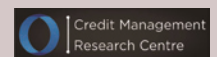# Private Equity
and **Insolvency**

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Private Equity
and Insolvency

Contents

Executive Summary

The following questions are examined to look at the relationship, if any, between private equity (PE) and insolvency:
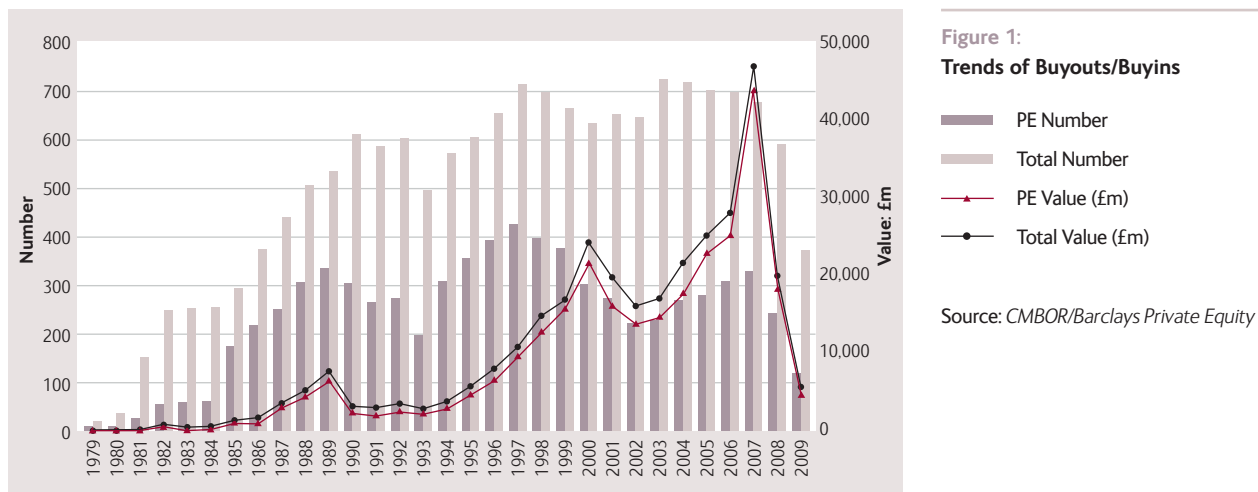
- Whether the likelihood of insolvency ('failure') is higher for buyouts in general and for PE-backed buyouts in particular, than non-buyout firms?
- What processes are involved in resolving distressed private equity deals? and
- Whether the proportion of secured debt recovered in the event of receivership is higher for buyouts than public companies, and if so, why?

- To study the determinants of failure, defined as entering the receivership or administration process, we constructed a unique dataset comprising 1.97million individual private companies and over 10 million company-year observations in the UK over the period 1995-2009. Of these, over 140,000 had failed.

- In the failure analysis we distinguish 3 types of buyout: management buyouts (MBO's) and management buyins (MBI's) that have received no private equity backing, and MBO/MBI's that have had private equity involvement.

- Our analysis indicates that, in line with popular perceptions, the *level* of leverage (the total level of debt in relation to shareholder funds and to assets) is higher for buyouts compared with other companies. However PE-backed buyouts have a significantly better *coverage ratio* (the ability to *pay* interest on debt from profit and cash-flow).

- PE firms seem to select the best opportunities from the potential (risky) buyout population in terms of company's prospective profitability, ability to generate cash and therefore cover the interest on debt.

- As might be expected in restructuring situations, buyouts are more prone to failure than other types of company. However, it is noteworthy that PE involvement significantly reduced the risk of buyout failure.

- Controlling for operational risk, financial risk and governance, PE-backed buyouts are *less* likely to fail than non PE-backed buyouts. This suggests that of two otherwise identical buyouts, the one that is PE-backed is the better managed of the two.

- This finding is also consistent with the fact that, leverage levels do not distinguish buyouts that fail from those that survive. Once again, the distinguishing feature appears to be how the companies are managed and their ability to generate cash.

- A more positive approach by banks since the start of 2009 regarding receivership is evident. This suggests that PE firms might need to be more proactive in approaching banks with potential solutions to distress problems; an approach that should be important for future bank-PE relationships when markets recover.

- Banks need to give more recognition to incumbent management's skills in turning around distressed firms and in ensuring adequate incentives after restructuring.

- Debt-equity swaps re-price risk and reward, but are risky as banks do not have the skills to manage the business in which the swap has taken place. Banks appear to be adding equity to their balance sheets, while treating it as debt.

- Debt-equity swaps may have major adverse implications for companies' longer term strategies, especially if the underlying business was sound. While PE firms may be left with a rump equity stake, some banks are recognising the importance of continuing to involve PE firms so that the business can recover value.

- Where restructuring takes place, exits will be likely to be delayed by up to two years as they will now take significantly longer than originally envisaged. It is anticipated that the banks will soon seek to recover value through equity sales, which may mean an increase in receiverships or sales to distress funds.

- Coordination of distressed deals with many different debt providers with different objectives is being addressed by 'thought-leader' groups involving representatives of the more experienced debt providers.

- Distress debt funds have established a market presence but not to the extent expected. They can focus greater effort on restructuring than banks and engage in some growth-oriented activities to prepare for exit.

- The short notice given by banks when they receive an offer from a distress fund to acquire a troubled company was considered by PE firms not to be helpful to future relationships.

- Restructuring in PE-backed firms is more timely and rigorous than in smaller PLCs. PLC NEDs appear generally less involved than boards in PE-backed buyouts when restructuring becomes necessary. PLCs can face greater problems in injecting new cash as they need to issue a formal investment proposal.

- To examine the relative performance of PE-owned companies and PLCs in recovering secured debt in failed companies, we collected recovery data on around 100 public and 100 PE-owned firms that became financially distressed in the period 1995-2009.

- Over the period 1995-2009, PLCs have increasingly resorted to administration when encountering distress, with administration being the exclusive outcome for such firms at and after 2007. By contrast, buyouts ending in receivership declined since 2002 whereas administration outcomes showed no obvious trends.

- PE ownership, due to the more hands on approach of PE firms over the period generated much higher recovery rates than public ownership, delivering more than twice the recovery rate of debt (62-63% versus 26-30% under PLC ownership).

- Amongst PE-owned firms there was little difference in recovery rates between receivership and administration both being around 62-3%), despite the fact that administration is aimed at selling the company as a going concern.

- Amongst publicly owned firms there are significant, albeit not large, differences between receivership and administration, with debt recovery rates in the latter being some 4% higher (30% versus 26%).

- Administration was a quicker debt recovery process: Overall, receivership took 2.5 times as long as administration to complete (1361 days versus 555 days in our sample). This however, may partly reflect the size of companies involved (PLCs are bigger and are involved in administration more often).

- *Other things equal*, if one were to start with a distressed firm in private equity ownership that passed through receivership, and were then to (notionally) transfer it into public ownership, its debt recovery rate would *decline* by 30%. If the debt recovery process were now to be replaced by one of administration, that recovery rate would decline by a further 10%.
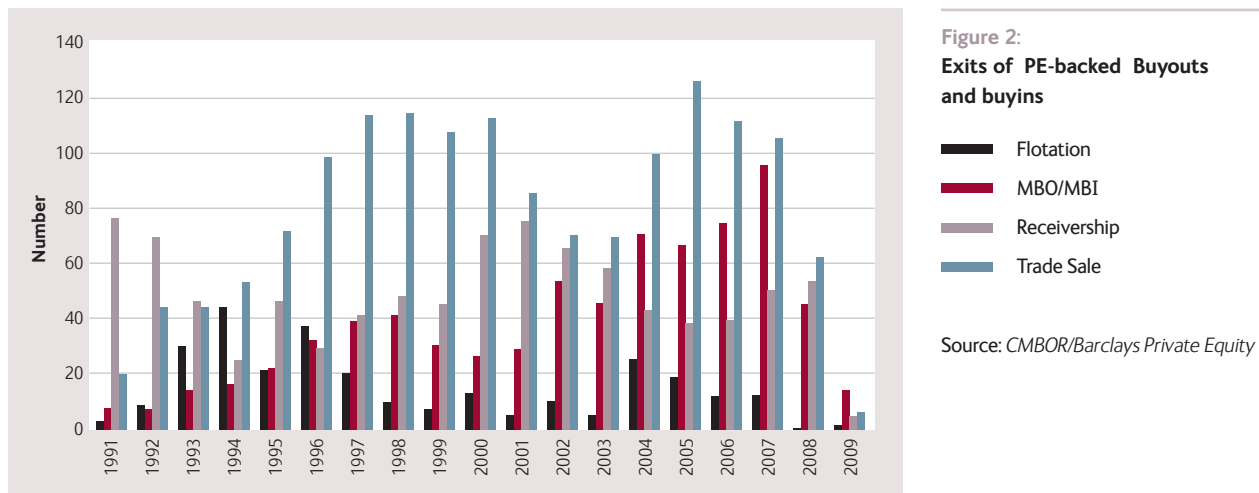
Introduction

Buyouts involve the creation of a new legal entity to acquire an existing firm. Ownership becomes concentrated among management and private equity firms, if present, with substantial leverage provided by banks. The form of the buyout may vary. A management buyout (MBO) usually involves a private equity acquisition in which the existing management takes a substantial proportion of the equity, which may be a majority stake in smaller transactions. A management buyin (MBI) is an MBO in which the leading members of the management team are outsiders. Many but **not all** buyouts involve private equity investors.

The extraordinary boom in global private equity activity over the period 2001-7 saw deal value in the UK hit £45.9 billion in 2007, some six times the value of £7.5 billion in 1989, the peak of the first wave of buyouts (Figure 1). This growth was fuelled by freely available low cost credit and the raising of major funds as institutional investors were increasingly attracted by the returns generated on private equity investments.

Figure 1:
Trends of Buyouts/Buyins

- PE Number
- Total Number
- PE Value (£m)
- Total Value (£m)

Source: *CMBOR/Barclays Private Equity*

The rapidity with which the PE and buyout market came to prominence attracted considerable policy attention regarding the economic impact of such deals. The accumulating evidence, encompassing both the first and second waves, indicates positive effects of PE buyouts in terms of financial performance and total factor productivity[1]. While employment appears to fall initially, there is generally a subsequent significant increase[2]. Asset disposals are largely confined to a few of the largest deals, while mean time to exit is five to six years and appears to be increasing[3]. A further strand of the debate has been the potential impact of high leverage on the stability and survival of private equity buyouts. The advent of the credit crunch and recession brought this issue to the fore with a dramatic freezing up of credit markets and sharp rises in debt spreads. The effects on the PE sector were equally dramatic, with difficulties for private equity firms in raising new funds and in refinancing debt for existing portfolio companies. The number of failures of private equity buyouts, defined as entering receivership or administration, increased sharply in the recession of the early 1990s and increased again from 2007 (Figure 2). However, most failures relate to smaller non PE-backed deals.

Exits of PE-backed Buyouts and buyins

■ Flotation
■ MBO/MBI
■ Receivership
■ Trade Sale

Source: *CMBOR/Barclays Private Equity*

Since most buyouts involve much higher leverage than comparable PLCs, some buyout distress may be attributable to financial structure. However, if the PE firms bring better corporate governance rather than simply the provision of capital, buyout firms should respond more effectively to the downturn than their listed counterparts. PE investors may be particularly proactive in negotiating restructurings of portfolio companies that become distressed.[4] There is little direct evidence relating to whether MBOs and MBIs, PE-backed or not, are more or less likely to fail than other firms and how this varies over the economic cycle. We examine the following questions relating to PE and distress:

• Whether the likelihood of insolvency is higher for buyouts in general and for PE-backed buyouts in particular, than non-buyout firms.

• what processes are involved in resolving distressed private equity deals; and

• whether the proportion of secured debt recovered in the event of receivership is higher for buyouts than public companies, and if so, why.

Part 1: Private Equity, Buyouts and Failure

1.1 Introduction

We built a unique, hand-collected dataset comprising the population of over 10 million firm-year observations of private firms in the UK over the period 1995-2009[5], of which over 140,000 had failed[6]. We developed a failure prediction model that isolates the key determinants of failure, including company type and incorporate changes in prevailing economic conditions. We define corporate failure as entry into voluntary liquidation, administration, or receivership. Given our unique dataset we believe this to be the most comprehensive study of failure among buyouts. We focus on three areas:

- an analysis of the financial and non-financial characteristics of failing firms and whether the extent of leverage in a firm significantly increases the likelihood of firm failure and whether this is more acute for buyouts.

- whether firms that have undergone a MBO or MBI are significantly more likely to fail than other firms.

- whether PE-backed buyouts are more or less likely to fail.

1.2 Background

Buyouts and private equity

Leverage places pressures on managers to perform in order to be able to service debt. Lenders also typically specify and closely monitor detailed loan covenants. Higher levels of leverage may be associated with a higher probability of failure. However, neither the amount of the money borrowed nor the proportion of borrowings in relation to equity in itself determines the chances of failure, but rather the ability of borrowers to generate enough cash to service that debt. The economy's business cycle phase affects firms' cash flows, and, hence, their debt capacity and credit risk[7]. The implication is that leverage increases the risk of insolvency for those firms that cannot adjust capital structure prior to/during the downturn.

Equity ownership by managers provides an incentive to improve performance but the extent to which they are able to do this depends partly on their abilities and motivations as well as their access to information at the time of the buyout. Although superficially similar to MBOs, MBIs carry greater risks as incoming management do not have the benefits of the insiders' knowledge of the operation of the business. We would therefore expect MBIs to be significantly more likely to fail.

Many but not all buyouts involve private equity investors. Private equity firms become active investors through taking board seats and specifying contractual restrictions on the behaviour of management. They also benefit generally both from more detailed pre-purchase due diligence and full, timely information on the current trading of the businesses in which they invest. Their expertise in monitoring may enable timely restructuring, including changes to the firm's leverage, that reduces the likelihood of firm failure. Their expertise may mean that they are better able to negotiate appropriate debt restructurings with banks than firms that are not private equity backed.

Failure and unlisted Companies

Building default prediction models for private companies is necessarily limited by data frequency and data availability. Many unlisted firms in the UK are granted concessions regarding the amount of financial statement data they are required to file, meaning that data required to calculate some important accounting ratios (from profit and loss accounts) is not available. It is also important to include qualitative variables, age and type of business, industrial sector etc, in combination with financial ratios as well as data relating to 'compliance and operational risk' such as legal action by creditors to recover unpaid debts that result in County Court Judgments (CCJs), company filing histories and audit report/opinion data[8]. The incorporation of this type of data has been shown to improve failure prediction[9]. Our data panel enables us to evaluate the propensity to fail amongst a large sub-sample of buyouts (PE-backed or otherwise) whilst controlling economic conditions and a wide range of company specific factors associated with insolvency risk.

1.3 The Data

The database available covers the population of UK companies that have filed accounts during 1995-2009. We cover the period of recovery from the early 1990's recession and a minor recession period around 2000-3 and a very stable period, in terms of the insolvency rate from 2003-2007. The latter part of 2007 through to the end of 2009 witnesses a sharp increase in the insolvency rate as the credit crunch hits the real economy. The data consists of over 10 million records of accounting and other publicly available data for companies active in this period. The incidence of insolvency in the data covers 146,518 companies (1.4% of the total). We cover over 23,000 non-failed buyouts and over 1,000 failed buyouts. Moreover, a subset of small and medium-sized companies based in the UK, have account filing exemptions which mean that these companies'[10] accounts include an abbreviated balance sheet and no profit and loss account, and medium-sized[11] company accounts include a full balance sheet but an abbreviated profit and loss account. We have access to some profit and loss account data for around 40% of our unlisted companies.

We exclude registered companies that appear not to be active or trading to give a sample used in the analysis of around 7.8 million observations of active/live companies and 140,000 incidences of insolvency. Within this total, we have full profit and loss account data on over 3 million companies in the years 1995-2009 including 55,000 failures. Our analysis includes the recession period up to the end of 2009. For robustness tests we estimate on 1995-2008 and retain data from 2009 as a test sample (hold-out sample) which includes 1,718,382 live companies and 21,020 failed.

1.4 The measures

Accounting information

We use accounting information to analyse financial risk including leverage, working capital and profitability. The majority of these variables are ratios. Therefore, only the size measure (total assets), is deflated by using the GDP deflator for each year. We are able to examine the value of the financial ratio data in both levels and direction (changes). The sample chosen for the analysis includes companies that filed at least one set of accounts[12] and survived until the start of each analysis year under consideration[13].

For the sub-sample of companies that submit 'abridged accounts' rather than full accounts, we examine insolvency risk using limited (balance sheet) accounting data.

Non-financial information

We include non-financial data covering operational risk and regulatory compliance. This data covers firm age, parentage, auditor information, and filing history and are supplemented with data from the register of County Court Judgments (CCJs). The CCJ information tracks the number and timing of court actions against a company for the recovery of debt (predominantly trade debt) including the value of the outstanding debt that has been verified in court. An additional variable tracks the number and timing of 'charges on assets' (fixed or floating) taken by creditors against the company in order to mitigate default risk on loans and mortgages. Companies that have more coordinated or vigilant creditors are more likely to be subject to court action to secure or recover debt and consequently more vulnerable to insolvency proceedings.

Directors

Our access to a comprehensive database of UK directors enables us to consider the influence of a range of variables reflecting director characteristics and experience, number of directorships held, distance located from the business and evidence of previous failure experience of directors. There is considerable debate about whether entrepreneurs and directors learn from previous failures, with some evidence suggesting that they become more cautious in subsequent ventures[14] but are less likely to succeed in their next venture[15].

Economic data

The data is combined over the period 1995-2008 so we control for economic conditions by the inclusion of macroeconomic indicators. Aggregate macroeconomic factors are gathered annually mainly from the Office for National Statistics (ONS). In addition we are able to calculate and forecast the aggregate insolvency rate in the economy and use this to control for changes in macroeconomic conditions. We refer to this variable as 'base hazard'.

Buyouts and private equity

To this company population database we match information on UK management buyouts formed during the sample period. The buyout data was provided by the Centre for Management Buyout Research (CMBOR) which has monitored the population of buyout activity and the characteristics of buyout deals throughout this time period[16]. Thus we were able to identify and match to the accounting and other data the buyouts that occurred during 1995-2009. This gives 23,236 observations on live buyouts and 1,110 instances of insolvency. We are able to track the entry and exit years of the buyout sub-sample and code the buyouts by type. The exit route of interest in this paper is insolvency/failure.

Of particular interest is the inclusion of variables indicating buyout type. We include separate variables for MBOs, MBIs and private equity-backed buyouts. Additionally we identify buyout deals pre and post 2003. The period 1995-2003 was relatively turbulent, marked by recovery from the recession of the early 1990's and a short recession 2000-2003 accompanied by a decline in buyout numbers and value, and which also encapsulated the dot.com boom. In contrast, the period from 2003 onwards was a stable period of low insolvency across all sectors and was also marked by the recovery of the buyout which culminated in the peak of the second wave in 2007. It therefore provides a better test of buyout versus non buyout performance and risk.

1.5 Pre-buyout characteristics of PE-backed and other buyouts

Analysis of the differences in the pre-buyout characteristics between our PE-backed buyouts and non-backed buyouts sub-samples shows that the PE-backed sub-sample are bigger, in terms of assets and slightly younger (Appendix Table A1). The PE-backed buyouts are from less risky industrial sectors than the other buyouts but the sectors are risky compared to population. We analyse credit reference agency risk scores for the population of UK limited companies (insolvency probability) and we note that PE-backed buyouts have generally better risk scores than other buyouts but again risks scores that place them in the higher risk portions of the corporate population. The buyout sub-population, therefore, has a higher prior probability of insolvency than the average company. However, PE-backed companies show no significant difference in ROA, profitability, profit margin but appear to have better cash-flow and working capital and, therefore, the ability to service debt (interest coverage) and a higher net worth.

1.6 Buyouts, non-buyouts and failure

Generally the failure rate of MBOs is higher than that of the non-buyout population and is more sensitive to downturns e.g. late 90's and 2001-2. There is some evidence that MBIs have a higher failure rate than MBOs. Moreover, there is evidence that PE-backed buyouts have a lower failure rate than non PE-backed buyouts. For instance the failure rate of non PE-backed buyouts is around 6.0% in the period since 1998 whereas PE-backed ventures have a failure rate of 5.3% in the same period. However we find that buyouts deals undertaken pre-2003 have a significantly higher failure rate than those completed post-2003[17]. In the latter period the PE-backed deals are not riskier than the non buyout population.

Using all companies' accounts (Appendix Table A2), we find significant differences between buyouts and non-buyouts in respect of nearly all profit and loss account variables, irrespective of whether the firms have failed or not. Compared to non-buyouts, non-failed and failed buyouts are significantly *more* likely to be in riskier industry sectors and have lower ROA, lower profit margins, lower pre-tax profit to total liabilities, higher change in retained profit to total assets, and lower cash to total assets. In contrast, non-failed and failed buyouts are significantly more likely to have higher operating cash flow to total assets, higher debt to net worth but better interest coverage (non-failed buyouts).

We also find significant differences between buyouts and non-buyouts in respect of nearly all variables, irrespective of whether the firms have failed or not. Compared to non-buyouts, non-failed and failed buyouts are significantly *more* likely to be older, larger (total assets) and in riskier industrial sectors. They are likely to have fewer county court judgments (CCJ/TL), but more likely to have charges on assets (both fixed and floating, and particularly to have more fixed charges), audited accounts, clean audits, but not qualified accounts. They are more prone to changes in auditors. Compared to non-buyouts, buyouts are significantly *less* likely to have late filing of accounts. Regarding financial risks they have lower cash/total asset ratios, lower trade creditors/total liabilities and similar trade debtors/total assets ratios.

Turning to director characteristics, non-failed buyouts have more directors but fewer local directors, a lower number of other directorships, less industry experience and more previous failures.

Comparing failed and non-failed buyouts using full accounts (Appendix Table A3), we find that buyouts that fail are significantly more likely than non-failed buyouts to be in riskier industry sectors, have lower ROA, lower pre-tax profit to total liabilities, and lower interest coverage. In contrast, failed buyouts are significantly more likely than non-failed buyouts to have lower operating cash flow to total assets, short-term debt, debt to total assets, lower current ratios, more inventory and more trade debt and credit. Debt levels to net worth are not significantly higher. Comparing failed and non-failed buyouts using full and abridged accounts we also find consistent results with the full accounts analysis. Interestingly, buyouts that fail also have more charges on assets. buyouts that fail are significantly more likely to have fewer directors, fewer local directors, less industry experience and more directors with a history of past failures.

1.7 Likelihood of insolvency

Analysis excluding financial measures

Initially we are interested in isolating the failure rate of management buyout types whilst controlling only for sector, asset size, the age of the company and age risk, whether the company is a subsidiary and macroeconomic indicators. We then add variables that indicate buyout type and deal period, that is whether the firm is a PE-backed management buyout; a non PE-backed MBO and a non PE-backed MBI. We then subdivide these into whether the buyout deal was pre or post 2003. The analysis uses the full database of buyouts and non buyouts and the subsample of companies with full accounts.

The results of the companies providing full accounts confirm a strong inverted U-shaped relationship between insolvency risk and asset size; a negative relationship between risk and company age with the exception of the 3-9 years period and parent support for subsidiaries (see Appendix Table A4). The buyout variables indicate that over the whole period, buyouts are generally more risky than the non buyout population, other things being equal. MBIs appear to have the highest insolvency risk and PE-backed deals are riskier than standard MBOs. However, if we take the two distinct time periods, the post 2003 MBOs and PE-backed deals are not riskier than the population of non buyouts, if we control for age, size, sector and macro conditions. The results are weaker when we include smaller companies in the sample.

Full analysis

We then analysed the data using the full range of risk-related company characteristics and director characteristics available. We estimate the likelihood of insolvency using data on companies that submit full accounts (Appendix Table A5); and for the whole sample using the variables that are common to both[18]. The insolvency rate is around 2% which represents the population failure rate for companies that survive more than 1 year.

Accounting information

Companies with a high ratio of cash to total assets exhibit a lower propensity to failure as do companies that can adequately cover interest payments on loans out of profits and show higher profit and retained profit to asset ratios. Companies with higher levels of short-term and long-term debt to equity are more prone to failure, as expected. We decompose the components of the current ratio and model the ratios of trade debt to total assets; trade creditors to total liabilities and inventories to working capital. All three attract positive and significant signs. Thus companies who rely on and extend trade credit are vulnerable to insolvency as are companies that tie up capital in inventories.

Non-financial information

Among the non-financial and non-accounting variables we find, as expected, that age of the company is negatively related to failure propensity, indicating that the longer a company survives then the less likely it is to fail. We find that companies in the age bracket 3-9 years are more vulnerable to failure.

The late filing of accounts is associated with a higher probability of failure. The longer a company takes to file accounts after the year end, the more likely the company is to encounter difficulties and/

or disagreements with the auditors. The variable *Cash Flow Statement* is significant and negative confirming the assertion that companies that submit detailed cash flow statements, and therefore volunteer extra information, are generally lower risk. The occurrence of County Court Judgments for the non-payment of trade debt is associated with failure amongst companies with a decreasing significance the larger the company. We find that the number and the value of CCJs in the years prior to failure are likely symptoms of financial distress. A further variable that is indicative of possible financial distress is the 'charging order'. Where a creditor has taken out a fixed or floating charge on the company's assets in order to secure a debt, this is associated with increased likelihood of insolvency.

Generally, subsidiaries have access to the financial and other resources of the parent company and can survive poor financial performance for longer than non-subsidiaries. Moreover, the parent may have reasons (R&D, tax or other) for supporting the survival of a subsidiary with recurring negative net worth. Subsidiaries are found to have a lower insolvency risk.

We also find that companies that are audited and have 'audit qualifications' (e.g. 'severe' or 'going concern') are more prone to failure since the auditor is indicating that the long term viability of the company is in some doubt. A change in auditor is also found to be associated with an increase in insolvency likelihood.

Turning to size, we find some interesting results. There is clearly a non-linear relationship between the probability of insolvency and size, as measured by asset values. Clearly, businesses with low asset values are less likely to be pursued through the legal process of insolvency since creditors (and lawyers) would have little to gain from the process and these same companies can opt to submit unaudited accounts. Our results suggest a threshold level of real assets before 'legal insolvency' becomes attractive for creditors. Industry sector also has significant influence on companies' probability of failure.

Director characteristics

Looking at director characteristics, the numbers of directors and directorships (a proxy for networks) are negatively related to the likelihood of insolvency. Having directors located close to the company and each other reduces insolvency risk. The total number of days experience in the sector is associated with lower risk. Directors with previous failures are more likely to fail again.

Buyout type

We find that the dummies on MBOs (pre and post 2003) are not significant. The dummies on post 2003 MBIs and PE-backed buyouts are not significant. To this effect the buyout dummies are proxies for the quality of management.

We also conducted analyses using all companies, that is including smaller companies that opt to submit 'abridged accounts' as fulfillment of their reporting requirements. These results are consistent with our findings for the full accounts firms.

We undertook tests to evaluate the performance of the models by examining the true positive against the false positive rate as the threshold to discriminate between failed and non-failed firms' changes. The models achieve strong classification performance. We also reanalysed the models derived using data for 1995-2008 and retain data on companies trading at the start of 2009 in order to undertake hold-out tests for model performance. For these tests, we track all companies that became insolvent in 2009 compared to those that are still alive as at the end of 2009. The results of the analysis remain the same in these hold-out tests.

1.8 Buyout only sample

We extended the analysis to focus solely on the buyout sample. This analysis involved full accounts for 11,772 non-failed buyouts and 804 failed buyouts. Selected financial ratios and non-financial variables are all significant and attract appropriate signs, as before. We include dummy variables for MBIs and PE-backed buyouts both pre and post 2003. Relative to MBOs, MBIs are significantly more likely to fail, while relative to non PE-backed buyouts, PE-backed buyouts pre 2003 are significantly more likely to fail, but this is not the case post 2003.

The results based on abridged accounts for 23,203 non-failed buyouts and 1,109 failed buyouts again show that the selected financial ratios are all highly significant and attract appropriate signs. The results in relation to MBIs and PE-backed buyouts pre and post 2003 are again consistent with our earlier findings. Of particular note is the fact that debt to net worth is not significant in distinguishing buyouts that fail from non-fails.

1.9 Conclusions

In summary, we find that buyouts that fail are significantly more like to display signs of distress prior to failure, to be more highly leveraged and to have greater working capital constraints than buyouts that have not failed. We also find that buyouts that fail have higher leverage and greater working capital constraints than failed non-buyouts. However, it is also the case that *non-failed buyouts* have significantly higher leverage and working capital constraints than *non-failed non-buyouts*.

Taking into account a range of other financial and non-financial factors, including director characteristics, our analysis shows that a greater likelihood of failure is significantly associated with higher leverage. Buyouts have a higher failure rate than non-buyouts with MBIs having a higher failure rate than MBOs which in turn have a higher failure rate than PE-backed buyouts/buyins. However, MBOs and PE-backed deals completed post 2003 are not riskier than the population of non buyouts if we control for other factors. We find that our results hold **whether or not** we control for financial risk and leverage.

These are important findings in the context of the current policy debate. First, our finding highlights the need to recognise that it is not only buyouts and PE-backed buyouts in particular that are highly leveraged; indeed not all buyouts are highly leveraged. Second, our finding is suggestive of active involvement by PE firms helping portfolio companies deal better and more timely with trading difficulties, particularly in the more recent period leading up to the credit crunch.

At this juncture, having encompassed a substantial part of the current recessionary period, we do not find support for the view that higher failure rates due to higher leverage are a specific feature of PE-backed buyouts. We suggest that PE-backed companies as well as targeting better buyout prospects are in a better position, because of active ownership and governance, to adjust capital structure over the economic cycle and, therefore, manage insolvency risk.

Part 2: Case Study Evidence on the Distress and Failure Process

2.1. Introduction

To provide further insights into the processes involved in dealing with distress in private equity buyouts we conducted in-depth case studies of PE-backed companies and PLCs that have either gone into receivership or distress using the financial press, company reports, data from CMBOR, and interviews with senior executives at six private equity firms covering both the mid and large buyout market. We also conducted interviews with a former CEO of a failed PLC. The following are the principal themes that emerged.

2.2 Lack of bank expertise in restructuring and delay in making decisions

A major problem reported to us was that few people in the banks have experience of previous recessions of dealing with problem cases under these current economic conditions. This lack of expertise can have a major adverse effect on the business. As a result, when a company enters distress, banks will often not discuss proactively until it is too late.

Banks are sometimes taking a shorter term view which may mean buyouts recover less than they otherwise would. There is a perception that initially during this economic crisis the banks allowed companies to fail but that they are now under pressure to prevent this from happening. Some change to a more positive approach by the banks since the beginning of 2009 was noted as they have been repairing their balance sheets.

The banks do not appear to appreciate the importance of specific management to the business. This is especially the case where the person who has the principal valuable knowledge about the business is sidelined or removed. A major issue is to assess whether incumbent management have been performing well but have been overtaken by events and whether they are strong enough to be able to take corrective restructuring decisions.

2.3 Debt-equity swaps

The ability of PE firms to make cash injections into distressed firms is constrained by unbridgeable gaps between the bank's exposure and the market value of the business. A debt-equity swap may be the result. While debt-equity swaps reprice risk and reward for the banks, it does so in a risky way for the company since the banks do not have the skills to manage the management and the equity position. This situation is also risky for the banks as they are taking equity risk onto their balance sheet, while treating this as loans.

Where a debt-equity swap takes place, it is import to maintain management's incentives if they are performing well. However, the re-negotiation of management contracts with the new bank owner my focus more on recovering the bank's position rather than the longer term viability of the business.

The behaviour of the banks thus has implications for the strategies of portfolio companies in debt-equity swaps where the underlying business is sound. There are likely to be shifts from acquisitive to organic strategies. As a result, original exit plans of PE firms are likely to be delayed.

PE firms may be left with a modest 'rump' stake but unless they inject further funds the banks are unlikely to allow them to have much influence. It may be preferable to continue to involve PE firms so that over time the business can recover value. Often it is the PE firms, who are very hands-on, who foresee problems rather than the management team. It is questionable practice to leave these struggling firms without PE support, possibly with a weak management team and a bank who may not have the necessary skills/resources to run the company.

Some more aware banks were reported to be keeping PE firms involved in helping to run the business as they recognise that they do not have the requisite skills. This may involve sidelining hedge fund investors and less involved overseas investors and retaining the more proactive PE firm. This approach may be especially appropriate where there is a track record of deal doing between the bank and the PE firm. In these cases, the PE firm would continue to manage the investment with

a board seat and be the first point of contact with management. This can be a mutually beneficial way of proceeding.

We identified a perception that the banks are going to have to claw back value soon through equity sales. If the market recovers and values increase, banks will be able to sell to PE firms at good prices (for the bank). If the economy does not recover, the banks will need either to put firms into administration or sell more businesses to distress funds.

2.4 Coordination issues in larger deals

A major problem identified in restructuring larger deals was the presence of many different debt providers with different objectives, notably clearing back, securitised debt or collateralized loan obligation (CLO) providers and mezzanine providers. Within each class of debt providers there may also be differences in attitudes depending on where the parent of the bank is domiciled (e.g. Ireland). There are significant costs involved in solving problems. One approach to addressing this issue is to designate 'thought leader' groups of experienced debt providers. The ability of CLOs' to hold equity can markedly affect the feasibility of a debt-equity swap.

2.5 Covenant breach/stress cases

A number of cases of covenant breach or stress are occurring where there are growth opportunities in the portfolio company but problems in servicing debt. It was reported to us that banks have typically been more interested in ramping up the interest rates charged for companies breaching their covenants. However, after initial problems arising from lack of bank experience of dealing with problem cases in a recession, a 'market price' is now being established for covenant resets and restructurings. The ability to buy back debt cheaply can enable capital restructuring to more serviceable levels.

2.6 The role of PE firms

PE firms need to engage with the banks in a proactive, solutions-based approach so that over time the portfolio business can recover value. PE firms need to be open and honest about problems to achieve a more positive reaction from the banks that the process is being well-managed. The advantage also is that the management team can go back to running the business.

There is a need to convince the banks that the original strategy has been stress-tested. There may be a need to moderate the strategy, such that it becomes harder to produce expected returns. It is likely that there will be a lost two years regarding exits. This is not necessarily bad since it means a return to a more stable situation.

We identified a perception that initially during this crisis the banks allowed companies to fail but that they are now under pressure not to allow this to happen, especially among government owned banks that are under pressure from the Treasury to be seen to be lending money to businesses. However, as the economy moves out of recession, banks are thought to be more likely to put firms into receivership to recover their loans. A sharp increase in receiverships is thus expected in 2010.

Banks will have to sell the equity they now hold in troubled companies over the next 18 months and this may create an opportunity for private equity firms to invest.

2.7. Distress funds

Banks typically do not offer PE firms and management a moratorium if an offer is made by a distressed debt or vulture fund. The notice involved can be no more than 12 hours and it is not unknown for this to be given by email. PE firms see this as an underhand way of dealing with the situation that may not be helpful to future relationships. As a result, PE firms report that they are now seeking to alter contracts in subsequent buyouts to prevent banks from being able to do this so easily.

Distressed debt funds typically aim to match what the bank would get from administration plus offering an equity stake to share in the upside. Distressed funds would typically seek a majority equity stake to give them power to enforce turnaround.

Although distress funds have emerged, this trend does not appear to have become as prevalent as anticipated. Some banks may be willing to partner with specialist distress funds who can inject more funds and who have the expertise in depth to stabilise the business which the banks do not have. In these cases, the distress fund is likely to take a controlling stake and several board seats with the bank taking, say a 30% stake. We were quoted examples of the distress fund being able to commit up to 8 or more people to the deal which the bank could not. After approximately three months when the business has been stabilised, the intention is typically to pull back and recruit the best management team to continue to run the business. The distress fund would continue to monitor working capital in detail and may become closely involved in leading acquisitions where these are considered appropriate.

Distress funds report that a major problem that they confront is the presence of a management team that is not tough enough to take decisions needed to restructure the business. These are likely to be replaced by new management drawn from the distress fund's pool of experienced turn around managers or from other portfolio companies.

While distress funds look to stabilise the business, they are generally not interested in, nor do they typically have the skills to, grow the business. However, they will engage in activities to groom the business for exit which may involve some concept proving that growth is feasible, for example with respect to beginning to roll-out retail outlets. While distress funds have envisaged that it would take 3-4 years to fix businesses, in some cases this has been achieved in around a year.

There have been cases where a deal between the bank and a distress fund has not been completed, partly because the bank believes that it will recoup more value if it holds all the equity. However, banks have subsequently gone back to distress funds where they have run into difficulties in managing the restructuring of the business. Where banks have to put more money into the deal they may reassess the situation and seek to partner with distress funds. There are expectations that next year will see more of this activity.

Some blurring of the distinction between traditional private equity funds and distress funds is occurring. However, traditional private equity firms may be reluctant to become involved in acquiring turnaround cases because of potential negative effects on their reputations if these are not successful.

2.8 PLCs

In contrast to PE firms, dealing with distress in PLCs can be more problematic. In PLCs, the sense and actuality of ownership held by the non-executive board (NEDs) members in a PE portfolio firm is missing. Further, quarterly pressure to maintain earnings in PLCs means that management cannot afford a slip and there is no ability to fix problems quietly behind the scenes. Rather than becoming actively involved in restructuring the business, NEDs may be more likely to 'run for the trees' at the first sign of trouble.

Smaller PLCs may comply with the requirements of corporate governance codes but NEDs may be quite inactive and ineffective, especially in dealing with distress. Residual family members in NED positions may be somewhat disconnected from being dynamically involved with the business. There may also be difficulty in attracting good external NEDs with experience into these smaller companies. Even where good external NEDs are attracted, it may be easier for incumbent CEOs and CFOs to restrict the information provided to other board members. Taking corrective actions may also be more problematic. For example, we encountered issues of lengthy notice periods for directors and lack of willingness to remove under-performing employees.

Distress can lead to disagreements within the management team regarding the way forward, especially if new management are brought in to turn around the business. Non-executive chairs in PLCs may need to play a strong role in managing these relationships but this may be more problematic than in PE-backed deals where the investors have a greater financial incentive to be actively involved.

PLCs can see greater problems in preparing proposals to inject further cash than in PE-backed deals. A PLC will need to prepare a formal investment proposal and its associated broker fees, as well as obtaining commitment from investors that they will not sell their shares.

Because of the lack of active involvement by investors, the seemingly greater potential for insiders to dominate NEDs and the reduced pressure to service funding commitments, restructuring in PLCs may be slower and not deep enough compared to PE-backed buyouts.

2.9 Future relationships with banks

PE firms that adopt a proactive approach may reap longer term benefits from being in a more favoured position when banks begin to lend again. Some PE firms appear not to be behaving in this way, and that some banks have shortened their sponsors' lists.

PE firms need to take great care to select banks that will continue to be active in helping restructure deals during downturns. Overseas banks, especially US banks, were cited as posing particular problems in this respect.

Some PE firms were reported to be reluctant to deal with banks in the near future and are seeking to conduct equity and mezzanine only deals in order to reduce the risks from bank involvement.

Part 3: Do Buyouts Respond Better to Financial Distress than their PLC Counterparts?

3.1 Introduction

We compared the secured debt recovery rates for financially distressed UK companies by selecting samples of 96 publicly listed firms (PLCs) and 93 private equity-owned buyouts (buyouts) that both entered and exited receivership or administration in the period 1997-2009[19] taking into account other relevant factors such as size. In addition to the role of company type (Publicly owned/ privately owned) on distress outcome, the role of outcome type (receivership/ administration) was explored.

3.2 Trends over time

Charts 1–2 below show the pattern of distress outcomes for PLCs and buyouts over the period 1997-2009 respectively.
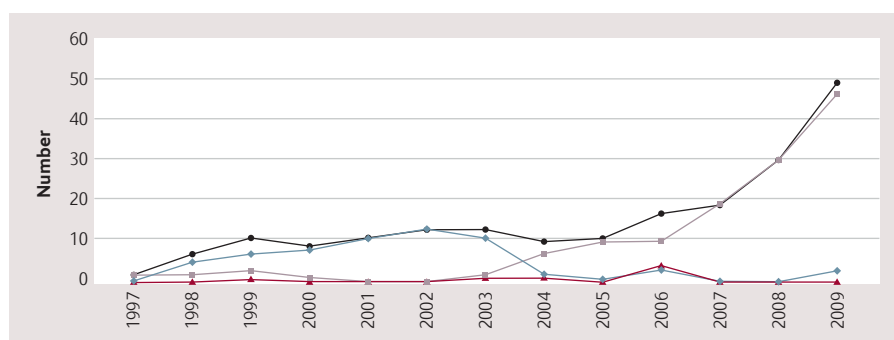
Chart 1:
Frequencies of PLCs in distress, 1997–2009 by outcome type

- Receivership
- Administration
- No data
- Total

In the case of PLCs (Chart 1), there is a clear upward trend from about 1997 onwards with a break in 2002-5. In the case of buyouts (Chart 2) total numbers peaked in 2003 and declined thereafter, with a brief rise in 2006-7. Year 2008 buyout failures are recorded as zero but in 2009 were beginning to show signs of an upward trend again. Examining the breakdown into outcome types, Chart 1 shows that PLCs have increasingly resorted to administration when encountering distress, with administration being the exclusive outcome for such firms at and after 2007. Receivership cases for PLCs correspondingly decline after 2003. By contrast, buyouts ending in receivership declined since 2002 whereas administration outcomes have fluctuated. In the case of PLCs missing data was low and showed little trend whereas for buyouts missing data cases were higher though showing a declining trend after 2003.
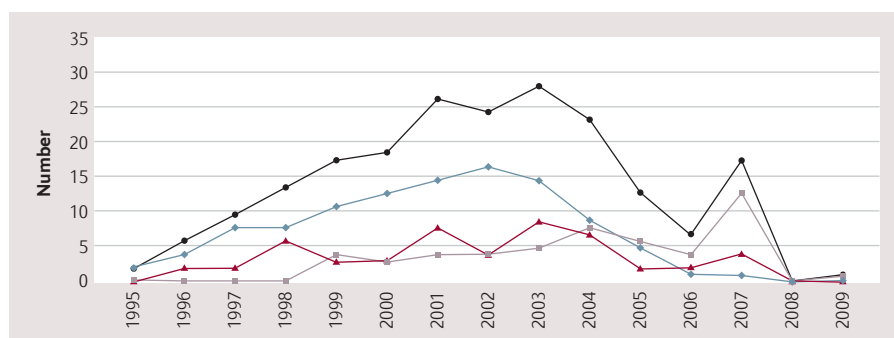
Chart 2:
Frequencies of Buyouts in distress, 1997–2009 by outcome type

- Receivership
- Administration
- No data
- Total

3.3 Extent of recovery

Table 1: **Recovery rates by ownership type and outcome**

	PLC-owned	PE-owned
Receivership	.26	.63
Administration	.30	.62

PE ownership delivers more than twice the recovery rate than PLC ownership when distress occurs (Table 1). There is little difference in recovery rates amongst PE outcomes between receivership and administration (both are around 62-3%) despite the fact that administration is aimed at selling the company as a going concern.

There are however, significant differences within the PLC ownership class between receivership and administration, with recovery rates in administration being some 4% higher than receivership, at 26% and 30% respectively. Thus, attempts at selling the company as a going concern seem to pay off slightly better (in proportional terms) in publicly owned companies. However, the differences are not great.

3.4 Drivers of recovery rates

In order to understand the differences between recovery rates of PE-backed buyouts and PLCs firms in distress we conducted a detailed statistical analysis (see Appendix 2).

First we considered the recovery rates in firms in receivership. After taking into account the time taken to complete the recovery process, the leverage (Debt/Equity ratio), and the total assets/ turnover ratio, we find that the recovery rate is significantly higher for PE-backed buyouts. Also the longer the time taken to recover debt, the smaller the proportion of debt recovered. The recovery rates were not affected by size of business.

Second, we analysed recovery rates from firms entering administration and also found that PE-owned firms in administration have higher recovery rates of debt. Third, we combined both firms in receivership and administration and again found that PE-backed buyouts displayed higher recovery rates. We find that more asset-efficient firms (as measured by the ratio of total asset/turnover ratio) have weakly higher recovery rates and the longer the process of recovery the smaller the fraction of debt recovered. Interestingly, the degree of leverage is *un*related to the recovery rate.

Fourth, using the full pooled set of distressed companies we examine whether *allowing* for differences due to ownership type, administration would deliver superior recovery rates than receivership given that there is a greater chance of emerging as a going concern from administration. In fact we find that given ownership type, administration leads to a *lower* rate of recovery than receivership. Administration, whilst shortening the time to recovery of debt by two thirds, seems nonetheless to be less efficient than receivership in the process of recovery. Finally, using the subsample of 89 firms that went into administration we found that the Prepack procedure, the predominant procedure under administration in the period, makes no difference to the recovery rate.

3.5 Conclusions

The most striking conclusion is that, controlling for size, distress outcome type, and time to recovery, PE-owned companies have over twice the recovery rate of secured debt over publicly owned companies. We find that if we were to take a PE-owned company that has passed through receivership and replace it with an identical publicly owned company, the recovery rate would fall by 30%. If we were to replace the recovery process by administration, the recovery rate would fall by an additional 10%. The most plausible explanation for the former result is the superior alertness and decisiveness of PE owners in the face of distress, and the superiority of debt covenants used to deal with it if and when it occurs. The most plausible explanation of the latter is that administration on average is less effective in extracting distressed value than receivership, a surprising result. Contrary to expectation, administration, with its express attempt to sell the company as a going concern, does not yield superior secured debt recovery rates. A longer time to recover debt is also associated with a smaller recovery rate. (e.g., 100 extra days spent in recovery means a 1% reduction in the proportion of debt recovered from a firm, controlling for other relevant factors). Finally, pre-pack administration does not seem to improve recovery rates either, again contrary to expectation. Perhaps attempts to speed up the process of debt-recovery have their costs in terms of lower recovery rates.

Appendix 1: Failure Prediction Methodology and Analysis

This appendix provides a summary of our approach and the main detailed results. As we have financial statements for individual firms over multiple periods or until exit (failure), it is desirable to incorporate dynamics that utilise the firm specific time varying covariates and changes in the base line hazard. Hence we use a discrete-time hazard model where estimation is done with firm-year logit observations. Each year in which the company survives is included in the sample and the company is treated as non-failed and a company is coded as failed in the analysis year prior to the insolvency event. We specify the base line hazard rate using an established macro-economic model that has been used to forecast the aggregate insolvency rate in the UK and which has been found to be accurate over an 18 month horizon which is reported in the 'Risk and Insolvency Report', Credit Management Research Centre, University of Leeds. We use the forecast insolvency rate to adjust the base hazard. We also undertook further diagnostic tests relating to in and out of sample prediction. The full model (M1) includes all the risk characteristics and controls discussed above from which we can isolate the effects of buyout type on insolvency risk. We formulate alternative specifications of the time discrete time duration model, nested in M1. Thus, we first look at the failure of buyout companies controlling for age, size and sector with and without the macro dependent base line hazard. We then estimated models including the other financial and non-financial variables separately and then estimated the full model (M1). Finally we estimate best-fitting failure prediction models for buyout subsample only and test the effects of private equity involvement.

Table A1: **Pre-Buyout Performance: 3 year average**

Variable	PE Buyouts: Mean	Buyouts: Mean	t-statistic	Significance
Size (log total Assets)	15.63	14.43	-6.891	0
Age (days)	6251	7020	3.617	0.0003
Company Risk Score[1]	0.0246	0.0296	7.665	0
Industry Risk [2]	-0.127	-0.255	-7.108	0
CCJ Numbers	0.05	0.03	-2.14	0.0325
CCJ Values	70.11	49.02	-0.915	0.3603
Charges on asset dummy	0.21	0.14	-5.451	0
Return on Assets	0.098	0.08	-0.825	0.4094
EBITDA/Total Liabilities	0.223	0.238	0.441	0.6593
EBITDA/Interest Paid	164.98	100.96	-5.038	0
Profit Margin	-0.044	-0.0406	0.085	0.932
Networth	4965235.57	2733591.4	-0.934	0.3503
Debt/NetWorth	207.2	97.67	-7.47	0
Debt/Total Assets	0.302	0.278	-1.978	0.0481
Trade Creditors/TL	0.336	0.46	13.044	0
Trade Debtors/TA	0.271	0.33	8.675	0
Inventories/TA	0.109	0.137	5.885	0
Cash/TA	0.144	0.128	-2.788	0.0053
Short-term Debt/TA	0.197	0.159	-5.548	0

1. Company risk scores were provided by a UK credit agency. This is an insolvency risk score (probability of being insolvent within 12 months). The credit agency score the whole UK company population using z-score type algorithms and make them available on company credit reports. The mean score for the UK population is 0.0171, reflecting the average failure rate (base line hazard).
2. Industry risk is calculated as the log odds of failure in 51 industrial sectors and is calculated using the actual failure rate in the previous year. The more negative the value the higher the risk of failure in the sector

Table A2: Differences Between Failed and Non-Failed Buyouts and Non-Buyouts

	T-Tests for Non-Failed Companies			T-Tests for Failed Companies		
	Non-Buyouts	*Buyouts*	*T-test*	*Non-Buyouts*	*Buyouts*	*T-test*
Variable	Mean	Mean	Significance	Mean	Mean	Significance
Log Age	7.814	8.453	0.000	7.855	8.388	0.000
AGERISK <3 years	0.153	0.061	0.000	0.149	0.078	0.000
AGERISK 3-10 years	0.496	0.345	0.000	0.552	0.383	0.000
AGERISK 10+ years	0.336	0.594	0.000	0.300	0.539	0.000
Log Total assets	11.835	15.117	0.000	12.414	14.908	0.000
Industry Risk	0.106	-0.207	0.000	-0.149	-0.409	0.000
Return on Assets	0.269	0.064	0.000	-0.003	-0.046	0.000
ST debt + LT /TA	0.120	0.194	0.000	0.177	0.248	0.000
Profit/TL	0.853	0.242	0.000	0.272	0.049	0.000
Profit Margin	-0.064	0.004	0.000	-0.244	-0.198	0.427
Change in Profit	2.934	3.061	0.224	1.475	0.962	0.274
Debt/Net Worth	13.099	44.418	0.000	23.685	54.752	0.001
Interest Coverage	58.700	118.846	0.000	39.938	35.036	0.498
Operating Cashflow/TA	0.010	0.050	0.000	0.008	0.027	0.001
Sales/TA	2.025	1.528	0.000	2.485	1.668	0.000
Current Ratio	3.846	3.383	0.000	2.802	2.890	0.839
Trade Debt/TA	0.257	0.295	0.000	0.356	0.326	0.000
Trade Credit/TL	0.557	0.372	0.000	0.579	0.400	0.000
Trade Credit/Trade Debt	13.232	5.364	0.000	8.930	4.748	0.000
Cash/TA	0.273	0.106	0.000	0.109	0.058	0.000
Inventory/WC	3.930	8.014	0.000	9.246	13.894	0.000
Capital Employed/TL	5.162	5.002	0.522	4.321	4.532	0.859
Retained Profit/TA	0.084	0.001	0.000	-0.227	-0.162	0.021
Change In Net Worth	1.254	1.218	0.310	0.718	0.823	0.513
Accounts Overdue	14.728	8.297	0.000	26.469	17.493	0.000
Late Filing Last Accounts	10.720	6.610	0.000	30.663	20.481	0.000
Charge on Assets	0.051	0.220	0.000	0.134	0.329	0.000
CCJ's/TL	0.009	0.003	0.000	0.105	0.047	0.000
Number of CCJ's	0.019	0.012	0.000	0.328	0.226	0.022
Audited	0.278	0.871	0.000	0.407	0.877	0.000
Change in Auditor	0.061	0.127	0.000	0.091	0.157	0.000
Accounts Qualification: Severe	0.002	0.003	0.001	0.010	0.009	0.633
Accounts Qualification: Going Concern	0.006	0.020	0.000	0.033	0.080	0.000
Accounts Qualification: Mild	0.002	0.003	0.001	0.003	0.005	0.420
Accounts Qualification: Scope	0.003	0.005	0.002	0.009	0.014	0.133
Accounts Qualification: Refer	0.003	0.008	0.000	0.012	0.028	0.001
No. of Directors	3.130	4.328	0.000	2.966	3.918	0.000
Ave_Age_directors	49.302	49.082	0.000	47.581	49.080	0.000
Ratio of Local Directors	0.454	0.207	0.000	0.195	0.124	0.000
Total no of currentdirectorships	43.104	39.583	0.000	25.554	37.003	0.006
Ratio of past failed directorships	0.045	0.076	0.000	0.110	0.109	0.874
Days experience in industry	2483.423	2401.464	0.000	2224.579	1990.365	0.000

Table A3: Differences Between Failed and Non-Failed Buyouts

	T-Tests for Buyout Companies		
	Non-Failed	**Failed**	**T-test**
Variable	Mean	Mean	*Significance*
Log Age	8.4534	8.3882	0.0423
AGERISK <3 years	0.0605	0.0779	0.0392
AGERISK 3-10 years	0.3453	0.3832	0.0171
AGERISK 10+ years	0.5942	0.5389	0.0006
Log Total assets	15.1171	14.9078	0.0604
Industry Risk	-0.2069	-0.4094	0.0000
Return on Assets	0.0641	-0.0459	0.0000
ST debt + LT /TA	0.1940	0.2478	0.0000
Profit/TL	0.2420	0.0486	0.0005
Profit Margin	0.0038	-0.1977	0.0005
Change in Profit	3.0610	0.9625	0.0000
Debt/Net Worth	44.4177	54.7517	0.2509
Interest Coverage	118.8458	35.0361	0.0000
Operating Cashflow/TA	0.0500	0.0271	0.0001
Sales/TA	1.5279	1.6677	0.0509
Current Ratio	3.3835	2.8900	0.2826
Trade Debt/TA	0.2950	0.3265	0.0000
Trade Credit/TL	0.3719	0.3996	0.0030
Trade Credit/Trade Debt	5.3643	4.7476	0.4118
Cash/TA	0.1063	0.0584	0.0000
Inventory/WC	8.0142	13.8944	0.0000
Capital Employed/TL	5.0020	4.5322	0.7222
Retained Profit/TA	0.0012	-0.1621	0.3828
Change In Net Worth	1.2177	0.8227	0.0274
Accounts Overdue	8.2965	17.4928	0.0000
Late Filing Last Accounts	6.6103	20.4805	0.0000
Charge on Assets	0.2203	0.3288	0.0000
CCJ's/TL	0.0031	0.0470	0.0000
Number of CCJ's	0.0124	0.2264	0.0000
Audited	0.8710	0.8768	0.3084
Change in Auditor	0.1273	0.1567	0.0081
Accounts Qualification: Severe	0.0027	0.0091	0.0257
Accounts Qualification: Going Concern	0.0196	0.0797	0.0000
Accounts Qualification: Mild	0.0035	0.0045	0.5895
Accounts Qualification: Scope	0.0047	0.0145	0.0071
Accounts Qualification: Refer	0.0080	0.0281	0.0001
No. of Directors	4.3278	3.9183	0.0000
Ave_Age_directors	49.0815	49.0796	0.9780
Ratio of Local Directors	0.2072	0.1239	0.0000
Total no of currentdirectorships	39.5828	37.0034	0.6546
Ratio of past failed directorships	0.0762	0.1087	0.0000
Days experience in industry	2401.4639	1990.3647	0.0000

Table A4: Buyouts and Insolvency Risk: Restricted Model Using Full Accounts 1995-2009

We estimate discrete time hazard models determining the probability of insolvency for each company. The models determine insolvency risk using company characteristics, age, size and company type whilst controlling for industry sector using 51 separate sector dummy variables. The equations include estimates of the base line hazard rate from a macro-economic model. From maximum likelihood estimation we report the estimated coefficients, wald statistics and significance level of each coefficient. Overall fit is gauged by log-likelihood statistics and chi-square. We test for the significance of buyout dummy variables, PE-backed buyouts, non PE-backed MBOs and non PE-backed MBIs. We create and tests additional dummies that categorise the buyouts created pre and post 2003.

Discrete Time Duration Models: hazard models with time-varying covariates and macro dependent baseline hazard rate (1995-2009)				
Variable	**Coefficient**	**Sig.**	**Coefficient**	**Sig.**
Log Total Assets	1.486	0.000	1.485	0.000
(Log Total Assets)^2	-0.050	0.000	-0.050	0.000
Log Age	-0.157	0.000	-0.157	0.000
Agerisk 3-9 years	0.246	0.000	0.246	0.000
Subsidiary	-0.086	0.000	-0.086	0.000
Management Buyout non-vc	0.214	0.001		
Management Buyin non-vc	0.798	0.000		
VC Backed Buyout	0.481	0.000		
VC Backed Pre 2003			0.525	0.000
VC Backed Post 2003			**0.169**	**0.257**
MBO Pre 2003			0.215	0.003
MB0 Post 2003			0.212	0.156
MBI Pre 2003			0.716	0.000
MBI Post 2003			1.020	0.000
Macro Base Hazard	2.564	0.000	2.563	0.000
Industry Dummies	**51 Sectors**		**51 Sectors**	
Constant	-15.972	0.000	-15.968	0.000
Failed	55159		55159	
Non-Failed	3022636		3022636	
Log Likelihood	525339.82		525332.87	
Chi-Square	27654.96		27661.92	
Significance	0.00000		0.00000	

Table A5 Multivariate Model Predicting Insolvency: Full Accounts 1995-2009

We estimate discrete time hazard model determining probability of insolvency for each company. The model determines insolvency risk using company characteristics, age, size & company type, controlling for industry sector risk using industry failure rate (log odds of failure in previous year). The equation includes macro-economic estimates of the base line hazard rate. From maximum likelihood estimation we report estimated coefficients, wald statistics and significance level of each coefficient. Overall fit is gauged by log-likelihood statistics & chi-square. We test for significance of buyout dummy variables, PE-backed buyouts, non PE-backed MBOs and non PE-backed MBIs. We create and tests additional dummies that categorise buyouts created pre and post 2003.

Discrete Time Duration Models: hazard models with time-varying covariates and macro dependent baseline hazard rate (1995-2009)			
Control Variables	**Variable**	**Coefficient**	**Sig.**
Financial Characteristics	Retained Earnings/Total Assets	-0.08098	0.00000
	Cash/Total Assets	-0.97362	0.00000
	Trade debtors/Total Assets	0.41756	0.00000
	Trade Creditors/Total Liabilities	0.26986	0.00000
	Inventory/Working Capital	0.01215	0.00000
	Sales/Total Assets	0.08076	0.00000
	EBITDA/Interest Paid	-0.00048	0.00000
	Return on Assets	-0.19670	0.00000
	Change in Profit	-0.00615	0.00000
	Debt/Networth	0.00025	0.00000
Size, Age, Sector	Log Total Assets	1.28472	0.00000
	(Log Total Assets)2	-0.04231	0.00000
	Log Age	-0.03598	0.00000
	Agerisk 3-9 years	-0.01334	0.24053
	Industry Insolvency (log odds)	-0.45984	0.00000
	Subsidiary	-0.27853	0.00000
Operational Risk	Account Qualification - Severe	0.69548	0.00000
	Account Qualification - Going Concern	0.88792	0.00000
	Change in Auditor	0.18150	0.00000
	Charge on Assets	0.39544	0.00000
	Cashflow Statement	-0.17088	0.00000
	Accounts Overdue	0.00180	0.00000
	Late filing last accounts	0.00251	0.00000
	County Court Judgements/Total Liabilities	2.16794	0.00000
	Number of CCJ's 12 months	0.19332	0.00000
Director Characteristics	No. of Directors	-0.11259	0.00000
	Age of Directors	-0.00586	0.00000
	Ratio of Local Directors	-1.33708	0.00000
	Total no of currentdirectorships	-0.00013	0.00006
	Ratio of past failed directorships	0.90431	0.00000
	Days experience in industry	-0.00016	0.00000
Buyout Type	VC Backed Pre 2003	0.21026	0.00043
	VC Backed Post 2003	-0.33649	0.06617
	MBO Pre 2003	0.01625	0.84321
	MB0 Post 2003	0.03752	0.82094
	MBI Pre 2003	0.37215	0.02328
	MBI Post 2003	0.37199	0.16248
Macro Conditions	Macro Base Hazard	2.11708	0.00000
	Constant	-14.09930	0.00000
	Failed	42526.00000	
	Non-Failed	2229004.00000	
	Log Likelihood	352608.49000	
	Chi-Square	69987.13000	
	Significance	0.00000	

Appendix 2: Drivers of Recovery Rates

We examined the following formal tests to establish the drivers or recovery rates

H1: Recovery rates under receivership are higher for PE-owned companies

Taking as our sample the set of 100 companies that entered (and exited) **Receivership** in the period we ran an OLS regression including the following variables:

RR_i: Recovery ratio

Pub_i: Dummy variable take a value 1 if public company (PLC) and 0 otherwise.

TAT: Total assets/turnover.

$Time_i$:   Time in days to recovery (the difference between receiver appointment date and Ceased to Act date)

DE_i: Debt-equity ratio.

We find as predicted that beta(1) is both negative in sign and highly significant (p<1%). The only other variable significant in this equation is the time to recovery which has a negative sign indicating that the longer the time taken to recover debt, the smaller the proportion of debt that is recovered.

Table A6: **Cross-sectional determinants of recovery rates (RR) for companies in Receivership**

Variable	CONSTANT	Pub	TAT	Time	DE
Coefficient	0.793^{***}	-0.281^{***}	-0.028	-0.0001^{***}	-0.0002
(S.E.)	(0.092)	(0.073)	(0.031)	(0.00001)	(0.001)
R-squared		**Adjusted R-squared**		**F test (p-value)**	
0.256		0.218		6.806^{***} (0.000)	

The Table reports the results of an OLS estimation of equation
***, **,* indicates significance at the 1%, 5% and 10% levels.

H2: recovery rates under administration are higher for PE-owned companies

Taking as our sample the set of 89 companies that entered administration in the period we also ran an OLS regression. Our findings again showed that the coefficient of Pub is indeed negative and highly significant. Thus PE-owned firms in administration as well as in receivership have higher recovery rates of debt as hypothesised.

H3: recovery rates under distress are higher for PE-owned companies

Taking as our sample the total set of distressed companies (i.e. pooling the samples of receiverships and administrations) we ran a further OLS regression

Table A7: **Cross-sectional determinants of the pooled sample**

Variable	CONSTANT	Pub	TAT	Time	DE
Coefficient	0.659***	- 0.327***	0.015*	- 0.0001**	0.00001
(S.E.)	(0.053)	(0.053)	(0.008)	(0.00001)	(0.0001)
R-squared		**Adjusted R-squared**		**F test (p-value)**	
0.219		0.199		10.989*** (0.000)	

The Table reports the results of an OLS estimation of equation
***, **,* indicates significance at the 1%, 5% and 10% levels.

This regression is highly significant and shows that in addition to the highly significant dummy Pub, more asset-efficient (TAT) firms have weakly higher recovery rates and the longer the process of recovery (Time) the smaller the fraction recovered (Table A6). Interestingly, the degree of leverage (DE) is quite *un*related to the recovery rate.

H4: recovery rates under distress, given ownership type and time to recovery, are higher for administration outcomes

Using the full set of distressed companies we controlled for both outcome and ownership type along with time to recovery. We expected that, *allowing* for differences due to ownership type, administration would deliver superior recovery rates than receivership. In fact we find that administration leads, contrary to the H4, to a *lower* rate of recovery than receivership: administration, whilst shortening the time to recovery of debt by two thirds, seems nonetheless to be less efficient than receivership in the process of recovery.

H5: prepack administration delivers a higher recovery rate than non-prepack administration

Using the subsample of 89 firms that went into administration we examine whether the prepack procedure, the predominant procedure under administration in the period, delivers higher recovery rates as might be supposed. The regression as whole proved to be insignificant, however, so we conclude that pre-pack makes no difference to the recovery rate under administration, despite controlling for other relevant factors, including time to recovery and size.

About the Authors

Professor Nick Wilson and The Credit Management Research Centre

Nick Wilson is Professor of Credit Management at Leeds University Business School and Director of the Credit Management Research Centre. He is an Honorary Fellow of the Credit Management Institute. His academic work has focussed recently on corporate finance including studies of trade credit, financial and working capital management, credit management practice, credit scoring and modelling, and new statistical and econometric methodologies for credit risk modelling. His work combines academic rigour with practitioner and policy relevance. He has published over 50 papers in leading academic journals in economics, finance, labour relations, marketing and business forecasting including: Economic Journal, Journal of Banking and Finance, etc. The **Credit Management Research Centre** was founded at Leeds University Business School in 1998 and was initially sponsored by the credit industry. The Centre's focus is on B2B credit; consumer credit; debt management; scoring and modelling; and policy. A spin-out company, CreditScorer specialises in commercial risk scoring.

Professor Mike Wright and The Centre for Management Buyout Research (CMBOR)

Mike Wright is Professor of Financial Studies at Nottingham University Business School. He is founding Director of the Centre for Management Buyout Research (CMBOR), the first centre for the study of private equity and buyouts. He has published 50 authored/edited books and over 300 academic papers on academic entrepreneurship, venture capital, and private equity in leading international journals. He was ranked #1 worldwide for publications in entrepreneurship 1995-2006. His books include Private Equity and Management Buyouts (2008). The ICAEW recently published his report "Private Equity Demystified" (with John Gilligan). He recently completed a report for BVCA (with Bart Clarysse and Mirjam Knockaert) on Venture Capital in UK, US and Israel. He has contributed extensively to the media on venture capital and private equity. **CMBOR** was founded in 1986 to examine developments in UK & European buyout markets in comprehensive and independent manner. CMBOR has developed a unique database of over 27,000 deal comprising the population of buyouts in the UK and Europe.

Professor Robert Cressy and The Entrepreneurship and Innovation Centre (EIC)

The Entrepreneurship and Innovation Centre (EIC) is a research centre in the University of Birmingham's Business School. Its activities cover both strategic, innovative entrepreneurship and entrepreneurship in large firms with a particular emphasis on the financing of entrepreneurship. The **EIC** is directed by Professor Robert Cressy, Professor of Entrepreneurship and Innovation at The Birmingham Business School. His academic research in the area of entrepreneurship and entrepreneurial finance has emphasised has been published in *The Economic Journal*, *Small Business Economics*, and *Journal of Corporate Finance* He is currently engaged in identifying best practice in early stage investing amongst UK PE and venture capital firms and has acted as a consultant for DGXXIII. He was a member of the Bank of England's former panel on small business finance.

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2   Amess, K., Girma, S., and Wright, M. 2008, *What are the Wage and Employment Consequences of Leveraged Buyouts, Private Equity and Acquisitions in the UK?* Nottingham: Nottingham University Business, Centre for Management Buyout Research, CMBOR Working Paper; Davis, S., Lerner, J., Haltiwanger, J., Miranda, J. and Jarmin, R. 2008, 'Private equity and employment'. In Lerner, J. and Gurung, A.(eds). *The Global Impact of Private Equity Report 2008, Globalization of Alternative Investments, Working Papers Volume 1*, World Economic Forum, pp43-64.

3   Strömberg, P., 2008, 'The new demography of private equity', In Lerner, J. and Gurung, A.(eds). The Global Impact of Private Equity Report 2008, Globalization of Alternative Investments, Working Papers Volume 1, World Economic Forum, pp3-26; . Wright, M., Burrows, A., Ball, R., Scholes, L., Meuleman, M., and Amess, K., 2007, *The implications of Alternative Investment Vehicles for Corporate Governance: A Survey of Empirical Research*. Paris, OECD, Report prepared for the Steering Group on Corporate Governance.

4   Acharya, V., Kehoe, C. and Reyner, 2009, 'Private Equity vs PLC Boards: A Comparison of Practices and Effectiveness', *Journal of Applied Corporate Finance*, forthcoming emphasise active ownership and governance and 'greater intensity of engagement' in PE-backed companies.

5   The period 2008 to the end of 2009 includes the recession period and covers the peak of corporate insolvencies.

6   We exclude very small companies from the data-base for the purposes of analysis (less than £10k assets). The majority of these are likely to be not active or trading and therefore not subject to insolvency. The estimation sample reduces to 6.5 million active companies and over 120,000 instances of formally entering receivership or administration

7   "*the debt capacity of a firm in a boom can be up to 40% higher than the debt capacity of the same firm in a contraction*" Hackbarth, D., Miao, J. and Morellec, E. (2006) "Capital Structure, Credit Risk, and Macroeconomic Conditions", *Journal of Financial Economics*, 82, 519-550.

8   Altman E., Wilson N. and Sabato G. 2008, 'The Value of Qualitative Information in SME Risk Assessment', CMRC working paper.

9   Shumway, T., 2001, 'Forecasting Bankruptcy More Accurately: A Simple Hazard Model', *Journal of Business*, Vol. 74, pp. 101 – 124.

10 UK companies are required to file accounts at 'Companies House'. The Companies House website defines a small company as one for which at least two of the following conditions are met: (i) Annual turnover is £5.6 million or less; (ii) the balance sheet total is £2.8 million or less; (iii) the average number of employees is 50 or fewer. For financial years ending before 30 January 2004 the exemptions thresholds are £2.8 million for turnover and £1.4 million for the balance sheet total.

11 The Companies House website defines a medium-sized company as one for which at least two of the following conditions are met: (i) Annual turnover is £22.8 million or less; (ii) The balance sheet total is £1.4 million or less; (iii) The average number of employees is 250 or fewer. For financial years ending before 30 January 2004 the exemptions thresholds are £11.2 million for turnover and £5.6 million for the balance sheet total.

12 The accounts analyzed for failed companies are the last set of accounts filed in the year preceding insolvency. For live companies, we include their accounts for each of the surviving years. For instance, for analysis year 2008 we use the data available as of 1st January 2008 and flag 'live' companies as those that are still live at the end of 2007. We flag 'failed' as those that are declared legally insolvent during 2008.

13 For instance, year 1995 sample contains the companies that filed at least one set of accounts and survived until 31/12/1994, which is the start of the period 1995. Year 1996 sample contains the companies that survived until 31/12/1995, and so on. It is also believed that companies that go insolvent are likely to file their last accounts some considerable time prior to their insolvency dates. Therefore, companies that filed their last accounts approximately 3 years prior to the sample period are excluded from the sample assuming that they are not practically live at the start of the analysis year. If a company goes insolvent in a particular analysis year, that company is flagged as failed for that analysis year and is not added for the consecutive analysis years in the sample. Additionally, only the companies that filed accounts earlier than the start date of an analysis year (1 January of each analysis year) are included in each analysis year. For example, in 2003 analysis year sample, a company must have filed at least one set of accounts between 01/01/2000 and 01/01/2003 and not gone insolvent before 01/01/2003 to enter the sample.

14 Ucbasaran, D., Westhead, P. and Wright, M. 2009, 'The Extent and Nature of Opportunity Identification by Repeat Entrepreneurs', *Journal of Business Venturing*, Vol. 24, pp. 99-115.

15 Gompers, P., Kovner, A., Lerner, J., and Scharfstein, D. 2007, 'Skill vs. Luck in Entrepreneurship and Venture Capital: Evidence from Serial Entrepreneurs'. *NBER Working Paper*. Available at http://papers.nber.org/papers/W12592, *Journal of Financial Economics*, forthcoming.

16 The CMBOR database effectively comprises the population of management buyouts and buyins in the UK, whether PE-backed or not. Data is captured from a twice-yearly survey of private equity firms, intermediaries and banks and obtains a full response rate as respondents are incentivized to supply data through receipt of a free copy of a quarterly review of the buyout market. Press and corporations' annual reports are also used to identify and check further deals. For further details see www.cmbor.org.

17 2003 is also chosen for cut-off because of the 'Enterprise Act 2002' which introduced new procedures and abolished administrative receivership for new loans but in practice banks adopted the new procedures for existing (defaulting) loans

18 The models, reported in Table 4 are built on a sample including 3,006,257 non-failed and 54,845 failed companies. We lose observations when we include director characteristics due to missing values and the sample reduces to and 2,229,004 non-failed and 42,526 failed companies (Models 2 and 4).

19 To do this we utilised the Companies House registration numbers of buyouts provided by CMBOR at Nottingham University Business School and for plcs provided by Centre for Credit Management at Leeds University Business School.

Notes

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