro-level explanatory variables. Firm, deal, and country characteristics, as well as year and industry fixed effects are added in the regressions. Control Variables_{*i,t*} is a vector of control variables. β_8 is the vector of the coefficients of control variables. β_8^T is the transpose of β_8 . The White (1980) test is applied to control for heteroscedasticity. The following regression model is used for firm *i* on day *t*:

$$\text{Pr}(\text{Complete}=1 \mid x_{i,t}) = \frac{e^{x'_{i,t}\beta}}{1 + e^{x'_{i,t}\beta}} \quad \text{where}$$

$$x'_{i,t}\beta = \beta_0 + \beta_1 \text{Vote}_t + \beta_2 \text{EU Target}_{i,t} + \beta_3 \text{EU Target}_{i,t} * \text{Vote}_t + \beta_4 \text{GDP Target}_{i,t} + \beta_5 \text{GDP Target}_{i,t} * \text{Vote}_t + \beta_6 \text{GDP Target}_{i,t} * \text{EU Target}_{i,t} + \beta_7 \text{GDP Target}_{i,t} * \text{EU Target}_{i,t} * \text{Vote}_t + \beta_8^T \text{Control Variables}_{i,t} \quad (4)$$

Long-term performance

We are interested in the implications of determinants for acquirers' long-term performance. To study the long-term performance, we calculate buy-and-hold abnormal

returns (BHARs) over 12- and 24-months periods. 12- and 24-month buy-and-hold returns are calculated from the sample and benchmarks. The 12- and 24-month buy-and-hold abnormal returns (BHAR12 and BHAR24) then represent the difference between sample firm returns and corresponding contemporaneous benchmark returns. For completed deals, BHARs are calculated from the effective month. For non-completed deals, BHARs are calculated from the announcement month due to the lack of effective date.

The benchmark of BAHRs is a matched control firm used to detect the long-run abnormal stock performance.² Matching firms should be listed on the same stock exchange as the sample firm. We sort the population of listed firms each month into size deciles. We simultaneously sort firms into book-to-market (B/M) deciles. After determining which of the 100 (10 size \times 10 B/M) groups the acquiring firm is in at the month-end prior to the deal completion, we choose the matching firms from that group that are the closet match on previous year stock return and are not involved in any significant acquisition activity in the previous three years.

Because of data availability, for the completed deals, the final sample for long-term performance analysis is 601 for BHAR12 and 474 for BHAR24 in domestic deals, and 488 for BHAR12 and 398 for BHAR24 in cross-border deals. For non-completed deals, the final sample for long-term performance analysis is 112 for BHAR12 and 95 for BHAR24 in domestic deals, and 97 for BHAR12 and 74 for BHAR24 in cross-border deals.

As with the previous analysis, we begin with domestic deals using the following regression model for firm i on day t :

$$\text{BHAR}_{s_{i,t}} = \beta_0 + \beta_1 \text{Vote}_t + \beta_2 \text{Relative Size}_{i,t} + \beta_3 \text{Relative Size}_{i,t} * \text{Vote}_t + \beta_4 \text{Experience}_{i,t} + \beta_5 \text{Experience}_{i,t} * \text{Vote}_t + \beta_6^T \text{Control Variables}_{i,t} \quad (5)$$

In the penultimate specification, we explore the relationship between macro-level characteristics after the

Brexit Referendum and long-term holding periods returns for cross-border deals. The specification for firm i on day t is displayed as below:

$$\begin{aligned} \text{BHAR}_{s_{i,t}} = & \beta_0 + \beta_1 \text{Vote}_t + \beta_2 \text{EU Target}_{i,t} + \beta_3 \text{EU} \\ & \text{Target}_{i,t} * \text{Vote}_t + \beta_4 \text{GDP Target}_{i,t} + \beta_5 \text{GDP} \\ & \text{Target}_{i,t} * \text{Vote}_t + \beta_6 \text{GDP Target}_{i,t} * \text{EU Target}_{i,t} \\ & + \beta_7 \text{GDP Target}_{i,t} * \text{EU Target}_{i,t} * \text{Vote}_t \\ & + \beta_8^T \text{Control Variables}_{i,t} \end{aligned} \quad (6)$$

Table 2 tabulates the summary statistics of CARs BHARs. Panel A reports the results for the domestic deals and Panel B reports the results for the cross-border deals. The full sample (Columns 1 and 2) is further divided into pre-vote (Columns 3 and 4) and post-vote (Columns 5 and 6) by the announcement date. The mean differences in returns between deals announced before and after the Brexit Referendum are reported in Column 7.

For domestic deals, abnormal return around announcement decreases after the vote. However, the differences in announcement effects are not significant across all event windows. We find a similar trend for cross-border deals in which the CARs are smaller in deals announced after the vote. The mean differences in CARs are statistically significant for the various event windows for cross-border deals. For example, the mean CAR(0,+5) is 1.73% less after the vote than before the vote. These results indicate that cross-border deals announced after the vote significantly decrease acquirer shareholder value.

BHARs are reported separately for completed and non-completed deals. In general, deals announced after the vote underperform. For example, the mean difference in BHAR12 for domestic completed deals is -5.09%. For non-completed deals, the results show that the mean difference in BHAR24 is -33.12% for domestic deals and -6.27% for cross-border deals. Overall, in the long run, acquirers with deals announced after the vote underperform compared to those with deals announced before the vote.

² We thank an anonymous referee for valuable comments. In addition to using matched control firms as benchmarks, we use a market index proxied by the Datastream UK market index to compute BHARs. Results are available upon request.

Table 2 Summary Statistics of CARs and BHARs

	Full sample			Pre-vote			Post-vote			Mean Difference (7)-(5)-(3)
	N	Mean (1)	Std (2)	N	Mean (3)	Std (4)	N	Mean (5)	Std (6)	
Panel A: Domestic Deals										
CAR (-5,+5)	728	0.0125	0.0648	492	0.0136	0.0676	236	0.0101	0.0584	-0.0035
CAR (-3,+3)	728	0.0115	0.0559	492	0.0131	0.0580	236	0.0083	0.0513	-0.0047
CAR(-1,+1)	728	0.0104	0.0430	492	0.0112	0.0449	236	0.0089	0.0388	-0.0023
CAR (0,0)	728	0.0079	0.0307	492	0.0076	0.0317	236	0.0085	0.0287	0.0009
CAR (0,+1)	728	0.0111	0.0383	492	0.0113	0.0389	236	0.0109	0.0372	-0.0004
CAR (0,+3)	728	0.0120	0.0459	492	0.0123	0.0464	236	0.0114	0.0448	-0.0009
CAR (0,+5)	728	0.0134	0.0531	492	0.0137	0.0536	236	0.0126	0.0521	-0.0011
Completed deals										
BHAR12	601	0.0498	0.4522	448	0.0740	0.5932	153	0.0231	0.3829	-0.0509*
BHAR24	474	0.0812	0.6346	435	0.1039	0.7395	39	0.0759	0.6543	-0.0271
Non-completed deals										
BHAR12	112	-0.0803	0.5029	66	0.0481	0.2817	46	-0.1722	0.6382	-0.2203*
BHAR24	95	-0.0649	0.5105	62	0.1549	0.3829	33	-0.1763	0.5938	-0.3312**
Panel B: Cross-border Deals										
CAR (-5,+5)	640	0.0110	0.0729	422	0.0164	0.0726	218	0.0006	0.0725	-0.0158***
CAR (-3,+3)	640	0.0089	0.0622	422	0.0125	0.0595	218	0.0018	0.0667	-0.0107***
CAR(-1,+1)	640	0.0109	0.0493	422	0.0146	0.0479	218	0.0039	0.0515	-0.0106***
CAR (0,0)	640	0.0085	0.0386	422	0.0108	0.0362	218	0.0039	0.0425	-0.0069***
CAR (0,+1)	640	0.0100	0.0462	422	0.0140	0.0444	218	0.0022	0.0487	-0.0119***
CAR (0,+3)	640	0.0100	0.0552	422	0.0147	0.0531	218	0.0008	0.0582	-0.0139***
CAR (0,+5)	640	0.0105	0.0615	422	0.0164	0.0598	218	-0.0009	0.0633	-0.0173***
Completed deals										
BHAR12	488	0.0091	0.3859	367	0.0158	0.4295	121	0.0331	0.3928	0.0173
BHAR24	398	0.0236	0.4928	355	0.0806	0.5205	43	0.0031	0.4924	-0.0775*
Non-Completed deals										
BHAR12	97	-0.0901	0.3049	56	-0.0948	0.4029	41	-0.0971	0.3928	-0.0023
BHAR24	74	-0.1193	0.9271	50	-0.0893	0.9421	24	-0.1520	0.7482	-0.0627*

The table presents summary statistics for the cumulative abnormal returns (CARs) of M&As and buy-and-hold abnormal returns (BHARs) of M&As involving UK firms announced within the period between January 1, 2012 and December 31, 2018. We report CARs over different event windows, including (-5,+5), (-3,+3), (-1,+1), (0,0), (0,+1), (0,+3) and (0,+5). BHARs are calculated over 12-month period (BHAR12) and 24-month period (BHAR24) by using matched control firms as benchmarks. For completed deals, BHARs are calculated from the effective date. For non-completed deals, BHARs are calculated from the announcement date. The sample is sorted by deal type and announcement date. Domestic deals refer to transactions in which UK firms acquire other UK firms. Cross-border deals refer to transactions in which UK firms acquire foreign firms. Deals announced before Brexit Referendum are classified as pre-vote and those announced after are classified as post-vote. All variables are winsorized at the 1st and 99th percentiles of their distributions. Mean and standard deviation of each variable are reported. Statistical tests for differences in means between pre-vote and post-vote groups are also presented. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Results

The results of deals are reported in this section, including announcement effect, determinants of deal completion, and long-term performance.

Domestic deals

Announcement effect in domestic deals

In this section, we test H1 by examining how various factors influence the acquirer shareholders' reaction to the M&A announcement for domestic deals. Table 3 reports the results of various event windows. In general, the Brexit Referendum has no impact on the announcement effect of domestic deals. Specifically, the variable Vote is

not significant for various CARs windows. For the interaction terms, such as Relative Size*Vote and Experience*Vote, the none of the coefficients is significant. These results show that deals announced after the Brexit Referendum involving larger relative size or better experience do not affect shareholder's wealth. This finding is consistent with H1, which posits that since the announcement effect of M&As on shareholder value reflects changes in the expected future cash-flows to shareholders due to the effects emerging from a deal, the impact of micro-level factors on the domestic deal announcement effect remains unchanged after the Brexit Referendum.

Table 3 Announcement Effects in Domestic Deals

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	CAR(-5,+5)	CAR(-3,+3)	CAR(-1,+1)	CAR(0,0)	CAR(0,+1)	CAR(0,+3)	CAR(0,+5)
Vote	0.0251 (1.25)	0.0183 (1.06)	0.0028 (0.22)	0.0056 (0.63)	0.0008 (0.07)	0.0034 (0.24)	0.0091 (0.56)
Relative Size	0.0244 (1.18)	0.0063 (0.35)	0.0263** (2.04)	0.0078 (0.86)	0.0265** (2.35)	0.0129 (0.91)	0.0336** (2.03)
Relative Size*Vote	-0.0209 (-0.80)	0.0050 (0.22)	-0.0168 (-1.02)	0.0041 (0.35)	-0.0044 (-0.31)	0.0142 (0.79)	-0.0146 (-0.69)
Experience	-0.0057 (-0.66)	-0.0009 (-0.12)	-0.0028 (-0.53)	0.0011 (0.29)	-0.0014 (-0.31)	-0.0053 (-0.91)	-0.0100 (-1.46)
Experience *Vote	0.0127 (0.87)	0.0050 (0.40)	0.0045 (0.49)	-0.0084 (-1.31)	0.0022 (0.27)	0.0115 (1.15)	0.0169 (1.44)
Friendly	-0.0215 (-0.92)	-0.0207 (-1.03)	-0.0147 (-1.01)	0.0061 (0.60)	-0.0154 (-1.22)	-0.0208 (-1.30)	-0.0228 (-1.22)
Competed	0.0075 (0.27)	-0.0182 (-0.75)	-0.0058 (-0.33)	-0.0102 (-0.82)	-0.0062 (-0.41)	-0.0347* (-1.79)	-0.0156 (-0.69)
Cash	0.0128* (1.81)	0.0063 (1.04)	0.0089** (2.00)	0.0067** (2.14)	0.0081** (2.11)	0.0057 (1.17)	0.0120** (2.10)
Public Target	-0.0478*** (-3.16)	-0.0327** (-2.52)	-0.0332*** (-3.51)	-0.0139** (-2.08)	-0.0366*** (-4.46)	-0.0332*** (-3.19)	-0.0431*** (-3.56)
Relatedness	0.0139** (1.98)	0.0056 (0.93)	0.0010 (0.22)	0.0044 (1.43)	-0.0014 (-0.38)	-0.0009 (-0.18)	0.0025 (0.45)
Deal Size	0.0015 (0.70)	0.0026 (1.41)	0.0015 (1.11)	0.0015 (1.62)	0.0007 (0.57)	0.0021 (1.38)	-0.0005 (-0.32)
Intercept	0.1672** (2.44)	0.1449** (2.45)	0.1548*** (3.60)	0.1389*** (4.59)	0.1567*** (4.19)	0.1545*** (3.27)	0.1850*** (3.35)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	728	728	728	728	728	728	728
Adjusted R-square	0.2957	0.3091	0.3395	0.3201	0.2859	0.3029	0.2985

The table presents the estimation results of announcement effects on the sample of domestic deals announced between January 1, 2012 and December 31, 2018. The dependent variable is the cumulative abnormal returns (CARs) of acquiring firms over event windows of (-5,+5), (-3,+3), (-1,+1), (0,0), (0,+1), (0,+3) and (0,+5). Variable definitions are reported in the appendix. The White (1980) test is applied to control for heteroscedasticity. t-value is shown in the parentheses. ***, **, and* denote statistical significance at the 1%, 5%, and 10% level respectively.

For the control variables, cash deals yield a better announcement effect. Consistent with previous studies, investors react negatively to public target deals. Acquiring a public target tends to earn negative short-term abnormal returns in which the public target deals decrease shareholder value by 4.78% over the 10-day window around the announcement date.

Determinants of deal completion in domestic deals

In this section, we test H2 by analyzing the

relationship between the event of the Brexit Referendum and the likelihood of deal completion in domestic M&As. Table 4 shows the results of the logit regression. Column 1 includes the first main variable set of interest, Vote, Relative Size, and the interaction term Relative Size*Vote. Control variables are added in Column 2. In Column 3, the main interest is acquirer's experience and control variables are further added in Column 4. We include both sets of main variable in Column 5 and include control variables in Column 6.

Table 4 Determinants of Deal Completion in Domestic Deals

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Vote	-0.0144 (-0.30)	-0.0189 (-0.39)	-0.0931 (-1.54)	-0.0931 (-1.55)	-0.0856 (-1.42)	-0.0856 (-1.43)
Relative Size	-0.0016** (-2.56)	-0.0016** (-2.57)			-0.0016** (-2.57)	-0.0016** (-2.58)
Relative Size*Vote	-0.0264*** (-3.82)	-0.0261*** (-3.79)			-0.0259*** (-3.75)	-0.0257*** (-3.73)
Experience			0.0181 (0.66)	0.0189 (0.70)	0.0179 (0.66)	0.0183 (0.68)
Experience *Vote			0.0913** (2.01)	0.0846* (1.87)	0.0880* (1.95)	0.0821* (1.82)
Friendly		0.4227*** (3.74)		0.4128*** (3.63)		0.4127*** (3.65)
Competed		-0.2541* (-1.75)		-0.2525* (-1.73)		-0.2478* (-1.71)
Cash		0.0245		0.0245		0.0245
Public Target		-0.0195 (-0.34)		-0.0126 (-0.22)		-0.0250 (-0.44)
Relatedness		-0.0225 (-0.96)		-0.0183 (-0.78)		-0.0203 (-0.86)
Deal Size		-0.0031 (-0.47)		-0.0059 (-0.89)		-0.0030 (-0.45)
Intercept	0.9644*** (2.78)	0.5478 (1.50)	0.9640*** (2.76)	0.5746 (1.56)	0.9652*** (2.79)	0.5579 (1.53)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,638	1,638	1,638	1,638	1,638	1,638
pseudo R-square	0.1758	0.1911	0.1675	0.1826	0.1805	0.1953

The table presents the estimation results of deal completion by using logit models on the sample of domestic deals announced between January 1, 2012 and December 31, 2018. The dependent variable is a dummy variable that equals one if the deal is completed and zero otherwise. Column 1, 3 and 5 examine the interaction term only. Column 2, 4, 6 further include the control variables. Variable definitions are reported in the appendix. White (1980) test is applied to control for heteroscedasticity. t-value is shown in the parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

These results suggest that domestic deals announced after the Brexit Referendum are less likely to be completed. However, the coefficient of Vote is not statistically significant, indicating that the Brexit Referendum has no impact on the likelihood of domestic deal completion.

Interestingly, we find a significant impact of relative size and acquirer experience on the probability of deal completion. For relative size, the results show larger relative size deals announced after the Brexit Referendum reduce the completion probability. For example, the coefficient is -0.0264 for the interaction term of Relative Size*Vote in Column 1 with 1% significance level. Column 2 adds control variables and the effect is robust.

In Column 3, acquirer's previous experience is tested. The results show that deals with experienced acquirers announced after the Brexit Referendum have significantly higher completion probability. Specifically, when interacting with Vote, the effect of experience is positive and significant, indicating that deals with previous M&A experience can moderate the effect on deal completion probability for deals announced after the Brexit Referendum. Control variables are included in Column 4 and the result is robust. We include both sets of main variable in Columns 5 and 6, and the effects remain robust. In general, this finding is consistent with H2 which posits that for domestic deals, the relative size of the target has a stronger negative impact on the probability of deal completion after the Brexit Referendum. However, acquirers with previous M&A experience can moderate that negative effect.

As for control variables, Friendly deals increase the probability of deal completion. However, Competed deals are less likely to be completed, indicating that if there is more than one potential acquirer competing for the transaction, the deal has a lower chance of being completed.³

³ Luo (2005) shows that managers of acquiring firms are influenced by their firms' stock price reactions at the announcement of proposed transaction. The more negative the stock price reaction around announcement, the greater the likelihood that a proposed transaction will be withdrawn. This association is attributed to managers' learning from market reactions when deciding whether to withdraw a proposed

Long-term performance in domestic deals

Next we test H3 and H4 by examining the effect of the determinants of long-term performance as measured by BHARs. The results are presented in Table 5. We report BHAR12 and BHAR24 for completed and non-completed deals separately.

These results show that there is no significant impact from the Brexit Referendum on long-term deal performance. The coefficients of Vote are not significant for both completed and non-completed deals.

Interestingly, we find different micro-level factors affect long-term performance depending on whether the deal is completed. For completed deals, deals announced after the vote perform better in the long run if they involve large relative size. Specifically, the coefficient of Relative Size*Vote for completed deals is 5.4629, significant at the 1% level, one year after the effective date, indicating that for completed domestic deals, the relative size has a stronger positive impact on acquirer's long-term performance after the Brexit Referendum. This result is consistent with the intuition that acquirers take advantage of assets such as market position or the distribution network of large targets to bulk up against the uncertainty, leading to better performance than with smaller targets. These results are robust when we test BHAR24. Hence, we find evidence consistent with H3.

For non-completed deals, deals announced after the vote perform better in the long run with better acquirer experience. For example, the coefficient of Experience*Vote for non-completed deals is 1.9084, significant at the 1% level, one year after the announcement date, indicating that for non-completed domestic deals, acquirer's experience has a stronger positive impact on long-term performance after the vote.

transaction that investors perceive to be value reducing. Chen, Harford, and Li (2007), Kau, Linck, and Rubin (2008), and Masulis, Wang, and Xie (2009) report evidence consistent with the view that managers are listening to the market. To test the association between the market reaction to the M&A announcement and managers' decision whether to withdraw proposed transaction, we perform a regression analysis to interact the deal announcement returns with the likelihood of transaction completion. Details of the results are available upon request. We thank the referees for their valuable comments.

This finding is consistent with the argument that when uncertainty is high, experienced acquirers will more carefully evaluate transaction values and drop unprofitable

deals. These results are robust when we test BHAR24. Hence, we find evidence consistent with H4.

Table 5 Long-term Performance in Domestic Deals

Variable	BHAR12		BHAR24	
	Completed	Non-completed	Completed	Non-completed
Vote	-0.1383 (-0.52)	-1.6394*** (-3.58)	-0.0356 (-0.08)	-1.2662 (-1.27)
Relative Size	-0.2530 (-0.37)	-0.5089 (-1.19)	0.0418 (0.05)	-0.2025 (-0.28)
Relative Size*Vote	5.4629*** (3.03)	0.2046 (0.37)	4.3014* (1.77)	-0.6804 (-0.46)
Experience	0.1011 (0.78)	-2.3918*** (-7.71)	-0.0567 (-0.34)	-2.0664*** (-4.24)
Experience *Vote	0.0069 (0.03)	1.9084*** (4.06)	0.0396 (0.08)	1.8748* (1.91)
Friendly	0.3965 (0.88)	1.1970 (1.15)	0.4482 (0.78)	0.5393 (0.39)
Competed	0.0650 (0.67)	-0.4837 (-0.68)	0.0450 (0.76)	-0.0990 (-0.07)
Cash	0.1530* (1.86)	0.2560* (1.81)	0.1679 (1.60)	0.5643** (2.48)
Public Target	0.0915 (0.14)	0.1088 (0.20)	1.3210 (1.54)	0.3895 (0.31)
Relatedness	0.0044 (0.04)	-0.1766 (-0.59)	0.1199 (0.85)	0.6153 (1.27)
Deal Size	-0.0622* (-1.87)	0.0458 (0.71)	-0.1345*** (-3.07)	-0.1146 (-0.99)
Intercept	-0.5276 (-0.95)	0.5162 (0.52)	-1.3651* (-1.93)	2.0205 (1.39)
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Observations	601	112	474	95
Adjusted R-square	0.2316	0.2984	0.2968	0.3029

The table presents the estimation results of long-term performance on the sample of domestic deals announced between January 1, 2012 and December 31, 2018. The dependent variable is buy-and-hold abnormal returns (BHARs). BHARs are calculated over 12-month period (BHAR12) and 24-month period (BHAR24) after effective date month for completed deals and after announcement date month for non-completed deals by using matched control firms as benchmarks. Variable definitions are reported in the appendix. White (1980) test is applied to control for heteroscedasticity. t-value is shown in the parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Cross-border deals

Announcement effect in cross-border deals

We now turn to study deals with foreign target firms and test H5. Table 6 reports the results using the CARs of various event windows as independent variables. After controlling for other variables, the results show that there

is no impact from the Brexit Referendum on the cross-border deal announcement effect. For the macro-level factors, the coefficients on the interaction terms are not significant. These findings are consistent with H5, which posits that for cross-border deals, the impact of macro-level factors on the deal announcement effect remains unchanged after the Brexit Referendum.

Table 6 Announcement Effects in Cross-border Deals

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	CAR(-5,+5)	CAR(-3,+3)	CAR(-1,+1)	CAR(0,0)	CAR(0,+1)	CAR(0,+3)	CAR(0,+5)
Vote	-0.0847 (-0.54)	-0.1218 (-0.93)	-0.0705 (-0.67)	0.0855 (1.03)	-0.0020 (-0.02)	-0.0297 (-0.26)	0.0022 (0.02)
EU Target	0.5773 (1.54)	0.7562** (2.39)	0.3391 (1.33)	0.0936 (0.47)	0.3829 (1.63)	0.5605** (2.02)	0.4258 (1.38)
EU Target*Vote	-0.8999 (-1.57)	-1.1250** (-2.32)	-0.5046 (-1.29)	-0.2938 (-0.96)	-0.6054 (-1.58)	-0.8499** (-2.00)	-0.5218 (-1.11)
GDP Target	-0.0084 (-1.19)	-0.0061 (-1.03)	-0.0057 (-1.18)	0.0006 (0.16)	-0.0050 (-1.14)	-0.0051 (-0.97)	-0.0106* (-1.83)
GDP Target*Vote	0.0047 (0.33)	0.0086 (0.71)	0.0053 (0.55)	-0.0086 (-1.12)	-0.0007 (-0.08)	0.0002 (0.02)	-0.0028 (-0.24)
GDP Target*EU Target	-0.0548 (-1.55)	-0.0721** (-2.42)	-0.0323 (-1.34)	-0.0092 (-0.49)	-0.0368* (-1.66)	-0.0536** (-2.05)	-0.0403 (-1.39)
GDP Target*EU Target*Vote	0.0849 (1.58)	0.1069** (2.36)	0.0475 (1.30)	0.0278 (0.96)	0.0571 (1.29)	0.0806 (1.02)	0.0491 (1.11)
Euro	-0.0429 (-0.27)	-0.1083 (-0.81)	-0.0883 (-0.82)	0.0400 (0.47)	0.0062 (0.06)	0.0288 (0.24)	0.0145 (0.11)
Relative Size	0.0084* (1.68)	0.0056 (1.32)	0.0067** (1.97)	0.0089*** (3.30)	0.0065** (2.07)	0.0020 (0.55)	0.0035 (0.85)
Experience	-0.0033 (-0.39)	-0.0047 (-0.67)	-0.0005 (-0.08)	-0.0040 (-0.89)	-0.0023 (-0.45)	-0.0068 (-1.10)	-0.0063 (-0.91)
Friendly	0.0312 (1.12)	0.0144 (0.62)	0.0297 (1.57)	0.0056 (0.38)	0.0188 (1.08)	0.0119 (0.58)	0.0290 (1.27)
Competed	0.0523 (1.62)	0.0240 (0.88)	0.0133 (0.60)	0.0176 (1.02)	0.0052 (0.26)	0.0238 (1.00)	0.0549** (2.07)
Cash	-0.0032 (-0.41)	-0.0043 (-0.66)	-0.0030 (-0.56)	0.0004 (0.09)	-0.0070 (-1.45)	-0.0058 (-1.01)	-0.0029 (-0.46)
Public Target	-0.0413*** (-3.10)	-0.0313*** (-2.79)	-0.0187** (-2.06)	-0.0212*** (-2.98)	-0.0225*** (-2.69)	-0.0339*** (-3.44)	-0.0445*** (-4.07)
Relatedness	0.0113 (1.44)	0.0081 (1.23)	0.0086 (1.63)	0.0099** (2.38)	0.0113** (2.32)	0.0132** (2.29)	0.0198*** (3.10)
Deal Size	0.0020 (0.94)	0.0031* (1.69)	0.0029* (1.95)	0.0029** (2.53)	0.0033** (2.41)	0.0037** (2.35)	0.0043** (2.41)
Intercept	0.0740 (0.75)	0.0432 (0.52)	0.0404 (0.60)	-0.0099 (-0.19)	0.0420 (0.68)	0.0737 (1.01)	0.1336 (1.65)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	640	640	640	640	640	640	640
Adjusted R-square	0.3615	0.3092	0.3058	0.3192	0.3404	0.3205	0.3105

The table presents the estimation results of announcement effects on the sample of cross-border deals announced between January 1, 2012 and December 31, 2018. The dependent variable is the cumulative abnormal returns (CARs) of acquiring firms over event windows of (-5,+5), (-3,+3), (-1,+1), (0,0), (0,+1), (0,+3) and (0,+5). Variable definitions are reported in the appendix. The White (1980) test is applied to control for heteroscedasticity. t-value is shown in the parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

For the control variables, Relative Size and Deal Size are positively correlated to cross-border deal announcement returns. Consistent with the results for domestic deals, deals involving public targets are associated with a significantly negative announcement effect.

Determinants of deal completion in cross-border deals

To test H6, we run logit regressions which provide evidence on the determinants of deal completion in cross-border deals and report the results in Table 7. In Column 1, we specify the effect of EU target and add control

variables in Column 2. The effect of the target country's GDP is the main interest in Column 3 and control variables are added in Column 4. In Column 5, both sets of main variables are included and control variables are added in Column 6.

Table 7 Determinants of Deal Completion in Cross-border Deals

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Vote	-0.0074 (-0.09)	0.0324 (0.41)	-0.2597 (-0.47)	-0.1398 (-0.26)	-0.4831 (-0.85)	-0.3642 (-0.65)
EU Target	-0.0367 (-0.85)	-0.0231 (-0.54)			0.6051 (0.36)	0.8906 (0.54)
EU Target*Vote	0.0947** (2.04)	0.0628** (1.97)			2.8896** (1.96)	2.6061* (1.77)
GDP Target			0.0075 (0.29)	0.0138 (0.53)	0.0111 (0.42)	0.0177 (0.67)
GDP Target*Vote			0.0260 (0.51)	0.0177 (0.35)	0.0442 (0.83)	0.0367 (0.7)
GDP Target*EU Target					-0.0601 (-0.38)	-0.0858 (-0.56)
GDP Target*EU Target*Vote					-0.2598 (-1.12)	-0.2359 (-1.03)
Euro		-1.5507** (-2.29)		-1.6066** (-2.38)		-1.5286** (-2.26)
Relative Size		-0.0028* (-1.68)		-0.0030* (-1.76)		-0.0030* (-1.76)
Experience		0.0207 (0.64)		0.0212 (0.66)		0.0189 (0.58)
Friendly		0.5115*** (4.05)		0.5107*** (4.04)		0.5008*** (3.95)
Competed		-0.2183 (-1.44)		-0.2170 (-1.44)		-0.2158 (-1.43)
Cash		-0.0228 (-0.65)		-0.0257 (-0.73)		-0.0274 (-0.78)
Public Target		-0.1134* (-1.85)		-0.1144* (-1.86)		-0.1161* (-1.88)
Relatedness		0.0581* (1.76)		0.0599* (1.82)		0.0623* (1.89)
Deal Size		0.0164* (1.9)		0.0160* (1.86)		0.0162* (1.87)
Intercept	0.8947*** (3.2)	0.3155 (1.03)	0.8151** (2.05)	0.1681 (0.41)	0.7783* (1.94)	0.1412 (0.34)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	910	910	910	910	910	910
pseudo R-square	0.2736	0.3139	0.2748	0.3136	0.2801	0.3180

The table presents the estimation results of deal completion by using logit models on the sample of cross-border deals announced between January 1, 2012 and December 31, 2018. The dependent variable is a dummy variable that equals one if the deal is completed and zero otherwise. Columns 1, 3, and 5 examine the interaction term only. Column 2, 4, 6 further include the control variables. Variable definitions are reported in the appendix. The White (1980) test is applied to control for heteroscedasticity. t-value is shown in the parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

As expected, the probability of deal completion for cross-border deals announced after the Brexit Referendum remains unchanged. In all regressions, the coefficients of the variable *Vote* are not significant. Interestingly, we find that deals involving EU targets are more likely to succeed. Specifically, the coefficient of *EU Target*Vote* is 0.0947 in Column 1, statistically significant. These results are robust when we add control variables in Column 2. Hence, these results are consistent with the argument that for cross-border deals, UK firms acquiring foreign firms domiciled in countries with EU membership to maintain the access to European markets after the Brexit Referendum are more likely to be completed. We thus find evidence supporting H6. However, deals involving targets headquartered in countries with higher GDP per capita after the Brexit Referendum do not appear to have significant changes in completion. The coefficient of *GDP Target*Vote* is not significant across all regressions.

The inclusion of control variables does not change the outcome of *Interested*. The effects of control variables are: (1) Euro appreciation decreases the likelihood of deal completion. (2) Large relative size deals have a lower chance of being completed. (3) Friendly deals have a higher chance of being completed. (4) Deals are less likely to be completed with public foreign target firms. (5) Acquirer and target firms in the same industry tend to have a higher chance of deal completion. (6) Larger deal size deals are more likely to be completed.⁴

Long-term performance in cross-border deals

We continue to test H7 by examining the long-term performance of deals involving foreign target firms. As shown in Table 8, results are similar to those for domestic deals. *Vote* has no effect on long-term performance, suggesting that UK firms cannot create greater value during periods with a high degree of uncertainty by acquiring foreign targets.

The results for the macro-level factors show no evidence that UK firms acquiring EU targets or targets in

higher GDP per capita countries will produce better long-term performance after the vote, for both completed and non-completed deals. None of the interaction terms, *EU Target*Vote* and *GDP Target*Vote*, is significant, indicating acquiring targets that are domiciled in countries with EU membership or higher economic development after the vote does not improve long-term performance. This finding supports H7, which posits that for cross-border deals, the impact of macro-level factors on long-term deal performance remains unchanged after the Brexit Referendum.

We have several findings for control variables. For completed deals, (1) the effect of relative size is positively associated with long-term performance and (2) experienced acquirers exhibit better long-term performance. For non-completed deals, (1) larger relative size is associated with poorer long-term performance, (2) friendly deals have better performance, (3) competed deals exhibit a negative relation to non-completed deals, (4) acquiring public targets leads to better long-term performance, and (5) smaller deal size performs better in the long run.

Discussion

Overall, the findings in this paper indicate that in response to leaving the EU, UK firms take M&A strategy into account in order to diversify the risk of uncertainty. For domestic deals, UK firms can combine the value and performance of another UK firm through mergers and acquisitions. Our results show a successful acquisition with a large target firm indeed benefits shareholders. Based on our analysis of long-term performance, a firm's post-merger share price increases if it can achieve a relatively large size deal, indicating synergy creation. The expected synergy can be attributed to various factors, such as increased revenues, combined talent and technology, or cost reduction.

Our findings show that a relatively large deal benefits shareholders in the long-term. However, such deals are not easily completed. Acquirer's experience can moderate the negative effect. Acquisition managers should seek and review potential deals to ensure that they fit the firm's

⁴ The analysis of the association between market reaction and deal completion for cross-border deals is available upon request. We thank the referees for their valuable comments again.

Table 8 Long-term Performance in Cross-border Deals

Variable	BHAR12		BHAR24	
	Completed	Non-completed	Completed	Non-completed
Vote	1.1679 (0.29)	-0.9585 (-0.38)	9.6560 (0.82)	-46.2350 (-0.31)
EU Target	-3.2549 (-0.74)	24.0974 (1.35)	6.3156 (0.52)	36.4699 (0.20)
EU Target*Vote	-6.3103 (-0.67)	-11.6291 (-0.76)	-17.2750 (-0.61)	53.6080 (0.17)
GDP Target	-0.1218 (-1.09)	-0.1366 (-0.77)	0.8339*** (2.63)	-0.7344 (-1.09)
GDP Target*Vote	-0.0843 (-0.22)	0.1074 (0.44)	-0.8849 (-0.81)	4.2895 (0.31)
GDP Target*EU Target	0.3159 (0.77)	-2.2042 (-1.32)	-0.5630 (-0.49)	-3.4193 (-0.20)
GDP Target*EU Target*Vote	0.5440 (0.62)	1.1073 (0.76)	1.5740 (0.60)	-4.9422 (-0.17)
Euro	1.1615 (0.57)	8.1085 (1.30)	4.3215 (0.74)	12.5484 (0.94)
Relative Size	0.9184** (1.98)	-0.9075** (-2.19)	0.8668 (0.66)	2.7043 (0.93)
Experience	0.3413** (2.54)	-0.6547 (-1.22)	0.4222 (1.05)	-0.3383 (-0.43)
Friendly	0.0379 (0.34)	0.0512 (0.10)	0.0300 (0.21)	9.0100*** (4.30)
Competed	0.0201 (0.29)	0.5228 (0.73)	0.0012 (0.57)	-7.5132*** (-4.23)
Cash	-0.0582 (-0.63)	-0.4831 (-1.00)	-0.3023 (-1.17)	-0.4885 (-0.74)
Public Target	-0.0508 (-0.10)	0.0542 (0.16)	-0.2205 (-0.15)	8.6540*** (7.62)
Relatedness	0.0505 (0.50)	0.3531 (1.38)	0.1325 (0.46)	-0.8127 (-1.25)
Deal Size	0.0224 (0.56)	-0.0487 (-0.76)	-0.1965 (-1.65)	-0.4982** (-2.82)
Intercept	1.7911 (1.43)	1.8463 (0.98)	-7.1477** (-2.02)	0.2799 (0.07)
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Observations	488	97	398	74
Adjusted R-square	0.2886	0.3106	0.3098	0.2956

The table presents the estimation results of long-term performance on the sample of cross-border deals announced between January 1, 2012 and December 31, 2018. The dependent variable is buy-and-hold abnormal returns (BHARs). BHARs are calculated over 12-month period (BHAR12) and 24-month period (BHAR24) after effective date month for completed deals and after announcement date month for non-completed deals by using matched control firms as benchmarks. Variable definitions are reported in the appendix. White (1980) test is applied to control for heteroscedasticity. t-value is shown in the parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

business strategy and finance well, making good additions to the firm. Under uncertainty, it is important that acquirers research prospective purchase deals carefully, especially for relatively large deals. Previous acquisition experience aids in the decision-making process, which can be achieved by hiring experienced acquisition directors.

For cross-border deals, our results show that UK firms prefer to maintain partnerships with firms located in the EU. Deals involving targets domiciled in countries with EU membership are more likely to be completed after the Brexit Referendum. However, such deals do not generate significant long-term benefits for shareholders, indicating that UK firms are focused on ensuring that they maintain frictionless trade in goods between the UK and the EU in response to the needs of business.

The analysis of this paper gives a greater understanding of how the Brexit Referendum affects micro and macro factors that impact UK firms' mergers and acquisitions. Regulators, firms, and outside investors can benefit from these insights. The analysis offered in this paper can help regulators, firms, investors, and other active participants in UK markets to develop a clearer picture of corporate activities in response to leaving the EU.

Conclusion

The Brexit Referendum of June 23, 2016 resulted in anomalies in the financial markets as well as political turmoil in UK and all around the world. Uncertainty for the future alters people's decision-making process and affects how corporations execute their operating and investment plans. This study investigates the impact of the Brexit Referendum on M&A activities, especially on deals involving UK acquirers. We provide evidence regarding the effect of micro and macro factors on the short-term announcement effect as measured by CARs, deal completion likelihood, and post-acquisition long-term performance as measured by BHARs after the Brexit Referendum.

For domestic deals, relative size of the target has a stronger negative impact on the probability of deal

completion after the Brexit Referendum, but the negative effect can be moderated by previous M&A experience. In the long run, UK firms benefit shareholders through acquiring large targets or if they have previous acquisition experience. By comparison, for cross-border deals, UK firms tend to retain partnerships with firms located in the EU in order to maintain access to European markets after the Brexit Referendum.

The government's Brexit bill has completed its passage through the House of Commons. The Brexit date is set for 31 January 2020. Empirical findings in this paper shed light on the impact of the Brexit Referendum on the M&As of UK firms. These insights provide information about the characteristics of corporate activities when responding to the impact of Brexit, which helps regulators, firms, investors and other active participants in the markets develop a clearer picture of their investment strategies.

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Appendix: Variable Definitions

Variable	Source	Definition
Cash	SDC	Dummy variable that equals 1 if the method of payment is fully in cash and 0 otherwise.
Competed	SDC	Dummy variable that equals 1 if there are more than one acquirer and 0 otherwise.
Complete	SDC	Dummy variable that equals 1 if the deal is completed and 0 otherwise.
Deal Size	SDC	The natural logarithm of the deal value.
EU Target		Dummy variable that equals 1 if the target is domiciled in countries with EU membership and 0 otherwise.
Euro	Datastream	The monthly return of British Pound against one Euro at the announcement date.
Experience	SDC	Dummy variable that equals 1 if the acquirer has conducted M&As within three years prior to the current deal announcement and 0 otherwise.
Friendly	SDC	Dummy variable that equals 1 if the deal is friendly and 0 otherwise.
GDP Target	Datastream	The natural logarithm of GDP per capita of target nation in prior fiscal year.
Public Target	SDC	Dummy variable that equals 1 if the target status is public and 0 otherwise.
Relatedness	SDC	Dummy variable that equals 1 if the acquirer and target share the same 3-digit SIC codes and 0 otherwise.
Relative Size	SDC, Datastream	The deal value (SDC) divided by acquirer's market value (Datastream, MV) four weeks prior to the announcement date.
Vote		Dummy variable that equals 1 if the transaction is announced after the Brexit Referendum, June 23, 2016, and 0 otherwise.

英國脫歐公投對英國企業併購活動之影響

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本文針對英國脫歐公投對英國企業併購影響進行探討。樣本分為國內併購（英商併英商）和跨國併購（英商併外商），從個體和總體因素角度，進行宣告效果、完成機率、以及併購後股票長期持有績效之實證研究。結果指出，個體因素對國內併購有顯著影響，就完成機率而言，公投後宣告之國內併購如涉及相對規模較大的被併方，完成機率更低。然而，若主併有過去併購經驗，則可提高完成機率。此外，公投後對涉及相對規模較大被併方之已完成國內併購案的長期績效產生正影響；若主併有過去併購經驗，即使併購最終沒有完成，公投仍對長期績效有正影響。就跨國併購案而言，總體因素則產生顯著影響，如被併國家為歐盟成員國，則公投後宣告之併購完成機率較高。

關鍵字：英國脫歐公投、併購、個體和總體因素、績效、完成機率。

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