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"Distressed Acquisitions
Evidence from European Emerging Markets"

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Distressed Acquisitions
Evidence from European Emerging Markets

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Abstract

We analyze factors impacting the acquisition of distressed firms in European emerging markets during and after the global financial crisis (2007–2017) by assessing 22,608 distressed acquisitions in 17 economies. We provide detailed evidence of the impact of financial ratios, legal form, ownership structure, firm size, and firm age, emphasizing the role of institutions. We show that institutions specifically related to quality and enforcement of insolvency law have lower probability of distressed acquisitions. The extent of corruption control and progress in banking reforms are also strong factors. The qualitative impact of institutions is similar, but its size is larger in less-advanced countries when compared to economically stronger ones. We take it as indirect evidence of the diminishing marginal returns of institutions with respect to their quality. The effect of institutions increased after the financial crisis, but as the economic situation improved, their impact declined.

Keywords: distressed acquisitions, mergers, European emerging markets

JEL Classifications: C13; D02; D22; G34; L22

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1 Introduction

Acquisitions of firms under financial distress, namely distressed acquisitions, represent both challenges as well as significant opportunities for acquirers, and knowledge of what factors impact distressed acquisitions offers crucial and valuable insights (DePamphilis, 2019). However, research on determinants behind distressed acquisitions is quite limited and, in terms of the regional coverage, the literature mostly targets firms in developed countries. Evidence from emerging markets lags behind, and the coverage of European emerging economies is virtually nonexistent. This is surprising, given the substantial economic potential of these countries (Darvas, 2011; Cubeddu et al., 2014) and the persuasive evidence showing that standard acquisitions of firms in emerging markets deliver positive and significant abnormal returns to acquirers from developed countries, who benefit from differences in the quality of institutions (Chari et al., 2010). In this paper, we analyze financial, firm-specific, and especially institutional factors and their impact on failure and the acquisition of distressed firms while concentrating on under-researched emerging economies in Europe. Our emphasis on the role of institutions originates in both theoretical and empirical grounds. In the subsequent account, we further detail our motivation.

Entry into emerging markets via mergers and acquisitions represents a relatively new phenomenon because, until the early 1990s, emerging economies frequently imposed restrictions on foreign acquirers (Evenett, 2004). Since then, a substantial wave of mergers and acquisitions (initiated by firms from developed countries) dramatically raised the foreign economic participation in Latin America and East Asia in connection with privatizations and the lifting of bans on foreign corporate control (Mody and Negishi, 2001; De Paula et al., 2002). In Europe, in the early 1990s, multinational firms from developed economies launched numerous acquisitions in connection with massive privatizations of state-owned companies during the economic transformation of Central and Eastern European (CEE) countries (Estrin et al., 2009; Meyer et al., 2009; Iwasaki and Mizobata, 2018). Recently, the global financial crisis (GFC) has hit hard CEE companies (Hanousek et al., 2015), leading many of them into financial distress and forcing some to exit the market (Baumöhl et al., 2019; Iwasaki and Kim, 2020). Under these circumstances, takeovers by stronger counterparts represent a viable solution for restructuring the assets of distressed firms, as a takeover may serve as an emergency-resolution mechanism instead of bankruptcy (Stiglitz, 1972).

Firms that experience economic or financial distress need to pass through a successful turnaround via a category of restructuring (Schweizer and Nienhaus, 2017).[1] One specific type of restructuring of a distressed firm is the merger of its operations with those of an acquirer (Clark and Ofek, 1994). Despite the fact that acquisitions, as a form of takeover and organizational restructuring, have long been employed as a tool for resolving financial distress (Nesvold et al., 2010) they still offer an ample room for research.[2] In addition, while there exist a limited literature body analyzing factors that impact the acquisition of distressed firms in developed countries, the issue remains unexplored with respect to emerging markets.

In their early work, Pastena and Ruland (1986) analyzed a set of variables with respect to their ability to predict the acquisition of distressed US firms. Their results showed a positive link between the probability of distressed acquisition with ownership concentration and firm size, while a negative link was found for financial leverage. Peel and Wilson (1989) assessed a similar topic for UK firms, but they found no link between ownership concentration and firm size and acquisition probability. On the contrary, they showed that the choice of acquiring a distressed company is primarily rooted in the extent of potential synergies and the severity of financial distress. In a more recent work, Theodossiou et al. (1996; p. 712) improved the testing strategy on a sample of distressed US firms, and they show that "the two most important factors for acquiring a financially distressed firm are the sales-generating ability of the firm's total assets and the presence of inefficient management. Insider control appears to be the third most significant factor providing support to the hypothesis that insiders generally resist an acquisition because of fears of losing their jobs." Additional factors found to have predictive power are the ratio of productive (fixed) assets to total assets, return on fixed assets, and financial leverage. Recent contributions to the literature, for example, Åstebro and Winter (2012) and Miglani et al. (2015), assert predictive power for a similar set of variables.

Another strand of the literature on distressed acquisitions investigates differences between pre- and post-acquisition performance. In these studies, stock prices are frequently used as performance measures. In an early work, based on a sample of 55 acquisitions of bankrupt US companies, Hotchkiss and Mooradian (1998) provided empirical evidence that

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[1] Schweizer and Nienhaus (2017) reviewed literature on corporate distress and turnaround, defined as "a decline and recovery from distress." They also covered operational, managerial, portfolio, and financial restructuring.

[2] The terms *mergers* and *acquisitions* are often used interchangeably, but in reality, they have somewhat different meanings. A transaction that combines two companies and leads to the creation of a new company is a merger. A purchase of one firm by another firm, which does not lead to the creation of a new firm, is an acquisition. We use the term *acquisition*, not *merger*, because business combinations involving distressed firms are not usually mergers of firms on equal (financial) footing.

takeovers can facilitate the efficient redeployment of assets of bankrupt firms. Clark and Ofek (1994) analyzed 38 takeovers of distressed US firms and showed that these takeovers are more likely to involve firms in the same industry, are less likely to be hostile takeovers than are acquisitions in general, and that bidders are unable to successfully restructure targets. Bruton et al. (1994) examined 51 acquisitions of financially distressed US firms and found that the best performance was observed in cases when acquirers had prior acquisition experience. Their results imply that implicit knowledge about the acquisition process, integration of the assets of distressed firms, and their management may be key factors for a successful acquisition.

Broader earlier literature on mergers and acquisitions agreed with findings that an acquirer's gains are usually small or close to zero (see Andrade et al. (2001) and Eckbo (2014) for literature reviews). On the other hand, Chari et al. (2010) documented that when foreign owners secure effective control of firms in emerging markets, they realize significant and positive abnormal returns, capitalizing on asymmetry between the quality of institutions in developed and emerging markets. Further, DePamphilis (2019) argued that new evidence in recent literature shows acquirers realizing significant abnormal returns for both cash and stock purchases of public companies since the economic recovery of 2009. Finally, in a recent detailed work aimed at analyzing acquisitions during severe distress, Meier and Servaes (2019) compared fire sales to a sample of regular acquisitions. They showed that acquirers who buy assets in fire sales earn excess returns that are two percentage points higher than in regular acquisitions. They demonstrated that the fire-sale effect identified rests in sellers' reduced bargaining power, and they concluded that the welfare losses associated with fire sales are smaller than previously thought. The assessment of differences between pre- and post-acquisition performance is not part of our analysis. Nevertheless, we reviewed some key works above, as the issue is related to our analysis.[3]

In our paper, we do not assess post-acquisition performance, and we do not use stock prices. Instead, we employ granular firm-level data and concentrate on analyzing factors that impact decisions to acquire a distressed firm. In our data, we observed distressed, failing firms that were subsequently incorporated into stronger firms. After their acquisition, distressed firms ceased to exist legally. Consequently, in our analysis, we proceed in two stages that correspond to a Heckman two-stage probit model. Specifically, in the first stage, we estimate the probability of distressed firm failure by employing a set of variables similar to that used by Baumöhl et al.

[3] Understanding the nature of transactions that do create significant shareholder wealth is of natural significance.

(2019). In the second stage, we employ a probability of acquisition of a distressed firm as our dependent variable and analyze factors behind the distressed acquisition. These factors constitute a set of explanatory variables motivated by Theodossiou et al. (1996), Platt and Platt (2008), and other relevant studies.

Naturally, the emphasis of our analysis lies in estimates from the second stage, where we model the probability of distressed acquisition as a function of specific factors—this is our key question of interest. We distinguish among three sets of factors. One, following Theodossiou et al. (1996), we include a set of financial performance variables. In accordance with the related literature, we hypothesize that better financial performance is linked to less need for distressed acquisition. Two, we account for the potential impact of ownership structures, legal form, firm size, and age that were empirically shown to influence the emergence of the acquisition process (Fan et al., 2013) as well as that of mature markets (Xu, 2019). Three, we account for differences in institutions among countries and accentuate their role.

The nexus between institutions and distressed acquisition is grounded in earlier evidence. First, Platt and Platt (2008; p. 130–131) rejected the idea of a single global distressed model and argued that "profound differences between regions in accounting rules, legal practices, environmental laws, and business practices" underscore the diversity of ways in which firms in various regions cope with financial distress. The differences voiced by Platt and Platt (2008) are, in reality, proxies for country differences in terms of business environment, level of institutions, and quality of legal practices. With respect to distressed acquisitions, these differences might be potentially more important than purely economic variations among countries. For example, Claessens and Klapper (2005) showed that disparities in institutional background can be found behind the diversity in bankruptcy laws across countries. In a similar vein, La Porta et al. (1998, 2013) emphasized the importance of legal rules covering the protection of corporate creditors and their enforcement. Furthermore, other studies have put forth evidence of the beneficial link between the quality of institutions and finance (Claessens et al., 2003; Dahiya and Klapper, 2007; Djankov et al., 2008; Acharya et al., 2011). In accordance with the reasoning above, the importance of quality of institutions with respect to acquisitions in emerging markets is supported by direct evidence shown by Claessens et al. (2001), Meyer et al. (2009), Chari et al. (2010), Fan et al. (2013), and Lebedev et al. (2015).

Second, the first rationale is also endorsed by the empirical evidence linking the quality of institutions with financial distress in countries being researched (Baumöhl et al., 2019). Progress in reforms and cultivation of the institutional environment are shown in the literature to be linked to economic processes in European emerging economies, namely with firm performance, efficiency, and survival (Roland, 2000; Meyer et al., 2009; Hanousek et al., 2015; Baumöhl et al., 2019; Iwasaki and Kočenda, 2020; Kočenda and Iwasaki, 2020). Specifically, with respect to distress and firm survival, Baumöhl et al. (2019) showed that the extent of corruption control ranks among the most important institutional factors that can be linked to improved chances manufacturing and services firms will survive on the market. Further, Kočenda and Iwasaki (2020) showed that progress in banking reforms positively affects bank survival, and Iwasaki and Kočenda (2020) show that progress in the liberalization and institutional reform of the enterprise sector are linked to the improved survival of service firms. Our dataset described in Section 2 is salient for addressing the impact of institutions because it covers 17 European emerging markets that are characterized by variations in terms of institutional quality and the legal protection of property rights. In any event, in both stages, we model probabilities with sets of theoretically and empirically grounded factors that are germane with respect to the probability consequence; these variables are described in detail in the data section.

We contribute to the literature in several ways. First, we provide evidence of the impact of a number of firm-specific characteristics and financial indicators on distressed acquisitions. Second, we show that better institutions decrease the need for distressed acquisitions. Institutions related to quality and the enforcement of insolvency law are especially effective at lowering the probability of distressed acquisition. The extent of corruption control and progress in banking reform are also strong factors linked to lowering the probability of distressed acquisition. Third, the qualitative impact of broadly defined institutions is similar across European emerging markets, but institutions tend to have a larger impact on distressed acquisitions in less-advanced countries as compared to economically stronger ones. We take this as indirect evidence of the diminishing marginal returns of institutions with respect to their quality as observed in Baumöhl et al. (2019). Fourth, the effect of institutions increased after the global financial crisis (GFC), but as the economic situation improves, their impact declines.

The remainder of the paper is organized as follows. In Section 2, we describe the data, variables, and hypothesized impacts. In Section 3, we introduce our empirical strategy. In Section 4, we bring forth extensive and detailed results. Section 5 is the conclusion.

2 Data coverage, variables, and hypothesized impact

With the aim of studying the distressed acquisition of firms and its relationship with country-level institutional quality, we employ a large dataset of business firms in European emerging economies. Our dataset consists of financial, firm-specific, and country-level institutional variables. The set of financial and firm-specific variables is extracted from the Bureau van Dijk's Orbis database.[4] In **Figure 1** and **Table 1**, we present a comprehensive account of the numbers and proportions of firms in our dataset. As both sources show, we are able to clearly identify the survival status of a total of 247,501 firms (N) in 17 European emerging economies from 2007–2017. Of these firms, 22,608 involved distressed acquisitions (D).

Firms in our dataset satisfy two conditions: (i) they were in business at the end of 2006 (i.e., before the GFC), and (ii) they provided information about their survival status at the end of 2017. In terms of regional distribution, we cover firms from: (a) Central European countries (Czech Republic, Hungary, Poland, and Slovakia); (b) Eastern European countries (Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Montenegro, Romania, and Serbia); (c) Baltic countries (Estonia, Latvia, and Lithuania); and (d) former Soviet Union (FSU) countries (Moldova, Russia, and Ukraine). In terms of economic development, we cover stronger countries that are members of the EU as well as less-advanced economies.[5]

In addition, and quite importantly, in our sample we also have information regarding each firm's legal status that enables us to identify (i) when and how a company failed and (ii) whether the distressed firm was later merged. Specifically, referring to changes in status registered in the Orbis database, it is possible to categorize each entry firm as either (A) a company that maintained operations through the observed period without management failure (i.e., survivors), (B) a company that was "bankrupted," "liquidated," or "dissolved" without any subsequent legal status change before the end of the observed period, (C) a company that became "dormant" during the observed period, or (D) a company that became "dormant," "bankrupt," "liquidated," or "dissolved" with a subsequent legal status change to "merged/taken over" within the observed period. In this study, the classification of distressed acquisition is given to firms that fall into category (D).[6]

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[4] Orbis is one of the largest company databases, covering more than 300 million companies worldwide; as such, it contains a large sample of listed and unlisted companies operating in various industries in European emerging economies.

[5] The EU members covered in our analysis are (alphabetically): Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovakia.

[6] We did not include firms whose status had changed to "merged/taken over" without any notification of management failure in the preceding period in the dataset because these cases may contain "peaceful" M&As that were not triggered by financial distress of the acquired company. Furthermore, we also assessed the remote possibility that some companies in categories (B) and (C) were merged or taken over after the observation period. To examine this possibility, we have checked their legal status in the

According to **Figure 1** and **Table 1**, the key observation is that, during the research period, about 37% of firms failed (F/N; **Table 1**). Of these, one fourth were acquired under distress (D/F; **Table 1**). Multiples of the two proportions mean that distressed acquisitions represent more than 9% of firms in our sample. The proportions signal quite high vulnerability of the firms in emerging markets. In **Table 1**, a more detailed breakdown is provided for firms across country groups and widely defined industry sectors. The share of distressed acquisitions in failed firms is highest in FSU countries (30%), followed by Central European countries (17%), while Eastern European and Baltic countries exhibit a much lower share (5% and 8%, respectively). Across industries, the shares are more level, ranging between 20 and 31%.

Further, in **Figure 2**, we show that the wave of distressed acquisitions coincides with post-crisis developments as the rate of distressed acquisitions climbs during 2007–2010 and then recedes, as the potential for viable restructuring via distressed acquisitions diminishes. The negative impact of the European sovereign debt crisis can be conjectured based on a single jump in 2014.

In addition to the detailed classification of firms, the Orbis database also provides data regarding relevant firm characteristics used in the literature related to financial distress. Specifically, we have information on each firm's legal form of incorporation, ownership structure, corporate governance structure, financial performance, size, and age. Additional data regarding country-level institutional variables are obtained from the European Bank for Reconstruction and Development (EBRD) and the Freedom House. We describe their details in Subsection 2.3.

In the next sub-section, we introduce the rationale for each variable included in our models along with its hypothesized impact. The detailed description of the factors analyzed with firm distress and acquisitions is provided in **Table 2**.

2.1 Financial indicators

Financial performance is measured by several representative variables identified in earlier literature as impacting the probability of distress and eventual exit or survival (Baumöhl et al., 2019). The performance variables are also used as factors behind acquisitions (DePamphilis,

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years beyond the span of our research (2018 and 2019), and we confirmed that no sample firms in question had any change in their legal status in these two years. We believe that this judgement is reasonable because distressed acquisitions tend to take place usually within one year after management failure of acquired companies.

2019). Specifically, as shown in **Table 2**, we employ returns on assets (ROA), liquidity, solvency, and labor productivity.

Return on assets (ROA) serves as a proxy for a firm's profitability, and its higher value is associated with a lower probability of financial distress and bankruptcy (Görg and Spaliara, 2014), thus, producing a negative impact on the likelihood of distress (bankruptcy). On the other hand, "financially distressed firms with above average profitability may be appealing acquisition targets to firms that have means and know how to alleviate their financial distress problems" (Theodossiou et al., 1996, p. 703). In such a case, higher profitability can be linked to a positive impact on the probability of acquisition. Similarly, higher liquidity, solvency, and labor productivity are also associated with lower probability of financial distress and bankruptcy but with higher probability of acquisition. Hence, between the four performance measures, there exists a hypothesized negative effect with respect to the probability of distress (bankruptcy) and a positive effect with respect to the probability of acquisition among distressed firms (Guariglia et al., 2016; Baumöhl et al., 2019; DePamphilis, 2019).

In line with similar empirical approaches in the literature, we include financial performance measures in both stages of our model. Furthermore, the correlation between financial performance variables is sufficiently low; see the correlation matrix of the variables in **Table A1**. Hence, the simultaneous estimation of these variables does not result in a multicollinearity issue.

2.2 Legal form, ownership structure, and other firm-specific variables

In **Table 2**, we further list a number of firm-specific controls. The choice of variables is motivated by their theoretical relevance and the proven empirical impact of firm distress and bankruptcy shown by Baumöhl et al. (2019, 2020).

The legal form of incorporation is represented by the limited liability company and the joint-stock company; other corporate legal forms are less frequent in our sample, and we do not assess their impact separately. A firm's corporate legal form is likely linked to its potential for firm distress—for example, Harhoff et al. (1998) showed that (West) German firms with limited liability exhibited higher growth and lower solvency as compared to other firms with full liability (e.g., joint-stock companies). However, the net effects of the legal form with respect to distress and acquisition remain ambiguous.

We further account for firms' ownership structure and corporate governance, which are both often neglected in the related literature. For ownership structure, we construct three categories: large (private) shareholders, foreign shareholders, and state ownership.

The hypothesized effects of large shareholders are often ambiguous, though. For example, the alignment hypothesis in Shleifer and Vishny (1986) advocated for the existence of a positive relationship between large shareholders and firm distress and bankruptcy. On the other hand, the negative relationship between large shareholders and firm failure is explained with the expropriation hypothesis in Claessens et al. (2000). Further, a financially distressed firm with the presence of a large private shareholder might have an incentive for a distressed acquisition as, upon the acquisition agreement, the controlling stake could be transferred easily from the large shareholder to a new acquirer. In this case, a large shareholder can be hypothesized to be linked to a positive impact on acquisition.

Since the 1980s, in the literature regarding industrial organization, it has been documented that foreign direct investments affect market dynamics. Generally speaking, two outcomes are possible: (i) foreign ownership increases overall sector efficiency, causing less-efficient domestic firms to exit, or (ii) a spillover effect transmits higher productivity to domestic firms, allowing them to survive even with increased competition (Franco and Weche Gelübcke, 2015). Consequently, we may hypothesize that foreign ownership can be associated with superior performance and lower probability of distress and bankruptcy. However, once a firm with foreign ownership falls into financial distress, the probability of acquisition might increase, as the ownership transfer should be performed with fewer obstacles in order to conclude the transaction quickly and minimize losses.

The (dummy) variables representing large shareholding and foreign ownership are not mutually exclusive variables. Nevertheless, we include them both in order to capture different aspects of ownership structures. Their joint use does not constitute a problem because their partial overlap is only marginal, and their correlation is negligible; in fact, the correlation coefficient between the two variables is only 0.102, as shown in **Table A1**.

State ownership was adopted for clear reasons. First, in emerging European markets, the state retained some control even after privatization programs were largely completed or during re-privatizations (Kočenda, 1999; Kočenda and Hanousek, 2012), and, in many countries, the state still acts as a large shareholder in key companies (Iwasaki and Mizobata, 2020). Furthermore, state ownership tended to be more prevalent in certain industrial sectors (e.g., energy). It is also plausible that states, with their implicit guarantee or for political reasons, prolong the existence of some strategic firms. Finally, in countries with weak institutions and/or poor investor protection, residual state ownership can enhance value in partially privatized firms by providing monitoring and protecting dispersed minority shareholders from exploitation by controlling private owners (Megginson, 2017). Nevertheless, state ownership is traditionally associated with weaker efficiency and, thus, increased probability of distress (positive effect). However, state ownership is also linked to a controlling stake that, to some extent, represents real potential for effectively facilitating the ownership transfer of a financially distressed firm to a new acquirer (positive effect).

Following the example of Baumöhl et al. (2019), we include the following corporate governance proxies in the first stage of our model: board size, its nonlinear impact, and presence of an international auditor; Hermalin and Weisbach (2003) show that board size has a negative relation to corporate performance.

We also include a dummy variable on whether a firm is listed on a stock market—linkage to the capital market represents a firm's ability to access external funds and should have a positive impact on firm growth and survival (Musso and Schiavo, 2008) while negatively impacting the probability of distress. On the other hand, a listed firm in financial distress might not be a sufficiently appealing acquisition target due to lengthy de-listing procedures, and the factor might negatively impact the probability of acquisition.

Finally, we control for firm size and age. Smaller and younger firms are less diversified and possess weaker market power than larger and older firms. Hence, their earnings are likely smaller as well. Smaller and younger firms are also often less stable and represent less difficult targets for acquirers. Therefore, firm size and age are expected to have a negative impact on the probability of financial distress as well as acquisition. Nevertheless, despite the fact that larger and older firms fail less often, Klepper and Thompson (2006) argue that the impact of age and size on a firm's exit may emerge due to other important determinants that were not included in an empirical specification in the first place.

2.3 Institutions and business environments

Claessens et al. (2001), Meyer et al. (2009), Chari et al. (2010), and Lebedev et al. (2015) provided compelling evidence that asymmetries in quality of institutions between developed and emerging markets are important with respect to acquisitions in emerging markets. For that, we extend the set of our variables and hypothesize that differences in quality of institutions in individual countries might produce varying impact on distressed acquisitions. Specifically, we consider the following three cases.

First, we hypothesize that the level of legal requirements and practices in a country positively impacts business-related activities. Prudent legal requirements, such as enforcement of security over assets during a firm's insolvency, should lower the need for distressed acquisitions as distressed firms might go through the bankruptcy process at a relatively fast pace. The legal practice of compliance with insolvency law should also be linked to a decrease in distressed acquisitions. Based on a large body of empirical literature, Altman (1991) argued that solvency (along with liquidity, profitability, and leverage) tends to serve as the key identifier of coming bankruptcy. As such, solvency, as a strong indicator of impending firm distress, can also be reasonably linked to a subsequent acquisition. The importance of a working insolvency regime that protects the rights of creditors and avoids the premature liquidation of viable enterprises was also stressed in a broad assessment by Claessens et al. (2001). In this respect, the level of compliance with insolvency law and its enforceability represent major institutional factors that might potentially impact the extent of distressed acquisitions in a country, *ceteris paribus*.

Based on the survey of bankruptcy law carried out by the EBRD, we consider three measures related to insolvency law: (i) the level of compliance with international insolvency standards that quantifies the extent to which the country's key insolvency legislation complies with the most widely accepted international standards adopted, among others, by the World Bank and the UN Commission on International Trade Law (UNCITRAL); (ii) the extensiveness of the insolvency legal regime that quantifies the implementation of laws on the books and how the legislation works together with the available institutional framework; and (iii) the enforceability of charged assets that quantifies the legal means for instituting valid and enforceable security over assets (EBRD, 2006).[7] Since all three measures are expressed on different scales, we normalize them to provide a directly comparable perspective of their impact.

Furthermore, we perform a principal component analysis to create a comprehensive insolvency law index formed from our three measures described above (**Table A2**). This step has two advantages: we can analyze the aggregate impact of insolvency law–related institutions

[7] With respect to the issue of enforceability of charged assets, it is specifically stated in the EBRD (2006, p. 6) that "Once the money is disbursed by the creditor and there is a problem with the borrower, the creditor should be able to rely on three things: the quality of the legal documentation, the value of the collateral and a speedy and smooth enforcement of the security. The quality of the legal documentation relating to security is directly determined by the quality of the legislation underpinning such security instruments and the implementation of such legislation by the relevant agencies and by the judiciary."

without omitting any particular measure and avoid the correlation existing between compliance with and the extensiveness of the insolvency law. The first principal component, which is extracted from the three individual measures and explains 70% of their total variance, is then used in our analysis as a proxy for their aggregate impact.

Second, we hypothesize that loose corruption control might increase distressed acquisitions if, for example, a distressed acquisition is used to prevent asset stripping; this argument is in line with that of Lebedev et al. (2015), in that better protection of shareholders' rights means fewer opportunities for controlling shareholders to expropriate minority shareholders. Furthermore, albeit an indirect link, the extent of corruption control is shown to significantly impact the survival of firms in the countries researched (Baumöhl et al., 2019). For that, we utilize data obtained from the Freedom House regarding the extent of corruption control. The original Freedom House index of corruption expresses public perceptions of corruption and ranges on a scale from 1 to 7, where 1 represents the highest and 7 the lowest level of corruption control (Freedom House, 2018). In our analysis, we use adjusted and normalized values that are computed as 7 minus the value of the original index relevant for a specific country.

Third, we hypothesize that level of banking reforms achieved might be linked to a decrease in distressed acquisitions as well. The argument is rooted in the fact that the extent of banking reform can be taken as a proxy for the lending practice efficiency level—an efficient banking sector usually does not restrict lending, brings more competition among financial institutions, and channels available financial resources to firms that might avoid financial distress that would otherwise lead to acquisition. In order to capture the development of the banking sector, we employ the "Banking reform and interest rate liberalization" indicator of the EBRD. The indicator ranks the progress in the banking sector of individual countries in terms of liberalization and institutional reforms on a scale from 1 to 4+ (EBRD, 2007).[8]

[8] A score of 1 denotes a little progress beyond the establishment of a two-tier system. A score of 2 marks significant liberalization of interest rates and credit allocation and limited use of directed credit or interest rate ceilings. A score of 3 represents substantial progress in establishing bank solvency and of a framework for prudential supervision and regulation, full interest rate liberalization with little preferential access to cheap refinancing, and significant lending to private enterprises and significant presence of private banks. A score of 4 means significant movement of banking laws and regulations toward standards of the Bank for International Settlements (BIS), well-functioning banking competition and effective prudential supervision, significant term lending to private enterprises, and substantial financial deepening. Finally, a score of 4+ represents standards and performance norms of advanced

3 Empirical strategy

As we state in the Introduction, our aim is to assess factors that significantly affect the decision to acquire a distressed firm. To empirically examine this research objective, we proceed in two stages that correspond to a Heckman two-stage probit model. In the first stage, we estimate the probability of a distressed firm's failure with a set of relevant variables. In the second stage, we employ a probability of the acquisition of a distressed firm as our dependent variable and analyze factors behind the distressed acquisition. In order to capture initial conditions of firms immediately before the analyzed period (2007–2017), we employ a rich set of independent variables from 2006 in both stages. This approach makes it possible (i) to empirically assess the predictive power of the initial conditions and (ii) to avoid or significantly mitigate the issue of potential endogeneity or self-selection (we further deal with the issue by using the Heckman two-stage estimation procedure detailed below). A similar approach with respect to initial conditions was effectively used in analyses related to firm survival in European emerging markets (Baumöhl et al., 2019, 2020; Iwasaki and Kim, 2020; Iwasaki and Kočenda, 2020; Kočenda and Iwasaki, 2020).

From an econometric perspective, we consider the decision to acquire a distressed firm to be the result of a dichotomous choice: to rescue a distressed firm by acquisition, or not to. As argued in the literature, in addition to the heterogeneity bias problem that could be generated by this dichotomization, the decision to acquire a distressed firm gives rise to a self-selection problem (Van de Ven and Van Praag, 1981).

We deal with the two econometric issues identified above by employing the Heckman two-step procedure that allows us to estimate equations of the selection model and the outcome model simultaneously. Specifically, we estimate the following set of two equations that characterize distress and acquisition models:

Distress model: $Pr(D_i = 1|Z_{ij}) = \mu + \alpha Z_{ij} + \varepsilon_i,$ (1)

Acquisition model: $Pr(A_i = 1|W_{ij}) = \eta + \beta W_{ij} + \lambda_i + \epsilon_i,$ (2)

where, in Equation (1), D_i is the dichotomous variable that assigns a value of 1 to firms distressed during the observation period of 2007–2017, and Z_{ij} is a set of variables that affect the probability of financial distress of i-th firm in j-th country. Meanwhile, in Equation (2), A_i

industrial economies: full convergence of banking laws and regulations with BIS standards and provision of a full set of competitive banking services (ibid, p. 211).

is the dichotomous variable, which equals 1 if a distressed firm is acquired and 0 otherwise, for each i-th firm; W_{ij} is a set of variables that influence the decision to acquire the i-th firm, including the institutional quality in j-th country; factor λ_i is obtained from the first-stage estimation and controls for sample selection bias; μ and η are constant terms; and ε_i and ϵ_i represent error terms that satisfy the following condition:

$$\binom{\varepsilon_i}{\epsilon_i} \sim i.i.d.\left(\binom{0}{0}, \begin{pmatrix} \sigma_\varepsilon^2 & \rho_{\varepsilon\epsilon} \\ \rho_{\epsilon\varepsilon} & \sigma_\epsilon^2 \end{pmatrix}\right). \tag{3}$$

We estimate both distress and acquisition models by the maximum likelihood. As Equation (3) indicates, the Heckman two-step model assumes that the error terms of Equations (1) and (2) are normally distributed with zero mean and variance and are correlated with each other. We test the null hypothesis that that $\rho = 0$ by a likelihood-ratio test, which compares the log likelihood of the full model with the sum of the log likelihoods for the selection and outcome models (i.e., an LR test of independence of equations). Rejection of the null hypothesis denotes that the estimators are not biased by a self-selection problem (Annunziata et al., 2019). In the estimation results, we report that all coefficients are zero of ρ and the Chi-squared statistic of the LR test, in addition to the result of a Wald test.

4 Results

4.1 First stage: Probability of distress

In the first stage, we estimate the distress model in specification (1) where the dependent variable is the probability of firm failure. Since the primary interest lies in the second-stage results, we report the first-stage results in the Appendix (**Table A3**) and comment on them only briefly, with an emphasis on results for all 17 countries.

In terms of the legal form, limited liability apparently represents a more vulnerable form, as it is linked to a somewhat higher increase in the probability of distress than joint stock. Larger shareholding is a substantial factor linked to decreased probability of distress, potentially due to the greater control it represents, the ability to marshal resources during distress events, and higher firm efficiency in general (Hanousek et al., 2015). Further results pertaining to ownership structure show that foreign ownership is also linked to the reduced probability of distress, while state ownership produces the opposite effect. The differences should be attributed to the well-established empirical fact that that state ownership of business assets is inherently less efficient than private ownership (Megginson, 2017); however, the finding also resonates with the idea that foreign ownership increases overall sector efficiency (Franco and

Weche Gelübcke, 2015). Corporate governance factors display a small effect in which a larger board of directors is linked to decreased probability of distress, although its impact is reversed when the board becomes too large. Engaging an international audit firm is linked to an increased probability of distress, potentially because of the strict application of the International Financial Reporting Standards (Baumöhl et al., 2019), or due to inherent client (firm) characteristics rather than audit quality (Lawrence et al., 2011).

The overall effects of financial performance indicators and labor productivity show that better performance is linked to decreased probability of distress; the impact is in line with results presented by Theodossiou et al. (1996). The exception is that liquidity exhibits an effect that is mostly linked with increased probability of distress, although the effect is small. The overall effect is both intuitively plausible and consistent with earlier evidence brought by Görg and Spaliara (2014), Guariglia et al. (2016), or Baumöhl et al. (2019), albeit in a somewhat different context. Finally, older firms are associated with mildly decreased probability of distress, potentially because of the stability that comes with years (Geroski, 1995; Geroski et al., 2010). A firm's size and listing status generally exhibit insignificant coefficients. Overall, the presented results are in line with those of a distress model presented by Baumöhl et al. (2019), albeit under a different research framework but for a similar set of emerging economies.

4.2 Second stage: Effects of firm-specific variables on the probability of acquisition

In the second stage, we assess the probability of acquisition by estimating specification (2). Before we present specific results, it is important to note that acquired firms differ from surviving and nonacquired failed firms (**Table 3**). Specifically, firms restructured by post-failure acquisition tend to have higher firm value and show better financial performance as compared with firms that were liquidated, dissolved, or that went bankrupt. Obviously, distressed acquisition firms have lower firm value and performance than firm survivors. Differences in firm value and financial performance show that distressed acquisitions are likely to occur in firms that are beyond a certain threshold in terms of those characteristics.

In the second stage of the Heckman two-step estimation, we estimate a probit model. Estimates of positive (negative) coefficients reported in **Table 4** represent positive (negative) relationships between specific variables and the probability a distressed firm will be acquired. For the purpose of interpretation, a positive (negative) coefficient means that a one-point change in a variable in question contributes (restrains) acquisition, and the effect depends on the value of a coefficient. For example, a coefficient of 0.1 (-0.1) means that a one-point change in a specific variable contributes to (curtails) the probability of acquisition by 10%. It is important to note that, once a firm already falls into distress, a distressed acquisition represents a way for it to be restructured. For example, an indication of performance ability of an already distressed firm should signal its better prospects for restructuring and *vice versa*. Furthermore, the LR test of independence of equations rejects the null hypothesis that $\rho = 0$ at the 1% significance level in all six models, thus, strongly supporting the estimation strategy of employing the Heckman two-step procedure to estimate the acquisition equation (2).

In terms of specific results, the size of the impact differs according to the specific legal form of a firm. The probability of a distressed acquisition declines for a limited liability company, but the effect is smaller than in the case of a joint-stock company. This result makes sense intuitively, as a limited liability company in case of a takeover faces potentially fewer red-tape obstacles than does a joint-stock company that has a more complex legal structure.

Ownership structure is also found to be relevant with respect to acquisitions. The presence of a large shareholding structure can be seen as contributing to the probability of acquisition. Large shareholding means that a controlling stake can be relatively easily transferred once a firm is in financial distress, and acquisition represents a viable option for its restructuring. Both foreign and state ownership can also be linked to a rise in the probability of acquisition, but to different extents, as the effect of foreign ownership clearly dominates. It is also, albeit indirectly, in line with the findings of Fan et al. (2013), who showed that distressed private companies are more sensitive to discipline and adjust their operations accordingly, as their sample of private companies includes foreign firms, along with domestic private firms and joint ventures. The positive effect of state ownership is in line with our prior contention that the state can use its controlling stake to ensure a smooth transfer to a potential acquirer.

Performance and productivity indicators exhibit uniformly positive impacts on the probability of acquisition, despite the fact that the coefficients are rather small. However, this is understandable because they are linked to firms that are in financial distress in the first place. Hence, any improvement in their financial performance is expected to be rather small as well. Financial ratios (ROA, liquidity, and solvency) seem to be the most important performance factors behind acquiring distressed firms. In contrast, labor productivity exhibits a weaker impact, as the associated coefficients are smaller and lack statistical significance in some cases. The overall outcome resonates well with the financial literature, as more profitable firms represent easier targets for effective restructuring (DePamphilis, 2019). Likewise, firms that are relatively more solvent, relying more on their own resources, are less leveraged and thus more attractive for acquisition—acquiring companies avoid highly leveraged firms because these alter their optimal capital structure, resulting in their lower market value (Theodossiou et al., 1996). Similar arguments can be paired with the effect of a higher liquidity ratio with respect to a higher probability of acquisition. These results are in line with the hypothesized effects and correspond to the related findings as presented by Åstebro and Winter (2012) and Miglani et al. (2015). Correlation among performance indicators is low (**Table A1**) and does not constitute a potential problem with respect to the reported results.

The fact that a firm is listed on the stock market is linked to a decrease in the probability of distressed acquisition, potentially because of expected bureaucratic complications related to the delisting of a firm from the stock market. This result intuitively correlates with the fact that capital markets in many countries being researched are still far from well-established and suffer from low levels of liquidity, capitalization, and transparency.

Larger firms are connected with a higher probability of acquisition, although the size of the associated coefficients is quite small. Hence, the economic effect of firm size seems to be rather superficial, which is in contrast to earlier results presented by Pastena and Ruland (1986) but in accord with findings of Peel and Wilson (1989). This evidence means that firm size, in terms of its asset volume, is less important for the acquiring firm than is the profitability of those assets (ROA). This conclusion closely correlates with that of Theodossiou et al. (1996), who showed that the sales-generating ability of a firm's total assets is one of the most important factors for acquiring a financially distressed firm. Finally, older firms are linked to a lower probability of acquisition, as their age represents more resistance to restructuring changes. The result is consistent with the evidence of Loderer and Waelchli (2011), who showed that old firms in distress have trouble finding merger partners.

4.3 Second stage: Effects of institutions relevant for distressed acquisitions and robustness checks

Individual country-specific effects of three insolvency law factors are presented separately in **Table 4**, columns 1–3. Since all three factors are normalized, the coefficient values provide a direct comparison: the level of compliance with international insolvency standards and the extent of the application of insolvency legislation exhibit comparably similar and very strong impacts that are linked to less probability of distressed acquisition. The third factor, the enforceability of charged assets, exhibits an effect that is significant, but the associated coefficient is smaller than in the previous two cases; this means that the specific factor is linked to a comparably smaller decrease in the probability of acquisition. The inference from these findings is that the broader concepts of institutional quality related to insolvency laws are clearly important factors for acquiring firms—even more critical than the level of practical administration for the recovery of financial resources tied up in legal bankruptcy proceedings. This finding also resonates well with the importance of legal rules protecting corporate creditors and their enforcement, as evidenced in La Porta et al. (1998, 2013).

In accordance with the individual results, the impact of the comprehensive insolvency law index (CIL index) is strong, statistically significant, and exhibits the hypothesized impact, in that a higher level of the institutions relevant for the quality and enforcement of the insolvency law correlates with a lower probability of distress acquisition in general (**Table 4**, column 4). Furthermore, the extent of corruption control and progress in banking reform can also be seen as strong factors linked to lowering the probability of distressed acquisition (**Table 4**, columns 5–6). While the impact of corruption control seems to be on par with the aggregate impact of insolvency-law institutions, the effect of banking reform is slightly lower. Nevertheless, we conclude that the impact of institutions on distressed acquisitions is both statistically and economically significant and is broadly in accord with the related empirical evidence of Claessens et al. (2001), Meyer et al. (2009), Chari et al. (2010), Fan et al. (2013), and Lebedev et al. (2015) with respect to acquisitions and of Baumöhl et al. (2019) with respect to firm survival.

In order to verify the robustness of our results on the impact of institutions, we perform a series of robustness checks. The impact of various factors, and especially institutions, may vary across industries. For this reason, we estimate our baseline model with firms grouped according to the NACE Rev. 2 classification. We form five groups: agriculture, forestry, and fishing (Section A); mining and manufacturing (Sections B–E); construction (Section F); nonfinancial services (Sections G–J, L–S); and financial services (K). Estimation results provided in **Table 5** show that the impact of the CIL index is relatively level across industries. However, a detailed inspection reveals that it is strongest in agriculture, forestry, and fishing, and weakest in the mining and manufacturing sector. Furthermore, the extent of corruption control and progress in banking reform can be seen as somewhat less-effective factors when compared to the CIL index. Still, both measures contribute to lowering probability of distressed acquisition; the impact of corruption control is especially strong in the construction industry (**Table 5**, column 8) and in agriculture, forestry, and fishing (**Table 5**, column 2). A slightly lower effect is exhibited in nonfinancial services, followed by mining and manufacturing (**Table 5**, columns 11 and 5, respectively). Banking reform demonstrates similar but smaller effects, as compared to corruption control. Both factors are statistically insignificant in the financial services sector. We conclude that sectoral specifics do come into play, but the industry differences do not materially affect our baseline results.

Furthermore, in **Figure 2**, we show the dynamics of failed firms in the researched countries, along with the rate of firm restructuring via distressed acquisition. The key observation is that, after the post-2007 steep increase, the rate of distressed acquisitions declined remarkably in recent years. The 2007–2008 global financial shock not only struck a fatal blow to poorly performing firms but also pushed many healthy firms to financial distress and failure. The data in **Figure 2** may indicate that distressed acquisitions are actively used as a tool to restructure firms damaged by an exogenous economic shock. But how does the effect of institutions evolve over time? To obtain more insight, we estimate our model on a yearly basis and show the dynamic impact of institutions on distressed acquisitions (**Table 6**). For this assessment, we use the CIL index as an aggregate measure of the insolvency law factors, plus proxies for the level of banking reform and corruption control. In **Table 6**, these three institutional variables are estimated individually, but with firm-level variables, as in the baseline model. The majority of coefficients exhibit the hypothesized effect—that better institutions relevant to acquisition decrease the probability of acquisitions. The combined impact of the insolvency law factors represented by the CIL index increased steadily after the global financial crisis but lost pace after 2015. Thereafter, the coefficients are rather small, and the impact of these legal institutions becomes economically marginal. The impact of corruption control follows quite a similar pattern, but the effect of banking reform begins losing its impact after 2012. Both indicators of corruption control and banking reform exhibit temporary deviations from the pattern in 2014 and 2015, respectively. Overall, the role of institutions seems to be more decisive in connection to a period of severe economic development and temporarily afterwards, which makes sense intuitively. On the other hand, as the quality of institutions improves in researched countries on average, the impact of institutional quality might exhibit diminishing returns over time as well.

In the next step, we assess whether the effects of institutions vary across countries, and for that, we estimate our model to perform a robustness check based on key country groups. The results are reported in **Table A4**. First, we exclude Russia from the full sample because the country has the largest share of observations regarding distressed acquisitions. The exclusion of the Russia is meant to see whether this high proportion might affect baseline results. When we compare specific coefficients from the reduced sample (**Table A4**, columns 1–3) with the baseline results (**Table 4**, columns 4–6), we see that the impact of institutions in the full sample is somewhat larger than in the reduced sample; however, Russia alone, despite its high representation in our sample, does not drive the qualitative aspect of our results. In full as well as reduced samples, the higher level of institutions contributes to reducing the probability of distressed acquisitions. In Russia alone, the role of institutions seems to be more important, though. In the next step, we estimate a sub-sample formed only from firms in EU member countries (**Table A4**, columns 4–6) because it is likely that non-EU states are less developed in terms of institutional quality, and this might affect our results. Again, a comparison with our baseline results (**Table 4**, columns 4–6) shows that the exclusion of the non-EU countries does not qualitatively alter the baseline findings. However, interesting evidence emerges. The extent of corruption control seems to be equally important in the full sample (**Table 4**, column 5) as well as the sample without non-EU states (**Table A4**, column 5). On the other hand, the impact of aggregate institutions and banking reform is less important in EU members (**Table A4**, columns 5 and 6) than in the full sample (**Table 4**, columns 5 and 6). We interpret this finding to be further evidence of the higher level of institutions and progress in banking reform in EU members compared to non-EU countries but similarly weak corruption control in both groups. Finally, we exclude the newest EU members (Bulgaria, Croatia, and Romania) from the sample of those that joined the EU in 2004 (**Table A4**, columns 7–9), as the three somewhat less-reformed economies might affect results.[9] Again, comparison with our baseline evidence (**Table 4**, columns 4–6) shows that the exclusion of those three countries does not qualitatively alter the baseline results. Still, the effect of institutions is less pronounced in the sub-sample of firms from the seven most advanced countries researched (**Table A4**, columns 7–9) than in the EU subsample (**Table A4**, columns 4–6) or the full sample (**Table 4**, columns 4–6). Based on evidence from the robustness checks, we conclude that individual countries do not seem to qualitatively affect the baseline results of the impact of institutions on distressed acquisitions.

As a further inference from the above results, we conjecture that institutions have greater impact on distressed acquisitions in less-advanced countries (FSU and Balkan states) than in economically stronger ones (Central Europe and the Baltics). This difference might be due to weaker legal institutions relevant for firm bankruptcy and the liquidation of company assets in less-advanced countries. Because it is costlier and/or time-consuming to deal with management failures according to the law and other regulations, companies and investors in less-advanced countries might prefer to solve problems on their own via distressed acquisitions, without the involvement of courts and government. In other words, in less-advanced countries, distressed

[9] The countries that joined the EU on May 1, 2004, and that we cover in our analysis are the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, and Slovakia.

acquisitions might function as a substitute for weak formal institutions. Finally, the lesser impact of institutions in more advanced countries with higher levels of institutions provides indirect evidence of their diminishing marginal returns as the effect of institutions is larger (smaller) for countries where the quality of broadly measured institutions is lower (higher).

5 Concluding remarks

In this paper, we analyze what factors impact acquisitions of distressed firms in European emerging markets during and after the GFC (2007–2017). We identify 22,608 distressed acquisitions in a total of 17 European economies: Czech Republic, Hungary, Poland, Slovakia, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Montenegro, Romania, Serbia, Estonia, Latvia, Lithuania, Moldova, Russia, and Ukraine. Furthermore, we use a number of theoretically and empirically motivated factors, including financial ratios, indicators related to legal form, ownership structure, and other firm-specific variables. We also use several measures that characterize the quality level of institutions in each country. Our highly salient data enable us to assess such a wide array of factors in European emerging markets that are characterized by differences in economic development as well as variation in terms of institutional quality and the legal protection of property rights.

In our empirical assessment, we proceed in two stages that correspond to a Heckman two-stage probit model. In the first stage, we estimate the probability of distressed firm failure with a set of relevant variables. In the second stage, we employ a probability of acquisition of a distressed firm as our dependent variable and analyze factors behind the distress acquisition, which is in the center of our analysis. The procedure allows us to estimate equations of the selection model and the outcome model simultaneously.

Results from the first stage are broadly in line with those of a distress model presented in relevant empirical literature. Results from the second stage indicate that firm-specific factors exhibit mainly hypothesized effects. In terms of firm performance, financial ratios (ROA and solvency) plus labor productivity seem to be the most important performance factors behind acquiring distressed firms, as more profitable, solvent, and productive firms represent easier targets for effective restructuring.

The impact of institutions clearly shows that better institutions decrease the need for distressed acquisitions. Specifically, institutions related to insolvency law factors are important, in that a better level of compliance with international insolvency standards and the extent of the application of insolvency legislation exhibit similar and strong impacts that restrain the probability of distressed acquisition. The broad concept of institutional quality related to insolvency laws is also in line with the importance of legal rules protecting corporate creditors and ensuring enforcement. The extent of corruption control and progress in banking reform are also strong factors linked to lowering the probability of distressed acquisition. The impact of broadly defined institutions does not qualitatively differ across countries, but it somewhat varies across country groups, in that institutions exhibit a larger impact on distressed acquisitions in less-advanced countries as compared to economically stronger ones. The findings can be taken as indirect evidence for the existence of diminishing marginal returns of institutions with respect to their quality.

We also find that the effect of institutions increased after the GFC, but as the economic situation improved, their impact declined. This particular result is even more important today as the coronavirus crisis evolves around the globe. We might expect an increased role of institutions for firm-level developments as the crisis unveils the fragility of economic units and their need for solid ground in the form of strong and well-functioning institutions.

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Figure 1. Survival status of 247,501 firms in 17 European emerging economies at the end of 2017

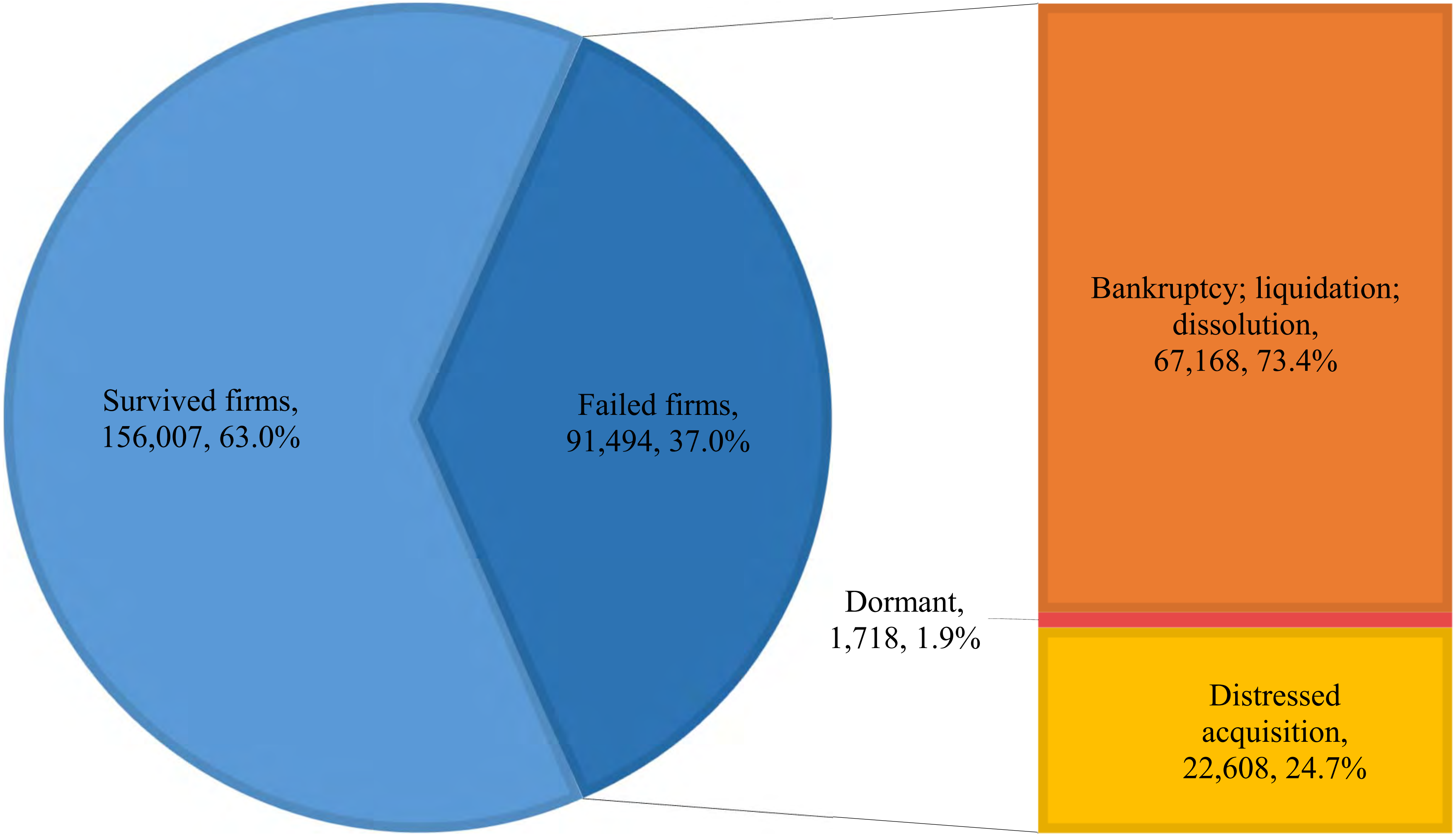


Table 1. Survival status of 247,501 firms and share of distressed acquisitions in failed firms in 17 European emerging economies, 2007–2017

	Number of firms operating at the end of 2006 (N)	Number of surviving firms (survivors) by the end of 2017 (A)	Number of failed firms by the end of 2017				Failure rate [a] (F/N)	Share of distressed acquisitions in failed firms (D/F)
			Total failed firms (F=B+C+D)	Bankruptcy; liquidation; dissolution (B)	Dormant (C)	Distressed acquisition (D)		
All 17 European emerging economies	247,501	156,007	91,494	67,168	1,718	22,608	0.370	0.247
Breakdown by country group								
Central European countries [b]	41,395	32,645	8,750	6,389	921	1,440	0.211	0.165
East European countries [c]	43,040	30,719	12,321	11,024	679	618	0.286	0.050
Baltic countries [d]	10,634	7,460	3,174	2,877	40	257	0.298	0.081
FSU countries [e]	152,432	85,183	67,249	46,878	78	20,293	0.441	0.302
Breakdown by sector (NACE Rev. 2 section)								
Agriculture, forestry, and fishing (Section A)	16,990	11,976	5,014	3,418	82	1,514	0.295	0.302
Mining and manufacturing (Sections B–E)	71,759	48,976	22,783	17,525	623	4,635	0.317	0.203
Construction (Section F)	29,937	16,654	13,283	10,296	251	2,736	0.444	0.206
Nonfinancial services (Sections G–J, L–S)	125,967	76,775	49,192	35,095	747	13,350	0.391	0.271
Financial service (Section K)	2,848	1,626	1,222	834	15	373	0.429	0.305

Notes :

[a] Denotes share of failed firms in firms operating at the end of 2006

[b] Czech Republic, Hungary, Poland, and Slovakia

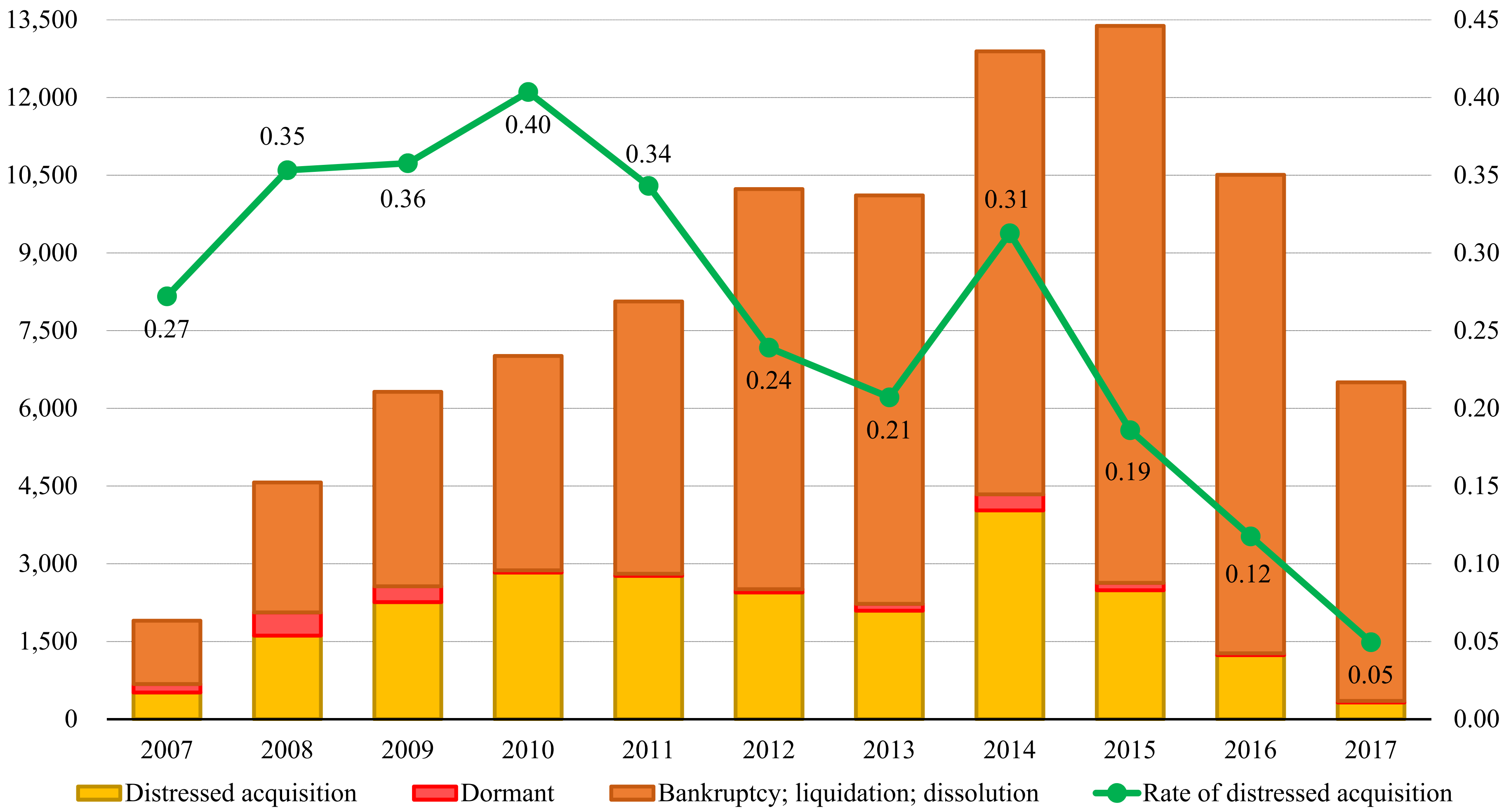
[c] Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Montenegro, Romania, and Serbia

[d] Estonia, Latvia, and Lithuania

[e] Moldova, Russia, and Ukraine

Source : Bureau van Dijk (BvD) Orbis database (https://webhelp.bvdep.com)

Figure 2. Dynamics of firm failure and distressed acquisitions in 17 European emerging economies during the period from 2007 to 2017



Note : The left axis is number of failed firms, while the right axis is the rate of distressed acquisitions (i.e., the share of distressed acquisitions in failed firms).

Table 2. Definitions and descriptive statistics of dependent variables used in the empirical analysis

Variable name	Definition	Descriptive statistics		
		Mean	S.D.	Median
Joint-stock company	Dummy variable for open joint-stock companies	0.193	0.395	0
Limited liability company	Dummy variable for limited liability companies	0.557	0.497	1
Large shareholding	Dummy for firms with a dominant and block shareholder(s)	0.807	0.394	1
Foreign ownership	Dummy for ultimate ownership of foreign investors	0.042	0.200	0
State ownership	Dummy for ultimate ownership of the state	0.051	0.221	0
Board size	Number of recorded members of the board of directors	1.855	2.162	1
International audit firm	Dummy for firms that employ an international audit firm as external auditor	0.013	0.115	0
ROA	Return on total assets (%) [a b]	0.447	3.468	0.100
Liquidity	Liquidity ratio (%) [b c]	0.209	1.022	0.000
Solvency	Solvency ratio (%) [b d]	0.188	5.107	0.100
Labor productivity	Natural logarithm of operating revenue per employee in Euros [b]	1.401	6.049	-0.062
Listed on stock market	Dummy for listed firms	0.021	0.142	0
Firm size	Natural logarithm of total assets in Euros [b]	21.157	103.978	-1.503
Firm age	Years in operation since the company's establishment [b]	0.135	2.340	0.000
Compliance with insolvency law	Normalized value of the EBRD indicator of the level of compliance with international insolvency standard	-0.238	0.944	0.000
Extensiveness of insolvency law	Normalized value of the EBRD indicator of the extensiveness of insolvency legal regimes	-0.264	0.874	-0.030
Enforceability of insolvency law	Normalized value of the EBRD indicator of the enforceability of charged assets	-0.501	0.778	-1.067
Comprehensive insolvency law index	First principal component score of the three insolvency law variables above [e]	0.000	1.445	0.564
Corruption control	Adjusted and normalized value of the Freedom House index of corruption [f]	-0.682	0.993	-1.419
Banking reform	Normalized value of the EBRD index of banking sector reform	-0.477	0.831	-0.609

Notes : The independent variables capture the firm and country-wide initial conditions in 2006 for firm failures and distressed acquisitions observed during the period of 2007–2017. The correlation matri of the variables is reported in Table A1.

[a] Computed using the following formula: (profit before tax/total assets) × 100

[b] Industry-adjusted value based on the method proposed by Eisenberg et al. (1998)

[c] Computed using the following formula: ((current assets - stocks)/current liabilities) × 100

[d] Computed using the following formula: (shareholder funds/total assets) × 100

[e] Table A2 reports the estimation results of the principal component analysis.

[f] Computed as 7 minus the value of the original index, which ranges between 1.00 (best) and 7.00 (worst)

Source : Country-level data from compliance with insolvency law to banking reform was obtained from EBRD (2006) and the website of the Freedom House and EBRD (https://freedomhouse.org/; http://www.ebrd.com/home). Firm-level raw data was extracted from the Bureau van Dijk (BvD) Orbis database (https://webhelp.bvdep.com).

Table 3. Univariate comparison between companies with different survival status

Variable name	Surival status						Univariate comparison between three survival statuses			Univariate comparison between bankruptcy/liquidation/dissolution and distressed acquisition	
	Survivor		Bankruptcy; liquidation; dissolution		Distressed acquisition		ANOVA (F)	Bartlett's test (χ^2)	Kruskal-Wallis equality-of-populations rank test (χ^2)	Test for equality of means (t) or test for equality of proportions (z)	Wilcoxon rank-sum test (z)
	Mean	Median	Mean	Median	Mean	Median					
Joint-stock company	0.204	0	0.183	0	0.144	0	263.800 ***	785.129 ***	245.759 ***	13.522 ***	13.522 ***
Limited liability company	0.533	1	0.589	1	0.631	1	580.020 ***	52.764 ***	854.603 ***	-10.988 ***	-10.988 ***
Large shareholding	0.854	1	0.709	1	0.775	1	3339.430 ***	6600.000 ***	3034.346 ***	-19.223 ***	-19.223 ***
Foreign ownership	0.052	0	0.022	0	0.034	0	538.070 ***	15000.000 ***	128.907 ***	-10.117 ***	-10.117 ***
State ownership	0.056	0	0.033	0	0.074	0	367.420 ***	6800.000 ***	106.906 ***	-25.581 ***	-25.581 ***
Board size	2.058	1	1.568	1	1.307	1	2043.290 ***	12000.000 ***	5177.834 ***	19.664 ***	12.695 ***
International audit firm	0.016	0	0.005	0	0.018	0	239.590 ***	27000.000 ***	18.816 ***	-18.716 ***	-18.716 ***
ROA	0.833	1.179	-0.253	-1.404	-0.073	-1.237	2448.740 ***	65.642 ***	5087.818 ***	-6.527 ***	-6.476 ***
Liquidity	0.280	0.200	0.058	-0.265	0.182	-0.141	1047.540 ***	1300.000 ***	2649.824 ***	-16.303 ***	-13.822 ***
Solvency	1.013	2.618	-1.461	-3.333	-0.514	-2.587	5611.440 ***	154.849 ***	10078.284 ***	-24.198 ***	-22.458 ***
Labor productivity	1.687	0.925	0.950	-0.720	0.864	-1.226	412.900 ***	365.457 ***	919.270 ***	1.856 *	8.014 ***
Listed on stock market	0.026	0	0.014	0	0.003	0	344.630 ***	31000.000 ***	41.425 ***	13.688 ***	13.687 ***
Firm size	25.644	8.043	13.033	-9.088	15.203	-10.684	366.750 ***	39000.000 ***	983.511 ***	-4.332 ***	2.753 ***
Firm age	0.468	1.000	-0.368	-1.414	-0.662	-1.414	4609.180 ***	767.330 ***	10017.330 ***	17.383 ***	14.427 ***
Compliance with insolvency law	-0.232	0.000	-0.068	0.000	-0.778	0.000	4982.790 ***	5700.000 ***	6337.784 ***	111.097 ***	97.424 ***
Extensiveness of insolvency law	-0.268	-0.030	-0.103	-0.030	-0.720	-0.030	4377.100 ***	4400.000 ***	5813.608 ***	103.833 ***	89.708 ***
Enforceability of insolvency law	-0.412	-0.342	-0.644	-1.067	-0.684	-1.067	2827.240 ***	8700.000 ***	3809.351 ***	7.905 ***	-17.094 ***
Comprehensive insolvency law index	-0.032	0.564	0.300	0.564	-0.671	0.564	4056.420 ***	4700.000 ***	5019.515 ***	97.446 ***	80.494 ***
Corruption control	-0.532	-1.419	-0.858	-1.419	-1.195	-1.419	6153.680 ***	6600.000 ***	9090.681 ***	51.624 ***	55.438 ***
Banking reform	-0.349	-0.609	-0.679	-1.126	-0.764	-1.126	5406.500 ***	9600.000 ***	8838.249 ***	15.783 ***	-19.545 ***

Notes : *** and * denote statistical significance at the 1% and 10% levels, respectively. Table 2 provides definitions and descriptive statistics of variables.

Table 4. Determinants of distressed acquisition in 17 European emerging economies: Baseline estimation

Model	[1]	[2]	[3]	[4]	[5]	[6]
Joint-stock company	-0.23741 ***	-0.23434 ***	-0.07961 ***	-0.18743 ***	-0.16548 ***	-0.09281 ***
	(0.0150)	(0.0144)	(0.0128)	(0.0123)	(0.0134)	(0.0129)
Limited liability company	-0.14563 ***	-0.15098 ***	-0.03522 ***	-0.12939 ***	-0.01089	-0.06052 ***
	(0.0133)	(0.0127)	(0.0108)	(0.0108)	(0.0114)	(0.0108)
Large shareholding	0.80117 ***	0.78620 ***	0.23023 ***	0.80605 ***	0.19263 ***	0.22548 ***
	(0.0123)	(0.0116)	(0.0103)	(0.0101)	(0.0105)	(0.0103)
Foreign ownership	0.30737 ***	0.31599 ***	0.00241	0.28259 ***	0.12959 ***	0.04354 **
	(0.0277)	(0.0265)	(0.0211)	(0.0226)	(0.0225)	(0.0213)
State ownership	0.03778 *	0.02691	0.32809 ***	0.01797	0.27311 ***	0.32092 ***
	(0.0227)	(0.0219)	(0.0170)	(0.0184)	(0.0177)	(0.0171)
ROA	0.02668 ***	0.02709 ***	0.02461 ***	0.02940 ***	0.02147 ***	0.02506 ***
	(0.0015)	(0.0014)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
Liquidity	0.01929 ***	0.01540 ***	0.02214 ***	0.00712 *	0.02505 ***	0.02339 ***
	(0.0050)	(0.0048)	(0.0042)	(0.0042)	(0.0042)	(0.0042)
Solvency	0.02812 ***	0.02985 ***	0.00574 ***	0.03388 ***	0.00614 ***	0.00466 ***
	(0.0012)	(0.0012)	(0.0009)	(0.0009)	(0.0010)	(0.0009)
Labor productivity	0.00682 ***	0.00555 ***	0.00527 ***	0.00694 ***	0.00020	0.00086
	(0.0008)	(0.0008)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Listed on stock market	-0.18350 ***	-0.15395 ***	-0.45057 ***	-0.09948 **	-0.40670 ***	-0.52947 ***
	(0.0622)	(0.0586)	(0.0518)	(0.0461)	(0.0527)	(0.0517)
Firm size	0.00065 ***	0.00058 ***	0.00001	0.00054 ***	0.00018 ***	0.00011 *
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Firm age	-0.01286 ***	-0.01742 ***	-0.07773 ***	-0.03390 ***	-0.05756 ***	-0.06558 ***
	(0.0031)	(0.0030)	(0.0019)	(0.0022)	(0.0020)	(0.0019)
Compliance with insolvency law	-0.58022 ***					
	(0.0087)					
Extensiveness of insolvency law		-0.59874 ***				
		(0.0094)				
Enforceability of insolvency law			-0.19699 ***			
			(0.0068)			
Comprehensive insolvency law index				-0.30818 ***		
				(0.0043)		
Corruption control					-0.32638 ***	
					(0.0060)	
Banking reform						-0.25361 ***
						(0.0068)
NACE division-level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	213750	213750	213750	213750	213750	213750
Censored observations	133766	133766	133766	133766	133766	133766
Uncensored observations	79987	79987	79987	79987	79987	79987
Log likelihood	-161065.300	-161396.300	-164734.300	-161541.100	-163426.400	-164425.400
Wald test (χ^2)	17714.850 ***	18218.530 ***	6540.740 ***	21656.770 ***	8034.150 ***	6957.810 ***
ρ	-0.737	-0.785	0.982	-0.928	0.962	0.981
LR test (χ^2)	413.21 ***	436.75 ***	3552.48 ***	943.84 ***	4215.81 ***	4217.48 ***

Notes : This table contains estimation results of a Heckman probit model with a sample selection of the determinants of distressed acquisition. The coefficient on a constant term is omitted from the table. The estimation results of the first stage are reported in Table A3. Table 2 provides detailed definitions and descriptive statistics of the independent variables used in the estimation. Figures in parentheses are robust standard errors. The Wald test examines the null hypothesis that all coefficients are zero. The LR test of independence of equations examines the null hypothesis that ρ = 0. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5. Determinants of distressed acquisition: Estimation by industry

Target industry	Agriculture, forestry, and fishing (Section A)			Mining and manufacturing (Sections B–E)			Construction (Section F)			Nonfinancial services (Sections G–J, L–S)			Financial service (Section K)		
Model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
Joint-stock company	-0.04067	-0.10973 **	-0.07632	-0.14791 ***	-0.05184 **	0.03192	-0.12643 **	-0.22762 ***	-0.08344 **	-0.17617 ***	-0.25014 ***	-0.17819 ***	-0.16610	-0.23401	-0.23590
	(0.0591)	(0.0480)	(0.0483)	(0.0197)	(0.0250)	(0.0238)	(0.0520)	(0.0404)	(0.0378)	(0.0185)	(0.0199)	(0.0191)	(0.2113)	(0.1562)	(0.1621)
Limited liability company	0.09890 *	0.17405 ***	0.21514 ***	0.00101	0.12682 ***	0.16953 ***	-0.03958	-0.03063	-0.09031 ***	-0.14620 ***	-0.09125 ***	-0.03576 **	-0.36703 *	-0.45904 ***	-0.46634 ***
	(0.0534)	(0.0400)	(0.0404)	(0.0185)	(0.0224)	(0.0214)	(0.0456)	(0.0346)	(0.0315)	(0.0157)	(0.0163)	(0.0155)	(0.2163)	(0.1634)	(0.1695)
Large shareholding	0.82692 ***	0.08807 **	0.05946	0.82527 ***	0.23338 ***	0.24928 ***	0.50998 ***	0.21815 ***	0.25386 ***	0.80033 ***	0.18649 ***	0.22868 ***	0.65423 ***	0.12478	0.15503
	(0.0520)	(0.0393)	(0.0442)	(0.0173)	(0.0210)	(0.0207)	(0.0779)	(0.0285)	(0.0280)	(0.0146)	(0.0147)	(0.0145)	(0.1756)	(0.1132)	(0.1215)
Foreign ownership	0.65989 ***	0.61582 ***	0.53477 ***	0.25969 ***	0.06399 *	-0.00591	-0.07006	0.15800	-0.01218	0.21239 ***	0.17573 ***	0.09222 ***	-0.02492	0.02542	-0.03700
	(0.1801)	(0.1417)	(0.1399)	(0.0321)	(0.0370)	(0.0346)	(0.1566)	(0.1185)	(0.1113)	(0.0322)	(0.0318)	(0.0304)	(0.2235)	(0.1707)	(0.1794)
State ownership	0.01511	0.15588 **	0.16092 **	0.01056	0.29954 ***	0.34289 ***	0.58535 ***	0.47093 ***	0.53143 ***	0.11492 ***	0.28756 ***	0.34490 ***	0.03150	0.11237	0.13145
	(0.0912)	(0.0700)	(0.0711)	(0.0294)	(0.0322)	(0.0309)	(0.0807)	(0.0591)	(0.0570)	(0.0267)	(0.0249)	(0.0240)	(0.2477)	(0.1873)	(0.1937)
ROA	0.05775 ***	0.02693 ***	0.02500 ***	0.03886 ***	0.02058 ***	0.02370 ***	-0.00193	-0.01257 ***	-0.01930 ***	0.02268 ***	0.02082 ***	0.02378 ***	0.00338	-0.02344 *	-0.02510 *
	(0.0087)	(0.0058)	(0.0061)	(0.0022)	(0.0026)	(0.0025)	(0.0051)	(0.0036)	(0.0035)	(0.0016)	(0.0017)	(0.0017)	(0.0181)	(0.0127)	(0.0129)
Liquidity	0.06283 ***	-0.01461	-0.02346	0.01694 **	0.03851 ***	0.03695 ***	0.04721 **	0.02534 *	0.01837	0.02239 ***	0.03061 ***	0.03090 ***	0.05201 **	0.03664 *	0.03895 **
	(0.0226)	(0.0175)	(0.0180)	(0.0085)	(0.0095)	(0.0092)	(0.0197)	(0.0150)	(0.0149)	(0.0055)	(0.0056)	(0.0055)	(0.0241)	(0.0190)	(0.0196)
Solvency	0.03215 ***	-0.00428	-0.00044	0.04469 ***	0.00476 **	0.00466 **	0.00990 *	-0.00168	0.00224	0.03423 ***	0.00989 ***	0.00840 ***	-0.01582	-0.02108 **	-0.02059 **
	(0.0048)	(0.0037)	(0.0038)	(0.0016)	(0.0019)	(0.0018)	(0.0054)	(0.0031)	(0.0030)	(0.0013)	(0.0013)	(0.0013)	(0.0118)	(0.0086)	(0.0089)
Labor productivity	-0.01063	-0.04078 ***	-0.05733 ***	0.01062 ***	0.00332 **	0.00166	0.00172	0.00034	0.00048	0.00536 ***	0.00072	-0.00021	-0.01002	-0.00477	-0.00621
	(0.0075)	(0.0061)	(0.0063)	(0.0014)	(0.0015)	(0.0015)	(0.0034)	(0.0028)	(0.0027)	(0.0009)	(0.0009)	(0.0008)	(0.0066)	(0.0051)	(0.0053)
Listed on stock market	0.06552	-0.28409	-0.69578 *	-0.10976 **	-0.35801 ***	-0.46184 ***	-0.71388 **	-0.78461 ***	-0.90720 ***	-0.02094	-0.51874 ***	-0.64091 ***	0.30049	0.13989	0.11820
	(0.4312)	(0.3772)	(0.3848)	(0.0499)	(0.0681)	(0.0667)	(0.3054)	(0.2384)	(0.2357)	(0.0909)	(0.1061)	(0.1021)	(0.5235)	(0.3690)	(0.3851)
Firm size	-0.00010	-0.00096 **	-0.00095 **	0.00038 ***	0.00029 ***	0.00023 **	-0.00045	-0.00045	-0.00054 **	0.00080 ***	0.00025 **	0.00019 *	0.00052	-0.00050	-0.00053
	(0.0005)	(0.0004)	(0.0004)	(0.0001)	(0.0001)	(0.0001)	(0.0004)	(0.0003)	(0.0003)	(0.0001)	(0.0001)	(0.0001)	(0.0005)	(0.0004)	(0.0004)
Firm age	-0.02597 **	-0.04724 ***	-0.06168 ***	-0.01812 ***	-0.03386 ***	-0.03948 ***	-0.09924 ***	-0.07057 ***	-0.08212 ***	-0.05974 ***	-0.07361 ***	-0.08476 ***	-0.03818	-0.07331 ***	-0.07610 ***
	(0.0113)	(0.0081)	(0.0083)	(0.0030)	(0.0034)	(0.0033)	(0.0100)	(0.0062)	(0.0060)	(0.0036)	(0.0030)	(0.0029)	(0.0322)	(0.0229)	(0.0233)
Comprehensive insolvency law index	-0.41799 ***			-0.22853 ***			-0.38418 ***			-0.30268 ***			-0.37073 ***		
	(0.0165)			(0.0062)			(0.0224)			(0.0065)			(0.0659)		
Corruption control		-0.43025 ***			-0.28056 ***			-0.43377 ***			-0.33214 ***			-0.07548	
		(0.0362)			(0.0100)			(0.0196)			(0.0090)			(0.0705)	
Banking reform			-0.18228 ***			-0.23718 ***			-0.29851 ***			-0.24479 ***			0.05148
			(0.0438)			(0.0117)			(0.0199)			(0.0100)			(0.1109)
NACE division-level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	15253	15253	15253	60671	60671	60671	26190	26190	26190	109618	109618	109618	2023	2023	2023
Censored observations	10764	10764	10764	41436	41436	41436	14451	14451	14451	66032	66032	66032	1083	1083	1083
Uncensored observations	4489	4489	4489	19235	19235	19235	11739	11739	11739	43586	43586	43586	940	940	940
Log likelihood	-9931.863	-10073.150	-10144.090	-41364.220	-42053.030	-42286.210	-21080.860	-21127.670	-21326.210	-85567.860	-86546.700	-87037.140	-1742.939	-1761.735	-1762.180
Wald test (χ^2)	1466.78 ***	483.97 ***	394.41 ***	6345.34 ***	1632.81 ***	1304.84 ***	1143.88 ***	1044.69 ***	849.67 ***	11464.22 ***	4448.84 ***	4002.51 ***	70.41 ***	41.00 ***	38.35 ***
ρ	-0.735	0.920	0.897	-0.976	0.956	0.984	-0.078	0.963	0.985	-0.935	0.958	0.978	-0.439	0.907	0.861
LR test (χ^2)	19.53 ***	295.46 ***	114.14 ***	540.06 ***	740.87 ***	743.88 ***	1.50	784.43 ***	914.32 ***	406.36 ***	1809.98 ***	1725.70 ***	0.21	29.67 ***	16.81 ***

Notes : This table contains estimation results of a Heckman probit model with a sample selection of the determinants of distressed acquisition. The coefficient on a constant term is omitted from the table. The estimation results of the first stage are reported in Table A3. Table 2 provides detailed definitions and descriptive statistics of the independent variables used i estimation. Figures in parentheses are robust standard errors. The Wald test examines the null hypothesis that all coefficients are zero. The LR test of independence of equations examines the null hypothesis that ρ = 0. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6. Determinants of distressed acquisition: Estimation by year focusing on the impacts of country-level factors

Observation year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Comprehensive insolvency law index	0.12917 ***	0.01650 ***	-0.00168	-0.06137 ***	-0.11460 ***	-0.14921 ***	-0.13027 ***	-0.22255 ***	-0.13644 ***	-0.05829 ***	-0.02594 ***
	(0.0072)	(0.0053)	(0.0044)	(0.0046)	(0.0046)	(0.0046)	(0.0047)	(0.0026)	(0.0033)	(0.0065)	(0.0066)
Corruption control	-0.01093	-0.10207 ***	-0.13412 ***	-0.17408 ***	-0.32333 ***	-0.24263 ***	-0.16855 ***	-0.26402 ***	-0.19521 ***	0.05154 ***	0.04425 ***
	(0.0175)	(0.0115)	(0.0098)	(0.0111)	(0.0113)	(0.0085)	(0.0084)	(0.0072)	(0.0090)	(0.0039)	(0.0066)
Banking reform	-0.24467 ***	-0.14256 ***	-0.14616 ***	-0.05033 ***	-0.20199 ***	-0.24246 ***	-0.19711 ***	-0.06740 ***	-0.18915 ***	0.05343 ***	0.04207 ***
	(0.0209)	(0.0168)	(0.0129)	(0.0132)	(0.0141)	(0.0131)	(0.0143)	(0.0112)	(0.0138)	(0.0050)	(0.0083)
N	213756	212446	209046	203842	197780	190598	181416	172527	161157	148926	139764
Censored observations	212446	209046	203842	197780	190598	181416	172527	161157	148926	139764	132924
Uncensored observations	1310	3400	5204	6062	7182	9182	8889	11370	12231	9162	5998

Notes : This table contains estimation results of a Heckman probit model with a sample selection of the determinants of distressed acquisition. The coefficients of firm-level variables and a constant term are omitted. Table 2 provides detailed definitions and descriptive statistics of the independent variables used in the estimation. Figures in parentheses are robust standard errors. *** denotes statistical significance at the 1% level.

Appendix

Table A1. Correlation matrix of variables used in empirical analysis

	Joint-stock company	Limited liability company	Large shareholding	Foreign ownership	State ownership	Board size	International audit firm	ROA	Liquidity	Solvency
Joint-stock company	1.000									
Limited liability company	-0.546	1.000								
Large shareholding	-0.009	0.137	1.000							
Foreign ownership	-0.027	0.002	0.102	1.000						
State ownership	0.059	-0.180	0.114	-0.048	1.000					
Board size	0.277	-0.272	0.039	0.079	0.062	1.000				
International audit firm	0.018	-0.008	0.035	0.210	-0.003	0.107	1.000			
ROA	-0.048	0.075	0.125	0.002	-0.042	-0.034	0.009	1.000		
Liquidity	0.025	0.000	0.018	0.030	0.002	0.022	0.023	0.268	1.000	
Solvency	0.079	-0.125	0.009	0.012	0.091	0.087	0.023	0.366	0.441	1.000
Labor productivity	-0.019	0.049	0.061	0.150	-0.047	0.086	0.159	0.095	0.028	-0.022
Listed on stock market	0.197	-0.143	0.026	0.015	0.015	0.209	0.028	-0.063	-0.005	0.062
Firm size	0.084	-0.106	0.039	0.135	0.098	0.244	0.223	-0.053	0.031	0.031
Firm age	0.199	-0.264	0.024	0.006	0.100	0.223	0.061	-0.016	0.029	0.254
Compliance with insolvency law	-0.013	-0.017	0.252	0.049	-0.059	0.092	-0.005	0.080	-0.010	-0.085
Extensiveness of insolvency law	-0.006	-0.020	0.245	0.042	-0.050	0.076	-0.001	0.082	-0.016	-0.088
Enforceability of insolvency law	-0.095	-0.092	-0.165	0.097	-0.078	0.232	0.033	-0.052	0.025	0.053
Comprehensive insolvency law index	0.011	0.001	0.266	0.023	-0.035	0.031	-0.009	0.086	-0.017	-0.091
Corruption control	-0.120	-0.083	-0.027	0.164	-0.081	0.223	0.190	0.004	0.035	0.073
Banking reform	-0.114	-0.039	-0.117	0.135	-0.060	0.196	0.165	-0.029	0.054	0.089

(contined)

Table A1. (continued)

	Labor productivity	Listed on stock market	Firm size	Firm age	Compliance with insolvency law	Extensiveness of insolvency law	Enforceability of insolvency law	Comprehensive insolvency law index	Corruption control	Banking reform
Labor productivity	1.000									
Listed on stock market	-0.016	1.000								
Firm size	0.332	0.134	1.000							
Firm age	0.071	0.163	0.170	1.000						
Compliance with insolvency law	0.113	0.129	0.042	0.078	1.000					
Extensiveness of insolvency law	0.069	0.131	0.023	0.066	0.984	1.000				
Enforceability of insolvency law	0.062	-0.025	0.041	0.082	0.209	0.261	1.000			
Comprehensive insolvency law index	0.074	0.127	0.022	0.051	0.971	0.982	0.423	1.000		
Corruption control	0.210	0.018	0.114	0.221	0.273	0.232	0.579	0.119	1.000	
Banking reform	0.264	-0.061	0.139	0.202	0.039	0.099	0.763	0.219	0.860	1.000

Note : For definitions and descriptive statistics of the variables, see Table 2.

Table A2. Estimation results of the principal component analysis of solvency law variables

Eigenvalue of the correlation matrix				Eigenvectors of the first component	
Component no.	Eigenvalue	Difference	Cumulative percentage of total variance	Variables	Eigenvector
1	2.0860	1.186	0.695	Compliance with insolvency law	0.6724
2	0.8996	0.885	0.995	Extensiveness of insolvency law	0.6797
3	0.0144	.	1.000	Enforceability of insolvency law	0.2929

Note : For definitions and descriptive statistics of the variables, see Table 2.

Table A3. Determinants of firm distress: Estimation results of the first stage of a Heckman probit analysis with sample selection

Target industry	All industries	Agriculture, forestry, and fishing (Section A)	Mining and manufacturing (Sections B–E)	Construction (Section F)	Nonfinancial services (Sections G–J, L–S)	Financial service (Section K)
Model	Table 4 Model [1]	Table 5 Model [1]	Table 5 Model [4]	Table 5 Model [7]	Table 5 Model [10]	Table 5 Model [13]
Joint-stock company	0.10514 ***	0.05479	0.12666 ***	0.05119	0.01445	0.07995
	(0.0114)	(0.0351)	(0.0198)	(0.0380)	(0.0168)	(0.1332)
Limited liability company	0.14333 ***	0.11523 ***	0.06255 ***	0.08937 **	0.07586 ***	-0.01891
	(0.0104)	(0.0305)	(0.0188)	(0.0354)	(0.0148)	(0.1399)
Large shareholding	-0.75680 ***	-0.74997 ***	-0.81484 ***	-0.75683 ***	-0.71985 ***	-0.50416 ***
	(0.0087)	(0.0302)	(0.0155)	(0.0250)	(0.0131)	(0.0918)
Foreign ownership	-0.12978 ***	0.02218	-0.18128 ***	-0.14341 *	-0.08211 ***	0.07612
	(0.0171)	(0.1046)	(0.0258)	(0.0804)	(0.0249)	(0.1416)
State ownership	0.26494 ***	0.17731 ***	0.17297 ***	0.32180 ***	0.34740 ***	0.11691
	(0.0141)	(0.0512)	(0.0247)	(0.0512)	(0.0199)	(0.1463)
Board size	-0.04625 ***	0.00447	-0.02772 ***	0.00311	-0.03255 ***	-0.13792 ***
	(0.0027)	(0.0197)	(0.0035)	(0.0124)	(0.0039)	(0.0391)
Board size^2	0.00054 ***	-0.00544 ***	0.00021	-0.00202 *	0.00040 *	0.00834 ***
	(0.0002)	(0.0020)	(0.0002)	(0.0011)	(0.0002)	(0.0026)
International audit firm	0.40223 ***	0.19007	0.34319 ***	-0.09518	0.41628 ***	0.39614
	(0.0289)	(0.3684)	(0.0354)	(0.1502)	(0.0379)	(0.2927)
ROA	-0.03774 ***	-0.08097 ***	-0.04205 ***	-0.02905 ***	-0.02987 ***	-0.04084 ***
	(0.0010)	(0.0043)	(0.0019)	(0.0028)	(0.0013)	(0.0101)
Liquidity	0.02346 ***	-0.04928 ***	0.01993 ***	0.00223	0.05225 ***	-0.00469
	(0.0033)	(0.0128)	(0.0071)	(0.0114)	(0.0044)	(0.0156)
Solvency	-0.03796 ***	-0.03580 ***	-0.04584 ***	-0.03929 ***	-0.04254 ***	-0.02747 ***
	(0.0007)	(0.0028)	(0.0014)	(0.0024)	(0.0010)	(0.0070)
Labor productivity	-0.00525 ***	-0.00672	-0.00379 ***	-0.00142	-0.00545 ***	0.00785 **
	(0.0006)	(0.0046)	(0.0012)	(0.0022)	(0.0008)	(0.0039)
Listed on stock market	-0.01594	-0.19629	0.03182	-0.22871 ***	-0.12198 **	0.11401
	(0.0255)	(0.1654)	(0.0337)	(0.0764)	(0.0499)	(0.2684)
Firm size	-0.00004	-0.00026	-0.00005	-0.00026	-0.00010	-0.00120 ***
	(0.0000)	(0.0003)	(0.0001)	(0.0002)	(0.0001)	(0.0003)
Firm age	-0.06520 ***	-0.02003 ***	-0.03314 ***	-0.07200 ***	-0.10299 ***	-0.08080 ***
	(0.0015)	(0.0060)	(0.0024)	(0.0046)	(0.0023)	(0.0178)
Country-level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
NACE division-level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes : This table contains estimation results of the first stage of a Heckman probit model with a sample selection of the determinants of distressed acquisition. The coefficient on a constant term is omitted from the table. The dependent variable is a dummy variable for failed firms. The estimation results of the second stage are reported in Tables 4 and 5. Table 2 provides detailed definitions and descriptive statistics of the independent variables used in the estimation. Figures in parentheses are robust standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A4. Determinants of distressed acquisition: Estimation by country group for robustness check

Target country group	Without Russia			EU member states			EU member states excluding Bulgaria, Croatia, and Romania		
Model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Joint-stock company	0.00748	0.11258***	0.11525***	0.50079***	0.18600***	0.41682***	-0.07046*	0.05832***	0.00377
	(0.0169)	(0.0093)	(0.0085)	(0.0327)	(0.0367)	(0.0337)	(0.0390)	(0.0158)	(0.0456)
Limited liability company	0.14646***	0.22215***	0.20255***	0.37816***	0.10053***	0.28051***	-0.11150***	0.09657***	-0.10927***
	(0.0121)	(0.0066)	(0.0064)	(0.0243)	(0.0251)	(0.0275)	(0.0351)	(0.0142)	(0.0406)
Large shareholding	0.45712***	0.18569***	0.01482*	0.67774***	0.66876***	0.70567***	0.56686***	0.08010***	0.57624***
	(0.0112)	(0.0073)	(0.0089)	(0.0212)	(0.0216)	(0.0198)	(0.0251)	(0.0117)	(0.0287)
Foreign ownership	0.15855***	0.10416***	0.01684	0.21216***	0.21595***	0.20835***	0.20289***	0.11531***	0.26687***
	(0.0210)	(0.0127)	(0.0119)	(0.0308)	(0.0318)	(0.0290)	(0.0388)	(0.0165)	(0.0443)
State ownership	-0.03841	0.08796***	0.23680***	0.05420	0.06430	0.03884	0.16877***	0.25697***	0.22413***
	(0.0257)	(0.0140)	(0.0131)	(0.0528)	(0.0548)	(0.0507)	(0.0620)	(0.0256)	(0.0674)
ROA	0.03522***	0.01795***	0.00218**	0.02335***	0.02237***	0.02530***	0.03328***	0.00400***	0.03523***
	(0.0016)	(0.0010)	(0.0010)	(0.0029)	(0.0030)	(0.0028)	(0.0038)	(0.0015)	(0.0043)
Liquidity	0.03225***	0.01697***	0.01432***	0.05729***	0.07105***	0.05597***	0.07628***	0.03510***	0.09189***
	(0.0060)	(0.0034)	(0.0031)	(0.0119)	(0.0123)	(0.0112)	(0.0154)	(0.0062)	(0.0177)
Solvency	0.03829***	0.02139***	0.00936***	0.04319***	0.04044***	0.04237***	0.04005***	0.00853***	0.03779***
	(0.0012)	(0.0008)	(0.0008)	(0.0023)	(0.0024)	(0.0021)	(0.0029)	(0.0012)	(0.0033)
Labor productivity	0.00312***	0.00280***	0.00244***	0.00699***	0.00778***	0.00520***	-0.00094	0.00313***	0.00050
	(0.0008)	(0.0005)	(0.0004)	(0.0013)	(0.0014)	(0.0014)	(0.0017)	(0.0006)	(0.0019)
Listed on stock market	-0.14337***	-0.24148***	-0.34289***	-0.38563***	-0.30980***	-0.35137***	-0.32054	-0.12668*	-0.59952**
	(0.0380)	(0.0191)	(0.0178)	(0.0742)	(0.0762)	(0.0690)	(0.2365)	(0.0754)	(0.2868)
Firm size	0.00013*	-0.00002	-0.00002	0.00135***	0.00153***	0.00121***	0.00145***	0.00075***	0.00138***
	(0.0001)	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0002)
Firm age	0.02128***	0.00925***	-0.01172***	0.04038***	0.03519***	0.03982***	0.01597***	0.00698***	0.01382***
	(0.0022)	(0.0013)	(0.0012)	(0.0036)	(0.0038)	(0.0034)	(0.0045)	(0.0018)	(0.0050)
Comprehensive insolvency law index	-0.15462***			-0.02210***			-0.13306***		
	(0.0035)			(0.0085)			(0.0105)		
Corruption control		-0.21455***			-0.37488***			-0.19305***	
		(0.0030)			(0.0269)			(0.0133)	
Banking reform			-0.20781***			-0.05751***			-0.13415***
			(0.0044)			(0.0208)			(0.0727)
NACE division-level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	105968	105968	105968	61853	61853	61853	36481	36481	36481
Censored observations	77112	77112	77112	46887	46887	46887	29311	29311	29311
Uncensored observations	28856	28856	28856	14966	14966	14966	7170	7170	7170
Log likelihood	-69398.470	-70728.590	-72666.180	-34081.650	-33963.060	-34081.690	-18739.690	-18710.840	-18668.540
Wald test (χ^2)	7758.51***	8257.61***	5473.81***	4323.77***	4255.81***	4739.97***	1966.71***	1266.53***	1675.31***
ρ	-0.994	-0.855	-0.954	-0.931	-0.923	-0.954	-0.962	-0.337	0.788
LR test (χ^2)	466.27***	317.18***	512.19***	389.98***	377.80***	314.62***	358.90***	50.53***	16.86***

Notes : This table contains estimation results of a Heckman probit model with a sample selection of the determinants of distressed acquisition. The coefficient on a constant term is omitted from the table. Table 2 provides detailed definitions and descriptive statistics of the independent variables used in the estimation. Figures in parentheses are robust standard errors. The Wald test examines the null hypothesis that all coefficients are zero. The LR test of independence of equations examines the null hypothesis that $\rho = 0$. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.