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Economic shocks, M&A advisors, and industry takeover activity

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ABSTRACT

The paper examines the role of **M&A** advisors in propagating takeover activity following economic shocks that affect industry conditions. M&A advisors constitute an important intermediary in the market for corporate control by enhancing M&A success at a transaction level. We posit that, at an industry level, M&A advisors also play a significant role in propagating aggregate merger activity in the wake of an industry shock. The empirical results show a positive, significant relationship between the presence of M&A advisors and industry takeover activity, and offer evidence supporting the incremental role of M&A advisors following industry shocks. The results are robust to empirical strategies aimed at alleviating endogeneity concerns, including using a legislative change as an exogenous shock to M&A advisors and exploring reverse causality. Our evidence offers novel insights on the collective role of M&A advisors in the takeover market.

1. Introduction

Merger and acquisition (M&A) advisors play a crucial role in facilitating takeover activity in the market for corporate control (Kale et al., 2003; Chemmanur et al., 2019). Quality advisors contribute to M&A success by enhancing acquirer returns (Golubov et al., 2012; Yawson and Zhang, 2021), facilitating deal completion (Hunter and Jagtiani, 2003; Kale et al., 2003; Chang et al., 2016a), and expediting transaction time (Walter et al., 2008). Despite the well-established importance of M&A advisors in enhancing the efficiency of M&A deals at a transaction level, the collective role of M&A advisors at the macro level is little understood and seldom investigated. Since takeover activity clusters over time and in specific industries following economy- or industry-wide shocks (Mitchell and Mulherin, 1996; Harford, 2005; Duchin and Schmidt, 2013), extensive research has been devoted to understanding time-varying factors that drive M&A propensity (Harford, 2005; Garfinkel and Hankins, 2011).[1] Yet the presence of M&A advisors, who constitute an important intermediary in the takeover market, has not been examined with respect to facilitating industry-level takeover activity beyond individual transactions.

We fill this gap in the literature by investigating the role of M&A advisors as a predictor of industry-level takeover activity. Specifically, we posit that the presence of M&A advisors contributes to propagating takeover activity in specific industries in the wake of industry shocks. Existing evidence shows that M&A advisors possess information advantage (Andrade et al., 2001; Servaes and Zenner, 2015) and industry-specific expertise in takeover markets (Loyeung, 2019; Wang et al., 2022) that enables them to enhance the quality of M&A transactions by facilitating the matching of potential bidders with targets (Hunter and Walker, 1990), identifying

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[1] For example, industry conditions such as capital liquidity (Harford, 2005), cash flow uncertainty (Garfinkel and Hankins, 2011), and acquirer stock overpricing (Shleifer and Vishny, 2003; Rhodes-Kropf and Viswanathan, 2004; Rhodes-Kropf et al., 2005) are documented as significantly associated with clustering of takeover activity.

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synergistic deals (Golubov et al., 2012), and assist in information sharing between bidders and targets (Agrawal et al., 2013; Chang et al., 2016b). As a result of this knowledge base and information advantage, M&A advisors are in a better position than individual firms to evaluate potential M&A opportunities, particularly following a shock that has changed firms' operating environment in an industry. Incentivized by the dual motives of attaining advisor fees (Hunter and Jagtiani, 2003) and expanding their market share of advisory services (Derrien and Dessaint, 2018), M&A advisors are driven to make recommendations to acquirer clients about potential M&A deals, thereby contributing to an increased volume of takeover activity following industry shocks. A higher volume of successful M&A transactions can, in turn, attract more firms to enter the M&A market, hence propagating industry-level takeover activity following an economic shock to an industry.

To examine this hypothesis, we use a large sample comprising 56,632 M&A transactions from 1980 through 2017 involving U.S. firms in 48 Fama and French (1997) industry groups. Following prior research (Mitchell and Mulherin, 1996), we capture the volume of M&A transactions at the industry-year level, proxied by the number and value of M&A deals, as well as the Harford (2005) measure of industry merger waves. The results show that, consistent with our expectation, the presence of M&A advisors is positively, significantly related to takeover activity after industry shocks. We re-conduct our analysis using a sample of Australian firms and produce consistent results, which demonstrates the relevance of our findings to the Asia-Pacific region.

We use a series of empirical analyses to verify the robustness of our results and alleviate potential endogeneity concerns. First, following Harford (2005), we conduct a simulation analysis with a binary variable to capture the existence of merger waves. This is used as an alternative dependent variable in the regression analysis, producing consistent results. Second, we examine the interaction between M&A advisors and industry shocks to capture the incremental role of M&A advisors in propagating takeover activity.[2] Third, to alleviate potential endogeneity concerns, we estimate a two-stage least squares (2SLS) model using an instrumental variable (IV) based on the introduction of the *Financial Services Modernization Act* enacted in 1999, which constitutes an exogenous regulatory shock to the number of M&A advisors in the market. The results from the 2SLS analysis confirm our baseline findings. Fourth, we use an alternative model specification (Fama and MacBeth, 1973) and alternative measures of M&A advisors to confirm the robustness of our baseline results. Fifth, we examine possible reverse causality as an alternative explanation, whereby it is industry shocks that create higher demand for more M&A advisors (demand-side effect), rather than M&A advisors contributing to industry takeover activity (supply-side effect) as we hypothesize. Specifically, we conduct a residual analysis by first estimating regressions using industry shocks to predict the expected level of M&A activity, obtaining the residual terms. We then use M&A advisors to predict the residual industry takeover activity, to isolate the portion of increased M&A activity attributable to the industry shocks from the "residual" portion attributable to other factors. Our results show that M&A advisors have a significant, positive association with the residual takeover activity, demonstrating the incremental predictive power of M&A advisors over takeover activity above and beyond the effects of industry shocks. Overall, the empirical evidence shows that M&A advisors play a key role in propagating merger activity in the wake of industry shocks.

Further, we evaluate whether our analysis, which predominantly focuses on the US market, has implications for markets and investors in the Asia-Pacific region. We re-conduct our main analysis using a sample of Australian firms to extend the investigation into the Asia-Pacific region. Unlike US markets, the Australian market features more restrictive legislation and regulations governing takeovers (Hutson, 2000; Tian and Twite, 2011; Hossain et al., 2021), raising tension whether this study's findings are applicable to the different regulatory environment of Australia. Our findings from this analysis are consistent in producing evidence of a significant, positive relationship between the presence of M&A advisors and industry takeover activity in the Australian market, which demonstrates the relevance of our findings to the Asia-Pacific region.

Our findings make several important contributions to the literature. This is the first study to investigate the collective presence of M&A advisors as a predictor of takeover activity at industry level, contributing novel evidence to the empirical literature on M&A advisors (Kale et al., 2003; Bao and Edmans, 2011; Golubov et al., 2012; Wan et al., 2021). M&A advisors serve as an essential intermediary facilitating merger activity (Golubov et al., 2015; Yawson and Zhang, 2021), yet prior studies on M&A advisors have primarily focused on their impacts at the transaction level, such as in influencing acquirer returns, deal completion, transaction duration, and deal negotiations (Hunter and Jagtiani, 2003; Kale et al., 2003; Golubov et al., 2012). No prior research has examined the collective role of M&A advisors at the macro level in explaining merger activity across different industries. Our study fills this important gap and extends the investigation of the role of M&A advisors beyond the transaction level and offer new insights into their role in propagating takeover activity following industry shocks.

Second, our evidence adds to the existing research under the theoretical framework of neoclassical theory (Gort, 1969), which posits that industry shocks change firms' operating environment, thereby driving firms to engage in M&A to adapt to the new industry conditions. Though high volumes of merger activity cluster following industry shocks (Mitchell and Mulherin, 1996), other industry conditions such as capital liquidity (Harford, 2005), cash flow uncertainty (Garfinkel and Hankins, 2011), and acquirer stock overpricing (Shleifer and Vishny, 2003; Rhodes-Kropf and Viswanathan, 2004; Rhodes-Kropf et al., 2005) also contribute to the clustering of industry takeover activity. For example, Harford (2005) finds that economic shocks alone are not enough to propagate merger waves but there must be sufficient capital liquidity to accommodate the asset reallocation that accompanies economic shocks. However, there is limited evidence on the specific mechanisms through which an initial economic shock ripples across an industry to initiate M&A clustering. We build on this work by investigating the role of M&A advisors as a mechanism contributing to industry-level takeover

[2] If M&A advisors contribute to the volume of M&A activity by encouraging their clients to conduct M&As, we would expect the interaction between M&A advisors and various proxies of industry shock to significantly predict industry merger activity. Consistent with expectations, our regression results show an incremental influence of M&A advisors on industry takeover activity.

activity. Our findings add to the literature by providing evidence of the importance of M&A advisors in contributing to industry merger activity in the wake of broad and specific industry shocks.

Third, this study contributes more broadly to the extensive corporate finance literature on the determinants of M&A activity (Duchin and Schmidt, 2013; Ahern and Harford, 2014; Andriosopoulos and Yang, 2015; Larkin and Lyandres, 2019; Ahmad et al., 2021; Meng and Vijh, 2021). Firms' propensity to pursue M&A activity is determined by numerous time-varying factors at the firm-, manager-, industry-, and institutional-levels. These include firm-level characteristics such as financing and operating policies and corporate governance (Harford et al., 2009; Harford et al., 2012; Bena and Li, 2014), CEO personal attributes (Goel and Thakor, 2010; Levi et al., 2010), industry conditions (Mitchell and Mulherin, 1996; Harford, 2005), and the general business environment (Alimov and Officer, 2017; Fang et al., 2021). Our findings offer a valuable addition to the evidence of the dynamic factors that influence firms' likelihood to engage in takeover activity.

Fourth, we contribute to the literature on entrepreneurial finance. At some point, an entrepreneur with private information about the viability of a firm relative to product market competition has to make an exit choice between public listing or a sale to an acquirer (Chemmanur et al., 2023). As M&A constitutes a crucial exit strategy for entrepreneurial firms (Chemmanur et al., 2023), engaging the services of M&A advisors may increase the likelihood of a successful sale to another firm. Even when an entrepreneur chooses to sell a portion of their holdings in an IPO, the entrepreneur, who may still hold majority shares in the company, can decide to sell to an acquirer. Again, the services of M&A advisors will be relevant. Thus, our findings contribute to the rapidly growing entrepreneurial finance literature (Vismara et al., 2012; Vismara and Signori, 2014; Cattaneo et al., 2015; Signori and Vismara, 2017, 2018) by demonstrating the presence of M&A advisors as a significant institutional characteristic that can potentially affect the climate in which takeovers take place, with particular relevance to small and start-up firms.

The remainder of this paper is organized as follows: Section 2 reviews prior literature and develops the hypotheses. Section 3 details the methodology and sample selection. Section 4 presents and discusses the empirical results, including analyses designed to alleviate endogeneity and Section 5 concludes.

2. Literature review and hypothesis development

2.1. The determinants of takeover activity

The propensity of firms to pursue M&A has attracted extensive researcher attention and is influenced by a myriad of firm- or management-related factors. At the firm level, takeover activity is affected by firms operational strategies (Gibbs, 1993), financing policies (Morellec and Zhdanov, 2008), lifecycle stage (Owen and Yawson, 2010), litigation risk (Krishnan et al., 2012; Liu and Yawson, 2018), corporate values and culture (Harford et al., 2019; Duchin et al., 2021), and managerial entrenchment (Bates et al., 2008; Harford et al., 2012). In particular, a series of dynamic time-varying factors play important roles in determining firm likelihood to engage in M&A, including firms' capital structure (Harford et al., 2009; Huang et al., 2018), cash reserves (Harford, 1999; Pinkowitz et al., 2013), ownership structure (Ambrose and Megginson, 1992; Henry, 2004; Brooks et al., 2018) such as institutional holdings (Harford et al., 2011), shareholder homogeneity (Chatterjee et al., 2012), and ownership concentration (Li and Qian, 2013), as well as performance-related factors, including firms' market pricing (Morellec and Zhdanov, 2005; Hackbarth and Morellec, 2008; Edmans et al., 2012), earnings forecasts (Amel-Zadeh and Meeks, 2019), accounting quality (Raman et al., 2013; Marquardt and Zur, 2015), and innovation (Bena and Li, 2014; Lin and Wang, 2016; Wu and Chung, 2019).

Managerial characteristics also make a significant difference in firms' likelihood to engage in M&A, including CEO overconfidence (Roll, 1986; Ferris et al., 2013), personality traits (Goel and Thakor, 2010; Aktas et al., 2016), age and hormonal level (Levi et al., 2010; Yim, 2013; Jenter and Lewellen, 2015), political ideology (Elnahas and Kim, 2017), experience (Ding et al., 2021; Li et al., 2022), and prior performance (Hirshleifer and Thakor, 1994). Additionally, executive compensation impacts firms' M&A activity (Agrawal and Knoeber, 1998; Hadlock et al., 1999; Phan, 2014). The board of directors also plays a role since takeover activity is predicted by board composition (Shivdasani, 1993; Bange and Mazzeo, 2004), director gender diversity (Levi et al., 2014; Ahmed et al., 2022), and board connections (Cai and Sevilir, 2012; Renneboog and Zhao, 2014; de Sousa Barros et al., 2021).

At the macro level, clustering of takeover activity typically occurs following economy- or industry-wide shocks (Mitchell and Mulherin, 1996) that change firms' business environment and prompt value-maximizing managers to reorganize their assets through M&A to improve efficiency and adapt to the new conditions (Calomiris, 1999).[3] Industry conditions can contribute to increased takeover activity in that industry, including capital liquidity (Harford, 2005; Oh, 2018),[4] overvaluation of bidder stock (Shleifer and Vishny, 2003; Ang and Cheng, 2006; Dong et al., 2006), risk management of cashflow uncertainty (Garfinkel and Hankins, 2011), competition intensity (Srinivasan, 2020), and government intervention (Alcalde and Powell, 2022). More generally, business environment and institutional factors can stimulate or disincentivize firms to engage in M&A: e.g., policy uncertainty is documented as retarding takeover activity (Nguyen and Phan, 2017; Bonaime et al., 2018; Paudyal et al., 2021); whereas takeover activity is promoted by property rights protection (Alimov and Officer, 2017; Fang et al., 2021) and is affected by monetary policy (Adra et al.,

[3] Consistent with this view, industry shocks such as technological advances (Coase, 1937), changes in foreign competition (Powell and Yawson, 2005), legislative reform (Stahl, 2016), and deregulation (Ovtchinnikov, 2013) precipitate M&A waves. Merger activity in one industry or region can also transmit to related industries (Ahern and Harford, 2014) and different countries (Ahmad et al., 2021).

[4] The importance of capital liquidity in facilitating M&A activities and capital reallocation has been highlighted by subsequent research (Eisfeldt and Rampini, 2006; Almeida et al., 2011; Khatami et al., 2015).

2020), political corruption (Nguyen et al., 2020), and takeover laws (Cain et al., 2017; Loureiro and Silva, 2023).

2.2. M&A Advisors in capital markets

M&A advisors play an important role in the market for corporate control (Bao and Edmans, 2011; Agrawal et al., 2013; Chemmanur et al., 2019). Top-tier M&A advisors can facilitate better M&A outcomes for their clients by offering superior negotiation skills and a valuable advisory service (Bowers and Miller, 1990).[5] Bao and Edmans (2011) identify a significant investment-bank-level fixed effect in the announcement returns from M&A deals, demonstrating the significant difference made by different providers of M&A advice in determining the success of the deals. The human capital of individual M&A advisors is also of value to firms participating in takeover activity (Chemmanur et al., 2019; Wan et al., 2021). Chemmanur et al. (2019) find that the personal experience of specific investment bankers makes a significant difference in enhancing acquisition returns and post-acquisition operating performance of M&A deals.

At a transaction level, reputable M&A advisors can improve M&A deal outcomes, including achieving better announcement-date returns (Kale et al., 2003; Bao and Edmans, 2011; Golubov et al., 2012), higher total synergy (Bowers and Miller, 1990), faster deal completion (Hunter and Jagtiani, 2003; Walter et al., 2008; Guo et al., 2020), and reduced likelihood of non-completion (Hunter and Jagtiani, 2003). For instance, Kale et al. (2003) and Golubov et al. (2012) find that the market returns of bidder firms in public M&A transactions are positively correlated with the reputation of their M&A advisors. The value of M&A advisors is amplified by deal and acquirer characteristics, e.g., firms facing complex M&A deals are more likely to hire external advisors (Golubov et al., 2012), and top-tier advisors play a greater role in attaining better M&A success for financially constrained acquirers (Guo et al., 2020). The value of boutique advisors and internal advisors has also been documented in M&A transactions (Song et al., 2013; Loyeung, 2019; Aktas et al., 2021).

Empirical evidence offers insights on multiple mechanisms through which M&A advisors contribute to achieving superior M&A outcomes, specifically by offering an information advantage, negotiating skills, industry expertise, and sourcing finance. First, M&A advisors have an information advantage over individual firms by accumulating a knowledge base of potential bidders and targets in the market. This information advantage enables M&A advisors to facilitate the matching of suitable acquirers and targets (Hunter and Walker, 1990) and to identify synergistic deals (Golubov et al., 2012). Consistent with this information advantage view, Yawson and Zhang (2021) and Chaudhry et al. (2022) find that more centrally-positioned M&A advisors in investment banking networks deliver superior deal outcomes for their clients by being more well informed and reducing information asymmetry. Second, M&A advisors offer valuable negotiating skills to facilitate takeover activity (Golubov et al., 2012), because more reputable M&A advisors achieve a lower premium for acquirers (Lyu and Wang, 2020). Third, M&A advisors provide industry-specific expertise that can enhance transaction success (Loyeung, 2019; Bilinski and Yim, 2022; Wang et al., 2022). For example, Wang et al. (2022) find that high acquirer announcement returns are attained by M&A advisors with more experience and expertise in the target industry. Finally, M&A advisors can assist acquirers to source financing to fund M&A deals (Chen and Wu, 2021; Power and Tandja, 2022). Through these avenues, M&A advisors are well documented as improving deal success.

Despite ample evidence of the importance of M&A advisors at a transaction level, no prior research has examined the role of M&A advisors at an industry level in propagating takeover activity. In this paper, we fill this gap by evaluating the role of M&A advisors in predicting industry-level takeover activity in a macro context beyond individual deals. Under neoclassical theory (Gort, 1969), when an industry shock alters the business environment in which firms operate, it creates demand for M&A activity because firms in that industry are driven to restructure and optimize their asset combination. We posit that M&A advisors can actively contribute to the increased demand for M&A and propagate takeover activity in the wake of industry shocks. We expect that M&A advisors, through their skillsets and knowledge base that enhance M&A success at a transactional level, can play a stimulatory role in encouraging and facilitating a higher volume of M&A transactions at an industry level for several reasons. First, the superior access to information of M&A advisors enables them to act as intermediaries to improve the efficiency of matching buyer and seller firms (Hunter and Walker, 1990) and identifying deals that can create synergy (Golubov et al., 2012). Additionally, M&A advisors possess industry expertise in their knowledge base (Graham et al., 2017; Cumming et al., 2023), which can further contribute to identifying synergistic M&A opportunities. Once potential opportunities are identified, M&A advisors are driven to recommend potential takeover targets to bidder clients by the dual incentives of expanding their advisory market share and earning fees from successful deal completion (McLaughlin, 1990, 1992). For these reasons, we expect the presence of M&A advisors to contribute to the overall volume of M&A activity in an industry following a shock. Accordingly, we hypothesize a positive relationship between M&A advisors and industry-level takeover activity.

3. Data and methodology

3.1. Mergers and acquisitions

We collect data on M&As from the Thomson Financial SDC database from 1 January 1980 to 31 December 2017. Following Harford (2005) and Golubov et al. (2012), we adopt the following sample selection criteria. An M&A transaction is included in the sample only if it meets all of the following conditions. First, each merger or acquisition bid has a transaction value of at least US$50 million. Second,

[5] M&A advisor quality is usually captured by market share of advisors or advisor rankings based on market share (Derrien and Dessaint, 2018).

Table 1
Descriptive statistics.

Variable	Obs	Mean	Std.Dev.	Min	Max
NumTrans	1824	28.532	55.865	0.000	575.000
NumAnnounce	1824	31.048	59.642	0.000	620.000
ValueTrans	1824	18.468	45.026	0.000	691.738
Wave	1824	0.1371	0.3440	0	1
Advisors	1824	16.521	17.826	0.000	150.000
AdvisorsDeals	1824	33.944	55.508	0.000	556.000
FSMA	1824	0.500	0.500	0.000	1.000
Sales shock	1824	0.343	0.316	0.000	2.804
Cash flow shock	1246	1.328	4.395	0.001	93.077
Employment shock	1824	0.259	0.568	0.000	8.292
Sales growth	1824	0.356	0.370	−1.008	2.828
Cash flow growth	1247	0.961	4.509	−14.304	93.149
Employment growth	1824	0.141	0.617	−1.306	8.318
Deregulation	1824	0.155	0.362	0.000	1.000
RD	1824	0.585	5.116	0.000	123.170
Capitalization	1783	10.773	2.045	−4.201	15.452
return	1824	0.464	0.422	−1.468	2.521
MB	1824	1.855	0.885	0.287	13.793
Volatility	1824	0.066	0.026	0.020	0.212
DE	1824	1.469	1.836	−2.941	16.632

This table reports the descriptive statistics for the sample 1980–2017. *NumTrans* and *NumAnnounce* represent the number of completed transactions and the number of completed plus withdrawn deals, respectively. *ValueTrans* is the US dollar value of completed M&A ($ billions). *Advisors* is the number of unique M&A advisors participating in M&A deals. This variable is computed as the sum of M&A advisor companies participating in M&A deals without duplicate company names. *AdvisorsDeals* is the number of times that M&A advisors participate in industry M&A FSMAity. *FSMA* is a dummy variable equal to 1 when Financial Services Modernization Act 1999 is announced and 0 before the Act is released. Sales, Cash flow and Employment shocks represent the measures of broad industry shocks separately. All three measures are calculated over a 5-year rolling period starting in 1975. Sales, Cash flow, and Employee growth are measured over the 5-year period before each sample year. Others are control variables as described in Appendix A. The number of observations represents the number of industry-years without missing data

the M&A bid must involve both US bidders and targets. Third, each transaction must have been announced or completed. These criteria result in an initial sample of 56,632 unique M&A transactions. These M&A transactions are classified into the Fama and French (1997) 48 industry groups. The final sample comprises 1824 industry-year observations.

We use four empirical measures to capture industry-level M&A activity. Following the literature (Powell and Yawson, 2005), our first measure captures the number of completed M&As in a given industry-year (*NumTrans*); the second captures transaction value of completed M&As at the industry level (*ValueTrans)*; and the third measure is the number of M&A announcements (*NumAnnounce*) in a given industry-year. Finally, the fourth measure, *Wave*, captures the occurrence of a merger wave using Harford (2005) simulation method.

3.2. Measuring M&A advisors

We collect data on M&A advisors from the Thomson Financial SDC Database. Like our empirical measures of M&As, we measure M&A advisors on an industry-year basis using the Fama and French (1997) 48 industry classifications. We compute *Advisors* as the number of unique M&A advisors that have participated in all M&A deals in our sample (including both bidder and target advisors).

3.3. Measuring industry shocks

Prior literature categorizes industry shocks to M&A markets into two general categories: broad and specific industry shocks (Mitchell and Mulherin, 1996; Powell and Yawson, 2005). Broad industry shocks represent economic changes experienced by industries that can alter the industry's structure. Following prior studies, we compute sales, employment and operating cash flow shocks as proxies for broad industry shocks (Mitchell and Mulherin, 1996). Sales growth is calculated as the growth rate of sales over the five-year period preceding the sample year. A sales shock is defined as the absolute value of the difference between an industry's sales growth and the average sales growth across all 48 industries. Using an absolute value allows us to capture both positive and negative shocks to an industry that can impact its structure (Mitchell and Mulherin, 1996). We repeat this methodology to compute employment and cash flow shocks.

In contrast, specific industry shocks, e.g., deregulation and technology change, significantly contribute to industry merger activity (Mulherin and Boone, 2000). Deregulation increases the pressure of market competition in the affected industry (Mitchell and Mulherin, 1996). Such changes impact the new business environment and require firms in the affected industry to adapt, which can be facilitated by M&As. Mitchell and Mulherin (1996) argue that technology shocks are negatively associated with industry merger activity because R&D expenditure and asset restructuring serve as substitute mechanisms. If companies have high R&D expenditure, they are unlikely to acquire other firms because of limited available financial resources.

In this study, we explore these two types of specific industry shocks. First, we examine a set of deregulation events provided by

Viscusi et al. (2005), after updating their data to include events until 2017 using data from the U.S. annual *Economic Report of the President*.[6] These reports provide an annual overview of economic progress of the country and publish deregulation initiatives adopted annually. Consistent with a prior study (Garfinkel and Hankins, 2011), we use a dummy variable, *Deregulation*, which equals one for the year of and all post deregulation years within a deregulated industry, and zero otherwise. Second, following Mitchell and Mulherin (1996), we compute the industry-level R&D/sales ratio as a proxy for a technology shock. Accounting information is from the Compustat Database. All industry shock indicators are measured at the year *t-1*, except for deregulation, which is measured at year *t*.

3.4. Control variables

We control for variables that have previously been documented as affecting industry takeover activity. Since more M&A transactions take place during a bull market (Shleifer and Vishny, 2003; Rhodes-Kropf and Viswanathan, 2004; Rhodes-Kropf et al., 2005), we seek to rule out the possibility that stock market conditions affect our results by including the following industry-level variables related to stock market conditions: market-to-book ratio (*MB*), market returns over the three-year period (*Return*), intra-industry standard deviation of returns over the three-year (*Volatility*), and industry capitalization (*Capitalization)*, computed as the natural log of the value of industry capitalization. Leverage is significantly related to M&A activity (Harford et al., 2009) and plays an important role in M&A waves (Harford, 2005; Garfinkel and Hankins, 2011). We therefore include the industry median debt-to-equity ratio (*DE*) as a control variable. The accounting information used to calculate the control variables is compiled from Compustat, and stock price data are from the CRSP Database.

Table 1 reports the summary statistics for the sample of 1824 industry-year observations across 38 years from 1980 to 2017. The average number of M&A announcements (*NumAnnounce*) is 31.05 per industry-year and the average number of completed M&As (*NumTrans*) is 28.53 per industry-year. The average value of completed M&As across the 48 industries is $18.47 billion. The mean number of unique M&A advisors (*Advisors*) is 16.52 per industry-year.[7] The average number of industry merger waves (*Wave*) is 0.1371. The total number of industry-year merger waves is 250 (0.1371*1824).

3.5. Econometric model

We estimate ordinary least squares (OLS) regressions using an industry-year panel dataset, as specified in Eq. (1):

$$M\&A_{i,t} = \beta_0 + \beta_1 * Advisors_{i,t} + \beta_2 * Shock_{i,t-1} + \beta_3 * Control_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

The dependent variable, $M\&A_{i,t}$, represents a series of variables that capture the M&A activity level in industry *i* during year *t*. Specifically, the following variables are used in turn as the dependent variable: (1) the number of completed M&As (*NumTrans*); (2) the number of announced M&As (*NumAnnounce*); and (3) the M&A transaction value (*ValueTrans*). The key independent variable, $Advisors_{i,t}$, represents the number of unique M&A advisors engaged in industry *i* during year *t*. Our next series of independent variables, $Shock_{i,t-1}$, captures broad industry shocks (sales, cash flow, and employment shocks) and technology shocks.[8] Since the focus of this study is on the role of M&A advisors in the wake of industry shocks, we lag industry shock measures by one year (measured at year *t-1*). All control variables are measured at year *t*.

4. Empirical results

4.1. M&A advisors and industry shocks

Table 2 reports the results from the OLS regressions using M&A advisors as a predictor of industry takeover activity. First, controlling for sales shocks in Models (1)–(3), we use *Advisors* to predict three measures of the clustering of M&As. In Model (1), the estimated coefficient of *Advisors* (2.984) is positive and significant in predicting the number of M&A transactions, *NumTrans* ($p < 0.01$). The coefficient means that one unique M&A advisor facilitates 2.984 M&A transactions to completion in an industry after a sales shock occurs. *Advisors* remains positive and significant in the regression estimating the number of announced (rather than completed) merger deals (*NumAnnounce*) in Model (2) ($p < 0.01$). The coefficient of *Advisors* in Model (2) is 3.187, indicating that one unique M&A advisor contributes 3.187 M&A transactions to an industry's M&A activity following a sales shock. In Model (3), when we observe the total value of all merger transactions in an industry-year, the coefficient of *Advisors* is again positive and significant ($p < 0.01$). Consistent

[6] U.S. annual *Economic Reports of the President* is the data source of deregulation events used by Viscusi et al. (2018).

[7] We report the summary statistics of all M&As across the 48 industries during the sample period in Appendix B. The highest volume of completed M&As was in the trading industry (FIN), with 10,298 transactions completed during the sample period, compared with a mean of 1084 transactions across all industries. The trading industry is followed by the business service industry (BUSSV) with 5380 completed M&As during the sample period. The trading and business service industries account for 19.79% and 10.34%, respectively, of total completed transactions across all industries. In contrast, the shipbuilding and tobacco industries experience relatively few M&As, with 59 and 61 completed deals, respectively, during the sample period. Appendix C reports the pairwise correlation coefficients among all variables included in our regression analyses. As reported in Appendix C, there is no correlation coefficient between any pair of independent variables included in the regression that exceeds 0.5, indicating that multicollinearity is not an issue in our empirical analyses.

[8] All industry-level shocks are measured at year *t–1* with the exception of the specific industry shock of deregulation, which is measured at year *t*.

Table 2
M&A advisors and industry takeover activity following broad industry shocks.

	Sales shock			Cash Flow shock			Employment shock		
Variable	*NumTrans*	*NumAnnounce*	*ValueTrans*	*NumTrans*	*NumAnnounce*	*ValueTrans*	*NumTrans*	*NumAnnounce*	*ValueTrans*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Advisors	2.984***	3.187***	2.097***	3.072***	3.221***	2.189***	2.994***	3.198***	2.108***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sales shock	13.043***	12.755***	11.914***						
	(0.000)	(0.000)	(0.000)						
Sales growth	−3.980	−2.114	−7.926***						
	(0.118)	(0.426)	(0.000)						
Cash flow shock				1.176**	1.660**	0.305			
				(0.049)	(0.013)	(0.536)			
Cash flow growth				−0.038	−0.396	0.633			
				(0.948)	(0.550)	(0.273)			
Employment shock							7.739***	7.222***	10.509***
							(0.000)	(0.000)	(0.000)
Employment growth							−4.582***	−3.922**	−8.517***
							(0.003)	(0.015)	(0.000)
Capitalization	−2.980***	−3.535***	−0.594	−3.619***	−3.837***	−0.340	−3.045***	−3.650***	−0.445
	(0.000)	(0.000)	(0.363)	(0.000)	(0.000)	(0.650)	(0.000)	(0.000)	(0.457)
Return	2.666*	3.331**	2.938**	0.902	1.433	0.234	3.185**	4.031***	3.022**
	(0.056)	(0.025)	(0.036)	(0.661)	(0.503)	(0.910)	(0.020)	(0.005)	(0.030)
MB	−0.329	−0.567	2.513***	0.907	1.038	3.811***	−0.304	−0.526	2.541***
	(0.651)	(0.472)	(0.002)	(0.303)	(0.247)	(0.001)	(0.663)	(0.484)	(0.002)
Volatility	8.980	−5.598	−36.174	17.572	10.382	−39.876	13.073	−1.415	−34.466
	(0.697)	(0.816)	(0.168)	(0.512)	(0.707)	(0.201)	(0.571)	(0.953)	(0.193)
DE	0.024	0.719	−1.344**	0.049	0.417	−0.910	0.184	0.916	−1.288**
	(0.968)	(0.278)	(0.034)	(0.961)	(0.705)	(0.432)	(0.761)	(0.164)	(0.041)
Constant	6.183	10.749**	−13.177**	10.207	10.938	−19.518***	7.602*	13.143***	−15.512***
	(0.183)	(0.037)	(0.014)	(0.173)	(0.163)	(0.003)	(0.092)	(0.009)	(0.001)
N	1736	1736	1736	1174	1174	1174	1736	1736	1736
adj. R^2	0.782	0.787	0.637	0.783	0.787	0.650	0.781	0.785	0.639
F	115.053	116.507	74.748	82.195	82.793	70.585	122.443	123.654	77.475

This table reports OLS regressions using M&A advisors and broad industry shocks to predict industry-level takeover activity. Three different measures of broad industry shock and growth (sales, cash flow and employment) are used. All explanatory and control variables are measured at year t-1, except for *Advisors*. *Advisors* is the number of unique M&A advisors computed as the sum of M&A advisors participating in M&A deals in a year after excluding any multiple appearances for each M&A advisor in different M&A deals. Each regression uses 48 industries, each over 38 years (1980–2017). ***, **, and * represent statistical significance at the 1%, 5% and 10% levels, respectively, using a two-tail test. The numbers in parentheses are *p*-values.

Table 3
Major economic deregulatory initiatives, 1980–2017.

Year	Initiative	Industry affected
1980	Motor Carrier Reform Act	Transportation
	Household Goods Transportation Act	Transportation
	Staggers Rail Act	Transportation
	Depository Institutions Deregulation and Monetary Control Act	Banking
	International Air Transportation Competition Act	Transportation
	Deregulation of cable television (FCC)	Telecommunication
	Deregulation of customer premises equipment and enhanced services (FCC)	Telecommunication
1981	Decontrol of crude oil and refined petroleum products (executive order)	Petroleum and Natural Gas
	Deregulation of radio (FCC)	Telecommunication
1982	Bus Regulatory Reform Act	Transportation
	Garn–St. Germain Depository Institutions Act	Banking
	AT&T settlement	Telecommunication
1984	Space commercialization	Telecommunication
	Cable Television Deregulation Act	Telecommunication
	Shipping Act	Transportation
1986	Trading of airport landing rights	Transportation
1987	Sale of Conrail	Transportation
	Elimination of fairness doctrine (FCC)	Telecommunication
1988	Proposed rules on natural gas and electricity (FERC)	Utilities
	Proposed rules on price caps (FCC)	Telecommunication
1989	Natural Gas Wellhead Decontrol Act of 1989	Petroleum and Natural Gas
1991	Federal Deposit Insurance Corporation Improvement Act	Insurance
1992	Cable Television Consumer Protection and Competition Act	Entertainment
	Energy Policy	Petroleum and Natural Gas
	FERC Order 636	Utilities
1993	Elimination of state regulation of cellular telephone rates	Telecommunication
	Negotiated Rates Act	Transportation
1994	Trucking Industry and Regulatory Reform Act	Transportation
	Riegle-Neal Interstate Banking and Branching Efficiency Act	Banking
1995	ICC termination Act	Transportation
1996	Telecommunication Act	Telecommunication
	FERC Order 888	Utilities
1999	FERC Order 2000	Utilities
	Gramm-Leach-Bliley Act	Banking
2003	Medicare Prescription Drug, Improvement, and Modernization Act	Drugs
	Energy policy in electricity transmission grid	Utilities
2004	Airline computer reservation systems deregulation	Transportation
2005	Magnuson-Stevens Fishery Conservation and Management Act	Agriculture
2008	Deregulation of broadband service providers (FCC)	Telecommunication
	Emergency Economic Stabilization Act	Insurance
2009	Health Information Technology for Economic and Clinical Health Act	Healthcare

This table lists the major deregulatory initiatives during the sample period. This table is adapted from Viscusi et al. (2005), *Economics of Regulation and Antitrust*, Tables 10.3 and 10.4 on pages 368 and 370, respectively, which list deregulation events up to 2002. Information about deregulation initiatives from 2002 to 2017 is from the US annual *Economic Report of the President* (https://fraser.stlouisfed.org/title/45). No deregulation events occurred between 2009 and 2017.

with these results, when we control for cash flow shocks and employment shocks as alternative proxies for broad industry shocks in Models (4)–(6) and Models (7)–(9), respectively, the coefficient of *Advisors* remains consistently positive and significant in predicting all three measures of M&A activity ($p < 0.01$). The estimated coefficients of broad industry shocks (sales, cash flow and employment shocks) are consistent with the work of Mitchell and Mulherin (1996) and Powell and Yawson (2005). The results in Table 2 show that, consistent with our expectation, M&A advisors are significantly, positively associated with industry merger activity while taking into account the role of broad industry shocks.

We next examine specific industry shocks as proxied by deregulation and technology advances. Table 3 lists all deregulation events and affected industries as used by Viscusi et al. (2005) plus the new additions up to 2017.[9] Ten industries have been affected by deregulation over the sample period: agriculture, banking, pharmaceutical products, entertainment, healthcare, insurance, petroleum and natural gas, telecommunication, transport, and utility.

Table 4 reports the results from the OLS regressions that use deregulation and technology changes as specific industry shocks in lieu of the broad industry shocks in Table 2. The estimated coefficient of M&A advisors (*Advisors*) remains positive and significant ($p < 0.01$) in predicting industry-level M&A activity after controlling for deregulation in Models (1)–(3). Specifically, in Model (1), the estimated *Advisors* coefficient is positive and statistically significant ($p < 0.01$) in predicting the number of M&A transactions, *NumTrans*. The coefficient indicates that, following a deregulation event, one unique M&A advisor facilitates the completion of 1.95

[9] The updates are sourced from the US *Annual Economic Report of the President*, which is the original data source used by Viscusi et al. (2018).

Table 4
M&A advisors and industry takeover activity following specific industry shocks.

	Deregulation			Technology		
Variable	*NumTrans*	*NumAnnounce*	*ValueTrans*	*NumTrans*	*NumAnnounce*	*ValueTrans*
	(1)	(2)	(3)	(4)	(5)	(6)
Advisors	1.950***	2.039***	2.090***	2.998***	3.201***	2.087***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Deregulation	6.140***	7.102***	11.722***			
	(0.000)	(0.000)	(0.006)			
RD				−0.467***	−0.464***	0.516**
				(0.000)	(0.001)	(0.025)
Capitalization	0.501	−0.319	3.470*	−3.279***	−3.869***	−0.911
	(0.568)	(0.739)	(0.092)	(0.000)	(0.000)	(0.158)
Return	5.939**	5.167*	5.307	2.654**	3.517**	3.092**
	(0.024)	(0.059)	(0.206)	(0.049)	(0.014)	(0.021)
MB	−1.355	−0.844	6.082	0.395	0.182	1.945**
	(0.329)	(0.568)	(0.110)	(0.548)	(0.797)	(0.013)
Volatility	46.073	39.188	−62.177	23.854	9.060	−30.335
	(0.307)	(0.388)	(0.405)	(0.295)	(0.703)	(0.245)
DE	0.010	0.351	−2.290***	0.198	0.933	−1.170*
	(0.972)	(0.314)	(0.000)	(0.744)	(0.156)	(0.067)
Constant	−19.548**	−9.468	−69.788***	9.916**	15.237***	−8.329
	(0.037)	(0.344)	(0.000)	(0.028)	(0.002)	(0.102)
N	342	342	342	1736	1736	1736
adj. R^2	0.774	0.756	0.490	0.781	0.786	0.639
F	141.309	122.456	32.812	116.203	115.845	86.945

The table reports OLS regressions using M&A advisors and specific industry shocks to predict industry-level takeover activity. *Advisors* is the number of unique M&A advisors computed as the sum of M&A advisors participating in M&A deals in a year after excluding any multiple appearances for each M&A advisor in different M&A deals. Two different measures of shock (deregulation and technology change) are used. Deregulation is a dummy variable for 10 industries experiencing major federal deregulation: agriculture, banking, drugs, entertainment, healthcare, insurance, petroleum and natural gas, telecommunication, transportation and utility. Each industry covers all of the sample period (1980–2017). Technology change is measured by industry average research and development expense/sales ratio at year t-1. The regressions on technology change use 48 industries, each over 38 years (1980–2017). ***, **, and * represent statistical significance at the 1%, 5% and 10% levels, respectively, using a two-tail test. The numbers in parentheses are p-values.

M&A transactions in an industry. Likewise, *Advisors* remains significant and positive in the regression estimating the number of announced M&A deals (*NumAnnounce*) in Model (2) ($p < 0.01$). The *Advisors* coefficient in Model (2) is 2.039, implying that one unique M&A advisor contributes 2.039 M&A transactions to the M&A activity of an industry following deregulation. Similarly, when technology change is included in the regressions in Models (4)–(6), *Advisors* remains positive and significantly associated with industry-level M&A activity ($p < 0.01$). Though not the focus of our study, the results also confirm that both deregulation and technology changes are statistically significant in predicting clustering of M&A activity but not always consistent for technology change. These results are consistent with prior research that shows that deregulation is positively associated with industry takeover activity (Mitchell and Mulherin, 1996), whereas technology change, as proxied by R&D/sales ratio, is negatively associated with industry merger activity (Mitchell and Mulherin, 1996). The empirical evidence in Table 4 supports our expectation that, after taking into account the role of specific industry shocks, there is a positive, significant relationship between the presence of M&A advisors and the volume of M&A activity occurring in that industry.

4.1.1. Simulation analysis of industry M&A waves

We next conduct additional analyses on how M&A advisors contribute to a merger wave by using an alternative dependent variable to capture the formation of industry merger waves. We follow the methodology used by Harford (2005) and conduct simulation analysis of industry M&A waves to create a binary variable, *Wave*. Specifically, the sample period (1980–2017) is split into four time series for each industry: 1980–1989, 1990–1999, 2000–2009 and 2010–2017. For each time series, we calculate the highest 24-month concentration of M&A bids and identify it as the potential wave for that time series. Taking the total number of M&A bids over a time series period in an industry, we simulate 1000 distributions of the total M&A bids over that time series, with the assumption that every M&A bid could occur in any month within the time series with equal probability. Then, we calculate the highest 24-month concentration of M&A bids from each of the 1000 simulated distributions. Hence, we have the empirical distribution of 1000 peak 24-month concentrations. If the actual number of M&A bids in the potential wave exceeds the 95th percentile of the empirical distribution of 1000 peak 24-month concentrations, the potential wave is classified as a merger wave and consequently the variable *wave* is assigned a value of one (and zero otherwise). Harford's (2005) simulation approach identifies 125 two-year merger waves across the Fama and French (1997) 48 industries in our sample, equaling 250 industry-year waves. We then estimate the alternative dependent variable, *Wave,* using the Probit models as specified in Eq. (2):

$$Wave_{i,t} = \beta_0 + \beta_1 * Advisors_{i,t} + \beta_2 * Econ\ Shock\ Index_{i,t-1} + \beta_3 * C\&I\ Rate\ Spread_{i,t-1} + \beta_4 * Control_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

Table 5
Harford simulation analysis of industry shocks.

Panel A: Economic Shock

	(1)	(2)	(3)	(4)
	NumTrans	*NumAnnounce*	*ValueTrans*	*Wave*
Advisors	2.990***	3.195***	2.099***	0.022***
	(0.000)	(0.000)	(0.000)	(0.000)
Econ Shock Index	1.073**	1.251**	2.156***	0.033
	(0.040)	(0.024)	(0.009)	(0.306)
C&I Rate Spread	−0.673**	−0.950***	−0.648**	0.036
	(0.033)	(0.004)	(0.024)	(0.153)
Capitalization	−3.123***	−3.631***	−0.553	0.003
	(0.000)	(0.000)	(0.366)	(0.909)
Return	1.919	2.270	2.022	−0.001
	(0.281)	(0.226)	(0.235)	(0.995)
MB	−0.119	−0.225	2.289***	0.151***
	(0.882)	(0.791)	(0.006)	(0.001)
Volatility	7.110	−8.383	−58.230*	−13.752***
	(0.792)	(0.765)	(0.064)	(0.000)
DE	0.256	0.988	−1.237**	−0.097***
	(0.673)	(0.135)	(0.048)	(0.006)
Constant	11.423**	16.350***	−9.295*	−0.912***
	(0.015)	(0.002)	(0.086)	(0.003)
N	1736	1736	1736	1736
R^2	0.781	0.786	0.641	
adj. R^2	0.780	0.785	0.639	
pseudo R^2				0.150
chi2				164.902

Panel B: Deregulation

	(1)	(2)	(3)	(4)
	NumTrans	*NumAnnounce*	*ValueTrans*	*Wave*
Advisors	1.987***	2.080***	2.227***	0.040***
	(0.000)	(0.000)	(0.000)	(0.000)
Deregulation	6.736***	7.766***	13.948***	0.523**
	(0.000)	(0.000)	(0.002)	(0.041)
C&I Rate Spread	−1.161**	−1.293**	−4.335***	0.049
	(0.025)	(0.023)	(0.000)	(0.487)
Capitalization	0.907	0.132	4.984**	−0.191**
	(0.286)	(0.885)	(0.011)	(0.041)
Return	4.154	3.180	−1.353	0.299
	(0.170)	(0.313)	(0.785)	(0.289)
MB	−1.087	−0.546	7.084*	0.176
	(0.447)	(0.721)	(0.074)	(0.127)
Volatility	46.340	39.485	−61.181	−9.672**
	(0.303)	(0.381)	(0.417)	(0.016)
DE	−0.108	0.220	−2.732***	−0.086*
	(0.734)	(0.562)	(0.000)	(0.068)
Constant	−23.433**	−13.794	−84.291***	0.199
	(0.012)	(0.159)	(0.000)	(0.836)
N	342	342	342	342
R^2	0.781	0.764	0.514	
adj. R^2	0.775	0.758	0.502	
pseudo R^2				0.144
chi2				44.906

Panel C: Technology Change

	(1)	(2)	(3)	(4)
	NumTrans	*NumAnnounce*	*ValueTrans*	*Wave*
Advisors	3.004***	3.210***	2.091***	0.022***
	(0.000)	(0.000)	(0.000)	(0.000)
RD	−0.486***	−0.490***	0.501**	0.006
	(0.000)	(0.001)	(0.032)	(0.328)
C&I Rate Spread	−0.854***	−1.143***	−0.657**	0.035
	(0.007)	(0.001)	(0.030)	(0.161)
Capitalization	−3.054***	−3.568***	−0.738	−0.000

(*continued on next page*)

Table 5 (*continued*)

Panel C: Technology Change				
	(1)	(2)	(3)	(4)
	(0.000)	(0.000)	(0.233)	(0.987)
Return	0.920	1.196	1.758	−0.004
	(0.594)	(0.510)	(0.291)	(0.977)
MB	0.902	0.861	2.335***	0.151***
	(0.202)	(0.249)	(0.010)	(0.001)
Volatility	31.324	19.057	−24.591	−13.184***
	(0.177)	(0.432)	(0.353)	(0.000)
DE	0.182	0.912	−1.182*	−0.096***
	(0.764)	(0.167)	(0.065)	(0.006)
Constant	8.088*	12.790**	−9.735*	−0.917***
	(0.075)	(0.011)	(0.051)	(0.002)
N	1736	1736	1736	1736
R^2	0.783	0.787	0.641	
adj. R^2	0.782	0.786	0.639	
pseudo R^2				0.150
chi2				166.099

The table reports the results from OLS (Column 1–3) and Probit (Column 4) regressions estimating merger waves following economic shock using unique M&A advisors (Panel A), deregulation shock (Panel B), and technology change (Panel C). The dependent variable in Column 4, *Wave*, is a dummy variable. *Wave* is created using Harford's (2005) simulation approach to identify the occurrence of industry Merger waves. *Advisors* is the number of unique M&A advisors, computed as the sum of M&A advisors participating in M&A deals in a year minus the multiple times each M&A advisor appears in different M&A deals. Following the methodology of Harford (2005), the Econ Shock Index is the first principal component of the seven economic shock variables. The seven economic shock variables are the absolute median change of profitability (net income scaled by sales), asset turnover (sales divided by beginning-of-period assets), research and development (scaled by beginning-of-period assets), capital expenditures (scaled by beginning-of-period assets), employee growth, return on assets (ROA), and sales growth. *C&I Rate Spread* is the commercial and industrial (C&I) loan rate spread (spread above the fed funds rate) as a proxy for low capital liquidity. For economic shock and technology change, the explanatory and control variables are measured at the end of year t-1. Each regression uses 48 industries, each over 38 years (1980–2017). The explanatory and control variables under deregulation shock, are measured at the end of year t. ***, **, and * represent statistical significance at 1%, 5% and 10%, respectively, using a two-tail test. The numbers in parentheses are p-values.

Wave represents the probability of an industry merger wave in industry *i* at year *t*. As stated in the baseline regressions, the key independent variable is *Advisors*. Following Harford (2005), we compute an Economic Shock Index (*Econ Shock Index*) as the first principal component of the seven economic shock variables. These economic shock variables are the median absolute change per industry-year in each of the following seven variables: profitability (net income scaled by sales), asset turnover (sales divided by beginning-of-period assets), research and development (scaled by beginning-of-period assets), capital expenditure (scaled by beginning-of-period assets), employee growth, return on assets (ROA), and sales growth. In addition, following Harford (2005) who documents that capital liquidity plays a key role in determining the formation of merger waves, in the regression model, we control for capital liquidity as proxied by commercial and industrial (C&I) loan rate spread above the Federal Funds rate.

As reported in Table 5, Panel A, we first re-estimate our baseline regressions by including the variable *Econ Shock Index* in lieu of the previous individual shock variables, to predict the dependent variables *NumTrans, NumAnnounce*, and *ValueTrans* in Models (1)–(3), respectively. Consistent with the baseline regressions, the estimated coefficient of the key independent variable *Advisors* remains positive and statistically significant ($p < 0.01$) after controlling for the composite index for economic shocks and capital liquidity. Specifically, in Model (1), the estimated coefficient of *Advisors* (2.990) is positive and significant in predicting the number of M&A transactions, *NumTrans* ($p < 0.01$). The coefficient indicates that, after a shock, a unique M&A advisor facilitates 2.99 M&A transactions to completion in an industry. In Model (2), the estimated coefficient of *Advisors* (3.915) is positive and significant in predicting *NumAnnounce* ($p < 0.01$), indicating that, after a shock, a unique M&A advisor contributes 2.039 M&A transactions to the M&A activity of the industry. In Model (4), we then estimate the dependent variable *wave*, which is computed by following the methodology used by Harford (2005) as detailed above. The coefficient of *Advisors* remains positive and significant in predicting *wave* ($p < 0.01$), implying that M&A advisors statistically significantly increase the likelihood of an industry merger wave occurring after a shock. These results corroborate our baseline findings by confirming the positive relationship between the presence of M&A advisors and the probability of the occurrence of industry merger waves.

We re-estimate the regressions in Eq. (2) by replacing *Econ Shock Index* with deregulation (*Deregulation*) and technology shocks (*RD*). The results are reported in Table 5, Panels B and C, respectively. Our key independent variable *Advisors* remains consistently positive and significant across Models (1)–(4). The results further support the significant and positive role played by M&A advisors in the formation of industry merger waves.

4.2. Do M&A advisors make a difference during industry shocks?

In this section we investigate the stimulatory role of M&A advisors in predicting M&A activity following industry shocks, by examining the interaction between M&A advisors and industry shocks. If M&A advisors indeed take advantage of a shock and contribute to the volume of takeover activity by encouraging their clients to conduct M&As, we would expect the interaction terms

Table 6
Interactions between M&A advisors and broad industry shocks.

	Sales shock			Cash flow shock			Employment shock		
Variable	*NumTrans*	*NumAnnounce*	*ValueTrans*	*NumTrans*	*NumAnnounce*	*ValueTrans*	*NumTrans*	*NumAnnounce*	*ValueTrans*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Advisors	2.815***	2.967***	2.029***	2.908***	3.021***	2.110***	2.875***	3.053***	2.122***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Advisors*Sales shock	0.582**	0.757***	0.232						
	(0.038)	(0.009)	(0.467)						
Sales shock	7.067*	4.981	9.535***						
	(0.062)	(0.203)	(0.005)						
Sales growth	−4.565*	−2.875	−8.159***						
	(0.068)	(0.270)	(0.000)						
Advisors*Cash flow shock				0.605**	0.737***	0.293			
				(0.019)	(0.006)	(0.315)			
Cash flow shock				0.713	1.096*	0.082			
				(0.241)	(0.098)	(0.881)			
Cash flow growth				0.376	0.108	0.833			
				(0.532)	(0.869)	(0.132)			
Advisors*Employment shock							0.734***	0.890***	−0.088
							(0.008)	(0.003)	(0.745)
Employment shock							4.543**	3.347	10.890***
							(0.036)	(0.149)	(0.000)
Employment growth							−4.727***	−4.097**	−8.499***
							(0.002)	(0.013)	(0.000)
Capitalization	−3.074***	−3.658***	−0.631	−3.617***	−3.834***	−0.339	−2.973***	−3.563***	−0.453
	(0.000)	(0.000)	(0.324)	(0.000)	(0.000)	(0.653)	(0.000)	(0.000)	(0.454)
Return	2.719**	3.400**	2.959**	0.266	0.658	−0.074	3.090**	3.917***	3.033**
	(0.048)	(0.019)	(0.034)	(0.895)	(0.754)	(0.972)	(0.021)	(0.006)	(0.030)
MB	−0.512	−0.806	2.440***	0.637	0.710	3.680***	−0.389	−0.629	2.551***
	(0.482)	(0.310)	(0.002)	(0.478)	(0.439)	(0.001)	(0.583)	(0.412)	(0.002)
Volatility	14.896	2.098	−33.820	19.048	12.180	−39.162	18.115	4.699	−35.068
	(0.519)	(0.930)	(0.203)	(0.468)	(0.651)	(0.207)	(0.433)	(0.845)	(0.193)
DE	−0.322	0.268	−1.482**	−0.400	−0.130	−1.128	−0.270	0.365	−1.234**
	(0.582)	(0.672)	(0.016)	(0.688)	(0.905)	(0.317)	(0.656)	(0.578)	(0.048)
Constant	9.660**	15.272***	−11.793**	11.452	12.454	−18.917***	7.879*	13.478***	−15.545***
	(0.027)	(0.002)	(0.016)	(0.118)	(0.103)	(0.003)	(0.080)	(0.007)	(0.001)
N	1736	1736	1736	1174	1174	1174	1736	1736	1736
adj. R^2	0.786	0.792	0.638	0.787	0.794	0.651	0.785	0.790	0.638
F	109.091	110.643	67.119	83.432	85.090	62.996	114.975	116.897	71.559

This table presents OLS regression estimates of M&A advisors and the interaction between M&A advisors and broad industry shocks. *Advisors* is the number of unique M&A advisors computed as the sum of M&A advisors participating M&A deals in a year after excluding any multiple appearances for each M&A advisor in different M&A deals. *Advisors*Sales shock*, *Advisors*Cash flow shock*, and *Advisors*Employment shock* are the three interaction terms of *Advisors* with three shock measures with a one-year lag (sales shock, cash flow shock and employment shock). Each regression uses 48 industries over 38 years (1980–2017). All shock and control variables are measured in year t-1. ***, **, and * represent statistical significance at the 1%, 5% and 10% levels, respectively, using a two-tail test. The numbers in parentheses are p-values.

Table 7
Interactions between M&A advisors and specific industry shocks.

Variable	Deregulation			Technology Change		
	NumTrans	*NumAnnounce*	*ValueTrans*	*NumTrans*	*NumAnnounce*	*ValueTrans*
	(1)	(2)	(3)	(4)	(5)	(6)
Advisors	1.479***	1.617***	0.638**	2.995***	3.200***	2.084***
	(0.000)	(0.000)	(0.043)	(0.000)	(0.000)	(0.000)
Deregulation	−2.516	−0.638	−14.941***			
	(0.263)	(0.799)	(0.007)			
Advisors*Deregulation	0.534***	0.478***	1.645***			
	(0.001)	(0.007)	(0.000)			
Advisors*RD				0.023	0.013	0.018
				(0.270)	(0.528)	(0.649)
RD				−1.390	−1.008	−0.218
				(0.111)	(0.257)	(0.893)
Capitalization	0.366	−0.440	3.053	−3.253***	−3.854***	−0.891
	(0.673)	(0.646)	(0.137)	(0.000)	(0.000)	(0.169)
Return	5.169**	4.479	2.937	2.655**	3.518**	3.093**
	(0.049)	(0.103)	(0.480)	(0.048)	(0.014)	(0.021)
MB	−0.847	−0.390	7.649**	0.485	0.235	2.017**
	(0.546)	(0.796)	(0.047)	(0.461)	(0.741)	(0.011)
Volatility	48.471	41.332	−54.790	25.201	9.854	−29.264
	(0.273)	(0.353)	(0.464)	(0.270)	(0.680)	(0.267)
DE	−0.055	0.292	−2.493***	0.194	0.931	−1.173*
	(0.857)	(0.420)	(0.000)	(0.748)	(0.157)	(0.067)
Constant	−11.362	−2.148	−44.574**	9.519**	15.003***	−8.645*
	(0.235)	(0.837)	(0.040)	(0.036)	(0.003)	(0.094)
N	342	342	342	1736	1736	1736
adj. R^2	0.777	0.758	0.507	0.781	0.785	0.639
F	162.686	142.408	34.265	102.249	101.603	76.253

This table presents OLS regression estimates of the role of unique M&A advisors and the interaction between M&A advisors and specific industry shocks. *Advisors* is the number of unique M&A advisors computed as the sum of M&A advisors participating M&A deals in a year after excluding any multiple appearances for each M&A advisor in different M&A deals. *Advisors*Deregulation* and *Advisors*RD* are two interaction terms of *Advisors* with deregulation and technology change, respectively. The control variables in deregulation are measured at year t, and the control variables in RD are measured at year t-1. ***, **, and * represent statistical significance at the 1%, 5% and 10% levels, respectively, using a two-tail test. The numbers in parentheses are p-values.

between M&A advisors and various proxies for industry shocks to have a significant positive impact on industry-level M&A activity. We estimate the following OLS regression model:

$$M\&A_{i,t} = \beta_0 + \beta_1 * Advisors_{i,t} + \beta_2 * \left(Advisors_{i,t} * Shock_{i,t-1}\right) + \beta_3 * Shock_{i,t-1} + \beta_4 * Control_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

Table 6 reports the results from the OLS regressions using sales shocks in Models (1)–(3), cash flow shocks in Models (4)–(6), and employment shocks in Models (7)–(9). The results give several important insights to confirm our main hypothesis. Specifically, the estimated coefficient of the original key independent variable, *Advisors,* remains positive and statistically significant across all models ($p < 0.01$). Furthermore, the estimated coefficient of *Advisors*Sales shock* (the interaction between M&A advisors and sales shock) is positive and significant in predicting both completed M&As and M&A announcements ($p < 0.05$ and $p < 0.01$, respectively) in Models (1)–(2). We interpret the interaction coefficient between M&A advisors and sales shock as the effect of M&A advisors taking advantage of the sudden increase in firms' demand for restructuring after a sales shock. Similarly, when cash flow shocks and employment shocks are observed in turn to represent broad industry shocks, the interaction term between broad industry shock and M&A advisors remains positive and significant in predicting the volume of M&A announcements and completions, in Models (4)–(5) ($p < 0.05$) and Models (7)–(8) ($p < 0.01$), respectively. These empirical results further confirm the significant role played by M&A advisors, when combined with the occurrence of industry shocks, in predicting industry clustering of M&As.

In Table 7, we adopt a similar approach by observing specific industry shocks, as captured by deregulation and technology advances and their interaction with M&A advisors (*Advisors*). As reported in Models (1)–(3), the interaction between M&A advisors and deregulation (*Advisors*Deregulation*) is positive and statistically significant in predicting M&A activities ($p < 0.01$). In contrast, the interaction term between M&A advisors and technology change (*Advisors*RD*) is not statistically significant in Models (4)–(6), which is not surprising because technology shocks are negatively related to M&As (Mitchell and Mulherin, 1996). Consequently, technology advances as captured by R&D do not provide opportunities for M&A advisors to contribute to increased M&A activity. Nevertheless, it is noteworthy that, after including these interaction terms, the estimated coefficient of *Advisors* remains consistently significant and positive ($p < 0.01$) in predicting M&A activity across all models. Overall, these results confirm the robustness of the baseline findings by demonstrating the relevance of the presence of M&A advisors in contributing to the volume of industry-level M&A activity.

Table 8
IV-2SLS regressions.

Panel A: 2SLS First-Stage Regression Results.

Dependent Variable	*Advisor*						
	No Shock	No Shock	Sales Shock	Cash Flow Shock	Employment Shock	Deregulation	Technology shock
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FSMA	8.659***	21.771***	6.800**	8.562**	6.696**	20.192***	6.742**
(Instrumental)	(0.000)	(0.000)	(0.036)	(0.014)	(0.033)	(0.000)	(0.031)
Sales shock			1.994				
			(0.378)				
Sales growth			0.042				
			(0.983)				
Cash flow shock				1.563***			
				(0.000)			
Cash flow growth				−1.030***			
				(0.000)			
Employment shock					−3.450**		
					(0.014)		
Employment growth					2.552**		
					(0.048)		
Deregulation						−0.039	
						(0.977)	
RD							0.226***
							(0.001)
Capitalization			4.571***	5.776***	4.368***	4.618***	4.445***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Return			0.544	0.945	0.634	3.018*	1.015
			(0.640)	(0.527)	(0.584)	(0.058)	(0.380)
MB			−1.081**	−1.277**	−1.049**	1.234*	−1.363***
			(0.026)	(0.029)	(0.030)	(0.094)	(0.006)
Volatility			−33.608*	−13.129	−26.405	52.673**	−32.555*
			(0.054)	(0.535)	(0.127)	(0.047)	(0.059)
DE			1.886***	1.850***	1.958***	1.721***	1.956***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	12.192***	2.333	−36.594***	−53.738***	−33.928***	−56.346***	−34.626***
	(0.000)	(0.337)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year-Fixed Effect	No	Yes	Yes	Yes	Yes	Yes	Yes
N	1824	1824	1736	1174	1736	342	1736
adj. R^2	0.059	0.107	0.379	0.399	0.381	0.661	0.383
F	114.284	6.898	25.665	26.173	25.795	16.447	26.600

(*continued on next page*)

Table 8 (*continued*)

Panel A: 2SLS First-Stage Regression Results.

Dependent Variable	*Advisor*						
	No Shock	No Shock	Sales Shock	Cash Flow Shock	Employment Shock	Deregulation	Technology shock

This table presents the first-stage 2SLS regression using M&A advisors and five types of industry shocks (sales shock, cash flow shock, employment shock, deregulation and technology change) to predict industry takeover activity. The instrumental variable used in the first stage regression is *FSMA*. *FSMA* is a dummy variable equal to 1 when Financial Services Modernization Act 1999 is announced and equals 0 before the Act is released. ***, **, and * represent statistical significance at the 1%, 5% and 10% levels, respectively. Using a two-tail test. The numbers in parentheses are p-values.

Panel B: Validity of Instrumental Variable.

Dependent Variable	Capitalization	Return	MB	Volatility	DE
	(1)	(2)	(3)	(4)	(5)
FSMA	0.001	−0.073	0.688	0.001	−0.377
	(0.722)	(0.155)	(0.560)	(0.749)	(0.113)
Constant	0.012***	0.056***	0.604	0.012***	1.682***
	(0.000)	(0.000)	(0.469)	(0.000)	(0.000)
Year-Fixed Effect	Yes	Yes	Yes	Yes	Yes
N	1783	1824	1824	1824	1824
adj. R^2	0.015	−0.004	0.033	0.017	−0.011
F	1.750	49.061	2.697	1.877	34.171

The table presents the OLS regression using other control variables and FSMA. The dependent variable are the control variables in the industry shock models. FSMA is a dummy variable equal to 1 when Financial Services Modernization Act 1999 is announced and equals 0 before the Act is released. All control variables are measured in year t. ***, **, and * represent statistical significance at the 1%, 5% and 10% levels, respectively. Using a two-tail test. The numbers in parentheses are p-values.

4.3. Endogeneity

4.3.1. The instrumental variable approach using regulatory shocks

Endogeneity is a potential issue in the examination of the relationship between M&A advisors and industry takeover activity. Reverse causality is one possible source of endogeneity, since the occurrence of M&A transactions in an industry could attract more M&A advisors into the market, which means that the greater presence and activity of M&A advisors are consequences of, rather than contributors to, increased takeover activity in an industry. In this section, we alleviate endogeneity concerns using a two-stage least squares (2SLS) regression model with an instrumental variable and taking advantage of an exogenous regulatory shock. We also seek to further explore the alternative explanation underpinning the source of reverse causality that demand rather than supply for M&A advisors is driving the results by conducting a residual analysis. The combined evidence from these empirical approaches provides robust support of our baseline results, consistent with our hypothesized causal relationship between M&A advisors and industry-level M&A activity.

To alleviate potential endogeneity concerns, we first use an instrumental variable (IV) approach and estimate a 2SLS regression as specified in Eq. (4):

$$Advisors_{i,t} = \alpha_0 + \alpha_1 * FSMA_{i,t} + \alpha_2 * Shock_{i,t-1} + \alpha_3 * Control_{i,t-1} + \theta_{i,t} \quad (4)$$

The first-stage regression predicts the number of M&A advisors in the markets, *Advisors,* using *Financial Services Modernization Act* 1999 as an exogenous instrument. Our instrumental variable takes advantage of an exogenous shock to the number of M&A advisors in the market resulting from a legislative change in 1999 that deregulated the financial advisory industry. The introduction of the *Financial Services Modernization Act* 1999 allowed different types of financial companies, such as commercial banks, insurance companies and investment banks, to integrate their operations. Before 1999, insurance companies and commercial banks were prohibited from providing financial advisory services for M&As. In 1999, the introduction of the Financial Services Modernization Act enabled

Table 9
Second-stage 2SLS regression with broad industry shocks.

	Sales Shock			Cash flow shock			Employment shock		
Variable	*NumTrans*	*Num-Announce*	*ValueTrans*	*NumTrans*	*Num-Announce*	*ValueTrans*	*NumTrans*	*Num-Announce*	*ValueTrans*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Advisor	1.792***	2.481***	2.621***	1.828***	3.068***	3.266***	2.400***	2.357***	2.483***
(*Instrumented*)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sales shock	13.611**	13.394**	12.218***						
	(0.026)	(0.038)	(0.004)						
Sales growth	−4.125	−2.277	−8.003**						
	(0.394)	(0.652)	(0.023)						
Cash flow shock				1.181	1.596	0.009			
				(0.377)	(0.281)	(0.993)			
Cash flow growth				−0.043	−0.349	0.852			
				(0.978)	(0.837)	(0.526)			
Employment shock							5.893*	5.152	9.596***
							(0.084)	(0.160)	(0.006)
Employment growth							−3.164	−2.331	−7.815**
							(0.305)	(0.483)	(0.014)
Capitalization	−0.561	−0.814	0.701	−3.596	−4.094	−1.541	−0.073	−0.316	1.025
	(0.777)	(0.701)	(0.667)	(0.292)	(0.261)	(0.643)	(0.970)	(0.881)	(0.524)
Return	2.836	3.522	3.029	0.910	1.348	−0.165	3.371	4.240*	3.114
	(0.231)	(0.161)	(0.128)	(0.787)	(0.702)	(0.953)	(0.148)	(0.088)	(0.114)
MB	−0.538	−0.802	2.401*	0.902	1.089	4.050**	−0.548	−0.800	2.420*
	(0.636)	(0.500)	(0.054)	(0.577)	(0.521)	(0.027)	(0.636)	(0.510)	(0.058)
Volatility	−11.270	−28.379	−47.008	17.441	11.844	−33.041	−10.444	−27.798	−46.100
	(0.801)	(0.546)	(0.178)	(0.724)	(0.816)	(0.372)	(0.814)	(0.550)	(0.188)
DE	0.951	1.761	−0.848	0.057	0.334	−1.299	1.381	2.259*	−0.696
	(0.441)	(0.188)	(0.385)	(0.977)	(0.878)	(0.524)	(0.267)	(0.095)	(0.477)
Constant	−11.023	−8.607	−22.382*	10.030	12.920	−10.257	−12.923	−9.884	−25.666**
	(0.481)	(0.606)	(0.079)	(0.713)	(0.656)	(0.694)	(0.403)	(0.547)	(0.038)
Year-Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1736	1736	1736	1174	1174	1174	1736	1736	1736
adj. R^2	0.233	0.237	0.222	0.280	0.291	0.270	0.227	0.230	0.220
F	23.863	24.285	21.033	19.222	19.277	19.327	29.585	29.931	24.582

This table presents the second-stage 2SLS regressions using M&A advisors and three types of broad industry shocks (sales shock, cash flow shock and employment shock) to predict industry takeover activity. The instrumental variable used in the first stage regression is *FSMA*. *FSMA* is a dummy variable equal to 1 when Financial Services Modernization Act 1999 is announced and 0 before the Act is released. Except for instrumented *Advisor*

more firms, including insurance companies and commercial banks, to access M&A markets as advisors. We observe the enactment of the *Financial Services Modernization Act 1999* had the effect of reducing the barrier to entry for providers of M&A advisory services, thus enabling more advisors to enter into the market. Our shock based IV, *Financial Services Modernization Act* (*FSMA*), equals one for years 1999 and after to capture the effect of the Act, and zero for the preceding years.

For our instrument to be a valid IV, it must satisfy both the relevance and exclusion criteria. First, to meet the relevance criterion, the IV must be correlated with the endogenous variable (*M&A advisors*), which represents the number of M&A advisors in the market. The passage of *Financial Services Modernization Act 1999* removed restrictions on financial institutions amalgamating and, consequently, had a direct effect on the number of M&A advisors in the market (Akhigbe and Whyte, 2001; Chen et al., 2020). Therefore, this IV meets the relevance criterion. Second, to satisfy the exclusion criterion, the instrument must not be correlated with the second-stage outcome variable (industry-level M&A activity), except through the endogenous variable. Since the *Financial Services Modernization Act* deregulated the financial services industry, no theoretical mechanism nor empirical evidence suggests that it can have any first-order effect on the merger activity in industries other than the financial services industry. Consequently, as a robustness check, we removed from our sample all M&A transactions relating to financial services firms (banking and insurance companies) and our results remained robust. Consequently, there is no reason to expect that the enactment of this legislation would affect M&A activity across industries. Therefore, the regulatory change satisfies the second stage exclusion criterion. For these reasons, we expect *FSMA* to meet both the relevance and exclusion criteria for it to serve as a valid IV.

We follow Bernstein et al. (2019) and empirically test the validity of our IV by first estimating the first-stage regression as specified in Eq. (4). The results reported in Table 8, Panel A, offer evidence in relation to the relevance criterion. In column (1), we estimate a regression to predict our endogenous variable, *M&A advisors*, using the IV *FSMA* as the sole independent variable. In column (2) we replicate the regression model in column (1) and control for year fixed effects. In both estimations, the coefficient of *FSMA* is positive and statistically significant ($p < 0.001$), confirming that our IV satisfies the relevance criterion. We separately add industry sales shock, cash flow shock, and employment shock, in addition to the relevant control variables as included in our baseline results in Table 2 and year fixed effects, in models (3), (4) and (5), respectively. Consistent with our a priori prediction, we find that our IV *FSMA* is indeed positive and statistically significant in predicting the number of M&A advisors, after controlling for broad industry shocks using various different proxies for shocks and model specifications. In columns (6) and (7), we re-estimate the first-stage regressions using deregulation and technology shocks as proxy for *specific* industry shocks. Consistent with the findings using broad industry shocks, we find that the instrument *FSMA* is positive and statistically significant ($p < 0.05$ or better). Furthermore, the *F*-statistic ranges from 16.45 to 114.28, which is well above the $F = 10$ threshold of Staiger and Stock (1997) and critical values of Stock and Yogo (2005), thus alleviating concerns about weak instruments. The results in Table 8 confirm our theoretical expectation that *FSMA* is a valid shock-based instrument predicting the number of advisors operating in the M&A market following the introduction of the *Financial Services Modernization Act*.

The exclusion restriction in the second-stage model requires that our instrument, *FSMA*, is not correlated with industry-level M&A

Table 10
The Second-stage of IV-2SLS regression with specific industry shocks.

	Deregulation			Technology change		
Variable	*NumTrans*	*NumAnnounce*	*ValueTrans*	*NumTrans*	*NumAnnounce*	*ValueTrans*
	(1)	(2)	(3)	(4)	(5)	(6)
Advisor	1.885***	1.916***	1.453***	2.349***	2.475***	1.853***
(Instrumented)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Deregulation	6.248**	7.308**	12.788***			
	(0.037)	(0.022)	(0.010)			
RD				−0.344***	−0.326**	0.560***
				(0.004)	(0.010)	(0.008)
Capitalization	0.921	0.476	7.583***	−0.209	−0.430	0.193
	(0.614)	(0.809)	(0.008)	(0.915)	(0.837)	(0.901)
Return	6.021*	5.323	6.117	2.980	3.883	3.209*
	(0.094)	(0.157)	(0.217)	(0.194)	(0.112)	(0.086)
MB	−1.182	−0.515	7.785*	−0.014	−0.276	1.798
	(0.562)	(0.812)	(0.090)	(0.991)	(0.827)	(0.118)
Volatility	45.668	38.421	−66.144	−2.556	−20.524	−39.834
	(0.474)	(0.560)	(0.466)	(0.954)	(0.656)	(0.244)
DE	0.104	0.529	−1.369*	1.420	2.302*	−0.731
	(0.844)	(0.361)	(0.061)	(0.251)	(0.086)	(0.449)
Constant	−23.713	−17.363	−110.651***	−11.421	−8.666	−16.004
	(0.224)	(0.409)	(0.000)	(0.452)	(0.592)	(0.174)
Year-Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
N	342	342	342	1736	1736	1736
adj. R^2	0.552	0.531	0.359	0.228	0.231	0.231
F	57.648	56.762	25.644	80.700	74.113	32.316

This table presents the second-stage 2SLS regressions using M&A advisors and two types of specific industry shocks (deregulation and technology change) to predict industry takeover activity. The instrumental variable used in the first stage regression is *FSMA*. *FSMA* is a dummy variable equal to 1 when Financial Services Modernization Act 1999 is announced and 0 before the Act is released. ***, **, and * represent statistical significance at the 1%, 5% and 10% levels, respectively. Using a two-tail test. The numbers in parentheses are p-values.

activity other than through its impact on M&A advisors. Though the lack of an economic relationship cannot be directly proven, we follow Bernstein et al. (2019) and seek to provide corroborating evidence that the IV does not have a significant impact on the second-stage dependent variable through avenues other than our endogenous variable, *M&A Advisors*. Here, we estimate a series of regressions using the IV, *FSMA*, as the independent variable to predict each of the control variables included in our second-stage regression model, controlling for year fixed effects. The results are reported in Table 8, Panel B. We find that *FSMA* is uncorrelated with any of the covariates in the models. These results provide empirical evidence consistent with our expectation that our instrument satisfies the exclusion criterion.

Having provided evidence that our shock-based instrument satisfies both the relevance and exclusion criteria, we estimate the second-stage regressions, as specified by Eq. (5):

$$M\&A_{i,t} = \beta_0 + \beta_1 * Advisors\ (instrumented)_{i,t} + \beta_2 * Shock_{i,t-1} + \beta_3 * Control_{i,t-1} + \varepsilon_{i,t} \quad (5)$$

The predicted value of *Advisors* from the first-stage regression is used as the independent variable to predict industry takeover activity. Table 9 reports the results from the 2SLS regressions, using broad industry shocks as proxied by sales shock (Models (1)–(3)), cash flow shock (Models (4)–(6)), and employment shock (Models (7)–(9)). In the second-stage regressions, the coefficient of the instrumented *Advisors* remains positive and consistently significant in predicting industry-level M&A activity ($p < 0.0001$) in Models (1)–(3) when the broad industry shock is proxied by sales shocks. In Models (4)–(6), when cash flow shocks are observed, the coefficient of the instrumented *Advisors* variable is positive and significant in predicting industry level M&A transactions ($p < 0.001$) in all the estimated models. Finally, the coefficient of *Advisors* remains positive and significant ($p < 0.001$) in Models (7)–(9) when employment shocks are observed.

In Table 10, we report the results of the 2SLS regressions using specific industry shocks. In the second-stage regressions in Models (1)–(2), the instrumented *Advisors* is positive and significant in predicting industry-level M&A transaction values ($p < 0.001$) and in Model (3) ($p < 0.001$). Models (4)–(6) present the results of the 2SLS regressions using technology changes to capture specific industry shocks. In the second-stage regressions in Models (4)–(6), the coefficient of the instrumented *Advisors* is positive and significant in predicting industry-level M&A activity, with similar economic magnitude and statistical significance ($p < 0.001$) as the baseline regressions reported in Tables 2 and 4. Overall, the 2SLS regressions confirm the positive association between M&A advisors in an industry and M&A activity taking into account both broad and specific industry shocks. These results are consistent with the view that M&A advisors serve as a significant contributor to the volume of merger activity at the industry level.

Table 11
Additional analyses.

Panel A: Fama-MacBeth Regressions – Broad Industry Shocks

	Sales Shock			Cash Flow Shock			Employment Shock		
Variable	*Num-Trans*	*Num-Announce*	*Value-Trans*	*Num-Trans*	*Num-Announce*	*Value-Trans*	*Num-Trans*	*Num-Announce*	*Value-Trans*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Advisors	2.575***	2.909***	1.413***	2.628***	2.739***	1.576***	2.589***	2.924***	1.425***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Controls for Shocks	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls & Constant	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	1736	1736	1736	1174	1174	1174	1736	1736	1736
R^2	0.864	0.848	0.762	0.884	0.886	0.802	0.864	0.847	0.762
F	92.802	119.703	17.463	154.804	157.731	30.794	102.118	135.209	16.855

Panel B: Fama-MacBeth Regressions – Specific Industry Shocks

	Deregulation			Technology		
Variable	*NumTrans*	*Num Announce*	*ValueTrans*	*NumTrans*	*Num Announce*	*ValueTrans*
	(1)	(2)	(3)	(4)	(5)	(6)
Advisors	2.496***	2.616***	1.661**	2.584***	2.919***	1.413***
	(0.000)	(0.000)	(0.010)	(0.000)	(0.000)	(0.000)
Controls for Shocks	YES	YES	YES	YES	YES	YES
Controls & Constant	YES	YES	YES	YES	YES	YES
N	342	342	342	1736	1736	1736
R^2	0.960	0.957	0.944	0.861	0.844	0.769
F	21.110	24.689	6.052	113.347	135.844	20.063

This table reports the results from additional analyses. Panels A and B report the results from Fama-MacBeth regressions using broad industry shocks (Panel A) and specific industry shocks (Panel B). The regressions on technology change use 48 industries, each over 38 years (1980–2017). All variables are defined in Appendix A. ***, **, and * represent statistical significance at the 1%, 5% and 10% levels, respectively, using a two-tail test. The numbers in parentheses are p-values.

Table 12
OLS regressions of the number of M&A advisors with broad industry shocks.

	Sales shock			Cash flow shock			Employment shock		
	NumTrans	*NumAnnounce*	*ValueTrans*	*NumTrans*	*NumAnnounce*	*ValueTrans*	*NumTrans*	*NumAnnounce*	*ValueTrans*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
AdvisorsDeals	0.961***	1.021***	0.710***	0.961***	1.005***	0.717***	0.962***	1.023***	0.711***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sales shock	5.324**	4.573*	6.084***						
	(0.027)	(0.077)	(0.001)						
Sales growth	−0.804	1.254	−5.547***						
	(0.691)	(0.558)	(0.000)						
Cash flow shock				1.871***	2.400***	0.679*			
				(0.000)	(0.000)	(0.085)			
Cash flow growth				−1.112**	−1.528***	−0.060			
				(0.019)	(0.009)	(0.890)			
Employee shock							0.986	0.001	5.824***
							(0.373)	(0.999)	(0.000)
Employment growth							0.224	1.220	−5.199***
							(0.833)	(0.303)	(0.000)
Capitalization	−1.568***	−1.954***	−0.074	−2.178***	−2.279***	0.146	−1.694***	−2.140***	0.062
	(0.000)	(0.000)	(0.891)	(0.000)	(0.000)	(0.815)	(0.000)	(0.000)	(0.900)
Return	0.612	1.155	1.383	2.130	2.734	0.954	0.853	1.558	1.268
	(0.602)	(0.361)	(0.251)	(0.244)	(0.151)	(0.603)	(0.456)	(0.207)	(0.284)
MB	−1.832***	−2.170***	1.447**	−2.365**	−2.393**	1.486	−1.821***	−2.144***	1.459**
	(0.004)	(0.002)	(0.036)	(0.015)	(0.015)	(0.109)	(0.004)	(0.002)	(0.038)
Volatility	−41.390**	−59.792***	−69.017***	−52.796**	−63.488***	−89.031***	−38.178*	−56.462***	−68.455***
	(0.039)	(0.005)	(0.005)	(0.023)	(0.009)	(0.002)	(0.053)	(0.007)	(0.006)
DE	−0.650	0.034	−2.043***	−1.358	−1.038	−2.151**	−0.565	0.150	−2.040***
	(0.225)	(0.957)	(0.001)	(0.121)	(0.290)	(0.045)	(0.292)	(0.809)	(0.001)
Constant	17.805***	22.517***	−0.854	27.627***	28.757***	−1.968	19.898***	25.691***	−3.032
	(0.000)	(0.000)	(0.872)	(0.000)	(0.000)	(0.755)	(0.000)	(0.000)	(0.521)
N	1736	1736	1736	1174	1174	1174	1736	1736	1736
adj. R^2	0.845	0.843	0.736	0.842	0.843	0.739	0.845	0.843	0.736
F	186.845	170.459	101.754	109.235	104.898	93.038	172.966	160.225	101.171

The table reports OLS regressions using the number of M&A advisors and broad industry shocks to predict industry takeover activity. Three different measures of shock and growth (sales, cash flow and employment) are used. The explanatory and control variables are measured at year t-1, except for *AdvisorsDeals*. *AdvisorsDeals* measures the number of advisor appearances within each industry-year across all M&A transactions (i.e., each advisor may appear multiple times in different transactions). Each regression uses 48 industries, each over 38 years (1980–2017). ***, **, and * represent statistical significance at the 1%, 5% and 10% levels, respectively, using a two-tail test. The numbers in parentheses are p-values.

4.3.2. Residual analysis

To further provide evidence supporting a causal relationship between M&A advisors and industry-level M&A activity, we explore an alternative explanation for our baseline results. The potential alternative explanation of our finding is that, rather than M&A advisors contributing to industry takeover activity as per our hypothesis ("supply-side effect"), industry shocks may create a higher demand for more M&A advisors to be present in the market ("demand-side effect"). To distinguish between the demand versus supply side effects in the role of M&A advisors in driving industry-level merger activity, we conduct a residual analysis to separate the expected level of M&A activity driven by industry shocks from excessive M&A activity that we attribute to M&A advisors. Specifically, we first estimate Eq. (6) to predict the expected level of M&A activity using industry shocks (Mitchell and Mulherin, 1996).

$$M\&A_{i,t} = \beta_0 + \beta_1 * Shock_{i,t-1} + \beta_2 * Control_{i,t-1} + \varepsilon_{i,t} \quad (6)$$

Like Eq. (1), the dependent variable, $M\&A_{i,t}$, captures the M&A activity level in industry i during year t, as represented by three possible proxies: the number of M&A transactions (*NumTrans*), the number of M&A announcements (*NumAnnoun*), and the total volume of transactions (*ValueTrans*). The dependent variable, $Shock_{i,t-1}$, captures broad industry shocks (sales, cash flow, and employment shocks) and technology and deregulation shocks. The control variables include industry capitalization (log of industry capitalization), industry median market-to-book ratio, the median industry stock returns for the three years ending at the end of year t-1, industry volatility and industry debt to equity ratio.

We obtain the residual term of industry takeover activity from Eq. (6), which we designate as "residual industry takeover activity", to represent M&A activity beyond the expected level of M&A driven by industry shocks. If the endogenous explanation is true that industry shocks simultaneously drive both M&A activity and the presence of M&A advisors, then M&A advisors would have no significant additional predictive power over the residual industry takeover activity, once the role of industry shocks have been taken into account. Conversely, if our prediction is true that M&A advisors indeed contribute to industry takeover activity above and beyond that caused by industry shocks, then we would expect to see significant positive predictive power of M&A advisors over residual industry takeover activity, indicating a supply-side effect.

$$Residual\_M\&A_{i,t} = \gamma_0 + \gamma_1 * Advisors_{i,t} + \gamma_2 * Control_{i,t-1} + \varepsilon_{i,t} \quad (7)$$

In Eq. (7), we estimate OLS regression models to predict residual industry takeover activity as the dependent variable, which represents the residual term from the regression estimated using a suite of alternative proxies for broad and specific industry shocks, as detailed in Eq. (6) above. Chen et al. (2018) provide evidence that using a residual from one regression as the dependent variable in

Table 13
OLS regressions of the number of M&A advisors with specific industry shocks.

	Deregulation			Technology Change		
	NumTrans	*NumAnnounce*	*ValueTrans*	*NumTrans*	*NumAnnounce*	*ValueTrans*
	(1)	(2)	(3)	(4)	(5)	(6)
AdvisorsDeals	0.636***	0.667***	0.765***	0.965***	1.025***	0.708***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Deregulation	5.067***	5.967***	10.004***			
	(0.000)	(0.000)	(0.005)			
RD				−0.417***	−0.408***	0.532**
				(0.000)	(0.000)	(0.014)
Capitalization	0.294	−0.573	1.571	−1.672***	−2.083***	−0.263
	(0.565)	(0.341)	(0.488)	(0.000)	(0.000)	(0.612)
Return	2.450	1.501	0.786	0.535	1.274	1.481
	(0.129)	(0.396)	(0.848)	(0.635)	(0.295)	(0.196)
MB	−1.375*	−0.880	5.375*	−1.251**	−1.577***	0.809
	(0.087)	(0.315)	(0.065)	(0.024)	(0.009)	(0.214)
Volatility	16.115	7.811	−96.614	−33.661*	−52.716**	−67.951***
	(0.548)	(0.779)	(0.158)	(0.084)	(0.011)	(0.005)
DE	−0.521***	−0.214	−3.299***	−0.593	0.124	−1.961***
	(0.010)	(0.415)	(0.000)	(0.268)	(0.841)	(0.001)
Constant	−0.078	11.304*	−29.987	18.951***	24.291***	1.984
	(0.989)	(0.089)	(0.192)	(0.000)	(0.000)	(0.688)
N	342	342	342	1736	1736	1736
adj. R^2	0.906	0.890	0.614	0.846	0.844	0.739
F	274.503	204.782	36.852	168.606	156.421	116.548

The table reports OLS regressions using the number of M&A advisors and specific industry shocks to predict industry takeover activity. Two different measures of shock (deregulation and technology change) are used. Deregulation is a dummy variable for 10 industries experiencing major federal deregulation: agriculture, banking, drugs, entertainment, healthcare, insurance, petroleum and natural gas, telecommunication, transportation and utility. Each industry covers the whole sample period (1980–2017). Technology change is measured by industry average research and development expense/sales ratio at year t-1. The regressions on technology change use 48 industries, each over 38 years (1980–2017). *AdvisorsDeals* measures the number of advisor appearances within each industry-year across all M&A transactions. The control variables in deregulation are measured at year t, and the control variables in RD are measured at year t-1. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively, using a two-tail test. The numbers in parentheses are p-values.

another regression leads to biased coefficient estimates, standard errors, and incorrect inferences. To address the concern that our results based on Eq. 7 could be biased, we follow the advice offered by Chen et al. (2018) and include all first-and second-stage covariates in Eq. 7.

In untabulated results, the estimated coefficient of *Advisors* is positive and statistically significant ($p < 0.01$) across all model specifications in predicting the residual level of industry M&A activity; the results remain robust regardless of which proxy is included for industry shocks (sales, cashflow, or employment shocks as proxies for broad industry shocks, technology change or deregulation as proxies for specific industry shocks), or which empirical measure of industry M&A activity is used (number of transactions, number of announcements, or value of transactions). The results from this residual analysis provide additional evidence that M&A advisors contribute to industry takeover activity ("supply-side effect") rather than being passively driven by the increased demand for M&A as a result of industry shocks ("demand-side effect"). These results further corroborate our baseline findings by confirming the stimulatory predictive power of M&A advisors over industry takeover activity, beyond mere increases caused by industry-level shocks.

4.4. Additional analyses

4.4.1. Fama-MacBeth regressions

To avoid potential under-estimation of the standard errors arising from the correlated residuals across years because of a panel dataset, we estimate Fama-MacBeth regressions. Specifically, we use average coefficients estimated from yearly regressions to infer statistical significance by using time-series standard errors estimated from the cross-sectional yearly regressions. This additional analysis is aimed at verifying the robustness of the positive relationship between M&A advisors and industry merger activity reported in the previous section.

The results are reported in Table 11. The key independent variable, *Advisors*, remains positive and significant ($p < 0.01$) in predicting industry M&A activity after controlling for all three types of broad industry shocks (sales, cash flow, and employment shock) in Panel A, and specific industry shocks (deregulation and technology advances) in Panel B, with similar economic magnitude as the results reported in Tables 2 and 4. The results from the alternative model specification further confirm the positive association between the presence of M&A advisors and industry-level takeover activity.

4.4.2. Alternative measure of M&A Advisors

Finally, we use an alternative test variable to capture the presence of advisors in M&A markets; *AdvisorsDeals* represents the total number of appearances of advisors across all deals in which they have participated in each industry-year (in contrast with our independent variable in our baseline regression, *Advisors*, which represents the number of unique advisors for each industry-year, *AdvisorsDeals* includes multiple appearances of the same advisor across different M&A transactions within an industry-year). We re-estimate our baseline regressions using *AdvisorsDeals* as the key independent variable alongside the broad and specific industry shocks. The results are reported in Tables 12 and 13, respectively.

In Table 12, the estimated coefficient of *AdvisorsDeals* is positive and significant in predicting all measures of takeover activity ($p < 0.01$) after controlling for each of the three types of broad industry shocks: sales shock in Models (1)–(3), cash flow shocks in Models (4)–(6), and employment shocks in Models (7)–(9). The results are consistent when specific industry shocks are taken into account in Table 13. Specifically, the coefficient of *AdvisorsDeals* remains positive and significant ($p < 0.01$) after taking into account deregulation (in Models (1)–(3)) and technology change (Models (4)–(6)). These results confirm our baseline finding of a significant, positive relationship between the presence of M&A advisors and industry-level merger activity.

4.5. Implications for the Australian market

In the preceding sections, we have documented the positive relationship between M&A advisors and industry takeover activity in the US market. However, it is not clear to what extend the findings are applicable to the Asia-Pacific region, such as the Australian market. The Australian takeover market remains one of the most restrictive markets in the world because of its unique regulatory features (Hutson, 2000; Tian and Twite, 2011; Hossain et al., 2021). For instance, M&A transactions in Australia are subject to regulations imposed by various regulatory bodies, including the Australian Securities and Investments Commission (ASIC) and the Australian Competition and Consumer Commission (ACCC). These legislative hurdles significantly increase the legal costs associated with initiating and concluding M&A deals (Duong and Izan, 2012; Hossain et al., 2021). This environment renders Australian acquirer firms to be more selective when seeking value-enhancing M&A opportunities, thereby enhancing their overall performance (da Silva Rosa and Walter, 2004). As a result of the more complex process required to complete takeovers, acquirer firms in Australia are expected to be more likely to hire M&A advisors to enhance deal performance and completion. Furthermore, the Australian M&A market is considerably smaller than its U.S. counterpart, and the relative contribution of M&A advisers to the wealth created or lost in a transaction may be more observable in smaller firms (da Silva Rosa et al., 2004; Duong and Izan, 2012).

In this section we investigate whether M&A advisors play the same role in the Australian market as they do in the US. We collect data on Australia M&A transactions and M&A advisors from the Thomson Financial SDC Database. Using the sample selection criteria presented in this paper, there are 2798 M&A transactions between 2003 and 2022. These transactions are divided into 11 Global Industry Classification Standard (GICS) industry sectors. We replicate the methodology described in Section 3 to generate four dependent variables and one independent variable: the number of completed M&As in a given industry-year (*NumTrans*); the transaction value of completed M&As at industry level (*ValueTrans)*; the number of M&A announcements in each industry-year (*NumAnnounce*); the occurrence of a merger wave in a given industry-year (*Wave*); and the number of unique M&A advisors

Table 14
M&A advisors and Australian industry takeover activity following sales and cash flow and shocks.

Panel A: Sales Shock

	(1)	(2)	(3)	(4)
	NumTrans	*NumAnnounce*	*ValueTrans*	*Wave*
Advisors	0.393***	0.498***	0.419***	0.032***
	(0.000)	(0.000)	(0.000)	(0.001)
Advisors*Sales shock	0.083***	0.112***	0.101	0.054**
	(0.005)	(0.003)	(0.353)	(0.012)
Sales shock	2.805	5.284*	2.159	−1.262
	(0.218)	(0.081)	(0.441)	(0.221)
Sales growth	−2.848	−5.253*	−2.875	1.083
	(0.225)	(0.093)	(0.328)	(0.298)
Capitalization	0.624*	0.788	0.874**	0.184
	(0.064)	(0.125)	(0.046)	(0.284)
Return	15.507	23.407	−19.214	12.369**
	(0.342)	(0.285)	(0.529)	(0.042)
MB	0.002***	0.003***	0.000*	0.000**
	(0.000)	(0.000)	(0.090)	(0.013)
Volatility	3.274	10.301	37.472	7.757
	(0.871)	(0.564)	(0.184)	(0.147)
DE	−0.000***	−0.000	−0.000	−0.000
	(0.004)	(0.281)	(0.116)	(0.238)
Constant	−13.168	−17.962	−23.687**	−6.441
	(0.103)	(0.147)	(0.029)	(0.123)
N	209	209	209	209
adj. R^2	0.668	0.759	0.592	0.248

Panel B: Cash Flow Shock

	(1)	(2)	(3)	(4)
	NumTrans	*NumAnnounce*	*ValueTrans*	*Wave*
Advisors	0.390***	0.494***	0.415***	0.034***
	(0.000)	(0.000)	(0.000)	(0.000)
Advisors*Cash flow shock	0.004**	0.005***	0.006***	0.001
	(0.047)	(0.003)	(0.003)	(0.133)
Cash flow shock	0.089	0.019	0.181***	0.008
	(0.306)	(0.759)	(0.004)	(0.820)
Cash flow growth	0.004	−0.000	0.009***	0.020***
	(0.358)	(0.878)	(0.004)	(0.004)
Capitalization	0.650**	0.788**	0.920**	0.183
	(0.025)	(0.020)	(0.032)	(0.162)
Return	15.905	22.643	−18.511	13.333
	(0.561)	(0.314)	(0.408)	(0.115)
MB	0.002***	0.003***	0.000	0.000***
	(0.000)	(0.000)	(0.202)	(0.007)
Volatility	6.944	8.664	46.938**	10.257*
	(0.655)	(0.640)	(0.016)	(0.063)
DE	−0.000**	−0.000	−0.000	−0.000
	(0.012)	(0.244)	(0.184)	(0.229)
Constant	−13.624**	−17.354**	−24.860**	−6.694**
	(0.044)	(0.028)	(0.021)	(0.040)
N	209	209	209	209
adj. R^2	0.667	0.757	0.593	0.270

This table reports OLS regressions using M&A advisors and two types of broad industry shocks (sales and cash flow shocks) to predict Australian industry-level takeover activity. All explanatory and control variables are measured at year t-1, except for *Advisors*. *Advisors* is the number of unique M&A advisors computed as the sum of M&A advisors participating in M&A deals in a year after excluding any multiple appearances for each M&A advisor in different M&A deals. Each regression uses 11 industries, each over 20 years (2003−2022). ***, **, and * represent statistical significance at the 1%, 5% and 10% levels, respectively, using a two-tail test. The numbers in parentheses are p-values.

(*Advisors*). In addition, we compute both sales and cash flow shocks,[10] and re-estimate Eq. (3) with the Australian sample.

The results are reported in Table 14. In the Panel A, the estimated coefficient of M&A advisors (*Advisors*) remains positive and significant ($p < 0.01$) in predicting Australian industry-level M&A activity after controlling for sales shock in Models (1)–(4). Furthermore, the estimated coefficient of *Advisors*Sales shock* (the interaction between M&A advisors and sales shock) is positive and significant in predicting completed M&As, M&A announcements and industry merger wave ($p < 0.01$, $p < 0.01$ and $p < 0.05$, respectively) in Models (1), (2) and (4). In Model (3), the coefficient of *Advisors*Sales shock* remains positive but statistically insignificant in predicting M&A transaction value. Similarly, when cash flow shocks are observed in the Panel B, the interaction term between cash flow shock and M&A advisors remains positive and significant in predicting the volume of M&A completions and announcements and M&A transaction values in Models (1)–(3) ($p < 0.05$, $p < 0.01$ and $p < 0.01$, respectively). In Model (4), the coefficient of *Advisors*cash flow shock* remains positive in predicting industry merger wave. These empirical results indicate that M&A advisors have a stimulatory effect on Australia industry takeover activity.

5. Conclusion

This study investigates the role of M&A advisors at industry level in contributing to the overall volume of takeover activity following a shock to an industry. Since industry shocks shift business conditions and trigger the need for firms to reorganize their assets, we posit that M&A advisors play a role in facilitating an increasing volume of M&As, thus forming an integral part of the process that explains industry-level takeover activity. Using a large sample of US M&As from 1980 through 2017, we produce novel evidence to show that M&A advisors are significantly, positively associated with M&A activity at an industry level. We use a series of empirical approaches to deal with endogeneity concerns, including an instrumental variable, using a legislative change (*Financial Services Modernization Act* 1999) as a shock-based instrument, and additional analyses using alternative model specifications and variable definitions. We replicate the main analysis using an Australian sample and our inferences remain unchanged.

Our empirical evidence makes a significant contribution to the literature. This study is the first to document a significant, positive relationship between the presence of M&A advisors and industry-level M&A activity following an industry shock. This study contributes to the literature investigating the clustering and propagation of industry takeover activity (Rhodes-Kropf and Viswanathan, 2004; Harford, 2005; Ahern and Harford, 2014), by demonstrating the role of M&A advisors as a contributor to industry-level M&A volume. Furthermore, though the important role of M&A advisors has been well-documented at the deal level to enhance the success and efficacy of M&A transactions (Hunter and Jagtiani, 2003; Kale et al., 2003; Walter et al., 2008; Golubov et al., 2012; Chang et al., 2016a; Yawson and Zhang, 2021), we provide compelling evidence on the role of M&A advisors at the industry level in promoting takeover activity following industry shocks.

One limitation of this study is that our data focuses on large takeover transactions. Each M&A deal in our sample has a transaction value of at least $50 million, limiting the applicability of our research to entrepreneurial firms. Entrepreneurial firms are active participants in the M&A market and M&As involving entrepreneurial firms are modest. Therefore, it is unclear whether M&A advisors play the same role in small M&As involving entrepreneurial companies as in large transactions. Future research can investigate the function of M&A advisors in small deals and entrepreneurial companies.

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Author statement

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Appendix A. Variable Definitions

Variable	Description
Dependent Variables	
NumTrans	The number of M&A transactions completed
NumAnnounce	The number of M&A transactions announced
ValueTrans	Transaction value in dollars ($billions)
Wave	Dummy variable representing industry merge wave computed using the methodology used by Harford (2005) by conducting simulation analysis as detailed in Section 4.4.

(*continued on next page*)

[10] In our Australia data sample, there is no employment shock because we do not have access to Australian companies' employment data. In addition, we are unable to use Australian deregulatory events as specific industry shocks because they occurred before year 2000 (Ragunathan, 1999; Lee et al., 2021) and our sample period is from 2003 to 2022.

(*continued*)

Variable	Description
M&A advisors Variables	
Advisors	The industry-year number of M&A advisors participating in the M&A market without multiple appearing times
AdvisorsDeals	The industry-year number of M&A advisors participating in the M&A market including multiple appearances
MAFee	The average M&A advisory income that M&A advisor earns in each appearance in M&A transaction
FSMA	Dummy variable if the Financial Services Modernization Act 1999 takes place
Shock Variable	
Sales shock	One measurement of broad industry shock by industry sales
Sales growth	One measurement of broad industry shock by industry sales growth
Cash flow shock	One measurement of broad industry shock by industry cash flow
Cash flow growth	One measurement of broad industry shock by industry cash flow growth
Employee shock	One measurement of broad industry shock by industry employment
Employment growth	One measurement of broad industry shock by industry employment growth
Deregulation	Dummy variable if a deregulation takes place
RD	Industry average research and development expense over sales
Econ Shock Index	The first principal component of the seven economic shock variables, specifically cash flow margin on sales (cash flow scaled by sales), asset turnover (sales divided by beginning-of-period assets), research and development (scaled by beginning-of-period assets), capital expenditures (scaled by beginning-of-period assets), employee growth, return on assets (ROA), and sales growth.
Control Variables	
Capitalization	log of industry capitalization
MB	Industry median market-to-book ratio
Return	The median return in the industry for the three years ending at the end of t-1
Volatility	Intra-industry standard deviation of three-year market returns
DE	Industry median debt to equity ratio

This table reports the description of all variables used in this study. All variables are measured on year-industry basis, except MarketAdvisors; MarketAdvisors measures only on a yearly basis.

Appendix B. Summary Statistics of M&A Transactions and the Firms Involved in M&As

Industry Abbreviation	Industry name	Total Completed M&A deals	Total Announced M&A deals	Industry % (Number of Completed Deals)	Industry % (Number of Announced Deals)	Unique Firms in Completed Deals	Unique Firms in Announced Deals
		(1)	(2)	(3)	(4)	(5)	(6)
AGRIC	Agriculture	165	186	0.32%	0.33%	267	287
AERO	Aircraft	190	207	0.37%	0.37%	248	270
BEER	Alcoholic beverages	105	116	0.20%	0.20%	161	168
CLTHS	Apparel	151	161	0.29%	0.28%	214	222
AUTOS	Automobile and Trucks	525	589	1.01%	1.04%	803	852
BANKS	Banking	3118	3401	5.99%	6.01%	4060	4233
BUSSV	Business Service	5380	5492	10.34%	9.70%	7564	7626
PAPER	Business Supplies	470	510	0.90%	0.90%	699	737
SODA	Candy and Soda	142	144	0.27%	0.25%	193	196
CHEMS	Chemicals	645	669	1.24%	1.18%	929	945
COAL	Coal	184	201	0.35%	0.35%	281	300
COMPS	Computer	1159	1258	2.23%	2.22%	1640	1727
CNSTR	Construction	469	513	0.90%	0.91%	756	803
BLDMT	Construction Material	1014	1046	1.95%	1.85%	1485	1510
HSHLD	Customer Goods	682	773	1.31%	1.36%	1029	1090
GUNS	Defense	102	116	0.20%	0.20%	144	158
DRUGS	Pharmaceutical products	1311	1423	2.52%	2.51%	1827	1907
ELCEQ	Electrical equipment	400	437	0.77%	0.77%	605	638
CHIPS	Electronic equipment	1703	1765	3.27%	3.12%	2310	2341
FUN	Entertainment	373	395	0.72%	0.70%	564	587
FABPR	Fabricated products	131	141	0.25%	0.25%	227	236
FOOD	Food	715	746	1.37%	1.32%	985	1003
HLTH	Healthcare	1186	1299	2.28%	2.29%	1650	1740
INSUR	Insurance	987	1064	1.90%	1.88%	1373	1425
MACH	Machinery	680	732	1.31%	1.29%	960	1010
LABEQ	Measuring and control equip	530	585	1.02%	1.03%	787	837
MEDEQ	Medical equipment	893	957	1.72%	1.69%	1230	1267
OTHER	Miscellaneous	67	71	0.13%	0.13%	113	117

(*continued on next page*)

(*continued*)

Industry Abbreviation	Industry name	Total Completed M&A deals	Total Announced M&A deals	Industry % (Number of Completed Deals)	Industry % (Number of Announced Deals)	Unique Firms in Completed Deals	Unique Firms in Announced Deals
MINES	Nonmetallic mining	202	232	0.39%	0.41%	324	358
PERSV	Personal services	393	427	0.76%	0.75%	629	663
ENRGY(OIL)	Petroleum and natural gas	2469	2628	4.74%	4.64%	3324	3437
GOLD	Precious metals	89	115	0.17%	0.20%	146	176
BOOKS	Printing and Publishing	674	745	1.30%	1.32%	932	986
RLEST	Real Estate	3281	3400	6.30%	6.00%	4536	4674
TOYS	Recreational Products	292	339	0.56%	0.60%	456	506
MEALS	Restaurants	1557	1730	2.99%	3.05%	2101	2221
RTAIL	Retail	1419	1613	2.73%	2.85%	2045	2193
RUBBR	Rubber and Plastic products	369	386	0.71%	0.68%	600	618
SHIPS	Shipbuilding	59	70	0.11%	0.12%	97	104
BOXES	Shipping container	183	195	0.35%	0.34%	282	292
STEEL	Steel work	607	686	1.17%	1.21%	894	962
TELCM	Telecommunication	2237	2463	4.30%	4.35%	2900	3046
TXTLS	Textiles	191	220	0.37%	0.39%	309	330
SMOKE	Tobacco	61	69	0.12%	0.12%	100	104
FIN	Trading	10,298	11,637	19.79%	20.55%	13,389	14,668
TRANS	Transportation	1122	1319	2.16%	2.33%	1685	1825
UTIL	Utilities	1726	1920	3.32%	3.39%	2391	2528
WHLSL	Wholesale	1337	1441	2.57%	2.54%	2075	2192
Mean	All Industries	1084.23	1179.83	2.08%	2.08%	1506.65	1585.73
Median	All Industries	568.50	629	1.09%	1.11%	848.50	898.50
Min	All Industries	59	69	0.11%	0.12%	97	104
Max	All Industries	10,298	11,637	19.79%	20.55%	13,389	14,668
STD	All Industries	1679.81	1854.40	0.0323	0.0327	2214.37	2371.95

Total Completed M&A deals is the total number of completed M&A deals from 1980 to 2017 in an industry. Total Announced M&A deals is the total number of announced M&A deals from 1980 to 2017 in an industry. Industry % (Number of Completed Deals) is the percentage of the total number of completed M&A deals in an industry relative to all the M&A completed deals in all industries. Industry % (Number of Announced Deals) is the percentage of the total number of announced M&A deals in an industry relative to all the M&A announcements in all industries. For each Industry % measurement, the sum of all industries is equal to 100%. Unique Firms Involved in Completed Deals is the number of unique firms involved in completed M&A deals from 1980 to 2017 in an industry. Unique Firms Involved in Announced Deals is the number of unique firms involved in announced M&A deals from 1980 to 2017 in an industry.

Appendix C. Pearson Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) NumTrans	1.000																	
(2) NumAnnounce	0.999	1.000																
(3) ValueTrans	0.841	0.846	1.000															
(4) Advisors	0.877	0.879	0.800	1.000														
(5) AdvisorsDeals	0.913	0.912	0.856	0.952	1.000													
(6) Sales shock	0.064	0.069	0.033	−0.021	0.024	1.000												
(7) Cash flow shock	0.182	0.191	0.128	0.108	0.124	0.102	1.000											
(8) Employment shock	−0.046	−0.044	−0.062	−0.127	−0.083	0.464	0.011	1.000										
(9) Sales growth	0.103	0.109	0.062	0.054	0.074	0.792	0.105	0.350	1.000									
(10) Cash flow growth	0.051	0.049	0.030	−0.006	0.028	0.053	0.817	0.003	0.067	1.000								
(11) Employment growth	−0.001	−0.000	−0.019	−0.040	−0.018	0.437	0.041	0.682	0.499	0.038	1.000							
(12) Deregulation	0.128	0.130	0.243	0.235	0.228	−0.020	−0.050	−0.077	0.021	−0.008	−0.019	1.000						
(13) RD	0.038	0.039	0.109	0.097	0.092	−0.023	−0.027	−0.044	−0.006	−0.013	−0.016	0.183	1.000					
(14) Capitalization	0.415	0.413	0.446	0.563	0.520	−0.153	−0.051	−0.219	−0.008	−0.016	−0.067	0.369	0.156	1.000				
(15) return	0.091	0.091	0.093	0.090	0.102	0.088	−0.018	0.017	0.159	−0.022	0.012	−0.000	0.020	0.117	1.000			
(16) MB	0.024	0.021	0.089	0.025	0.061	−0.006	−0.065	−0.001	0.030	−0.015	−0.000	−0.120	0.228	0.186	0.382	1.000		
(17) Volatility	−0.122	−0.126	−0.128	−0.153	−0.114	0.095	−0.053	0.044	−0.017	−0.024	0.014	−0.111	0.047	−0.108	0.033	−0.006	1.000	
(18) DE	0.247	0.259	0.188	0.285	0.284	0.066	0.199	0.058	0.072	0.060	0.048	0.308	−0.079	0.135	0.008	−0.153	−0.201	1.000

The table reports a correlation matrix for the sample period 1980–2017. The observations used in the calculation of correlations are on an industry-year basis without missing values.

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