

INDUSTRY SIZE AND DEAL INITIATION:  
EVIDENCE FROM MERGER AND ACQUISITION



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สารนิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

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By                                      Miss Sirilak Sriburapar  
Field of Study                      Finance  
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ศิริลักษณ์ ศรีบูรพา : ขนาดอุตสาหกรรมกับการเริ่มต้นควบรวมและซื้อกิจการ. ( **INDUSTRY SIZE AND DEAL INITIATION:EVIDENCE FROM MERGER AND ACQUISITION**) อ.ที่ปรึกษาหลัก : รศ. ดร.มนพล เอกโยคยะ

บริษัทที่อยู่ในอุตสาหกรรมขนาดเล็กมีโอกาสที่จะประกาศขายส่วนของผู้ถือหุ้นมากกว่าบริษัทที่อยู่ในอุตสาหกรรมขนาดใหญ่ ผู้ซื้อส่วนใหญ่ยอมที่จะจ่ายเงินซื้อส่วนของผู้ถือหุ้นของบริษัทในอุตสาหกรรมขนาดเล็กแพงกว่าส่วนของผู้ถือหุ้นของบริษัทในอุตสาหกรรมขนาดใหญ่ วิจัยเล่มนี้จะแสดงให้เห็นว่าขนาดของอุตสาหกรรมมีผลต่อการตัดสินใจขายกิจการของผู้ประกอบการและส่งผลต่อการตัดสินใจจ่ายเงินของผู้ซื้อ ผู้ประกอบการในอุตสาหกรรมขนาดเล็กมีโอกาสที่จะประกาศขายมากกว่าเนื่องจากความต้องการสินทรัพย์ของบริษัทในอุตสาหกรรมขนาดเล็กมีน้อยกว่าความต้องการสินทรัพย์ของอุตสาหกรรมขนาดใหญ่ จึงส่งผลให้ผู้ประกอบการในอุตสาหกรรมขนาดเล็กที่ออกมาขายกิจการได้ผลตอบแทนที่ต่ำกว่า

อย่างไรก็ตาม เราพบว่าผลกระทบของการออกมาประกาศขายกิจการต่อกำไรของผู้ขายแตกต่างกันไปขึ้นอยู่กับขนาดของอุตสาหกรรม โดยทั่วไปการออกมาประกาศขายกิจการจะส่งผลเสียต่อกำไรที่จะได้จากการขาย แต่บริษัทที่อยู่ในอุตสาหกรรมขนาดเล็กเมื่อออกมาประกาศขายกิจการกลับได้ราคาสูงกว่าบริษัทที่อยู่ในอุตสาหกรรมขนาดใหญ่โดยเปรียบเทียบสามารถศึกษารายละเอียดเพิ่มเติมได้จากงานเล่มนี้

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ลายมือชื่อนิติ

ปีการศึกษา 2563

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ลายมือชื่อ อ.ที่ปรึกษาหลัก

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KEYWORD merger, acquisition, merger and acquisition, M&A,  
RD: deal initiation, bidder-initiated deal, target-initiated deal, industry size, industry size and deal initiation, large industry, small industry

Sirilak Sriburapar : INDUSTRY SIZE AND DEAL INITIATION:EVIDENCE FROM MERGER AND ACQUISITION. Advisor: Assoc. Prof. MANAPOL EKKAYOKKAYA, Ph.D.

Targets in small industries are more likely to initiate the deal than targets in large industries. Bidders are willing to pay more for target-initiated deals in small industries than in large industries. This research finds empirical evidence that industry size significantly impacts firms' decision to initiate the deal and bid premium. Targets in small industries are more plausibly to initiate the deal because the demand for target corporate assets is lower. Consequently, they receive lower premiums compared to targets in large industries.

Surprisingly the impact of target-initiated deals on premiums significantly depends on target industry size, the negative impact of target-initiated deals is larger in large industries. As a result, target-initiated deals in small industries receive higher premiums than target-initiated deals in large industries. The premium gap between bidder-initiated deals and target-initiated deals in small industries is narrower than in large industries.

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Student's Signature  
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Sirilak Sriburapar

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## **Chapter 1:**

### **Introduction**

This paper examines whether industry size can predict deal initiation and bid premium in mergers and acquisitions by using data from the SDC Platinum and the industry size data from DataStream. A firm that acquires others is a bidder, and the acquired firm is a target in this research. Empirical evidence suggests that financial constraint and financial distress motivate targets to initiate mergers and acquisitions (Aktas et al., 2010; Masulis & Simsir, 2018). Because bidders help targets' financial after merger or acquire (Erel et al., 2015). However, not every target that experiences financial constraints and financial distress has to initiate the deals. Sometimes bidders also initiate the deal to financially distressed targets and offer lower premiums as compensation for the weakness (Masulis & Simsir, 2018). This raises why some financial weakness firms have to initiate the deal, and some do not? We question that the market competition and demand for target firms have something to do here.

We found that the larger the industry's size, the less likely for targets to initiate the deal, or target-initiated deals are more likely in small industries than in large industries. This is due to the demand for corporate assets. In which the demand for target corporate assets in small industries is lower than targets in large industries. The assets in large industries are more generic and able to redeploy for alternative use (Kim & Kung, 2017). The demand for generic assets is higher than specific assets in small industries. As a result, targets in small industries are more likely to initiate the deal themselves and also receive lower premiums than target-initiated deals in large industries.

Our results align with the extant literature of deal initiation that target-initiated deals in small industries receive lower premiums than bidder-initiated deals. We extend the study to examine the relationship between deal initiation and industry size on bid premium and found that target-initiated deal impact premium depends on whether the target is in small or large industries. The negative impact of initiating the

deal for targets in small industries is much smaller than target-initiated deals in large industries.

This causes the difference in the premium gap between bidder-initiated deals and target-initiated deals in small industries vs. large industries. The premium gap in small industries is less than half of the premium gap in large industries. Target in large industries could have wait for too long to accept/initiate the deal proposal. When targets in large industries are at the early stage of financial constraints, they are less likely to initiate the deal. Due to large industries, mergers and acquisitions occur on a general basis. In the meantime, targets in large industries simultaneously negotiate with several bidders and reject a low premium offer. However, they might have to wait for a perfect match until facing a financial predicament. When cash flow is low, they now need to initiate the deal, revealing that they cannot close the deal in bidder-initiated deals. Eventually, they need to accept low premium offer to solve the financial situation (20% lower than its peers).

Lastly, our results shed more light on deal initiation decision making that deal initiation is not absolute decision making from firm financial characteristics, such as financial constraints or financial distress. Industry characteristics, industry size also has a significant impact on deal initiation decision and bid premiums. Unexpectedly, the negative impact of target-initiated deals is twisted between targets in small and large industries, in which you can find more discussion in this paper.

## **Chapter 2: Literature Review**

In this section, we firstly discuss current empirical studies about deal initiation in mergers and acquisitions. Secondly, we review the known effects of industry size on deal initiation and bid premium.

### 2.1 Deal Initiation in Mergers and Acquisitions

Prior M&A literature has a limitation of deal initiation<sup>1</sup>. Extant literature implicitly assumes that bidders initiate acquisition (Fidrmuc & Xia, 2019). When data is available, researchers focus on study deal initiation.

Either targets or bidders can initiate M&A depends on their motivation. In typical bidder-initiated deals, target managements were approached by bidders' investment bankers that the bidder is interested in merging two firms. An example bidder-initiated deal is that Google bought a mobile start-up, Android, in 2005 because Google wanted to expand the business to the wireless devices market. In bidder-initiated deals, bidders know how to utilize the target before deal initiation is publicly announced. In target-initiated deals, target managements take the first step by hiring investment banking to evaluate their options and fill the merger document with the SEC. Potential bidders will be contacted by the target's investment banker later.

Why target self-select to initiate the deal? Target financial constraints motivate targets to initiate the deal (Masulis & Simsir, 2018). Financial constraints firms are in cash flow limitation due to high-interest rates and unable to borrow externally because of debt overhang. Thus, financial constraints targets need to reduce operation cash spending, including investment spending. Around 86% of the firms forego attractive investment opportunities (Campello et al., 2010). The costs of doing nothing are massive and consequential. A financially constrained firm bypasses an attractive investment opportunity, which could make a positive net contribution to firm market

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<sup>1</sup> Since May 1996, public companies are required to submit their merger and acquisition filing through Electronic Data Gathering, Analysis, and Retrieval (EDGAR).

value (Myers, 1977). The opportunity might go to competitors who have the potential to invest. Eventually, underinvestment firms will lose their competitiveness and lose market share to their competitors.

Financial distress also motivates targets to initiate the deal. The mechanism behind is if distressed firms cannot meet the financial obligations with creditors, firms would go bankrupt, and target shareholders will receive nothing. Creditors will sell collateral as soon as possible to reduce their risk exposure; the assets might be sold at a firesale (Shleifer, 1992). Merger and acquisition help the distressed firm survive from bankruptcy because bidders can generate cash flow internally and also have the ability to raise capital externally to help target financial situations. After merger and acquisition targets, financial perform better (Erel et al., 2015). Consequently, targets that experience financial constraints and financial distress are more likely to initiate deals to evade financial constraints and financial distress.

## 2.2 Deal initiation and bid premium

As many would perceive, target-initiated deals receive lower premiums than bidder-initiated deals (Aktas et al., 2010; Masulis & Simsir, 2018). In target-initiated deals, bidders have no prior intention of merging with the target; bidders might be less interested in making an aggressive bid premium. If the bidder's offer price is lower than the target's reservation prices, the target can start negotiating with another potential bidder. In this case, takeover premiums should not have the consequence of deal initiation.

Why would targets accept lower premiums? One plausible explanation from Aktas et al. (2010) is that the target's financial weakness drive targets to accept low premiums offer with one-on-one negotiation. Targets prefer auction (multiple bidders) to negotiation because the competition is likely to increase bid premium. However, not every target can afford the auction or second-round negotiation because of their cash flow limitation due to the high-interest rates and debt overhang. Targets need to accept low premiums offers from bidders; otherwise, the companies are at risk of

bankruptcy. Aktas et al. (2010) document that targets receive around 32% lower premium in target-initiated deals with one-on-one negotiation.

Masulis and Simsir (2018) argue about the low premiums in target-initiated deals, which contrast with Aktas et al. (2010). Masulis and Simsir (2018) report that the target's private information explains the premium gap between target-initiated deals and bidder-initiated deals. Furthermore, targets financial constraints no longer have a significant impact on bid premiums. In general M&A, bidders are exposed to an information disadvantage because targets have superior information about their company valuation more than bidders. Target-initiated deals reveal targets' willingness to sell, and bidders infer target willingness to sell as negative information. The motivations why target publicly announces its willingness to sell remains an unobservable factor. Therefore, target-initiated deals exacerbate the information asymmetry between merger partners. When bidders are at a high information disadvantage, they will offer low prices to protect themselves from purchasing a lemon (Akerlof, 1970). Takeover premiums are significantly lower in target-initiated deals. However, targets can reduce the negative effect of information asymmetry with bidders by accepting stock as a payment (Masulis & Simsir, 2018) or selling the company to existing shareholders (toehold) to protect their private information (Eckbo, 2014).

Anyhow, the conflict results of the deal initiation factor on takeover premiums between Aktas et al. (2010) and Masulis and Simsir (2018) give us a decisive question that it could be another variable that explains the low premiums in target-initiated deals. This paper will shade more light on deal initiation likelihood and determinates of low takeover premium in target-initiated deals.

### 2.3 Industry size

Traditional literature uses industry size (number of firms) as a measurement for competitive markets (Boone & Mulherin, 2007; Stiglitz, 1987). There will always be demand for corporate assets in competitive markets because firms are continuously searching for investment opportunities. These firms want to expand the business,

diversify, avoid free cash flow and underinvestment problems (Andrade & Stafford, 2004). Meanwhile, bidders who search for targets are the demand, and targets willing to sell are the supply side for corporate assets. The demand/supply for large industries' targets is relatively higher than the demand/supply for small industries targets. For an individual target in a small industry, the volume of demand for the assets is smaller than the volume of demand for an individual target in a large industry.

The assets of firms in large industries is more generic than assets of firms in small industries because more firms own the same assets. The generic assets are easy to trade to firm outside industries because firms (both inside and outside industries) are familiar with the generic assets (Aktas et al., 2010). On the other hand, the smaller the industry size is, the less generic or more specific the asset. The specific assets are designed for a specific purpose, and hard to redeploy outside industry for alternative use (Shleifer, 1992). These specific assets need to be transferred within the hosting industry to get the best use. Otherwise, the assets will be traded under its fundamental value because outside bidders who have no expertise cannot bring the best use to the assets.

Bidders will initiate deals to target who are more generic assets because they know how to utilize them. It is hardly likely for any bidder to initiate the deal to specific assets that they have no expertise unless they are in the same industries. Consequently, the potential bidders' scope for generic assets is more broad than potential bidders for small industries' specific assets. Therefore, the volume of demand for small industries' targets is less than the demand for targets in large industries.

Merging firms in large industries gain higher benefits than firms in small industries, reflecting higher takeover premiums in mergers and acquisitions (Simonyan, 2014). The aggregate benefit is from industry consolidation by eliminating the overlapping function among parties. The greatest efficiency improvement opportunities come from large industries with too many firms with access capacity (Brealey et al., 2011). However, neither of them has examined how does industry size impact takeover premiums. In this research, we will begin

intercorporate deal initiation into the study, which will explain how industry size can predict deal initiation.

Large industries are not only higher liquidity, but also, the assets are more generic. Generic assets receive higher premiums than specific assets in mergers and acquisitions (Kim, 2018). Greater demand and supply for generic assets bring the competition to generic assets themselves. An individual seller/buyer will become a price taker. If a buyer offers a price lower than the market price, targets can reject and find other bidders in competitive markets. Therefore, the premium for generic assets will not low. Adversely, target assets in small industries are more specific and less competitive compared to target assets in large industries. Targets have to accept low premium offers because targets have less bargaining power when another negotiation is not certain.



### Chapter 3: Hypotheses Development

The volume of demand for targets in large industries higher than in small industries because target assets in large industries are more generic than in small industries. When many firms hold the same asset type, the asset will become more generic, and the generic assets are easy to redeploy for alternative use. In contrast, the specific assets are designed for a specific purpose, with fewer firms familiar with the asset. The specific asset is hard to redeploy for alternative use; it needs to be traded within the hosting industry to get the asset's best use. Contrary, generic assets usually trade outside the industries (Kim, 2018). Be able to trade outside the industry brings advance to generic assets. The scope of potential investors for generic assets is broader than specific assets and less relies on internal industry demand. Therefore, the demand for large industries' targets is higher and more stable than targets in small industries.

Financial constraints and financial distress motivate firms to initiate the deal (Aktas et al., 2010; Masulis & Simsir, 2018). By initiating the deal, firms also release a negative signal to the market. If the firms can choose, they will choose not to initiate the deal. However, the option is available only for firms in large industries because many bidders are continuously searching for investment opportunities in large industries. With the great demand, eventually, bidders will offer them the deal. Therefore, financial constraints and financial distress firms in large industries are less likely to initiate the deal. On the opposite, the financial constraint and financial distress firms in small industries need to initiate the deal themselves in order to get merged or acquired because of lower demand or fewer potential bidders in small industries. Even initiating the deal releases terrible news about the company, but it is still better for the target's shareholders than receiving nothing if the firms enter bankruptcy. Therefore, we hypothesize that *target-initiated deals are more likely in small industries than in large industries.*



A financial constraint or financial distress firm initiates the deal. Bidders will offer low premiums because bidders know that the target has less bargaining power. After all, targets are at risk of bankruptcy due to financial constraints and financial distress. Alternatively, targets can reject the low premium offer and find another potential bidder willing to provide a satisfying premium. However, the decision to reject low premium offers is feasible only for targets in large industries. Targets from small industries are less likely to reject the low premium offer because another potential bidder is not easy to find in small industries. Especially financial constraints or financial distress targets, they have limited time and ability to afford the second-round negotiation or auction (Aktas et al., 2010). Therefore, we hypothesize that *target-initiated deal creates larger negative impacts on premium in small than in large industries; consequently, the premium gap between bidder-initiated deals and target-initiated deals in small industries is wider than the premium gap in large industries.*

## Chapter 4: Data and Sample Selection

### 4.1 Data & Sample Selection

The list of all mergers and acquisitions was obtained from the SDC/Platinum Merger & Worldscope databases. We restricted ourselves to a sample of mergers and acquisitions among Group of Seven (G7) countries. G7 is an international intergovernmental economic organization consisting of seven developed countries worldwide: Canada, France, Germany, Italy, Japan, the UK, and the US<sup>2</sup>.

Our database meets the following sample criteria: i) the deal announcement occurs from 1990 to 2019, ii) deal status is completed, iii) We exclude recapitalizations and deals that either target or bidder is a government agency, a utility, or financial industry. From the initial sample of 20,405 completed deals between 1990 to 2019, we eliminate 6,303 deals according to the criteria above, leaving 14,102 in our data set.

**Table 1** reports the distribution of the final sample by industry group across sample periods. Our sample consists of 8 main industry sectors<sup>3</sup>. The majority of the deal is from manufacturing sectors, services sectors, respectively. Half of the M&A deals are targets in the United States, followed by Japan (21%), United Kingdom (12%), Canada (9%), France (5%), Germany (3%), and Italy (2%). The deal grew in the late 1990s to early 2000 due to subprime market growth, and deal frequency was peak again before the Great Recession in 2007 to 2008.

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<sup>2</sup> G7 become G8 when Russia join in 1997 and return to G7 again when Russia as disinvited in 2014. In this research, we concentrate our study on original G7.

<sup>3</sup> Industry sector classification is from NC state university. We group target industries into 8 main sectors for easier to see sample distribution. However, the regressions were still run based on target's SIC 2 digits code.

Table 1: Distribution of sample by industry across sample periods

Year	Industry								Total	%
	Agriculture, Forestry, & Fishing	Mining	Construction	Manufacturing	Transport & Public Utilities	Wholesale	Retail	Services		
1990	2	20	6	123	28	16	21	52	<b>268</b>	2%
1991	1	30	8	108	31	18	32	45	<b>273</b>	2%
1992	2	24	6	173	40	21	32	75	<b>373</b>	3%
1993	4	37	5	149	42	26	42	88	<b>393</b>	3%
1994		42	10	220	59	40	51	131	<b>553</b>	4%
1995	3	38	5	171	61	24	44	102	<b>448</b>	3%
1996	5	37	4	147	69	16	66	82	<b>426</b>	3%
1997	1	47	7	244	59	38	69	168	<b>633</b>	4%
1998	2	38	13	262	86	31	82	178	<b>692</b>	5%
1999	1	36	24	309	122	28	70	226	<b>816</b>	6%
2000	1	54	26	322	95	39	67	252	<b>856</b>	6%
2001		73	12	176	61	24	53	179	<b>578</b>	4%
2002		41	25	166	34	23	52	125	<b>466</b>	3%
2003		10	20	118	26	37	36	73	<b>320</b>	2%
2004	1	25	8	145	33	24	55	109	<b>400</b>	3%
2005	4	47	19	232	71	29	95	226	<b>723</b>	5%
2006	1	53	15	232	60	27	102	203	<b>693</b>	5%
2007	1	63	22	279	59	46	92	247	<b>809</b>	6%
2008		45	13	201	38	27	55	154	<b>533</b>	4%
2009	2	47	15	151	40	9	58	142	<b>464</b>	3%
2010	3	40	15	150	35	16	36	110	<b>405</b>	3%
2011	1	38	11	146	42	11	41	116	<b>406</b>	3%
2012	3	40	14	164	40	16	54	128	<b>459</b>	3%
2013	1	23	7	123	40	11	56	83	<b>344</b>	2%
2014		24	2	132	36	13	52	82	<b>341</b>	2%
2015	1	26	7	143	45	10	44	92	<b>368</b>	3%
2016	1	18	4	130	27	8	41	69	<b>298</b>	2%
2017		14	6	112	28	7	30	58	<b>255</b>	2%
2018	1	24	16	104	34	10	39	67	<b>295</b>	2%
2019		15	8	76	11	7	34	63	<b>214</b>	2%
<b>Total</b>	<b>42</b>	<b>1,069</b>	<b>353</b>	<b>5,208</b>	<b>1,452</b>	<b>652</b>	<b>1,601</b>	<b>3,725</b>	<b>14,102</b>	<b>100%</b>
%	0%	8%	3%	37%	10%	5%	11%	26%	100%	

#### 4.2 Research Variables

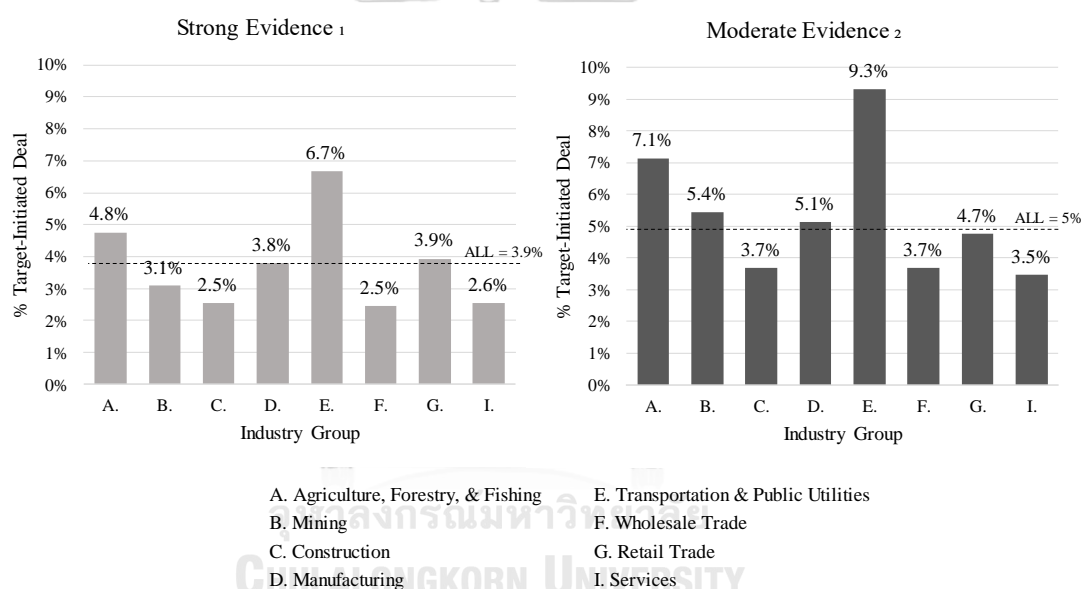
##### Deal Initiation

The target-initiated deal variable equals 1 in case targets initiated the deal, 0 in case bidders initiated the deal. The identification of deal initiation was acquired from merger detail from the SDC database. Due to the limitation of the data field in the SDC database, the deal initiator cannot be taken directly from a specific field. We performed deal initiator classification based on available information in the database. Deals can be classified as; (i) strong evidence (e.g., search for buyers) of target-initiated deals, which has obvious information that the deal was initiated by targets (ii) moderate evidence of target initiation. Moderate evidence is a gray area in which the deals are more likely target-initiated deals, but the confidence level is lower compared to the strong evidence group (e.g., divestiture, plan to sell, and buyers are sought).

Strong evidence of target-initiated deals also is a part of moderate evidence as well. To robustness test our implication of deal initiation, we will run the regression in both data sets.

**Figure 1** shows the distributions % of target-initiated deals across industry groups. On average, 5% of the deal is target-initiated deals, and the majority 95%, is bidder-initiated deals. Transportation & Public Utilities Industries have the highest contribution of target-initiated deals. Meanwhile, Construction and Wholesales Trade have the lowest percentage of target-initiated deals.

*Figure 1: Distributions of % target-initiated deal by target industry group*



### *Industry size*

We use industry size as a proxy for demand for corporate assets. There are various ways to measure industry size by the number of firms, the number of laborers, market size <sup>4</sup>, the number of customers <sup>5</sup>, GDP, and asset values of all industry firms (see, Simonyan, 2014; Wang, 2020; Asiedu 2006). Moreover, many different methods of constructing the variable, such as (i) using the raw number in the target's two-digit SIC code. (ii) constructing a new ratio for the variable. Alternatively, (iii) setting a

<sup>4</sup> Market size can also reflect competition in the market (Raith, 2003). Merger and acquisition is a secondary market for corporate control, which trading firms instead of goods and services. Therefore, we can infer the industry size as market size.

<sup>5</sup> Wang (2020) measures market size by using the raw number of customers interested in the product.

threshold and convert industry size into a dummy variable, small and large industries. Researchers choose different measures to construct the industry size, depending on the research background theory.

Simonyan (2014) constructs the industry size by using the number of firms as measures. Her hypothesis was developed from industry consolidation when too many firms operate under the same industries. Therefore, the number of firms is suitable for measuring industry size. Simonyan (2014) constructed a new variable called Industry size as a ratio of the number of firms in the target's two-digit SIC code industry over the total number of firms in Compustat at the end of the fiscal year prior to the takeover announcement. In the research, the raw number of targets is also used to robustness test in the regression. The results were similar in both cases.

**Table 2** reports the descriptive statistics of M&A deals in the sample. **Panel A** reports industry size characteristics. In this research, we use three distinct industry size measures: the number of firms, the value of all firms' total assets, and total revenues within the industry to robust our implication of industry size—Target's industry size by number listed firm in the industry (*SIC 2 digits*) by country. On average, a target industry has around 133 listed firms. Industry assets are around \$139 million. Industry revenue is around \$77 million per year from 1990 to 2019. Thus, industry size (number of firms) of target-initiated deals, both strong and moderate evidence, are smaller than bidder-initiated deals. Meanwhile, industry size by total assets and total revenues of target-initiated deals are larger than bidder-initiated deals.

Table 2: Descriptive statistics of M&amp;A deals in the sample

		ALL	Strong Evidence <sup>1</sup>		Moderate Evidence <sup>2</sup>	
			Target-initiated deal	Bidder-initiated Deal	Target-initiated deal	Bidder-initiated Deal
Observation	Count.	14,102	513	13,589	705	13,397
	%	100%	4%	96%	5%	95%
<b>Panel A: Industry Size</b>						
Industry Size (Number of firms)	Mean.	133	111	140	99	141
	Median.	83	90	56	57	91
Industry Size - Assets Million \$	Mean.	139	217	141	176	142
	Median.	68	78	69	57	69
Industry Size - Revenues Million \$	Mean.	77	122	39	98	78
	Median.	37	44	39	38	39
<b>Panel B: Premium</b>						
Equity Book Value (Adjusted)	Mean.	284	628	253	572	250
	Median.	17	141	21	123	21
(-) Target Equity Book Value	Count.	1,141	67	1,074	79	1,062
	%	8%	13%	8%	11%	8%
Premium (Dummy)	Mean.	39%	33%	39%	37%	39%
	Median.	63%	65%	63%	65%	63%
<b>Panel C: Control Variables</b>						
Private Target (Dummy)	Count.	2,398	42	2,356	53	2,345
	%	17%	8%	17%	8%	18%
HHI	Mean.	1918	2230	1776	2041	1780
	Median.	1253	1390	1121	1300	1120
Relative Deal Size	Mean.	0.37	0.41	0.37	0.46	0.37
	Median.	0.10	0.15	0.09	0.18	0.09
Target Industry PE	Mean.	228	186	235	181	236
	Median.	131	109	135	107	135
Payment method : CASH (Dummy)	Mean.	5,697	272	5,425	330	5,367
	%	40%	53%	40%	47%	40%
Focus (Dummy)	Mean.	7718	285	7433	391	7327
	%	55%	56%	55%	55%	55%

### Takeover Premium

There are various definitions of takeover premiums in the literature depends on the data set. If researchers draft the data set focusing on public targets and public bidders, they can compute premiums based on target and bidder stock price movement<sup>6</sup>. However, in this research, we include private firms in our data set

<sup>6</sup> This method is broadly used i.e., Simonyan (2014) use cumulative abnormal return on target's stock from 42 trading days before through 126 trading days after the takeover announcement date. Moeller (2005) use price per share offered by bidder divided by target's share price six days prior the announcement date.

because it is a primary indicator for measuring target financial constraints and financial distress. Therefore, this research cannot use a measure of takeover premium that relies on share price data. Simonyan (2014) robustness tests the results from measuring takeover premiums between accumulative abnormal return and takeover premiums, which is not adjusted for stock market movement. The results were similar in both definitions.

**Panel B** reports bid premium, which is a dependent variable in our 2<sup>nd</sup> regression. Initially, the takeover premium was following Kohers and Ang (2000). The total offer price is determined by the value of the transaction from the SDC database.

$$\text{Takeover premium} = \frac{\text{total offer price}}{\text{book value of target equity (adjusted)}} - 1$$

However, 13% of target-initiated deals have a negative adjusted book value of equity because target liabilities are higher than their assets. The takeover premiums from the 1<sup>st</sup> equation were misled and cannot compare across deals (see further explanation in **Appendix 6**). Moreover, we cannot drop those negative book values of equity because it is our main study. 13% of target-initiated deals have a negative book value of equity, whereas 8% of bidder-initiated deals have a negative book value of equity; this might significantly impact regression results. Nevertheless, the negative book value of equity is also a sign of financial constraint. Therefore, we update the premium formula to be as follow;

$$\text{Takeover premium} = \frac{\text{total offer price} - \text{book value of target equity (adjusted)}}{\text{total offer price}}$$

The 2<sup>nd</sup> equation has the same structure as the profit margin calculation. From **Panel B**, the mean of bidder-initiated deals' premium is 6% higher than target-initiated deals. In comparison, the median of target-initiated deals is 2% higher than bidder-initiated deals.

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<sup>7</sup> for example, if a bidder purchases only 51% of the target stake and the target book value of equity is \$10 million, the adjusted book value of the target equity will be \$5.1 million.

**Panel C of Table 2** presents descriptive statistics of control variables, consist of private targets (dummy), HHI (Herfindahl-Hirschmand index), relative asset, target industry PE, cash payment (dummy), and focus (dummy). We found that only 8% of target-initiated deals are from private firms, whereas 17% of bidder-initiated deals are private targets. HHI of target-initiated deals is larger than bidder-initiated deals, meaning that targets who initiated deals are in higher market concentration than targets whose bidders initiated the deal. We also found that deal value to bidder assets in target-initiated deals is relatively larger than bidder-initiated deals. Bidders are less likely to initiate the deal to targets as large as their size.

Target industry PE represents the attractiveness of the target's assets. Target in high industry PE is more attractive than target in low industry PE; therefore, the mean and median of target industry PE of bidder-initiated deals are higher than target-initiated deals. 40% of deal uses cash as a payment method, whereas, the ratio raises when target-initiated deal. 53% of target-initiated deals were paid by cash. This descriptive statistic describes the basic feature of the variable that we use to test our hypotheses. In the next chapter, we will discuss how we perform the test.



## Chapter 5: Methodology

**Hypothesis 1:** Target-initiated deals are more likely in small industries than in large industries.

To prove that target-initiated deals are more likely in small industries than in large industries, we first run the Binomial Probit Regression. The formula is as follows;

$$target\_initiated\_dummy_i = \beta_0 + \beta_1 industry\_size_i + \sum_{j=2}^5 \beta_j control\_variables_j + \varepsilon_i \dots [1.1]$$

Where  $target\_initiated\_dummy_i$  is a dummy variable, the variable equals 1 in case targets initiated the deal, 0 in case bidders initiated the deal. The computation of this variable is mentioned in the prior section. Industry Size is the number of firms in the target's two-digit SIC industry code and the value of all assets in the target's two-digit SIC industry code.

We run regression by employing a deals/firm's specific characteristics variable into our estimation to account for another possible that could impact the likelihood of deals initiated by targets. The control variables for our first regression are as follows;

(i)  $Private\_Dummy$  indicates the target ability to raise additional capital, representing target financial distress and financial constraints. Kohers and Ang (2000) use target public status representing target financial distress and financial constraints. If the target is a subsidiary or listed firm, the target is capable of raising funds from its parent company or release additional shares or debt instruments. It is hardly likely for a private target to raise the additional capital, given that their debt ratio already reaches its optimal level. However, the optimal debt ratio, total liability to total assets, varies across industries and businesses practice, and it cannot reveal targets actual financial distress. For example, a target has a very high debt ratio, but it is a subsidiary of a company. Its parent can lend them additional capital, so they are not really in distress or constraints situation.

For this research, the measurement of target financial constraints and financial distress differs from Aktas et al. (2010) and Masulis and Simsir (2018) using *ALTMAN\_Z\_SCORE*<sup>8</sup>, *SA Index*<sup>9</sup>, debt, or liquidity ratio. We follow Kohers and Ang (2000) using target public status, it is more suitable for measuring target financial constraints in our term. The target public status is converted into a dummy variable, *Private\_Dummy* equals 1 if the target is private firms, equals 0 if the target is public or subsidiary.

(ii) HHI is the Herfindahl-Hirschmand index of the target industries. HHI common uses for measuring market concentration and competition among market participants. In low market competition, targets are more likely to initiate the deal because of fewer market participants or potential bidders (Masulis & Simsir, 2018). Therefore, we control HHI in this regression. HHI is calculating by squaring the market share of individual target firms and then sum by industry<sup>10</sup>. Based on the formula, the results range between 1 and 10,000. The score will close to 10,000 if the market is a high concentrate or monopolistic. If the score is close to 1, the market will be very competitive<sup>11</sup>.

(iii) *Industry\_Growth*; we use industry growth to control the characteristic of industry size that would impact the deal initiation decision. We hypothesize that firms in small industries are more likely to initiate the deal because of the low demand for target corporate assets. However, sometimes a small industry can have high demand if it's a high growth industry (i.e., eCommerce or Fintech). A high growth industry is an interesting investment opportunity for any bidders; therefore, bidders are more likely to initiate the deal to firms in growth industries. Moreover, a high growth opportunity firms themselves are less likely to start selling their products (Aktas et al., 2010). Hence, we expect a negative correlation between industry growth and target-initiated deal likelihood.

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<sup>8</sup> The *ALTMANS\_Z\_SCORE* was calculated from target financial ratios which represent financial difficulties; liquidity ratio, retain earning to total assets, EBITDA to total assets, Market value of equity to Book value of liabilities and sales to total assets.

<sup>9</sup> *SA\_INDEX* is broadly used to measure financial constraints. The index was constructed by Hadlock and Pierce (2010) using firm size and age to estimate firm financial constraints.

<sup>10</sup>  $HHI = S_1^2 + S_2^2 + S_3^2 + S_4^2 + \dots + S_n^2$ , where  $S_i = \text{firm market share}$

<sup>11</sup> HHI might have a high correlation with the *INDUSTRY\_SIZE* variable. Therefore, we will test the multicollinearity problem before running the regression.

(iv) *Relative\_Deal\_Size*; Aktas et al. (2010) have proved that relative size matters in deal initiation. Bidders are hardly likely to initiate the deal to target, which as large as them. Moreover, bidders are more likely to initiate the deal to target that relatively smaller than the original bidder firms. The larger the deal size, the higher the bidder's risk, given bidder's primary business is already profitable. *Relative\_Deal\_Size* by Aktas et al. (2010) is the market value of the target firm's equity divided by the bidder firm's equity market value. However, our sample set is different; the target public status is a key measurement of target financial constraints and financial distress that cannot drop from the sample. Including private target firms in the sample set, the target firm's equity value is incomplete. Therefore, *Relative\_Deal\_Size* uses deal value divided by the bidder's total assets.

See the summary formula, and predicted signed, see **Table 3**.

*Table 3: The measurement and predicted signs of variables employed in probit regression*

No	Variable	Measurement	Predicted Sign
1	<i>Industry_Size</i>	is the number of firms in the target's two-digit SIC industry code.	-
2	<i>Private_dummy</i>	equals 1 in case of private target, equals 0 in case of public target or subsidiary target.	+
3	<i>HHI</i>	is calculating by squaring the market share of individual target firms and then sum by industry.	+
4	<i>Relative_Deal_Size</i>	is the deal value divided by the bidder's market cap.	+
5	<i>Industry_Growth</i>	is measured by industry P/E ratio	-

**Hypothesis 2:** target-initiated deal creates larger negative impacts on premium in small than in large industries; consequently, the premium gap between bidder-initiated deals and target-initiated deals in small industries is wider than the premium gap in large industries.

We further investigate the impact of industry size on takeover premiums. To test this implication, we run the following OLS regression of takeover premium on the factor variables; *industry\_size*, *target\_initiated\_dummy*, and a set of control variables.

$$\begin{aligned} \text{premium}_i = & \beta_0 + \beta_1 \text{target\_initiated\_dummy}_i + \beta_2 \text{small\_industry\_dummy}_i + \\ & \beta_3 (\text{small\_industry\_dummy} * \text{target\_initiated\_dummy})_i + \sum_4^8 \beta_{i,j} * \\ & \text{control variables}_{i,j} + \varepsilon_i \dots [2.1] \end{aligned}$$

Interaction Term (*target\_initiated\_dummy* \* *small\_industry\_dummy*)<sub>i</sub>

We apply the same methodology as previous probit regression for the industry size and dummy variable for the target-initiated deal. However, we need to add an interaction term to demonstrate our 2<sup>nd</sup> hypothesis. Running 2<sup>nd</sup> regression without the interaction term, the interpretation of deal initiation and industry size is straightforward. It does not indicate that which industry size is being discussed; we implicitly assume no difference in the effect of the target-initiated deal in small and large industries.  $\beta_1$  represents the premium change when targets initiate deals. Similarly,  $\beta_2$  only represents the effect of industry size on premium individually. Therefore, the regression equation for 2<sup>nd</sup> hypothesis will include the interaction term.

With the interaction term, the equation for the 2<sup>nd</sup> hypothesis would follow equation [2.1]. We have chosen bidder-initiated deals to be the benchmark group; therefore, the intercept of this equation ( $\beta_0$ ) measures the average premium of bidder-initiated deals without the impact from other variables.  $\beta_1$  measures the difference of intercepts between target-initiated deals and bidder-initiated deals. Hence, the intercept for target-initiated deals shifts to  $\beta_0 + \beta_1$ .  $\beta_2$  measures the slope on industry size for bidder-initiated deals. By interacting *target\_initiated\_dummy* variable with

industry\_size<sup>12</sup> (continuous variable), the coefficient of the interaction term would tell the difference in slope ( $\beta_3$ ) between target-initiated deals and bidder-initiated deals. Therefore, the slope on industry size for target-initiated deals will be  $\beta_2 + \beta_3$ .

However, we are testing whether the impact of target-initiated deals on premiums is different between targets in small and large industries to answer the 2<sup>nd</sup> hypothesis. Therefore, industry\_size in the 2<sup>nd</sup> regression should be limited to the dummy variable, small\_industry\_dummy, where the dummy equals 1 if the target is in a small industry and 0 if the target is in a large industry. The adjusted equation for testing the 2<sup>nd</sup> hypothesis would be;

$$\text{premium}_i = \beta_0 + \beta_1 \text{target\_initiated\_dummy}_i + \beta_2 \text{small\_industry\_dummy}_i + \beta_3 (\text{small\_industry\_dummy} * \text{target\_initiated\_dummy})_i + \sum_4^8 \beta_{i,j} * \text{control\_variables}_{i,j} + \varepsilon_i \quad \dots [2.2]$$

This new equation [2.2] allows us to obtain the estimated premium among all four groups;

- (1) Target-initiated deals in small industries;  $\beta_0 + \beta_1 + \beta_2 + \beta_3$
- (2) Target-initiated deals in large industries;  $\beta_0 + \beta_1$
- (3) Bidder-initiated deals in small industries;  $\beta_0 + \beta_2$
- (4) Bidder-initiated deals in large industries;  $\beta_0$

By using interaction from two dummy variables, the interpretation of coefficients in equation [2.2] would be different. In equation [2.2], we choose bidder-initiated deals in large industries to be the benchmark group in which comparisons are made.  $\beta_0$  is the mean value of premium of bidder-initiated deals in large industries.  $\beta_2$  is the difference of premium between bidder-initiated deals in small and large industries; see (3)-(4).  $\beta_1$  is the difference of premium between target-initiated deals and bidder-initiated deals in large industries; see (2)-(4). The difference of premium between target-initiated deals and bidder-initiated deals in small industries is  $\beta_1 + \beta_3$ ; see (1)-(3). The mean value of premium of target-initiated deals in small industries is  $\beta_0 + \beta_1 + \beta_2 + \beta_3$ . The difference of premium between deals in small

<sup>12</sup> In the data set, industry size can be raw number, ratio and a dummy variable.

and large industries is  $\beta_2 + \beta_3$  ; see (1)-(2). However, partial of the difference in premium is from the difference of premium between small and large industries ( $\beta_2$ ). Implying the additive effect, the interaction effect of target-initiated deals in small industries would be  $\beta_3$ . If we expect that the target-initiated deals impact premium differently between small and large industries, therefore, we will use  $\beta_3$  to test the 2<sup>nd</sup> hypothesis.

In fact, adding an interaction term in regression would change how to measure the significance of the result. When we estimate the model in the regression, now there are four possible outcomes:

- (i) The coefficients of `target_initiated_dummy`, `small_industry_dummy`, and the interaction between the two are zero or insignificant.
- (ii) Either coefficient of `target_initiated_dummy` or `small_industry_dummy` is significant, but the other dummy coefficient and the interaction coefficient are insignificant.
- (iii) The coefficients of `target_initiated_dummy` and `small_industry_dummy` are significant, but the interaction coefficient is zero.
- (iv) All dummy variables and interaction coefficients are significant.

If we are testing whether industry size affects bid premium, we need to consider the collective significance of all variables in the regression. The effect of industry size can be collectively significant even if they are individually insignificant (see outcome cases i to iii). Testing the joint significance using F-test, the null hypothesis to prove that industry size can impact the bid premium is stated as  $H_0: \beta_2 = \beta_3 = 0$ . However, this study aims to test whether target-initiated deals impact premiums differently in small and large industries; the negative impact on premiums of target-initiated deals in small industries is larger than target-initiated deals in small industries. We use two-tails test our 2<sup>nd</sup> hypothesis. The null hypothesis should be  $H_0: \beta_3 = 0$ , and the alternative hypothesis is  $H_1: \beta_3 \neq 0$ . We expect that  $\beta_3$  will be significantly negative, and we can reject the null hypothesis. It means that target-initiated deals impact premiums differently in small and large industries. Target-initiated deals in small industries receive  $\beta_3$  premium lower than target-initiated deals in large industries. However, if we fail to reject the null hypothesis, there's no

difference in the deal initiation impact on premium between targets in small and large industries. Therefore, target-initiated deals in small and large industries will receive the same premium, and the premium gap between bidder-initiated deals and target-initiated deals will be indifferent in both small and large industries.

To account for another possible difference in takeover premiums, we add control variables in the OLS regression: see the predicted signs in Error! Reference source not found.4.

(i) *Private\_Dummy* indicates the target ability to raise additional capital, representing target financial distress and financial constraints. *Private\_Dummy* equals 1 in case of the private target, 0 if the target is either subsidiary or public. The subsidiary or public targets' financial constraints are less constrained than the private firm due to both subsidiary and public targets having the alternative way to raise the additional capital. A listed target can raise additional capital through a secondary equity offering. A subsidiary can raise cash from its parent company through debt. However, internally, the approval process of additional debt is more painless than raising funds from outside, like the private target. Since the parent company already has the visibility of all financial health of its subsidiary. Private targets can only raise cash through the debt issue, and debtors can reject the proposal without consequences. Because of fewer alternative options, private targets likely have to accept lower takeover premiums offered by bidders; therefore, we expect the negative impact of *Private\_Dummy* on takeover premiums. The explanation of selecting target public status is mentioned in the prior section.

(ii) *Payment Method*; the payment method with merger and acquisition can be cash payment, stock payment, or the combination of the two. The selection of each payment method depends on the negotiation between bidders and targets. Using cash payment, target shareholders cannot participate in post-merger outcomes. On the other hand, target shareholders can participate or share risk in post-merger outcomes using stock payment. The bid premiums increase when bidders use cash payment because bidders need to compensate target shareholders not to participate in post-merger benefits. The post-merger outcomes could be bad. However, bidders are optimistic about the deal; otherwise, the merger deal would not occur. Moreover, if the deal is at

risk, bidders can offer stock payment. Therefore, the bid premium is lower (higher) in stock (cash) payment (see, e.g., Aktas et al., 2010 and Simonyan, 2014). In this research, we use *Cash\_Dummy* to represent the payment method's impact on premiums. *Cash\_Dummy* equals 1 if the consideration offer record in SDC is cash-only, and 0 otherwise.

(iii) *Relative\_Deal\_Size*; as mentioned in the previous section, *Relative\_Deal\_Size* is measured by total revenue and total assets because of data limitation. Nevertheless, the mechanism of the ratio remains the same, target to bidder size. When a target size is comparatively smaller than the bidder value, and bidders expect an excellent outcome from the deal, bidders are more likely to pay higher premiums because the incremental premium contributes to a small portion of their investment. Contrastingly with high *Relative\_Deal\_Size*, that the target size is significant to the bidder size. The ability to pay higher premiums (in terms of percentage) is lower because the dollar term is significant<sup>13</sup>. As a result, we expect that the larger the target (comparatively), the lower the percentage premium paid by bidders (Aktas et al., 2010; Simonyan, 2014).

(iv) *Focus\_Dummy* is to measure the familiarity of the bidder to the target business. The focus equals 1 if the bidder and the target have the same two-digit SIC code and 0 otherwise. Bidders from the same industry have higher expertise in the target asset than outside industry bidders. Outside industry bidders must hire an agent who has expertise in target assets to operate the business. Therefore, outside industry bidders' cost is higher than that of the same industry bidders, then the offer premium of outside industry bidders cannot compete with the same industry bidders. We expect that *Focus\_Dummy* will positively impact bid premiums.

(v) *Industry\_Growth*; we use another industry-level variable, industry growth, to capture industry characteristics that would impact on bid premium. The growth opportunity of the industry could impact bid premium also. High growth industry is an industry that has the potential to have magnificent growth in the future, the

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<sup>13</sup> For example, given bidder assets \$50 mill, if target size is \$5 mill, the bidder can offer \$7.5 mill to make 50% bid premium and bidder have ability to raise the premium to 100% by adding only \$ 2.5 mill or 5% of bidder size. However, if the target size is larger, \$20 mill, the bidder needs to add \$10 mill or 20% of bidder size to raise the premium from 50% to 100%.



investment opportunities that are very attractive to bidders. If any bidders would like to participate in the performance, they need to pay high entering cost, the premium. Therefore, we expect a positive correlation between industry growth and bid premium. Industry growth will be measured by Industry Price to Earnings Ratio (P/E). High P/E industry is a growth industry, and low P/E industry represents a non-growth or mature industry.

*Table 4: The measurement and predicted signs of variables employed in the OLS premium regression*

No	Variable	Measurement	Predicted Sign
1	Small_Industry_Dummy	equals 1 in case the target is in a small industry, equals 0 in case the target is in a large industry	-
2	Target_Initiated_Dummy	equals 1 in case targets initiated the deal, equals 0 in case bidders initiated the deal	-
3	Small_Industry_Dummy * Target_Initiated_Dummy	is interaction term between Industry_Size_Dummy and Target_Initiated_Dummy	-
4	Private_Dummy	equals 1 in case of private target, equals 0 in case of public target or subsidiary target.	-
5	Dummy_Cash	is equal to 1 if more than 50 percent of the consideration paid by bidders was cash, and 0 otherwise.	+
6	Relative_Deal_Size	is the deal value divided by bidder's market cap.	-
7	Focus_Dummy	equals 1 in case bidder and target have the same two-digit SIC, equals 0 otherwise.	+
8	Industry_Growth	is measured by industry P/E ratio	+

## Chapter 6: Empirical results

This section will show the results of empirical tests to answer two hypotheses about deal initiation and industry size. The analysis will begin with the likelihood of deal initiation and the impact of industry size on the premium of target-initiated deals.

### 6.1 H1: Target-initiated deals are more likely in small industries than in large industries

Firstly, we performed T-test & Wilcoxon Rank Sum-test to check whether the percentage of target-initiated deals different between small and large industries. Secondly, we run probit regression to test the likelihood of target-initiated deals in small and large industries.

#### 6.1.1 Results from T-test & Wilcoxon Rank Sum-test

*Table 5: T-test & Wilcoxon Rank Sum test about industry size*  
The sample consists of merger and acquisition deals during 1990-2019. To perform the test, the sample was equally split into three groups by its percentile. 1<sup>st</sup> group (1) represents small industries, 2<sup>nd</sup> group (2) represents medium industries, and 3<sup>rd</sup> group represents large industries.

% Target-initiated Deal	Percentiles				Diff (1) - (3)	T-test   P-value			Wilcoxon Ranksum   P-value Ha : $\mu_1 = \mu_3$
	ALL	(1)	(2)	(3)		Ha : diff < 0	Ha : diff = 0	Ha : diff > 0	
<b>Strong Evidence</b>									
Industry Size - # Firms	3.64%	5.10%	3.24%	2.72%	2.38%	1.000	0.000	0.000	0.000
Number of obs	16,425	4,387	7,258	4,780		9,167	9,167	9,167	9,167
Industry Size - Assets	3.64%	3.70%	2.90%	4.32%	-0.63%	0.063	0.125	0.938	0.125
Number of obs	16,425	4,384	7,276	4,765		9,149	9,149	9,149	9,149
Industry Size - Revenues	3.64%	3.74%	2.95%	4.23%	-0.49%	0.114	0.228	0.886	0.228
Number of obs	16,425	4,387	7,258	4,780		9,167	9,167	9,167	9,167
<b>Moderate Evidence</b>									
Industry Size - # Firms	5.00%	6.70%	5.53%	2.94%	3.76%	1.000	0.000	0.000	0.000
Number of obs	16,425	4,387	7,258	4,780		9,167	9,167	9,167	9,167
Industry Size - Assets	5.00%	5.67%	4.50%	4.88%	0.79%	0.955	0.089	0.045	0.089
Number of obs	16,425	4,384	7,276	4,765		9,149	9,149	9,149	9,149
Industry Size - Revenues	5.00%	5.63%	4.74%	4.68%	0.95%	0.981	0.039	0.020	0.039
Number of obs	16,425	4,387	7,258	4,780		9,167	9,167	9,167	9,167

In **Table 5**, we run t-test and Wilcoxon Rank Sum-test, testing the percentage of target-initiated deals between small (1) and large (3) industries. We repeat the same

test for both strong evidence and moderate evidence of target-initiated deals. We construct the industry size by equally splitting data into three groups then test the difference between the percentage of target-initiated deals in small industries (1) and large industries (3). We drop the data range between 33<sup>rd</sup> – 66<sup>th</sup> percentile because we want to cancel the noise of industry classification between small and large industries. The results are shown in **Table 5**.

**Table 5, Strong Evidence Panel**, shows that around 5% of deals in small industries are target-initiated deals, whereas only 2.7% of deals in large industries are target-initiated deals. Moreover, the percentage of target-initiated deals in small industries (by the number of firms) is significantly higher than the percentage of target-initiated deals in large industries (at 0.01 significant level). Implying that targets in small industries are more likely to initiate the deal than targets in large industries.

However, the results are inconsistent across all measurements. If measuring the industry size by industry assets and industry revenues, the percentage of target-initiated deals in small industries is 0.6% and 0.5% lower than in large industries, meaning that targets in small industries are less likely to initiate the deal than targets in large industries. The results are ambiguous in the strong evidence. However, the results are obvious in moderate evidence; all of the test results align that percentage of target-initiated deals in small industries is larger than in large industries at 0.01 significant level.

We extend the analysis breaks the data set into 5 groups by its percentile, and drop the middle group to cancel the noise and perform the same tests as breaking down into 3 groups. The results are similar in both grouping; see 5 groups break test in **Appendix 7**.

### **6.1.2 Results from Probit regression**

To test our 1<sup>st</sup> hypothesis, target-initiated deals are more likely in small industries than in large industries; we run probit regression according to 1<sup>st</sup> regression equation [1.1]. The results are shown in **Table 6**. Three industry size measurements were reported separately, beginning with industry size by the number of firms in

model (1) to (3), total assets in model (4) to (6), and total revenues in model (7) to (9). We use total assets and total revenues as industry size to robust the implication of industry size. The regression results are quite similar to the T-test in **Table 5**, especially industry size by the number of firms that significantly impact the likelihood of target-initiated deals. However, total assets and total revenues measurement doesn't significantly impact the likelihood, except model (8) Logarithm based 10 of industry revenues shows result align to our expectation.

**Table 6**, model (1) to (3), the coefficients of industry size show signs as expected (negative, negative, and positive, respectively), implying targets in small industries are less likely to initiate the deal. The coefficients are interpreted as follows; Model (1), if the number of firms in the target industry grows by 100 firms, the probability that target-initiated deal will increase by 0.5%. Model (2), if the number of firms in the target industry increases by tenfold, the likelihood of target-initiated deals will increase by 1.5%. Model (3), targets in small industries (dummy = 1) are 1.8% more likely to initiate the deal than targets in large industries.

However, when we measure industry size by industry total assets and industry total annual revenues, the coefficients are insignificant, and their signs are opposite from the expectation and insignificant. We try alternative ways to robustness the regression by converting industry size data into logarithm base 10. If the number of firms in the target industry increases by tenfold, the likelihood of target-initiated deals will increase by 0.5%, model (8).

**Table 6: Probit Regression for measuring the impact of industry size on the likelihood of target-initiated deals (Moderate evidence)**

The sample consists of merger and acquisition deals during 1990-2019. In all models, the dependent variable is a dummy variable equal 1 if target-initiated deal and 0 if bidder-initiated deal. In this regression, we use three distinct industry size measurements; the number of firms, total assets, and total revenues, with 3 different methods to construct the industry size (level, log, and dummy). We have 9 models in total. Industry size in model (1) is the number of firms in the target industry (basis 1:100 firms). Industry size in model (2) is Logarithm base 10 of the number of firms in the industry (basis 1:100 firms). Industry size in model (3) is a dummy variable of industry size where industry size dummy equal to 1 if the number of firms less than the median (small industries), and equal to 0 if the number of firms in the industry greater than the median (large industries). Industry size in model (4) is the total assets of target industries (basis 1:1 billion USD). Industry size in model (5) is logarithm base 10 of total assets of target industry (basis 1:1 billion USD). Industry size in model (6) is a dummy variable of small industry; the threshold and construction are the same as model (3). Industry size in model (7) is total annual revenues of target industry (basis 1:1 billion USD). Industry size in model (8) is logarithm base 10 of total annual revenues of target industry (basis 1:1 billion USD). Lastly, industry size in model (9) is a dummy variable of small industry. The threshold and construction are the same as model (3). The coefficient of country, industry, and year are not reported.

\*\*\* Significant at the 0.01 level, \*\* Significant at the 0.05 level, and \* Significant at the 0.10 level.

Target-Initiated_Deal	(1) Industry Size # Firms	(2) Log Industry Size # Firms	(3) Industry Size # Firms (dummy)	(4) Industry Size Assets (Billion \$)	(5) Log Industry Size Assets (Billion \$)	(6) Industry Size Assets (dummy)	(7) Industry Size Rev (Billion \$)	(8) Log Industry Size Rev (Billion \$)	(9) Industry Size Rev (dummy)
Industry Size	-0.0604 ***	-0.1578 ***	0.1987 ***	-0.0373	-0.0396	-0.0146	0.0069	-0.0496 **	-0.0176
Private (Dummy)	-0.5148 ***	-0.5180 ***	-0.5150 ***	-0.5160 ***	-0.5163 ***	-0.5154 ***	-0.5157 ***	-0.5186 ***	-0.5154 ***
log HHI	-0.0723 *	-0.1025 ***	-0.0485	0.0312	0.0275	0.0331	-0.0355	-0.0400	-0.0363
log PE	0.0214	0.0253	0.0186	0.0215	0.0216	0.0233	0.0196	0.0198	0.0188
Relative Deal Size	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
_cons	-1.3905 ***	-1.8831 ***	-1.8505 ***	-2.3418 ***	-2.6853 ***	-2.3611 ***	-1.6828 ***	-2.1588 ***	-1.6511
Target Nation	...	...	...	...	...	...	...	...	...
Target Industry	...	...	...	...	...	...	...	...	...
Year	...	...	...	...	...	...	...	...	...
Number of obs	12,773	12,773	12,773	12,776	12,776	12,776	12,773	12,773	12,773
. Margin, dydx (*)									
Industry Size	-0.0057 ***	-0.0149 ***	0.0188 ***	-0.0035	-0.0037	-0.0014	0.0007	-0.0047 **	-0.0017
Private (Dummy)	-0.0487 ***	-0.0489 ***	-0.0487 ***	-0.0488 ***	-0.0489 ***	-0.0488 ***	-0.0488 ***	-0.0491 ***	-0.0488 ***
log HHI	-0.0068 *	-0.0097 ***	-0.0046	0.0030	0.0026	0.0031	-0.0034	-0.0038	-0.0034
log PE	0.0020	0.0024	0.0018	0.0020	0.0020	0.0022	0.0019	0.0019	0.0018
Relative Deal Size	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Target Nation	...	...	...	...	...	...	...	...	...
Target Industry	...	...	...	...	...	...	...	...	...
Year	...	...	...	...	...	...	...	...	...

The results from industry size by dummy variable show the strongest effect of the industry size impact to the likelihood of target initiation; we robust our implication of industry size, dummy variables in **Table 7**. The industry dummy in **Table 6** is equally split into two groups using its median, equal to 1 if the industry is less than the median, and 0 if the industry greater than the median. Three industry size measurements were reported separately, beginning with industry size by the number

of firms in model (1) to (3), total assets in model (4) to (6), and total revenues in model (7) to (9).

Model (1), (4), and (7), we construct the industry size by equally split by its median; the small industry is between 1<sup>st</sup> to 50<sup>th</sup> percentile, and large industry is between 50<sup>th</sup> to 100<sup>th</sup> percentile. Model (2), (5), and (8), we construct the industry size by equally split in to three groups then converted to two dummy variables; '2nd group' for moderate industry equal to 1 if targets are in the 2nd group and 0 if targets are in 1st or 3rd group. The '3rd group' for large industry equal to 1 if targets are in the 3rd group, and 0 if others. Lastly, model (3), (6), and (9), we construct the industry size by equally split into five groups. Therefore, we will have 4 dummy variables in these regressions. We construct the dummy variables as we did in 3 group split. Therefore, the industry size coefficient in **Table 7** will be the likelihood of deal initiation compared to small industry (1st group), and we expect that the coefficient signs will be negative.

We break down into several groups to robust that when industries size is larger, the likelihood of target-initiated deal decreases. The results in **Table 7** are interpreted as follows; model (2), targets in 3rd industry group (large) are 2% less likely to initiate the deal compared to target in 1st industry group. Model (3), targets in the 3rd, 4th, and 5th groups are less likely to initiate the deal compared to targets in the 1st industry group. Moreover, the (negative) coefficient is getting larger, representing the less likely when the industry is larger. The results are significant when the number of firms measures the industry size. In the case of total assets and total revenue, the results have the same direction but insignificant. Therefore, we fail to reject the null hypothesis; target-initiated deals are more likely in small industries than in large industries.

*Table 7: Probit Regression for measuring the impact of industry size on the likelihood of target-initiated deal (Moderate evidence) – robustness test industry size dummy variables*

The sample consists of merger and acquisition deals during 1990-2019. In this regression, we use three distinct industry size measurements; the number of firms, total assets, and total revenues, and convert them into dummy variables based on a different assumption. Industry size in model (1) is a dummy variable of industry size where industry size dummy equal to 1 if the number of firms less than the median (small industries), and equal to 0 if the number of firms in the industry greater than the median (large industries). In model (2), industry size are equally split to 3 groups by the number of firms. In model (3), industry size are equally split to 5 groups by the number of firms. Industry size in model (4) is constructed the same as model (1) but using target industry assets. Industry size in model (5) is constructed the same as model (2) but using target industry assets. Industry size in model (6) is constructed the same as model (3) but using target industry assets. Industry size in model (7) is constructed the same as model (1) but using target industry revenues. Industry size in model (8) is constructed the same as model (2) but using target industry revenues. Industry size in model (9) is constructed the same as model (3) but using target industry revenues.

\*\*\* Significant at the 0.01 level, \*\* Significant at the 0.05 level, and \* Significant at the 0.10 level.

Target-Initiated_Deal	(1) Industry Size # Firms (dummy)	(2) Industry Size # Firms (dummy)	(3) Industry Size # Firms (dummy)	(4) Industry Size Assets (dummy)	(5) Industry Size Assets (dummy)	(6) Industry Size Assets (dummy)	(7) Industry Size Rev (Billion \$)	(8) Industry Size Rev (Billion \$)	(9) Industry Size Rev (Billion \$)
2   Industry Size	0.1987 ***			-0.0146			-0.0176		
3   2nd Group		-0.0140			-0.0252			-0.0510	
3   3rd Group		-0.2268 **			-0.0423			-0.0914	
5   2nd Group			-0.0856			-0.0216			-0.0264
5   3rd Group			-0.0841			-0.0552			0.0142
5   4th Group			-0.2662 ***			-0.0074			-0.0457
5   5th Group			-0.3415 ***			-0.1353			-0.0683
Private (Dummy)	-0.5150 ***	-0.5135 ***	-0.5148 ***	-0.5154 ***	-0.5166 ***	-0.5151 ***	-0.5154 ***	-0.5171 ***	-0.5168 ***
log HHI	-0.0485 ***	-0.0537	-0.0653	0.0331	0.0325	0.0222	-0.0363	-0.0354	-0.0377
log PE	0.0186	0.0212	0.0249	0.0233	0.0207	0.0174	0.0188	0.0195	0.0174
Relative Deal Size	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
_cons	-1.8505 ***	-1.5962 ***	-1.5448 ***	-2.3611 ***	-2.3805 ***	-2.2756 ***	-1.6511 ***	-1.7097 ***	-1.6707 ***
Target Nation	...	...	...	...	...	...	...	...	...
Target Industry	...	...	...	...	...	...	...	...	...
Year	...	...	...	...	...	...	...	...	...
Number of obs	12,773	12,773	12,773	12,776	12,776	12,776	12,773	12,773	12,773
. Margin, dydx (*)									
2   Industry Size	0.0188 ***			-0.0014			-0.0017		
3   2nd Group		-0.0013			-0.0024			-0.0048	
3   3rd Group		-0.0214 **			-0.0040			-0.0087	
5   2nd Group			-0.0081			-0.0020			-0.0025
5   3rd Group			-0.0080			-0.0052			0.0013
5   4th Group			-0.0252 ***			-0.0007			-0.0043
5   5th Group			-0.0323 ***			-0.0128			-0.0065
Private (Dummy)	-0.0487 ***	-0.0486 ***	-0.0487 ***	-0.0488 ***	-0.0489 ***	-0.0487 ***	-0.5154 ***	-0.0490 ***	-0.0489 ***
log HHI	-0.0046 ***	-0.0051	-0.0062	0.0031	0.0031	0.0021	-0.0363	-0.0033	-0.0036
log PE	0.0018	0.0020	0.0024	0.0022	0.0020	0.0016	0.0188	0.0018	0.0017
Relative Deal Size	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000

Despite the industry dummy classification, target industry control variables are highly correlated to Industry size (max correlation -0.42). Due to the industry size is constructed based on target SIC 2 digits code. If we drop target industry control variable, there is a slightly improvement in the impact of industry size on the likelihood of target-initiated deal (see, **Appendix 8-1**)

In relation to the control variables, some control variables have consistent coefficient signs, and some don't. Begin with the private target dummy; we expect that private targets are more likely to initiate the deal due to the source of funds being less compared to the public firm or subsidiary firm. However, the result shows that private targets are 4% significantly less likely to initiate the deal across all models. Secondly, HHI (Herfindahl-Hirschmann Index) measures the market concentration of target industries. In low market competition, targets are more likely to initiate the deal because of fewer market participants or potential bidders; our result coordinates with Masulis and Simsir (2018). However, all signs of HHI's coefficients in industry size by the number of firms model (1) to (3) are reversed and insignificant. This due to HHI formula and the number of firms that are correlated. The correlation between the two variables is around -0.43; the higher number of firms in the industry, the more competitive the market is. Target industry PE represents growth industry, and the coefficient is as expected that targets in growth industries are less likely to initiate the deal. Next, relative deal size, the coefficient is insignificant, and the impact is so tiny. We didn't rescale relative deal size because the ratio would be too complicated to interpret, and it's not our main study. Lastly, we also control the target nation, target industry, and year that the deal occurred.

However, we found that our regression has a heteroskedasticity problem that the error term is correlated with explanatory variable. We run robust standard error to take this problem in to account, and chose target industry (SIC 2 digits) as the cluster of observation. **Table 8** presents probit regression results with robust standard error. The confidence level of the industry size coefficient is still 99%, which is the same as in probit regression without cluster in **Table 6**. In summary, we fail to reject 1<sup>st</sup> null





**6.2 H2: target-initiated deal creates larger negative impacts on premium in small industries than in large industries; consequently, the premium gap between bidder-initiated deals and target-initiated deals in small industries is wider than the premium gap in large industries.**

**Table 9 - 10**, we estimate industry size in three different approaches. Model (1) is strong evidence of target-initiated deal dummy with small industry dummy (by the number of firms). Model (2) is the same as 1<sup>st</sup> model, but the target-initiated deals dummy is from moderate evidence. Model (3) and (4) the industry size is calculated from industry assets. Model (5) and (6) the industry size is calculated from industry revenue.

#### **6.2.1 Deal initiation and Industry Size - without the interaction term**

We first address deal initiation's fundamental question: do target-initiated deals receive lower premiums than bidder-initiated deals? The results are in **Table 9, 1<sup>st</sup> panel** that target-initiated deals receive premiums lower than bidder-initiated deals at 1% significant level in both strong and moderate evidence of deal initiation. The coefficient interprets as follows; model 1 target-initiated deals receive 13% premium lower than bidder-initiated deals across industries at 1% significant level. In other models, the coefficient signs are consistent. Overall results align with Aktas et al. (2010) and Masulis and Simsir (2018) that target-initiated deals receive lower premiums than bidder-initiated deals.

However, small industry has a negative impact on bid premium, but insignificant results. We further check the correlation between variables and find that target industry control variables are highly correlated to industry size variables because the industry size is constructed by using the target industry. Thus, the impact of industry size is partially embedded in target industry control variables. If we drop the target industry control variables, we will find that targets in small industries significantly receive premiums lower than targets in large industries, **Table 9, 2<sup>nd</sup> panel**. The results align with Simonyan (2014).

*Table 9: Ordinary least squares of bid premium – without the interaction term*

The sample consists of merging and acquisition deals during 1990-2019. In all model, the dependent variable is bid premium (formula:  $\text{premium} = (\text{deal value} - \text{book value of target equity (adjusted)})/\text{deal value}$ ). Target-initiated deals dummy variable consists of both strong evidence and moderate evidence of deal initiation. We apply the same industry measurement approach as probit regression; industry size is computed from the number of firms, industry assets, and industry revenue. Control variables are the same as to mention in the earlier section. The coefficient of country, industry, and year are not reported.

\*\*\* Significant at the 0.01 level, \*\* Significant at the 0.05 level, and \* Significant at the 0.10 level.

Deal Premium	(1) Industry Size # Firms (dummy)	(2) Industry Size # Firms (dummy)	(3) Industry Size Assets (dummy)	(4) Industry Size Assets (dummy)	(5) Industry Size Rev (dummy)	(6) Industry Size Rev (dummy)
Target-Initiated Deal (dummy)						
Strong Evidence <sub>1</sub>	-0.1315 ***		-0.1325 ***		-0.1325 ***	
Moderate Evidence <sub>2</sub>		-0.0930 ***		-0.0941 ***		-0.0942 ***
Small Industry (dummy)	-0.0340	-0.0342	-0.0228	-0.0230	-0.0111	-0.0120
Target Nation	...	...	...	...	...	...
Target Industry	...	...	...	...	...	...
Year	...	...	...	...	...	...
Number of obs	12,717	12,717	12,717	12,717	12,717	12,717
Target-Initiated Deal (dummy)						
Strong Evidence <sub>1</sub>	-0.1266 ***		-0.1320 ***		-0.1342 ***	
Moderate Evidence <sub>2</sub>		-0.0859 ***		-0.0915 ***		-0.0952 ***
Small Industry (dummy)	-0.0589 ***	-0.0595 ***	-0.0543 ***	-0.0548 ***	-0.0811 ***	-0.0818 ***
Target Nation	...	...	...	...	...	...
Year	...	...	...	...	...	...
Number of obs	12,717	12,717	12,717	12,717	12,717	12,717

## 6.2.2 Deal initiation and Industry Size - with the interaction term

General OLS regression in **Table 9** cannot answer our 2<sup>nd</sup> hypothesis; interaction term between target-initiated deal and industry size is required. Regarding Simonyan (2014), targets in small industries receive lower premiums than in large industries because margining firms in large industries gain higher benefits than merging with firms in small industries. By removing overlapping functions in large industries, we would observe that targets in small industries will always receive premiums lower than targets in large industries.

Surprisingly to our expectation, the interaction of target-initiated deals impacts premiums differently in small and large industries. **Table 10**, model (1), Target-

initiated deals in small industries receive a premium on average 12% higher than target-initiated deals in large industries. The interaction term coefficient of each model has a consistent sign. However, only model (1), where measuring industry size by the number of firms, is significant at 10%, while the rest is in the same direction but insignificant.

*Table 10: Ordinary least squares of bid premium – with the interaction term*

*The sample consists of merging and acquisition deals during 1990-2019. In all model, the dependent variable is bid premium (formula: premium = (deal value – book value of target equity (adjusted)/deal value). Target-initiated deals dummy variable consists of both strong evidence and moderate evidence of deal initiation. We apply the same industry measurement approach as probit regression; industry size is computed from the number of firms, industry assets, and industry revenue. The interaction term in this research needs to be a dummy variable in order to test whether the impact of target-initiated deals on premiums is different between targets from small and large industries (see further explanation in Chapter 5, Hypothesis 2, Interaction term). Control variables are the same as to mention in the earlier section. The coefficient of country, industry, and year are not reported.*

*\*\*\* Significant at the 0.01 level, \*\* Significant at the 0.05 level, and \* Significant at the 0.10 level.*

Deal Premium	(1)	(2)	(3)	(4)	(5)	(6)
	Industry Size # Firms	Industry Size # Firms	Industry Size Assets (dummy)	Industry Size Assets (dummy)	Industry Size Rev (dummy)	Industry Size Rev (dummy)
Target-Initiated Deal (dummy)						
1. Strong Evidence <sub>1</sub>	-0.2077 ***		-0.1594 ***		-0.1601 ***	
1. Moderate Evidence <sub>2</sub>		-0.1491 ***		-0.1085 ***		-0.1121 ***
1. Small Industry (dummy)	-0.0381 *	-0.0386 **	-0.0247	-0.0243	-0.0131	-0.0137
Target-Initiated Deal # Small Industry (interaction term)	0.1284 *	0.0912	0.0588	0.0278	0.0638	0.0386
Private (dummy)	0.1107 ***	0.1105 ***	0.1104 ***	0.1101 ***	0.1109 ***	0.1106 ***
Cash (dummy)	0.0264 *	0.0257 *	0.0261 *	0.0255 *	0.0258 *	0.0251 *
Relative Deal Size	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Focus (dummy)	0.0214	0.0214	0.0215	0.0215	0.0220	0.0219
log_PE	-0.0216 **	-0.0217 **	-0.0217 **	-0.0217 **	-0.0213 **	-0.0213 **
_cons	0.5859 ***	0.5867 ***	0.5597 ***	0.5586 ***	0.5428 ***	0.5431 ***
Target Nation	...	...	...	...	...	...
Target Industry	...	...	...	...	...	...
Year	...	...	...	...	...	...
Number of obs	12,717	12,717	12,717	12,717	12,717	12,717

We summarize the possible outcome of the target-initiated deal dummy, industry size, and interaction term from **Table 10, model (1)** in **Table 11**, which is interpreted as follows: bidder-initiated deals in large industries, target shareholders receive premiums margin around 59% of deal value. Bidder-initiated deals in small industries, target shareholders receive premiums margin 55% of deal value. Target-initiated deals in large industries, target shareholders receive premiums margin 38%

of deal value. Lastly, in target-initiated deals in small industries, target shareholders receive premiums margin 47% of deal value.

*Table 11: Estimated premium of four possible outcomes results from Table 10, model (1)*

			Bidder	Bidder	Target	Target
			Large	Small	Large	Small
	B0	59%	59%	59%	59%	59%
Target-initiated deal	B1	-21%			-21%	-21%
Small industry	B2	-4%		-4%		-4%
Target & Small	B3	13%				13%
			59%	55%	38%	47%

With this interpretation, we present that target-initiated deals in large industries receive the lowest premium among four possible outcomes, follow by target-initiated deals in small industries, bidder-initiated deals in small industries, and bidder-initiated deals in large industries, respectively. The premium gap between bidder-initiated deals and target-initiated deals in large industries is 21%. The premium gap between bidder-initiated deals and target-initiated deals in small industries is 8%. Thus, the premium gap in small industries is less than half of the premium gap in large industries.

We hypothesize that target-initiated deals in small industries would exacerbate its premium because of the low demand for corporate in small industries. Moreover, target-initiated deals in large industries should be easier to find alternative bidders because of the higher demand for corporate assets in large industries. But the results show that the negative impact of initiation deals by targets is larger in large industries causing the premium gap between bidder-initiated deals and target-initiated deals even larger in large industries. Thus, the target-initiated deal impacts premiums differently in small and large industries in the opposite direction to our expectation. Therefore, we reject our 2nd hypothesis.

The control variables in 2<sup>nd</sup> regression have consistent signs to our expectation and the same significant level across models, but Private (dummy) is the only variable that has reversed signs. We expect that private targets receive lower premiums than

public or subsidiary firms due to fewer capital choices. **Table 10, model (1)**, private targets receive 12.8% higher margin than non-private targets at 0.01 significant level.

### **6.2.3 Robustness test the implication of industry size (dummy variable)**

Regarding chapter 5, the interaction term section explains that the interaction term in this regression should be the interaction between two dummy variables. Therefore, we perform a further test on the implication of industry size. Three industry size measurements were reported separately, beginning with industry size by the number of firms in model (1) to (3), total assets in model (4) to (6), and total revenues in model (7) to (9).

Model (1), (4), and (7) we construct the industry size by equally split by its median; the small industry is between 1<sup>st</sup> to 50<sup>th</sup> percentile, and large industry is between 50<sup>th</sup> to 100<sup>th</sup> percentile. Model (2), (5), and (8), we construct the industry size by equally split into three groups and converted to two dummy variables; '2nd group' for moderate industry equal to 1 if targets are in the 2nd group and 0 if targets are in 1st or 3rd group, and '3rd group' for large industry equal to 1 if targets are in the 3rd group, and 0 if others. Model (3), (6), and (9), we construct the industry size by equally split into five groups therefore, we will have 4 dummy variables in these regressions. We construct the dummy variables as we did in 3 group split. Lastly, we add the interaction term between each industry size and target-initiated deal to check how target-initiated deals impact premium in each industry size. Model (2), (5), and (8) will have 2 interaction terms and model (3), (6), and (9) will have 4 interaction terms.

Table 12: Ordinary least squares of bid premium – robustness industry size dummy variables

The sample consists of merger and acquisition deals during 1990-2019. In this regression, we use three distinct industry size measurements; the number of firms, total assets, and total revenues, and convert them into dummy variables based on a different assumption. Industry size in model (1) is a dummy variable of industry size where industry size dummy equal to 1 if the number of firms less than the median (small industries), and equal to 0 if the number of firms in the industry greater than the median (large industries). In model (2), industry size are equally split to 3 groups by the number of firms. In model (3), industry size are equally split to 5 groups by the number of firms. Industry size in model (4) is constructed the same as model (1) but using target industry assets. Industry size in model (5) is constructed the same as model (2) but using target industry assets. Industry size in model (6) is constructed the same as model (3) but using target industry assets. Industry size in model (7) is constructed the same as model (1) but using target industry revenues. Industry size in model (8) is constructed the same as model (2) but using target industry revenues. Industry size in model (9) is constructed the same as model (3) but using target industry revenues.

\*\*\* Significant at the 0.01 level, \*\* Significant at the 0.05 level, and \* Significant at the 0.10 level.

Deal Premium	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Target-Initiated (dummy)	-0.208 ***	-0.072	0.020	-0.159 ***	-0.025	-0.022	-0.160 ***	-0.108 ***	-0.102
Small Industry (dummy)	-0.038 *			-0.025			-0.013		
2nd Group		-0.011	-0.015		0.033	-0.036		0.020	0.023
3rd Group		0.053 ***	-0.011		0.068 **	0.001		0.025	0.030
4th Group			0.006			0.030			0.047
5th Group			0.037			0.025			0.045
<b>Interaction term</b>									
Target-Initiated # small industry	0.128 *			0.059			0.064		
Target-Initiated # 2nd Group		-0.058 ***	-0.200 **		-0.165 **	-0.060		0.015	0.043
Target-Initiated # 3rd Group		-0.144 **	-0.221 **		-0.145 *	-0.187		-0.068	0.041
Target-Initiated # 4th Group			-0.103			-0.147			-0.037
Target-Initiated # 5th Group			-0.290			-0.147			-0.128
Private (dummy)	0.111 ***	0.110 ***	0.110 ***	0.110 ***	0.111 ***	0.110 ***	0.111 ***	0.111 ***	0.111 ***
Cash (dummy)	0.026 *	0.025 *	0.026 *	0.026 *	0.027 *	0.026 *	0.026 *	0.026 *	0.026 *
Relative Deal Size	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Focus (dummy)	0.021	0.022 *	0.021	0.022	0.021	0.021	0.022	0.022	0.021
log_PE	-0.022 **	-0.021 **	-0.022 **	-0.022 **	-0.019 *	-0.020 *	-0.021 **	-0.021 *	-0.021
_cons	0.586 ***	0.505 ***	0.530 ***	0.560 ***	0.540 ***	0.523 ***	0.543 ***	0.534 ***	0.540 ***
Target Nation	...	...	...	...	...	...	...	...	...
Target Industry	...	...	...	...	...	...	...	...	...
Number of obs	12,717	12,717	12,717	12,717	12,717	12,717	12,717	12,717	12,717

As we add multiple interaction terms in regression, the model becomes complicated, and we will only interpret the 3 groups split by the number of firms; model (2). We have 6 possible outcomes in this model; bidder-initiated deal in 1st industry group (small), bidder-initiated deal in 2nd industry group (middle), bidder-

initiated deal in 3rd industry group (large), target-initiated deal in 1st industry group (small), target-initiated deal in 2nd industry group (middle), target-initiated deal in 3rd industry group (large).

The results show the substantial negative impact of target-initiated deals when industry size is getting larger (see panel A B4 and B5). Consequently, the premium gaps of 3 industry groups are growth consistency (see Panel B). The premium gap in small, middle, and large industries is 7%, 13%, and 22%, respectively. The larger the industry size, the wider the premium gap between bidder-initiated deal and target-initiated deal. Therefore, we strongly reject the null hypothesis. Target-initiated deals create larger negative impacts on premium in large industries than in small industries; consequently, the premium gap between bidder-initiated deals and target-initiated deals in large industries is more than triple the size of the premium gap in small industries.

*Table 13: Estimated premium of six possible outcomes results from Table 12, model (2)*

<b>Panel A</b>			Bidder	Bidder	Bidder	Target	Target	Target
			1st	2nd	3rd	1st	2nd	3rd
Constant	B0	51%	51%	51%	51%	51%	51%	51%
Target-initiated deal	B1	-7%				-7%	-7%	-7%
industry size	2nd	B2	-1%	-1%			-1%	
industry size	3rd	B3	5%		5%			5%
Target & Industry	2nd	B4	-6%				-6%	
Target & Industry	3rd	B5	-14%					-14%
			51%	49%	56%	43%	36%	34%
<b>Panel B</b>			1st	2nd	3rd			
	Bidder		51%	49%	56%			
	Target		43%	36%	34%			
	Premium gap		7%	13%	22%			



Table 14: Ordinary least squares of bid premium, robust cluster target 2 digits SIC

The sample consists of merging and acquisition deals during 1990-2019. In all model, the dependent variable is bid premium (formula:  $\text{premium} = (\text{deal value} - \text{book value of target equity (adjusted)})/\text{deal value}$ ). Target-initiated deals dummy variable consists of both strong evidence and moderate evidence of deal initiation. We apply the same industry measurement approach as probit regression; industry size is computed from the number of firms, industry assets, and industry revenue. The interaction term in this research needs to be a dummy variable in order to test whether the impact of target-initiated deals on premiums is different between targets from small and large industries (see further explanation in Chapter 5, Hypothesis 2, Interaction term). Control variables are the same as to mention in the earlier section. The coefficient of country and year are not reported.

\*\*\* Significant at the 0.01 level, \*\* Significant at the 0.05 level, and \* Significant at the 0.10 level.

Deal Premium	(1) Industry Size	(2) Industry Size	(3) Industry Size	(4) Industry Size	(5) Industry Size	(6) Industry Size
Target-Initiated Deal (dummy)						
1. Strong Evidence <sub>1</sub>	-0.2077 **		-0.1594 *		-0.1601 *	
1. Moderate Evidence <sub>2</sub>		-0.1491 **		-0.1085		-0.1121 **
1. Small Industry (dummy)	-0.0381	-0.0386	-0.0247	-0.0243	-0.0131	-0.0137
Target-Initiated Deal # Small Industry (interaction term)	0.1284 *	0.0912	0.0588	0.0278	0.0638	0.0386
Private (dummy)	0.1107 ***	0.1105 ***	0.1104 ***	0.1101 ***	0.1109 ***	0.1106 ***
Cash (dummy)	0.0264 *	0.0257 *	0.0261 *	0.0255 *	0.0258 *	0.0251 *
Relative Deal Size	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Focus (dummy)	0.0214	0.0214	0.0215	0.0215	0.0220	0.0219
log_PE	-0.0216	-0.0217	-0.0217	-0.0217	-0.0213	-0.0213
_cons	0.5859 ***	0.5867 ***	0.5597 ***	0.5586 ***	0.5428 ***	0.5431 ***
Target Nation	...	...	...	...	...	...
Target Industry	...	...	...	...	...	...
Year	...	...	...	...	...	...
Number of obs	12,717	12,717	12,717	12,717	12,717	12,717

We find the heteroskedasticity problem in our regression; therefore, we run robust standard error to consider this problem. We choose target industries by SIC 2 digits code as the cluster of observation; present in **Table 13**. As a result, the significant level slightly drops but still in the acceptable range at 0.05 and 0.1. Whereas the result on the negative impact of deal initiation on bid premium is as expected. The negative impact on premiums of target-initiated deals in small industries is smaller than target-initiated deals in large industries. Therefore, the rejection of our 2<sup>nd</sup> hypothesis remain unchanged.

## **Chapter 7: Conclusions**

Prior M&A literature has the limitation of deal initiation; researchers implicitly assume that deals are bidder-initiated deals. Once the data is available in the SDC database, we aim to provide more studies on target-initiated deals. Extant literature found that financial constraints and financial distress motivate targets to initiate the deal. However, concerns are raised when some financial weakness firms do not initiate the deal, and some do. Therefore, we question that demand for corporate assets has something to do here, and it does.

First, we address the 1st hypothesis to check whether industry size impacts target-initiated deal decisions; target-initiated deals are more likely in small industries than in large industries. The demand for corporate assets in large industries is higher than corporate assets in small industries. Secondly, we study how target-initiated deals impact premium in both small and large industries. In the extant literature, target-initiated deals receive lower premiums than bidder-initiated deals. We extend to study the compound impact of deal initiation and industry size. We should observe that the premium gap between bidder-initiated deals and target-initiated deals in small industries is wider than in large industries because of relatively low corporate demand in small industries.

We have two key empirical findings. First, industry size impacts deal initiation decisions. Target-initiated deals are more likely in small industries than in large industries because of the higher demand for corporate assets in large industries. Solid and consistent results show when we measure industry size by the number of firms, but the results are insignificant in total assets and total revenues. Secondly, target-initiated deals receive lower premiums than bidder-initiated deals, and targets in small industries receive lower premiums than targets in large industries, aligning with the extant empirical finding of other researchers. Unexpectedly, the compound impact of deal initiation and industry size is twisted; target-initiated deals in large industries cause a larger negative impact on bid premium than target-initiated deals in small

industries. Consequently, the premium gap between in large industries is double size of the premium gap in small industries.

Generally, targets in large industries receive higher premiums than targets in small industries because of the higher demand for targets' corporate assets. However, the target in large industries could have wait for too long to initiate the deal. As a result, targets in large industries are less likely to initiate the deal than targets in small industries. Even in the early stage of financial constraints (assume that target would have noticed the constraint years earlier), targets in large industries are not in a rush to initiate the deal because target-initiate deals receive low premiums.

The financial constraint (to be) targets in large industries simultaneously consider the bid proposal from several bidders and reject the one with a low premium offer. Targets in large industries are more likely to reject low premium offers because their corporate assets' demand is high. We found targets in large industries have larger assets than targets in small industries on average (see Appendix 5-1 and 5-2). They gloat that they are too big to fail. Eventually, their assets still are in demand. They have been waiting for a perfect deal until they are facing a financial predicament and need to initiate the deal. Bidders in general also observe this and know that targets in large industries who initiate the deal are very close to their deadline. Therefore, they cut the premium offer, and targets have to accept it to survive.

'Industry size' is constructed differently depends on the research question. We have considered using several implications of industry size, such as the number of firms, total assets, and total revenues. However, our fundamental of using industry size is to represent the demand for corporate assets. The total revenue represents the demand for a firm's goods and services. The total assets might be a suitable indicator for the demand for corporate assets, but it lacks the number of parties in the market. Moreover, some assets have high value but not high in demand. Therefore, the practical implication of industry size in this research is using the number of firms.

In summary, we show the empirical finding that target-initiated deal is not the definitive decision making from target financial situation. Deal initiation behavior also depends on the target's industry size, and industry size also impacts the bid

premium. However, in this research, we narrow down the scope of the data set to G7, the world's largest economic country. Therefore, results are the practice of developed countries. Meanwhile, the practice of emerging markets or developing countries is unknown. The type of market would impact target decision-making to initiate the deal because of different standards of law and regulations. This would be interesting to study whether the industry stage impacts deal initiation.



## APPENDIX

## Appendix 1: Distribution of number of deals by target nation by year

Target	1990	%	1991	%	1992	%	1993	%	1994	%	1995	%	1996	%	1997	%	1998	%	1999	%
CA	15	5%	23	8%	21	5%	37	8%	32	5%	45	9%	49	11%	43	6%	39	5%	53	6%
DE	2	1%	7	2%	8	2%	6	1%	6	1%	4	1%	4	1%	11	2%	6	1%	13	2%
FR	11	3%	20	7%	20	5%	26	6%	18	3%	16	3%	21	5%	21	3%	26	3%	47	5%
IT	3	1%	2	1%	8	2%	12	3%	5	1%	1	0%	2	0%	5	1%	3	0%	11	1%
JP	3	1%	3	1%	6	1%	4	1%	3	0%	5	1%	6	1%	15	2%	25	3%	77	9%
UK	154	48%	98	33%	100	24%	136	30%	133	21%	112	22%	96	21%	71	10%	55	7%	59	7%
US	134	42%	147	49%	260	61%	235	52%	444	69%	320	64%	279	61%	527	76%	596	79%	596	70%
<b>Total</b>	<b>322</b>	<b>100%</b>	<b>300</b>	<b>100%</b>	<b>423</b>	<b>100%</b>	<b>456</b>	<b>100%</b>	<b>641</b>	<b>100%</b>	<b>503</b>	<b>100%</b>	<b>457</b>	<b>100%</b>	<b>693</b>	<b>100%</b>	<b>750</b>	<b>100%</b>	<b>856</b>	<b>100%</b>
Target	2000	%	2001	%	2002	%	2003	%	2004	%	2005	%	2006	%	2007	%	2008	%	2009	%
CA	97	11%	89	15%	54	11%	31	5%	57	8%	49	6%	68	9%	83	9%	60	10%	57	11%
DE	26	3%	14	2%	23	5%	16	3%	35	5%	24	3%	19	2%	16	2%	15	2%	11	2%
FR	53	6%	31	5%	24	5%	11	2%	32	4%	49	6%	38	5%	53	6%	25	4%	10	2%
IT	15	2%	4	1%	6	1%	11	2%	6	1%	11	1%	6	1%	7	1%	5	1%	4	1%
JP	104	12%	104	17%	150	32%	204	32%	225	31%	270	33%	242	30%	298	32%	200	32%	185	37%
UK	65	7%	43	7%	26	5%	102	16%	178	25%	165	20%	119	15%	167	18%	95	15%	56	11%
US	529	60%	327	53%	192	40%	253	40%	191	26%	254	31%	308	39%	315	34%	231	37%	176	35%
<b>Total</b>	<b>889</b>	<b>100%</b>	<b>612</b>	<b>100%</b>	<b>475</b>	<b>100%</b>	<b>628</b>	<b>100%</b>	<b>724</b>	<b>100%</b>	<b>822</b>	<b>100%</b>	<b>800</b>	<b>100%</b>	<b>939</b>	<b>100%</b>	<b>631</b>	<b>100%</b>	<b>499</b>	<b>100%</b>
Target	2010	%	2011	%	2012	%	2013	%	2014	%	2015	%	2016	%	2017	%	2018	%	2019	%
CA	53	12%	52	11%	47	9%	36	9%	28	7%	24	5%	23	6%	25	7%	27	7%	24	9%
DE	13	3%	23	5%	21	4%	14	3%	17	4%	18	4%	16	4%	7	2%	8	2%	7	3%
FR	12	3%	29	6%	37	7%	22	5%	35	9%	50	11%	34	8%	34	10%	31	8%	9	3%
IT	2	0%	7	2%	17	3%	18	4%	26	7%	48	11%	53	13%	52	15%	42	11%	37	14%
JP	126	28%	112	24%	134	25%	101	24%	75	19%	96	21%	78	19%	46	13%	87	23%	61	23%
UK	63	14%	60	13%	69	13%	71	17%	90	23%	79	17%	73	18%	64	18%	57	15%	35	13%
US	187	41%	182	39%	211	39%	152	37%	118	30%	140	31%	127	31%	120	34%	123	33%	90	34%
<b>Total</b>	<b>456</b>	<b>100%</b>	<b>465</b>	<b>100%</b>	<b>536</b>	<b>100%</b>	<b>414</b>	<b>100%</b>	<b>389</b>	<b>100%</b>	<b>455</b>	<b>100%</b>	<b>404</b>	<b>100%</b>	<b>348</b>	<b>100%</b>	<b>375</b>	<b>100%</b>	<b>263</b>	<b>100%</b>

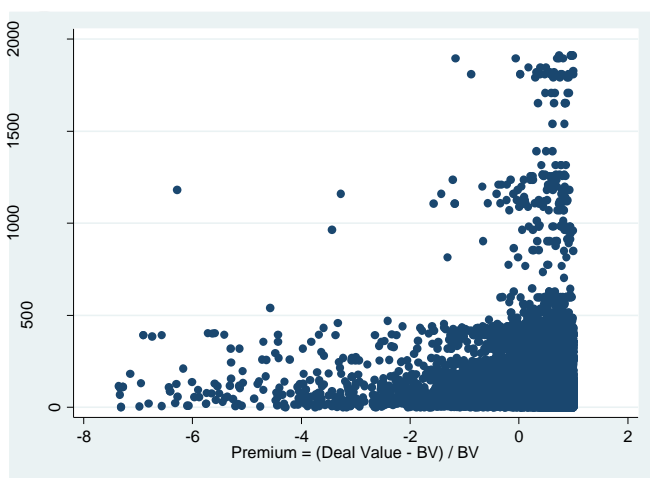
## Appendix 2: Distribution of bidder-initiated deals and target-initiated deals by target nation

Target Nation	Strong evidence			Moderate evidence		
	Bidder	Target	% Target	Bidder	Target	% Target
CA	1,262	39	3%	1,241	60	5%
DE	333	38	11%	332	39	12%
FR	692	48	7%	692	48	7%
IT	276	15	5%	274	17	6%
JP	2,993	27	1%	2,987	33	1%
UK	1,596	96	6%	1,575	117	7%
US	6,514	258	4%	6,373	399	6%
<b>Total</b>	<b>13,666</b>	<b>521</b>	<b>4%</b>	<b>13,474</b>	<b>713</b>	<b>5%</b>

# Appendix 3: Distribution of number of M&A deals by target's SIC 2 digits by year

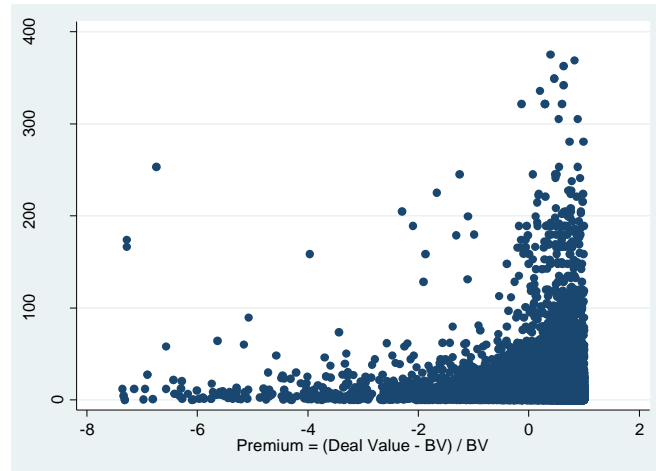
Number of Observation	target SIC	CODE	Definition	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
01	01	Agricultural Production—Crops	1 2 1 1 2 1																														
02	02	Agricultural Production—Livestock																															
07	07	Agricultural Services	1 1 1 1 1 2 1																														
08	08	Forestry																															
09	09	Fishing, Hunting, & Trapping																															
10	10	Metal Mining	2 13 7 11 9 10 10 5 8 6 6 10 10 10 1 2 7 19 12 8 10 12 9 9 5 5 9 8 8 5 4																														
12	12	Coal Mining	1 1 1 2 1																														
13	13	Oil & Gas Extraction	18 16 18 23 35 27 25 41 31 30 49 68 30 23 34 39 35 50 34 35 23 30 33 20 18 17 11 7 20 12																														
14	14	Nonmetallic Minerals, Except Fuels	2 1 1 1 1 2 3 1 2 2 2 1 2 2 1 2 1 3 3 1 3 1 1 3 3 1 3 1 1 1 1 1 1 1 1 1																														
15	15	General Building Contractors	4 3 5 4 4 9 6 6 8 14 18 9 14 18 9 11 11 16 13 8 9 3 7 3 1 4 2 4 7 5																														
16	16	Heavy Construction, Except Building	4 1 4 4 7 2 2 2 5 7 6 3 4 3 3 9 3 7 6 4 7 4 4 2 2 3 2 1 7 1 2 4 6 4																														
17	17	Special Trade Contractors																															
20	20	Food & Kindred Products	17 11 18 14 15 6 7 21 15 20 22 15 8 12 17 23 25 29 9 19 14 6 10 7 11 13 16 11 12 7 1																														
21	21	Tobacco Products																															
22	22	Textile Mill Products	5 4 7 9 6 2 3 4 7 5 5 2 1 2 3 8 4 3 6 3 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1																														
23	23	Apparel & Other Textile Products	4 2 1 5 7 2 2 4 4 2 5 5 7 7 7 9 10 4 8 5 6 1 5 4 6 2 2 2 2 1 2 1																														
24	24	Lumber & Wood Products	3 2 1 3 1 6 5 3 3 2 5 2 2 3 2 2 3 2 2 3 2 2 3 2 2 3 2 2 3 2 2 3 2																														
25	25	Furniture & Fixtures	5 1 3 3 3 3 3 4 5 3 2 2 2 2 2 1 1 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1																														
26	26	Paper & Allied Products	4 3 5 4 4 9 6 10 9 6 12 10 2 2 2 7 3 6 13 5 3 5 8 5 2 9 5 2 2 2 2																														
27	27	Printing & Publishing	7 3 7 18 16 12 6 9 10 10 22 5 1 10 12 8 15 20 4 5 1 5 2 2 7 9 1 2 5 6 6																														
28	28	Chemical & Allied Products	18 17 18 27 35 32 24 25 37 41 54 29 24 44 39 43 48 48 49 19 33 29 31 38 31 36 33 31 27 21																														
29	29	Petroleum & Coal Products	2 3 1 1 1 2 4 7 2 2 1 3 1 3 2 2 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1																														
30	30	Rubber & Miscellaneous Plastics Prod	10 5 4 9 9 9 1 8 6 13 4 2 4 3 8 5 9 3 3 5 1 2 4 3 1 7 3 2 3 1 2 3																														
31	31	Leather & Leather Products	2 2 1 4 2 2 2 2 3 2 2 2 1 1 2 2 1 1 2 2 1 1 2 3 1 1 1 1 1 1 1 1 1																														
32	32	Stone, Clay, & Glass Products	6 1 6 3 2 1 9 5 6 9 5 7 6 5 12 8 7 9 4 1 4 4 7 2 6 2 3 6 2 2 2																														
33	33	Primary Metal Industries	8 8 6 6 14 8 6 15 7 8 14 4 15 16 10 9 12 16 7 5 2 5 6 2 3 7 1 2 7 6 6																														
34	34	Fabricated Metal Products	13 7 10 9 10 9 5 15 20 6 7 3 8 9 8 5 15 14 8 3 3 3 9 5 10 4 8 4 8 4 8 4																														
35	35	Industrial Machinery & Equipment	30 17 24 17 37 25 27 47 44 51 58 21 24 25 31 31 33 35 35 21 19 31 23 16 18 32 18 17 16 11																														
36	36	Electronic & Other Electric Equipment	15 19 38 20 34 28 26 37 48 75 62 31 38 35 29 47 33 47 42 41 36 31 40 21 33 32 28 23 27 14																														
37	37	Transportation Equipment	6 3 16 11 20 13 11 16 19 26 15 12 8 17 16 12 12 11 11 5 9 8 10 8 7 10 11 10																														
38	38	Instruments & Related Products	10 14 31 26 33 29 21 37 33 34 39 21 24 24 33 34 40 42 31 18 29 25 22 22 13 11 20 15 13 12																														
39	39	Miscellaneous Manufacturing Industrie	9 5 3 3 10 6 1 8 4 6 7 1 3 6 7 11 5 4 5 2 4 2 1 6 3 5 5 1 1 1 1																														
40	40	Railroad Transportation	2 5 1 3 2 2 1 1 1 3 1 1 3 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1																														
41	41	Local & Interurban Passenger Transit																															
42	42	Trucking & Warehousing	3 3 1 8 4 6 4 8 7 4 3 4 4 10 14 6 5 2 3 2 4 1 4 8 3 3 5 1 1 1 1 1 1																														
44	44	Water Transportation	1 2 3 2 2 1 3 1 2 2 1 2 2 1 2 5 4 1 6 2 2 2 2 1 2 3 1 1 1 1 1 1																														
45	45	Transportation by Air	2 3 2 3 1 3 5 4 6 1 5 3 4 1 1 1 3 4 3 2 2 6 5 1 1 5 2 1 1 1 1																														
46	46	Pipelines, Except Natural Gas																															
47	47	Transportation Services	2 1 2 4 1 3 2 1 1 7 4 3 6 5 3 2 5 2 5 2 5 2 5 2 5 2 5 2 5 2 5 2 5 2																														
48	48	Communications	8 16 14 21 35 31 37 38 47 70 57 29 11 24 32 44 28 27 20 18 13 12 16 18 13 23 12 8 6 1																														
49	49	Electric, Gas, & Sanitary Services	12 8 16 12 19 21 19 13 28 38 23 14 13 9 9 14 18 18 13 12 15 21 18 21 11 4 22 29 26 9																														
50	50	Wholesale Trade—Durable Goods	17 12 12 23 35 19 15 30 23 17 27 16 19 29 20 20 25 35 24 6 9 7 15 10 10 8 10 11 9 4																														
51	51	Wholesale Trade—Nondurable Goods	4 11 17 18 19 11 6 16 11 12 13 8 5 20 19 15 12 19 5 5 10 5 7 3 4 4 7 5 6 4																														
52	52	Building Materials & Gardening Suppl																															
53	53	General Merchandise Stores	3 5 3 5 3 3 3 3 7 4 5 7 7 1 10 2 5 3 2 3 1 2 3 1 2 3 1 2 1 2 1 1																														
54	54	Food Stores	1 5 3 6 8 3 5 6 7 8 7 3 4 10 6 5 7 7 8 2 4 8 3 9 6 4 3 8 3 3																														
55	55	Automotive Dealers & Service Station	1 5 1 1 2 6 2 3 2 4 1 3 8 6 14 3 1 3 1 1 4 3 4 4 3 4 4 3 4 4																														
56	56	Apparel & Accessory Stores	3 1 3 1 1 3 2 1 3 4 3 1 6 3 5 6 8 7 4 3 1 3 1 2 2 2 2 2 2 2 2																														
57	57	Furniture & Homefurnishings Stores	1 4 1 3 5 3 2 1 5 2 2 4 3 5 9 6 4 7 4 3 3 9 3 1 3 1 1 1 1 1 1 1																														
58	58	Eating & Drinking Places	5 1 4 8 9 7 11 6 6 8 12 8 7 6 10 15 17 16 8 10 4 7 4 10 5 2 4 7 3 5																														
59	59	Miscellaneous Retail	5 6 10 5 11 7 14 5 11 13 11 11 8 9 11 19 16 16 17 10 8 6 9 11 10 7 9 6 5 7																														
65	65	Real Estate	5 4 7 11 17 10 9 24 16 15 12 11 11 12 19 26 24 18 9 14 4 12 14 12 9 3 4 4 7																														
67	67	Holding & Other Investment Offices	3 9 8 16 15 21 31 30 38 33 23 19 13 24 35 40 19 26 19 19 16 18 26 24 31 24 24 18																														
70	70	Hotels & Other Lodging Places	2 4 6 5 4 4 17 6 8 5 5 6 3 9 5 7 7 2 1 3 8 3 6 2 3 4 3 6 4																														
72	72	Personal Services	1 1 1 1 2 4 3 2 2 1 1 1 1 1 3 1 1 1 1 3 1 1 1 1 2 2 2 5 3 2 2																														
73	73	Business Services	30 23 41 41 76 56 54 94 155 184 194 165 104 157 182 183 176 225 143 117 98 105 106 64 63 90 72 60 68 51																														
75	75	Auto Repair, Services, & Parking																															
76	76	Miscellaneous Repair Services	2 1 1 1 1 1 2 2 3 2 2 1 1 2 1 2 3 3 1 1 2 3 3 1 1 3 1 1 1 1 1																														
78	78	Motion Pictures	3 9 4 14 7 5 2 7 4 7 11 9 3 4 8 9 9 3 2 7 3 6 3 9 3 2 5 5 3 4																														
79	79	Amusement & Recreation Services	3 1 4 3 6 1 12 1 5 17 5 9 6 6 9 4 6 5 1 3 4 6 2 3 4 2 3 3 2 3 2																														
80	80	Health Services	2 7 26 26 37 23 18 38 18 10 7 7 6 10 8 13 13 12 11 7 8 9 20 7 12 9 4 6 4 3																														
81	81	Legal Services																															
82	82	Educational Services	1 1 1 2 1 1 6 1 5 3 1 4 2 4 2 5 7 5 2 4 4 4 2 1 1 1 1 2 1 1 2																														
83	83	Social Services																															
84	84	Museums, Botanical, Zoological Gardens																															
86	86	Membership Organizations																															
87	87	Engineering & Management Services	13 9 16 11 31 20 8 22 19 29 27 17 5 27 41 39 45 55 37 35 16 14 20 17 12 14 11 10 10 14																														
89	89	Services, Not Elsewhere Classified	1 1																														

# Appendix 4 – 1: Scatterplot between bid premiums and Industry size by the number of firms

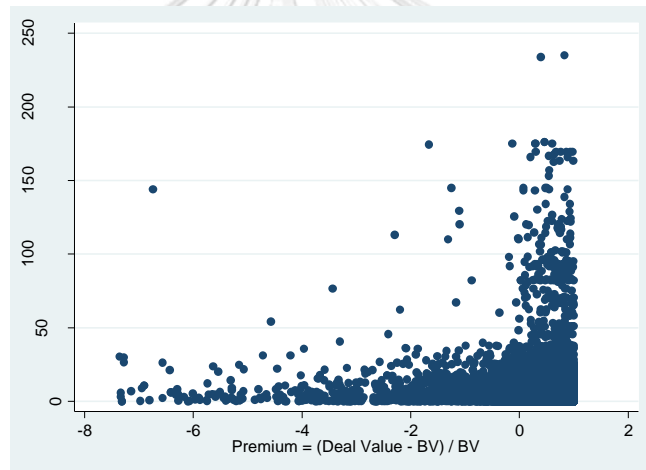


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**Appendix 4 – 2:** Scatterplot between bid premiums and Industry size by total assets



**Appendix 4 – 3:** Scatterplot between bid premiums and Industry size by total revenues



**Appendix 5-1: Target size by three industry size dummies**

		ALL	(1)	(2)	(3)
Observation	Count.	13,836	4,663	4,569	4,604
	%	100%	34%	33%	33%
<b>Panel A : Number of firms</b>					
Asset Book Value	Mean.	899	1085	906	702
	Median.	107	115	110	97
Equity Book Value (Adjusted)	Mean.	163	156	174	160
	Median.	22	21	22	24
<hr/>					
Observation	Count.	13,836	4,612	4,614	4,610
	%	100%	33%	33%	33%
<b>Panel B : Total Assets</b>					
Asset Book Value	Mean.	899	578	661	1457
	Median.	107	85	87	165
Equity Book Value (Adjusted)	Mean.	163	113	142	235
	Median.	22	15	22	34
<hr/>					
Observation	Count.	13,836	4,619	4,615	4,602
	%	100%	33%	33%	33%
<b>Panel C : Total Revenues</b>					
Asset Book Value	Mean.	899	638	630	1429
	Median.	107	92	85	156
Equity Book Value (Adjusted)	Mean.	163	139	150	201
	Median.	22	19	22	27



### Appendix 5-2: Target size by five industry size dummies

		ALL	(1)	(2)	(3)	(4)	(5)
Observation	Count.	13,836	2,803	2,784	2,779	2,707	2,763
	%	100%	20%	20%	20%	20%	20%
<b>Panel A : Number of firms</b>							
Asset Book Value	Mean.	899	1235	812	1022	678	736
	Median.	107	133	100	115	122	79
Equity Book Value (Adjusted)	Mean.	163	176	138	173	182	149
	Median.	22	23	17	23	26	22
Observation	Count.	13,836	2,773	2,773	2,766	2,770	2,754
	%	100%	20%	20%	20%	20%	20%
<b>Panel B : Total Assets</b>							
Asset Book Value	Mean.	899	595	608	606	939	1750
	Median.	107	73	105	85	140	163
Equity Book Value (Adjusted)	Mean.	163	105	135	136	176	266
	Median.	22	14	19	22	28	36
Observation	Count.	13,836	2,770	2,771	2,761	2,769	2,765
	%	100%	20%	20%	20%	20%	20%
<b>Panel C : Total Revenues</b>							
Asset Book Value	Mean.	899	668	596	549	881	1799
	Median.	107	83	102	70	134	183
Equity Book Value (Adjusted)	Mean.	163	123	151	140	177	226
	Median.	22	15	23	20	25	32

## Appendix 6: Bid Premium Calculation

Bid premium was initially following Kohers and Ang (2000) equation as below. The percentage of acquisition adjusts the book value of target equity. In our sample set, over 10% of target-initiated deals have a negative book value of equity. Negative book value misleads the equation result which elaborates from below example;

$$\text{Premium} = \frac{\text{total offer price}}{\text{book value of target equity (adjusted)}} - 1$$

- Firm A: Deal Value \$20, Assets \$140, Liabilities \$100; premium = 50%
- Firm B: Deal Value \$20, Assets \$80, Liabilities \$100; premium = -100%
- Firm C: Deal Value \$20, Assets \$90, Liabilities \$100; premium = -200%

If we insist on using the takeover premium according to the above equation, we will report that firm A receives the highest premium, followed by Firm B and Firm C. However, firm B receives the highest premium among the three. Even we add absolute to convert negative book value to positive; the ratio still does not reflect the true value. It will show that firm C receives the highest premium. Therefore, we need to use premiums calculated as profit margin as below, which is more suitable for the sample with a negative value of target equity.

$$\text{Premium} = \frac{\text{total offer price} - \text{book value of target equity (adjusted)}}{\text{total offer price}}$$

- Firm A: Deal Value \$20, Assets \$140, Liabilities \$100; premium = -100%
- Firm B: Deal Value \$20, Assets \$80, Liabilities \$100; premium = 200%
- Firm C: Deal Value \$20, Assets \$90, Liabilities \$100; premium = 150%

<sup>14</sup> for example, if a bidder purchases only 51% of the target stake and the target book value of equity is \$10 million, the adjusted book value of the target equity will be \$5.1 million.

## Appendix 7: T-test & Wilcoxon Rank Sum test about industry size

The sample consists of merger and acquisition deals during 1990-2019. To perform the test, the sample was equally split into five groups by its percentile. 1<sup>st</sup> group (1) represents small industries from 1<sup>st</sup> to 20<sup>th</sup> percentile, 2<sup>nd</sup> group (2) represents data from 20<sup>th</sup> to 40<sup>th</sup> percentile, 3<sup>rd</sup> group (3) represents data from 40<sup>th</sup> to 60<sup>th</sup> percentile, 4<sup>th</sup> group (4) represents data from 60<sup>th</sup> to 80<sup>th</sup> percentile, and 5<sup>th</sup> group (5) represents data from 80<sup>th</sup> to 100<sup>th</sup> percentile.

% Target-initiated Deal	ALL	Percentiles					Diff (1,2) - (4,5)	T-test   P-value			Wilcoxon Ranksum
		(1)	(2)	(3)	(4)	(5)		Ha : diff < 0	Ha : diff = 0	Ha : diff > 0	P-value
<b>Strong Evidence</b>											
Industry Size - # Firms	3.64%	5.81%	3.92%	3.19%	2.58%	2.91%	-0.54%	0.100	0.201	0.900	0.201
Number of obs	14,102	2,615	2,780	2,880	2,904	2,923		11,222	11,222	11,222	11,222
Industry Size - Assets	3.64%	3.90%	3.61%	2.51%	3.37%	4.82%	-0.44%	0.113	0.225	0.888	0.225
Number of obs	14,102	2,541	2,908	2,826	2,942	2,885		11,276	11,276	11,276	11,276
Industry Size - Revenues	3.64%	4.08%	3.10%	2.75%	3.42%	4.88%	-0.70%	0.029	0.059	0.971	0.059
Number of obs	14,102	2,597	2,713	2,977	2,927	2,888		11,125	11,125	11,125	11,125
<b>Moderate Evidence</b>											
Industry Size - # Firms	5.00%	7.38%	5.79%	5.94%	3.13%	3.04%	1.01%	0.983	0.034	0.017	0.034
Number of obs	14,102	2,615	2,780	2,880	2,904	2,923		11,222	11,222	11,222	11,222
Industry Size - Assets	5.00%	5.82%	5.50%	4.28%	4.25%	5.23%	0.87%	0.982	0.040	0.020	0.040
Number of obs	14,102	2,541	2,908	2,826	2,942	2,885		11,276	11,276	11,276	11,276
Industry Size - Revenues	5.00%	5.62%	4.87%	5.07%	4.41%	5.09%	0.52%	0.890	0.220	0.110	0.220
Number of obs	14,102	2,597	2,713	2,977	2,927	2,888		11,125	11,125	11,125	11,125

**Appendix 8-1: Probit Regression for measuring the impact of industry size on the likelihood of target-initiated deals (*Strong evidence*).**

The sample consists of merger and acquisition deals during 1990-2019. In all models, the dependent variable is a dummy variable equal 1 if target-initiated deal and 0 if bidder-initiated deal. In this regression, we use three distinct industry size measurements; the number of firms, total assets, and total revenues, with 3 different methods to construct the industry size (level, log, and dummy). We have 9 models in total. Industry size in model (1) is the number of firms in the target industry (basis 1:100 firms). Industry size in model (2) is Logarithm base 10 of the number of firms in the industry (basis 1:100 firms). Industry size in model (3) is a dummy variable of industry size where industry size dummy equal to 1 if the number of firms less than the median (small industries), and equal to 0 if the number of firms in the industry greater than the median (large industries). Industry size in model (4) is the total assets of target industries (basis 1:1 billion USD). Industry size in model (5) is logarithm base 10 of total assets of target industry (basis 1:1 billion USD). Industry size in model (6) is a dummy variable of small industry; the threshold and construction are the same as model (3). Industry size in model (7) is total annual revenues of target industry (basis 1:1 billion USD). Industry size in model (8) is logarithm base 10 of total annual revenues of target industry (basis 1:1 billion USD). Lastly, industry size in model (9) is a dummy variable of small industry; the threshold and construction are the same as model (3). The coefficient of country and year are not reported.

\*\*\* Significant at the 0.01 level, \*\* Significant at the 0.05 level, and \* Significant at the 0.10 level.

Target-initiated_Deal	(1) Industry Size	(2) log Industry	(3) Industry Size	(4) Industry Size	(5) log Industry	(6) Industry Size	(7) Industry Size	(8) log Industry	(9) Industry Size
Industry Size	-0.0954 ***	-0.1909 ***	0.3305 ***	0.0706	-0.0065	0.0828	0.1913	-0.0026	-0.0242
Private (Dummy)	-0.4243 ***	-0.4392 ***	-0.4326 ***	-0.4298 ***	-0.4328 ***	-0.4335 ***	-0.4242 ***	-0.4267 ***	-0.4255 ***
log HHI	-0.0298	-0.0908 **	-0.0023	0.0919 ***	0.0837 **	0.0806 **	0.0490	0.0439	0.0440
log PE	-0.0278	0.0112	-0.0199	-0.0554 **	-0.0493 **	-0.0417 *	-0.0636 ***	-0.0583 ***	-0.0621 ***
Relative Asset	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
_cons	-1.6395 ***	-1.8389 ***	-2.2405 ***	-2.5579 ***	-2.5398 ***	-2.5665 ***	-2.1544 ***	-2.1425 ***	-2.0998 ***
Target Nation	...	...	...	...	...	...	...	...	...
Year	...	...	...	...	...	...	...	...	...
. Margin, dydx (*)									
Industry Size	-0.0072 ***	-0.0143 ***	0.0248 ***	0.0053	-0.0005	-2.5665	0.0145	-0.0002	-0.0018
Private (Dummy)	-0.0319 ***	-0.0329 ***	-0.0325 ***	-0.0325 ***	-0.0327 ***	-0.0327 ***	-0.0321 ***	-0.0323 ***	-0.0322 ***
log HHI	-0.0022	-0.0068 **	-0.0002	0.0069 ***	0.0063 ***	0.0061 **	0.0037	0.0033	0.0033
log PE	-0.0021	0.0008	-0.0015	-0.0042 **	-0.0037 **	-0.0031 *	-0.0048 ***	-0.0044 ***	-0.0047 ***
Relative Asset	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Target Nation	...	...	...	...	...	...	...	...	...
Year	...	...	...	...	...	...	...	...	...

**Appendix 8-2: Probit Regression for measuring the impact of industry size on the likelihood of target-initiated deals (*Strong evidence, robust cluster target SIC 2 digits*).**

The sample consists of merger and acquisition deals during 1990-2019. In all models, the dependent variable is a dummy variable equal 1 if target-initiated deal and 0 if bidder-initiated deal. In this regression, we use three distinct industry size measurements; the number of firms, total assets, and total revenues, with 3 different methods to construct the industry size (level, log, and dummy). We have 9 models in total. Industry size in model (1) is the number of firms in the target industry (basis 1:100 firms). Industry size in model (2) is Logarithm base 10 of the number of firms in the industry (basis 1:100 firms). Industry size in model (3) is a dummy variable of industry size where industry size dummy equal to 1 if the number of firms less than the median (small industries), and equal to 0 if the number of firms in the industry greater than the median (large industries). Industry size in model (4) is the total assets of target industries (basis 1:1 billion USD). Industry size in model (5) is logarithm base 10 of total assets of target industry (basis 1:1 billion USD). Industry size in model (6) is a dummy variable of small industry; the threshold and construction are the same as model (3). Industry size in model (7) is total annual revenues of target industry (basis 1:1 billion USD). Industry size in model (8) is logarithm base 10 of total annual revenues of target industry (basis 1:1 billion USD). Lastly, industry size in model (9) is a dummy variable of small industry; the threshold and construction are the same as model (3). The coefficient of country and year are not reported.

\*\*\* Significant at the 0.01 level, \*\* Significant at the 0.05 level, and \* Significant at the 0.10 level.

Target-initiated_Deal	(1) Industry Size	(2) log Industry	(3) Industry Size	(4) Industry Size	(5) log Industry	(6) Industry Size	(7) Industry Size	(8) log Industry	(9) Industry Size
Industry Size	-0.0954 ***	-0.1909 ***	0.3305 ***	0.0706	-0.0065	0.0828	0.1913	-0.0026	-0.0242
Private (Dummy)	-0.4243 ***	-0.4392 ***	-0.4326 ***	-0.4298 ***	-0.4328 ***	-0.4335 ***	-0.4242 ***	-0.4267 ***	-0.4255 ***
log HHI	-0.0298	-0.0908 ***	-0.0023	0.0919 ***	0.0837 ***	0.0806 ***	0.0490	0.0439	0.0440
log PE	-0.0278	0.0112	-0.0199	-0.0554 *	-0.0493	-0.0417	-0.0636 **	-0.0583 **	-0.0621 **
Relative Asset	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
_cons	-1.6395 ***	-1.8389	-2.2405 ***	-2.5579 ***	-2.5398 ***	-2.5665 ***	-2.1544 ***	-2.1425 ***	-2.0998 ***
Target Nation	...	...	...	...	...	...	...	...	...
Year	...	...	...	...	...	...	...	...	...
. Margin, dydx (*)									
Industry Size	-0.0072 ***	-0.0143 ***	0.0248 ***	0.0053	-0.0005	-2.5665	0.0145	-0.0002	-0.0018
Private (Dummy)	-0.0319 ***	-0.0329 ***	-0.0325 ***	-0.0325 ***	-0.0327 ***	-0.0327 ***	-0.0321 ***	-0.0323 ***	-0.0322 ***
log HHI	-0.0022	-0.0068 ***	-0.0002	0.0069 ***	0.0063 ***	0.0061 ***	0.0037	0.0033	0.0033
log PE	-0.0021	0.0008	-0.0015	-0.0042 *	-0.0037	-0.0031	-0.0048 **	-0.0044 **	-0.0047 **
Relative Asset	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Target Nation	...	...	...	...	...	...	...	...	...
Year	...	...	...	...	...	...	...	...	...

**Appendix 9:** Probit Regression for measuring the impact of industry size on the likelihood of target-initiated deals (Moderate evidence) – without target industry control variables.

The sample consists of merger and acquisition deals during 1990-2019. In all models, the dependent variable is a dummy variable equal 1 if target-initiated deal and 0 if bidder-initiated deal. In this regression, we use three distinct industry size measurements; the number of firms, total assets, and total revenues, with 3 different methods to construct the industry size (level, log, and dummy). We have 9 models in total. Industry size in model (1) is the number of firms in the target industry (basis 1:100 firms). Industry size in model (2) is Logarithm base 10 of the number of firms in the industry (basis 1:100 firms). Industry size in model (3) is a dummy variable of industry size where industry size dummy equal to 1 if the number of firms less than the median (small industries), and equal to 0 if the number of firms in the industry greater than the median (large industries). Industry size in model (4) is the total assets of target industries (basis 1:1 billion USD). Industry size in model (5) is logarithm base 10 of total assets of target industry (basis 1:1 billion USD). Industry size in model (6) is a dummy variable of small industry; the threshold and construction are the same as model (3). Industry size in model (7) is total annual revenues of target industry (basis 1:1 billion USD). Industry size in model (8) is logarithm base 10 of total annual revenues of target industry (basis 1:1 billion USD). Lastly, industry size in model (9) is a dummy variable of small industries. The threshold and construction are the same as model (3). The coefficient of country and year are not reported.

\*\*\* Significant at the 0.01 level, \*\* Significant at the 0.05 level, and \* Significant at the 0.10 level.

Target-Initiated_Deal	(1) Industry Size # Firms	(2) Log Industry Size # Firms	(3) Industry Size # Firms (dummy)	(4) Industry Size Assets (Billion \$)	(5) Log Industry Size Assets (Billion \$)	(6) Industry Size Assets (dummy)	(7) Industry Size Rev (Billion \$)	(8) Log Industry Size Rev (Billion \$)	(9) Industry Size Rev (dummy)
Industry Size	-0.1111 ***	-0.1859 ***	0.3161 ***	0.0764	-0.0009	0.0460	0.2213	0.0050	0.0344 **
Private (Dummy)	-0.0470 ***	-0.5041 ***	-0.5010 ***	-0.4937 ***	-0.4959 ***	-0.4970 ***	-0.4890 ***	-0.4905 ***	-0.0471 ***
log HHI	-0.0036	-0.0861	-0.0061	-0.0774 ***	0.0721 ***	0.0700 **	0.0452	0.0420	0.0036
log PE	-0.0014	0.0172	-0.0131	-0.0461 **	-0.0426 **	-0.0371 *	-0.0518 ***	-0.0492 **	-0.0056 ***
Relative Deal Size	0.0000	0.0003	0.0003	0.0005	0.0003	0.0003	0.0003	0.0003	0.0000
_cons	-1.5764 ***	-1.8385 ***	-2.1611 ***	-2.4198 ***	-2.3919 ***	-2.3659 ***	-2.1201 ***	-2.0745 ***	-2.0937 ***
Target Nation	...	...	...	...	...	...	...	...	...
Year	...	...	...	...	...	...	...	...	...
Number of obs	12,773	12,773	12,773	12,776	12,776	12,776	12,773	12,773	12,773
. Margin, dydx (*)									
Industry Size	-0.0107 ***	-0.0178 ***	0.0303 ***	0.0074	-0.0001	0.0044	0.0214	0.0005	0.0033 **
Private (Dummy)	-0.0470 ***	-0.0483 ***	-0.0481 ***	-0.0477 ***	-0.0479 ***	-0.0480 ***	-0.0473 ***	-0.0474 ***	-0.0471 ***
log HHI	-0.0036	-0.0082	-0.0006	0.0075 ***	0.0070 **	0.0068 **	0.0044	0.0041	0.0036
log PE	-0.0014	0.0016	-0.0013	-0.0044 **	-0.0041 **	-0.0036 *	-0.0050 ***	-0.0048 **	-0.0056 ***
Relative Deal Size	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Target Nation	...	...	...	...	...	...	...	...	...
Year	...	...	...	...	...	...	...	...	...

### Appendix 10: Ordinary least squares of bid premium – with the interaction term, without industry control variables

The sample consists of merging and acquisition deals during 1990-2019. In all model, the dependent variable is bid premium (formula:  $\text{premium} = (\text{deal value} - \text{book value of target equity (adjusted)})/\text{deal value}$ ). Target-initiated deals dummy variable consists of both strong evidence and moderate evidence of deal initiation. We apply the same industry measurement approach as probit regression; industry size is computed from the number of firms, industry assets, and industry revenue. The interaction term in this research needs to be a dummy variable in order to test whether the impact of target-initiated deals on premiums is different between targets from small and large industries (see further explanation in Chapter 5, Hypothesis 2, Interaction term). Control variables are the same as to mention in the earlier section. The coefficient of country and year are not reported.

\*\*\* Significant at the 0.01 level, \*\* Significant at the 0.05 level, and \* Significant at the 0.10 level.

Deal Premium	(1) Industry Size # Firms (dummy)	(2) Industry Size # Firms (dummy)	(3) Industry Size Assets (dummy)	(4) Industry Size Assets (dummy)	(5) Industry Size Rev (dummy)	(6) Industry Size Rev (dummy)
Target-Initiated Deal (dummy)						
1. Strong Evidence <sub>1</sub>	-0.2046 ***		-0.1620 ***		-0.1663 ***	
1. Moderate Evidence <sub>2</sub>		-0.1489 ***		-0.1165 ***		-0.1227 ***
1. Small Industry (dummy)	-0.0636 ***	-0.0646 ***	-0.0566 ***	-0.0571 ***	-0.0838 ***	-0.0847 ***
Target-Initiated Deal # Small Industry (interaction term)	0.1310 *	0.1020 *	0.0655	0.0486	0.0744	0.0595
Private (dummy)	0.1429 ***	0.1428 ***	0.1427 ***	0.1426 ***	0.1453 ***	0.1451 ***
Cash (dummy)	0.0566 ***	0.0559 ***	0.0568 ***	0.0562 ***	0.0537 ***	0.0531 ***
Relative Deal Size	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Focus (dummy)	0.0174	0.0174	0.0157	0.0157	0.0157	0.0156
ln_PE	0.0159 **	0.0158 **	0.0169 **	0.0170 **	0.0156 **	0.0156 **
_cons	0.3605 ***	0.3618 ***	0.3297 ***	0.3290 ***	0.3546 ***	0.3544 ***
Target Nation	...	...	...	...	...	...
Year	...	...	...	...	...	...
Number of obs	12,717	12,717	12,717	12,717	12,717	12,717



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