

# Private equity and employment

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Evidence from Netherlands

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*Abstract*

In the years after crisis, policy makers are focused on finding the ways to create sustainable economic growth and create employment. Their attention is shifting towards private equity industry. Once a ‘bad guy’, now the instrument of policy makers used to affect economy as a whole. However, private equity effects on employment are still not clear. This paper tries to contribute to the ongoing debate. It is investigated whether there is a difference in effect on employment among private equity and non-private equity backed companies in Netherlands as well as how that effect varies across sectors. It is also examined how MBO and other PE types affect the employment separately. The research is conducted on the sample of companies involved in transaction in a period 2007 to 2010. Somewhat surprisingly, the findings are not significant, except in the case of other PE types. Several issues which arise from these results are identified but they should be examined further in the future.

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## *1. Introduction*

In the aftermath of the financial crisis, policymakers are faced with the constant pressure of finding the way to create sustainable economic growth as well as bring back the European Union to full employment (EVCA, 2013). The center of their attention is the private equity (PE) industry. This industry is considered to be a new, more superior form of capitalism which brings high returns to investors (Froud & Williams, 2007). On the one hand, one may argue that policymakers are mistaken, and that PE industry do not contribute to creation of sustainable economic growth. The only ones who benefit from the PE deals are investors. This criticism follows especially from the leveraged-buy outs<sup>1</sup> (LBOs) waves in last decades of 20<sup>th</sup> century, where a considerable number of jobs were destroyed (Froud & Williams, 2007). On the other hand, private equity and venture capital associations have been conducting researches about the social gains of PE. They aim to show that PE industry is not the ‘bad guy’ and that this industry has to offer more than just high returns for the investors (Froud & Williams, 2007). For example, according to the exploratory analysis conducted by European Venture Capital Association<sup>2</sup> (2013), private equity investments encourage innovation, higher productivity and competitiveness. All of those, in turn, contribute to economic growth.

In terms of job creation, in particular, the contribution of PE industry to employment is still unclear. On the one side, EVCA and BVCA<sup>3</sup> find that the private equity investment creates jobs and leads to increases in employment in general. On the other side S.Davis & J.Lerner (2011) find a negative impact on employment. Therefore, there is still considerable disagreement on the effect of PE on employment. The goal of this paper is to help to contribute to this ongoing debate regarding the employment effects created by private equity investments.

To achieve this goal, the research question will be the following: *Do private equity participations in companies affect employment, as compared to non-PE backed companies in the Netherlands?* Answering this question will provide insight in whether employees and not solely shareholders benefit from PE-deals. The analysis will be conducted on a sample of Dutch

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<sup>1</sup> Acquisition of other company, usually using large amounts of debt to meet the cost. (Investopedia , 2014)

<sup>2</sup> EVCA

<sup>3</sup> British Venture Capital Association (BVCA)

companies with PE participations in companies, from 2007 until 2010. The effect will be observed in three years after transaction. Furthermore, as a follow up to the main research question, it will be analyzed if employment impact varies across different sectors' types. Finally, it will be examined how two types of private equity investments separately affect employment compared to companies financed some other way.

The relevance of this project is rooted in the fact that most of the studies, as it will be elaborated in the literature review, are focused on analyzing the impact of leveraged buyouts' (LBOs) on employment in comparison to non-LBOs companies. However, very little attention is paid to the overall effect of private equity on employment. Moreover, previous studies, have generally examined the USA and UK private equity markets. Therefore, it appears relevant to investigate the effect of private equity transactions in other European countries, especially in the ones where the level of private equity activity has been rather high in the recent years (such as in Netherlands). This is particularly interesting because these countries have different institutional environments relative to the UK and USA and therefore private equity transactions could have different effects on employment and on the economy as a whole. The European countries such as Netherlands belong to Germanic type environments, which are more regulated and coordinated than liberal Anglo-Saxon markets such as UK and USA (Bacon et al, 2008). Furthermore, this analysis could also indicate that not only markets matter but also institutions. If, for instance, the analysis reveals that PE firms have positive influence on employment in comparison to non-PE firms, policy makers should support private equity deals and in that way contribute to employment growth. If it turns out that effect is negative, the private equity market regulators should consider making the PE market regulations stricter. Finally, it could be the case that there is no impact of PE investments on employment, at least not a significant one. In that case private equity could be used more freely as the type of financing because of its many other benefits, such as, for example, improving organizational form of the firm and reducing agency costs.

The paper is organized as follows. Section 2 provides the explanation of the theory and literature review of the effects of private equity on employment. It also describes the hypotheses examined in this paper. Section 3 is devoted to the explanation of data and methodology. Section 4 provides the results of different tests and regression analysis. Section 5 is the discussion of the

results and possible implications. Section 6 is dedicated to additional analysis. Finally, section 7 is the conclusion and summary of the research.

## *2. Literature and theory review*

### *2.1. Theory review*

Less than a decade ago the term ‘private equity’ has been known only to the small group of professionals (bankers, pension funds etc) and a minority of very rich people (Watt, 2008). However, the PE-industry has been growing in popularity. The public is becoming aware of consequences of private equity for ‘real economy’ (Watt, 2008). While the literature may not agree on various impacts of private equity on the economy as whole, the concept of private equity is universal. In the simplest form, private equity means “equity capital that is not quoted on public exchange” (Investopedia, 2014). Private equity investors make investments in private companies or perform buyouts of public companies (‘going private’), which results in their delisting from the stock exchange (Investopedia, 2014).

There are many types of private equity transactions such as growth and replacement capital, including leveraged buy-outs (LBOs), management buyouts (MBOs), bridge financing and so on. These different PE transactions differ in a choice of target company (growing, mature or distressed company) and in the amounts and type of debt that is used for financing. Buyouts, especially LBOs, seem to be the most popular type of PE transactions (Kaplan & Stromberg 2009). The last two decades of 20<sup>th</sup> century as well as the beginning of 21<sup>st</sup> century are characterized by two waves of LBOs (Amess & Wright, 2010). LBOs represent the investments by PE firm in mainly mature companies. As the name says, these investments are financed by large amounts of debt (Kaplan & Stromberg, 2009). As Jensen (1989, as cited in Kaplan & Stromberg, 2009) predicted, leveraged buy-out organization became dominant corporate organizational form among private companies. Some authors (e.g. Kaplan & Stormberg, 2009) argue that LBO is a superior organizational form as it decreases the agency cost between managers and investors. Higher debt levels, improved monitoring by investors as well as increased managers’ incentives are just some of the reasons for the expected lower agency costs (Leslie & Oyer, 2008). Moreover, there is significant empirical evidence that LBOs not only decrease agency costs but also improve efficiency and operational performance of the target

firms which grants higher profitability and higher returns for the investors (Jensen, 1989, as cited in Bernstein et al, 2010). As a form of LBOs, in a broader sense, management buy-outs (MBOs) and management buy-ins (MBIs) are also types of buyouts which together with LBOs, attracted most attention. Of particular interest for this paper is MBO. As it will be elaborated later on, this type of PE transaction has some specific characteristics and positive employment impacts in the company in comparison to MBI backed companies.

Next to the different forms of buyouts, other types of PE financing are also interesting, especially growth financing and later venture stage financing. These transaction types focus on investing in growth firms, which need money to achieve business expansion (AttractCapital, 2014).

While there is broad literature on the different types of PE transaction and their role in value creation process, this paper will focus on the overall effect of private equity transactions on employment as well as on the effect of MBOs. Therefore, this section will provide a brief review of the literature which deals specifically with the impact of private equity on employment as well as the analysis of theory underlying particular employment impact.

## *2.2. Literature review on private equity and employment*

The research about the impact of private equity investments on employment produces controversial results. Many of these studies focus on different types of equity buyouts (MBOs, LBOs, etc) and their role in creation or destruction of jobs. Furthermore, as mentioned above, these studies are oriented to UK and USA private equity markets, with the exception of few papers which analyze the French and Spanish equity markets. This review will focus on two groups of papers: the ones which claim to find the negative employment impact of private equity and the ones which claim the opposite.

### *2.2.1. Private equity and negative impact on employment*

There is a significant number of studies which find a negative impact of PE on employment, especially in the first years after investment. Before reviewing these studies, it is important to understand what the theory is behind expected job destruction, once PE investors take over the company.

Private equity investors have been called different names “locusts”, “asset-strippers”, “gluttons at the gate” and they are accused of destroying jobs and profiting on workers expense (Froud & Williams, 2007). One of most applicable explanations for these ‘accusations’ lies in rational-incentive theory approaches (Wright & Wood, 2009). This theory is based on principal-agent problems between investors and managers which may exist in one company (Wright & Wood, 2009). According to agency theory, managers may work in their own interest at the expense of shareholders’ interests (Groenewegen et al, 2010). In order to align interests of managers and shareholders, one way is to increase managers’ incentives. The new organizational forms introduced by PE transactions give the opportunity to control managers more effectively and to increase their incentives (Lestle & Oyer, 2008). There are many factors at play that may influence how managers behave after PE transaction. As many researchers argue, giving managers more equity in the company, and increasing their variable rewards while reducing the base pay, may increase their incentives and reduce agency costs.

According to Lestle and Oyer (2008), not only the idea of upside potential, but also the exposure to downside risk-failing to repay debt- may be good motivators for managers. Since, each of PE transactions is also highly supported by debt, the company’s free cash flows are rather restricted and that leaves less opportunity for managers to use it for other purposes. Therefore, the increased incentives and the pressure of failing to repay debt cause managers to make decisions which will increase profits of the company and consequently the return to investors. As a result, they usually undertake the restructuring of the whole company.

According to Wright and Thompson (1995), restructuring takes place in order to improve organizational performance and increase the profitability of the company by minimizing costs, which will create higher returns to investors. The best way to minimize costs is by reducing the workforce. The process of cost minimization usually means the revision of employees’ contracts and possible layoffs. Revision of employees’ contracts usually means reducing the employees’ pay, especially the ones which are above marginal product of labor and thereby increasing profits (Amess & Wright.2007). On the other side, it could be argued that laying off workers as a part of restructuring is due to the fact that the company previously performed at sub-optimal high levels of employment. Now, by undertaking the restructuring company has the opportunity to correct this sub-optimal employment level (Amess & Wright, 2007).



A number of studies have found evidence which is in line with above described theory.

The most important representative is the empirical analysis conducted by Davis et al (2011). The authors analyze the effect of LBOs transaction in period from 1980-2005. They focus not only on employment effects in the firms but also on the employment effects in their greenfield establishments, opened after buyout transaction. The results support the view of negative employment impact with the exception of greenfield establishments where jobs are created at a faster rate than in the control firms<sup>4</sup>. Furthermore, the authors point out that the employment effects vary according to the industry and type of the transaction in question.

Wright and Amess (2007) analyze the employment and wage effects of LBOs in UK as well as the different impact on employment of MBO and MBIs<sup>5</sup> from 1999 to 2005. They find that LBOs have negative impact on wage growth while the effect on employment growth is rather insignificant. Also, both MBOs and MBIs transactions have negative impact on wages. On the other side, it appears that the MBOs transaction is associated with a higher employment growth than MBIs transactions when compared to control sample.

Finally, in the empirical analysis done by Cressy et al. (2010) the authors analyze the private equity backed LBOs transactions in UK during five years period (1995-2000). They find that LBOs indeed result in jobs cuts in years immediately after the transaction, but as profitability rises after the transaction, they also indicate that is possible that these companies will become net employers in future years.

### *2.2.2. Private equity and positive impact on employment*

The review of above papers shows the negative impact on employment in the company targeted by PE investors. However, there is a small but significant number of studies which find that PE transactions in the firm can create the jobs and thereby increase employment. The explanation for these findings is rooted in the fact that PE investors bring also many benefits to the targeted company. For instance, private equity investors bring more funds to the firm, which makes it easier for the company to grow and expand its business (Davila et al, 2009). Furthermore, they usually have well developed networks of partners and suppliers and access to potential clients

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<sup>4</sup> Control firms-sample of firms which didn't participate in the buyout transaction.

<sup>5</sup> Management buy in

(Sahlman, 1990; Sapienza et al., 1996, as cited in Davila et al, 2009). Moreover, investors' knowledge about growing firms is broad and they usually share it with the companies they invest in, thereby accelerating their growth (Davila, 2005). Also, one should not forget that managers are, after PE transaction takes place, free from bureaucracy which allows them to pursue growth strategies otherwise impossible. Taking all these facts into account suggests that companies targeted by PE investors have more opportunities for expanding their businesses. Therefore, they create jobs and increase the employment in the company in the long run. Consequently, expanding business means also higher profits (Wright & Thompson (1987), as cited in Wright & Amess (2007)). The following studies support this theory.

Achleitner et Klöckner (2005) have found that the overall impact of private equity on employment is positive. According to their findings, employment increased by 10.1 % compounded growth rate and around 420 000 jobs were created during the period of 2000-2004 in the European Union countries, including Norway and Switzerland. While there are some job losses in the smaller number of companies, they are offset by the large number of jobs created in other companies (Achleitner & Klöckner, 2005).

Boucly et al. (2011) also find positive results regarding employment in the French equity market. Their study is focused only on a particular type of private equity, leveraged buyouts (LBOs). While their research also includes the general impact of LBOs on firms' profitability, growth and capital expenditure, the impact on employment is of the main concern. They find that employment grows up to 18% in four years following the buyout. Furthermore, they also control for the effect of rigidity of labor laws, especially because French labor law is one of the strictest regarding the layoff of the workers. They assume that because French labor law is strict, their analysis would not show cost cutting effects of LBOs as that is the case in UK and USA which have more flexible markets. Moreover, post-LBOs growth would be higher in French companies. However, they do not find any significant results that more rigid labor laws have higher positive impact on post-LBOs growth in general and on employment in particular.

Another study is conducted by ACRI, the Private equity and Venture Capital Association in Spain. This research, as the ones before, shows that there is an increase in employment in private equity backed firms. Yearly growth in employment is reported to be 8.2 % during 2005 until 2008 (ACRI, 2011).

BVCA<sup>6</sup> (2008) also reports that the private equity backed firms experience the employment growth in years following the first transaction. They find that the overall growth rate is around 9% per annum, in comparison to only 1% and 2% in FTSE 100 and FTSE mid-250 companies, respectively.

As can be seen from the review of the papers above, the studies do not agree on the exact employment impact of private equity transactions. It also appears that not much research has been done on the topic proposed in this paper, especially when it comes to analysis of private equity transactions in Netherlands.

### *2.3. Hypothesis*

As it has been shown in the previous section, researchers still do not agree on the employment impact of PE transactions. Some say that PE transactions destroy jobs, finding the explanation for their results in the principle-agent theory. They argue that PE investors increase managerial incentives by giving them the large equity stake in the company and increasing their rewards, so that in that way they ensure that managers will perform in their interests. However, performing in the interest of shareholders requires increasing profits and thereby, shareholders' returns. As it is explained, one way to achieve this is by minimizing costs. The cost minimization goes at the expense of employees because they lose their jobs or their wages are cut.

On the other side, other academics argue that PE brings many benefits, including the creation of employment. The jobs are created due to the fact that managers have more resources and are able to pursue growth strategies which before transaction were not even considered. While the results on this topic might be controversial, the assumptions in this paper support the negative view. The choice for this is rooted in the fact that the papers which find the negative impact on employment provide more objective results. Therefore, the first hypothesis is:

*H<sub>1</sub>: PE backed firms will experience lower employment growth than non-PE backed counterparts, in each of three years after the PE transaction and in general.*

Furthermore, this paper looks at effects among different sectors. The focus in this paper will be mainly on manufacturing, retailing, services and telecommunication, media and technology

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<sup>6</sup> British Private Equity and Venture Capital Association

(TMT). The sample consists of the companies from these sectors because they are the most popular sectors for PE investors. For example, according to Sudarsnam (2010), TMT sector, together with manufacturing sector are the most attractive sectors for PE investors because of its growth potential.

In this paper it is expected to find some difference in employment impact of PE and non-PE backed companies among sectors. The reason for this lies in the fact that the service sector and retailing are more labor intensive<sup>7</sup> sectors than manufacturing and TMT. Therefore, it is assumed that more labor intensive sectors will be characterized by more cuts in employment.

The second hypothesis follows created from the above mentioned arguments:

*H<sub>2</sub>: Employment growth in PE and non-PE backed firms will differ among the sectors.*

As it is mentioned above, next to the overall effect of PE transactions on employment, it will be analyzed if MBOs and other PE types individually have some employment effects. Firstly, MBO type is not chosen accidentally. According to Amess and Wright (2007) MBOs experience higher employment growth in comparison to MBIs. The reason for this is rooted in the sole definition of the MBO. Management buy-out or MBO is type of PE transaction in which managers of the firm buy its assets and operations or precisely its controlling shares (Investopedia, 2014). These managers already have insider knowledge about the growth opportunities and new products which company could offer but now, they also have more power to pursue those strategies. This can result in higher employment growth (Amess & Wright, 2007). Furthermore, since they were managers before and knew the company's employees, they may be oriented towards employee preservation and towards increasing their commitment to the company, rather than laying them off (Wright, 1990, as cited in Amess & Wright, 2007). Secondly, other PE type in the sample mainly consists of some type of growth financing or later venture stage financing and therefore, it is expected that these types will show significant positive employment effects. Precisely, these types are usually oriented towards pursuing unexploited growth strategies which usually result in employment creation. Therefore the third hypothesis is created and it consists of two parts:

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<sup>7</sup> Labor intensive industry-“Industry that requires large amount of labor to produce its goods and services” ( Investopedia, 2014)

*H<sub>3</sub>(a) : MBO companies will have higher employment growth than the companies financed some other way.*

*H<sub>3</sub>(b): Other PE companies will have higher employment growth than the companies financed some other way.*

### *3. Data and Methodology*

#### *3.1. Data*

The sample in this paper consists of 46 Dutch companies. It is built by using the matched pair sample approach. Half of the companies are PE backed, while the other half is non-PE backed. They are, however, of similar size and operate in the same sector. The data about private equity transactions has been provided by NVP (Dutch Private Equity and Venture Capital Association). While the NVP provided the information about more than 200 companies which had PE transactions in period from 2007 to 2010, the difficulties in obtaining data about employees reduced this big sample to only 23. However, it is not surprising that data about employees are not easily obtainable. As it is known, these are private companies and they are not obliged to disclose all information, as their public counterparts. Furthermore, the PE companies which have the data about employees usually lack that information in year when PE transaction took place as well as in two to three subsequent years. This fact also has caused the number of original companies to be significantly reduced.

Among the companies which have the data available, only the companies which fulfill two requirements have been chosen for the analysis. Firstly, the companies have to be involved in private equity transaction during period from 2007-2010(dependent on the company).Secondly, the type of private equity transaction should be either some type of buyout (MBOs, MBIs, LBOs) or some other type of capital financing (growth, replacement, later stage venture financing). The companies at the stage of seed and start-up are excluded from the sample. The selection process results in sample of 23 PE companies. Once PE companies are chosen, their non-PE counterparts are obtained from Amadeus database. As already mentioned they are from the same sector and of similar size and are not financed by private equity investors in this period. The number of employees is used as a measure of size of a company. Moreover, finding 23 non-

PE backed companies has been harder than expected due to unavailable employment data. However, at the end, the sample of 46 companies is created. It is worth pointing out that the sample is not perfect. Some of the chosen companies lack data on employment growth in some of the observed years and therefore, the number of observations in regressions can be even lower than 46.

### *3.2. Methodology*

The recent studies about the employment impact of private equity have not yet agreed about the right econometric model. Some of these studies make use of the simultaneous equations to account for both wage and employment effects (Amess & Wright, 2007). Others, such as the study by Davis et al (2011) develop a model to account for effects at both the firm and plant level. One could argue that the variation in research approaches could be the reason for obtaining different results. One aspect which keeps on repeating in all studies is the finding that the type of sector and type of private equity transaction can influence the results; therefore these variables are important to control for. Furthermore, as for the control sample, most of the papers use the companies from same sector and similar size but which do not take part in private equity transactions.

The approach developed in this paper also uses a control sample built from non-PE backed companies from same sector and similar size. Furthermore, as already explained it will also include the type of the sector, in order to control for possible different employment effect among sectors. In order to see if there is significant difference in employment between two types of companies, a univariate Mann-Whitney test will be firstly performed. Afterwards, multiple regressions will be used to analyze the effect of PE on employment over years. Firstly, the effect of PE on percentage change in employment for each of three years will be investigated. Secondly, the general employment effect of PE transaction over three years will be analyzed.

#### *3.2.1. Dependent Variable*

Since the main focus of the paper is to analyze if there is employment impact of private equity, the percentage change in employment as dependent variable is chosen. The formula used to calculate percentage change is :  $(E_t - E_{t-1}) / E_{t-1}$ . This seems to be the best way to analyze if there has

been positive or negative growth in employment after PE transaction took place in comparison to non-PE companies. As already mentioned, the approach in this paper is to run multiple regressions in order to analyze if there has been PE effect on employment for each of three years after transaction and what the overall effect for these three years is. Therefore, the dependent variable for every regression is defined as a percentage change between the year in question and previous year. The only exception is variable for the regression analyzing the overall employment effect. It is defined as a percentage change between the employment in year 3 and employment in initial year. In all cases, the initial year is the year in which PE transaction occurred.

### *3.2.2. Independent Variables*

In order to be able to answer the research question, the main independent variable in this study is a dummy variable which indicates the nature of the transaction - (PE or non-PE backed firm). The dummy variable for two groups will be used. The value 1 is assigned if the company was involved in PE transaction (See Table1).

As it is explained, it is important to control for sectors' effect. However, the approach in this paper will be slightly different than in previous studies. In order to answer second hypothesis, the chosen sectors will be divided in two groups- the labor intensive and non labor intensive sectors. Therefore, the dummy variable which indicates the type of sector will be created. The value 1 will be assigned if the sector is labor intensive. Subsequently, so that the effect could be distinguished among two types of companies, the interaction term will be created. Table 1 below gives the overview of the variables.

*Table 1: Variables*

<b>Variable</b>	<b>Description</b>
<b>Employment</b>	Employment change: $(E_t - E_{t-1})/E_{t-1}$
<b>PE,non-PE</b>	Dummy variable (1=PE-backed transaction, 0= non-PE backed firm)
<b>Labor intensive</b>	Dummy for type of sector (1= labor intensive, 0=less labor intensive)
<b>Labor_PE</b>	Interaction term if sector is labor intensive and company is PE-backed)
<b>E</b>	Error term

## *4. Empirical Results*

### *4.1. Descriptive statistics*

The summary statistics, precisely, mean and standard deviation, for employment change according to type of transaction and sector are shown in tables 2 and 3. As it can be seen from the table 2, the average employment change in PE backed companies over the years is mostly larger than the average employment change over the years in non-PE backed ones. The only exception is the average value for employment change from year 1 to year 2, which is negative. It seems that in year 2 employment on average decreased in PE backed companies. Furthermore, particularly interesting are the average employment change from initial year to year 1, and the average overall employment change. The employment in year 1 in PE backed companies increased by 0.182 % on average while it increased only 0.057 % in their non-PE backed counterparts. Also, the employment from initial year to year 3 (overall effect) increased by about 0.278% in PE backed companies, contrary to only 0.166% in the non-PE backed ones. However, the standard deviations of these two examples are high. This indicates that there is great variation in the data and the mean values should be taken with caution. Also, higher standard deviations in these two examples indicate that the existing difference in their mean values is not significant.



*Table 2: Summary statistics employment and type of transaction*

Employment	MN	SD
Year 0-1 if pe==1	0.182	0.615
Year 0-1 if pe==0	0.057	0.176
Year 1-2 if pe==1	-0.005	0.152
Year 1-2 if pe==0	0.08	0.271
Year 2-3 if pe==1	0.095	0.178
Year 2-3 if pe==0	0.061	0.173
Overall if pe==1	0.278	0.586
Overall if pe==0	0.166	0.235

Next, table 3 below summarizes the mean and standard deviation values for employment over two types of sectors. Looking at the values in the table below, it appears that the PE companies in labor intensive sectors have mainly higher average employment growth over the years, except in year two when the average employment growth is negative. However, high standard deviation once again indicates great variance of data around mean which may result in the mean value being not good representative for the average value in population.

*Table 3: Summary statistics employment and sectors*

Employment	Labor intensive_PE		Non labor intensive_PE	
	Mean	SD	Mean	SD
<b>Year 0-1</b>	.383	.891	.046	.167
<b>Year 1-2</b>	-.001	.180	.062	.249
<b>Year 2-3</b>	.140	.206	.060	.163
<b>Overall</b>	.518	.773	.135	.236

## *4.2. The effects of private equity on employment*

### *4.2.1. Mann-Whitney test*

In order to answer main research question of this paper and to test first hypothesis, the non parametric Mann-Whitney test is performed. The choice of this particular test is rooted in the fact that there are two independent samples which need to be compared and which are not normally distributed. The test is performed four times, once for each of three years and once for overall effect on employment in three years. Test is based on the null hypothesis that there is no difference in employment between two groups of the company. The table 4 below shows the p-value of the tests.<sup>8</sup>

*Table 4: Mann-Whitney test P-values*

<b>Employment Growth</b>	<b>Mean PE</b>	<b>Mean Non-PE</b>	<b>P-Value</b>
<b>Year 0-1</b>	0.182	0.057	0.6806
<b>Year 1-2</b>	-0.005	0.08	0.0838
<b>Year 2-3</b>	0.095	0.062	0.8616
<b>Overall Effect</b>	0.278	0.166	0.3294

Interestingly, no significant result is found in 3 out of 4 tests performed. For each of these three tests p-value is higher than the assumed level of significance  $\alpha=0.05$ . However, in year 1-2 null hypothesis is rejected at significance level  $\alpha=0.1$ . The findings indicate that the employment growth in PE backed companies is lower than employment growth in non-PE backed ones in this year. Even though this result is significant, it does not allow accepting hypothesis 1. The reason for that lies in the fact that the insignificant results are obtained in other years and that taken together all the p-values imply that there is no evidence that the employment growth is lower in PE backed companies than in non-PE backed ones over the time period observed. This result appears to be contrary to the above mentioned expectations. However, before analyzing why the

<sup>8</sup> See Appendix 1 for detailed output

results obtained are not as expected, it is interesting to extend the previous univariate tests and include the type of the sector in the analysis to see if this will alter the results.

#### 4.2.2. Regression analysis of the effect of private equity on employment

The analysis in this section builds on the previous analysis by adding the effect of types of the sectors on employment. As already stated, sectors are divided in two groups- labor-intensive and non-labor intensive sectors. These regressions in the tables below are just the extension of the univariate Mann-Whitney tests of the first hypothesis. They include the type of the sectors but they do not account for PE effect across the sectors (hypothesis 2) This is the subject of the following section. The sector effect is accounted for by creating the dummy variable for sector type. Value 1 is assigned if the sector is labor-intensive. Multiple regressions are performed for each of the three years and for overall effect from initial year to year three. Again, the null hypothesis is the same as before. It assumes no difference in employment between two group of the companies.

As it can be seen from table 5, the obtained results are insignificant. P-value of 0.311 is above assumed level of significance of 0.05.

Table 5: Regression for PE effect on employment for year 0-1

`. reg employment1 dPe2 dlabor2`

Source	SS	df	MS			
Model	.49721338	2	.24860669	Number of obs =	36	
Residual	4.84662316	33	.146867368	F( 2, 33) =	1.69	
Total	5.34383654	35	.152681044	Prob > F =	0.1996	
				R-squared =	0.0930	
				Adj R-squared =	0.0381	
				Root MSE =	.38323	

  

employment1	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dPe2	.136912	.1332005	1.03	0.311	-.1340864	.4079105
dlabor2	.2025556	.1279584	1.58	0.123	-.0577778	.4628889
_cons	-.0485039	.1041276	-0.47	0.644	-.2603531	.1633453

Insignificant results are obtained in regressions for year 2, 3 and for overall effect (See table 6, table 7 and table 8). In all these regressions obtained p-values are rather high. Now, even the PE effect on employment in year 2 which is found to be significant when Mann-Whitney test is performed, becomes insignificant. R-squared as well as adjusted R-squared are rather low which

indicates that the model may not fit data very well and more variables should be included in the analysis.

Table 6: Regression for PE effect on employment for year 1-2

```
. reg employment2 dPe2 dlabor2
```

Source	SS	df	MS			
Model	.164980537	2	.082490268	Number of obs =	36	
Residual	1.79701544	33	.054455013	F( 2, 33) =	1.51	
				Prob > F =	0.2347	
				R-squared =	0.0841	
				Adj R-squared =	0.0286	
Total	1.96199597	35	.056057028	Root MSE =	.23336	

  

employment2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dPe2	-.0841254	.0809824	-1.04	0.306	-.2488854	.0806345
dlabor2	-.1075021	.0779157	-1.38	0.177	-.2660228	.0510187
_cons	.1365118	.0634048	2.15	0.039	.0075137	.2655098

Table 7: Regression for PE effect on employment for year 2-3

```
. reg employment3 dPe2 dlabor2
```

Source	SS	df	MS			
Model	.040826029	2	.020413014	Number of obs =	36	
Residual	1.01376909	33	.030720275	F( 2, 33) =	0.66	
				Prob > F =	0.5213	
				R-squared =	0.0387	
				Adj R-squared =	-0.0195	
Total	1.05459512	35	.030131289	Root MSE =	.17527	

  

employment3	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dPe2	.0396275	.058861	0.67	0.505	-.080126	.159381
dlabor2	.0590514	.058861	1.00	0.323	-.0607021	.1788049
_cons	.0274119	.0527079	0.52	0.606	-.0798232	.134647

Table 8: Regression for overall PE effect on employment

. reg overall dPe2 dlabor2, robust

Linear regression

Number of obs = 37  
 F( 2, 34) = 1.24  
 Prob > F = 0.3013  
 R-squared = 0.0873  
 Root MSE = .42291

overall	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
dPe2	.1302297	.1536772	0.85	0.403	-.18208	.4425393
dlabor2	.2251927	.143381	1.57	0.126	-.0661926	.516578
_cons	.0419226	.0843825	0.50	0.623	-.1295633	.2134086

Overall, it follows that, even though the type of the sector is included in the analysis, the significance of the results does not change. Therefore, in both Mann-Whitney analysis and multivariate regression analysis, there could not be found enough evidence to support hypothesis 1.

#### 4.3. The effects of private equity on employment in different sectors

After performing Mann-Whitney test and multivariate regressions which include type of the sector and after showing that there is insignificant difference in employment among PE and non PE companies, this section will include in the regression analysis the variable which will account for both PE and sector effect on employment. The purpose of including this variable is to test hypothesis 2. Again, the effect will be analyzed for each of three years as well as the overall effect from initial year to year three. The null hypothesis assumes no different employment effect among sectors in PE and non-PE backed companies.

The regression analysis for the employment effects in the first year and the equation of the model are following:

$$\text{Employment} = \beta_0 + \beta_1 \text{PE} + \beta_2 \text{LABORIN} + \beta_3 \text{LABOR\_PE} + \varepsilon$$

Table 9: Regression analysis of the effects of PE on employment across different sectors for year 0-1

`. reg employment1 dPe2 dlabor2 labour_PE, robust`

Linear regression

Number of obs =	36
F( 3, 32) =	1.28
Prob > F =	0.2967
R-squared =	0.1201
Root MSE =	.38333

employment1	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
dPe2	<b>.0091159</b>	<b>.0782745</b>	<b>0.12</b>	<b>0.908</b>	<b>-.1503241</b>	<b>.1685559</b>
dlabor2	<b>.1073001</b>	<b>.0727836</b>	<b>1.47</b>	<b>0.150</b>	<b>-.0409553</b>	<b>.2555555</b>
labour_PE	<b>.2644671</b>	<b>.3634613</b>	<b>0.73</b>	<b>0.472</b>	<b>-.4758794</b>	<b>1.004813</b>
_cons	<b>.0011946</b>	<b>.057185</b>	<b>0.02</b>	<b>0.983</b>	<b>-.1152874</b>	<b>.1176766</b>

As it can be seen from the table 9, the results appear not to be statistically significant even after correcting for the heteroscedasticity. P-value of the variable labour\_PE is higher than the assumed level of significance  $\alpha=0.05$ . It follows that the hypothesis 2 for year 1 does not hold and that there is no enough proof that difference in employment between two types of sectors exists. Similar results are obtained by running regressions for year two and three (See table 10 and table 11). Again, calculated values are statistically insignificant because p-values are really high and therefore, it is impossible to derive some economic explanations. In addition, the R-squared in regression 1 and adjusted R-squared in subsequent two regressions are really low, indicating that only small percent of employment effects in these companies is explained by the type of the financing and type of the sector.

Table 10: Regression analysis of the effects of PE on employment across different sectors for year 1-2

. reg employment2 dPe2 dlabor2 labour\_PE

Source	SS	df	MS			
Model	.233270848	3	.077756949	Number of obs =	36	
Residual	1.72872513	32	.05402266	F( 3, 32) =	1.44	
Total	1.96199597	35	.056057028	Prob > F =	0.2496	
				R-squared =	0.1189	
				Adj R-squared =	0.0363	
				Root MSE =	.23243	

  

employment2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dPe2	-.1809012	.1179616	-1.53	0.135	-.4211811	.0593786
dlabor2	-.1729681	.0970208	-1.78	0.084	-.370593	.0246569
labour_PE	.1817596	.1616612	1.12	0.269	-.1475335	.5110526
_cons	.1706679	.0700796	2.44	0.021	.0279205	.3134154

Table 11: Regression analysis of the effects of PE on employment across different sectors for year 2-3

. reg employment3 dPe2 dlabor2 labour\_PE

Source	SS	df	MS			
Model	.046041282	3	.015347094	Number of obs =	36	
Residual	1.00855383	32	.031517307	F( 3, 32) =	0.49	
Total	1.05459512	35	.030131289	Prob > F =	0.6938	
				R-squared =	0.0437	
				Adj R-squared =	-0.0460	
				Root MSE =	.17753	

  

employment3	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dPe2	.014266	.0862646	0.17	0.870	-.1614493	.1899813
dlabor2	.0358598	.0824917	0.43	0.667	-.1321702	.2038898
labour_PE	.0485531	.1193585	0.41	0.687	-.1945723	.2916784
_cons	.0408386	.0627667	0.65	0.520	-.087013	.1686903

It is worth pointing out that the difference in terms of employment growth between PE and non PE backed companies does not become significant and that even the employment in year 1-2 is again insignificant.

Furthermore, the results do not seem better when the overall effect on employment from year one to year three is analyzed. Contrary to the expected, table 12 shows that there is again no significant difference in employment growth between two types of companies and between two sector types. Therefore, again, there is no enough evidence to accept hypothesis 1 and 2.

Table 12: Regression analysis of the effects of PE on employment across different sectors for overall effect

```
. reg overall dPe2 dlabor2 labour_PE
```

Source	SS	df	MS			
Model	.990597348	3	.330199116	Number of obs =	37	
Residual	5.67232473	33	.171888628	F( 3, 33) =	1.92	
Total	6.66292208	36	.185081169	Prob > F =	0.1454	
				R-squared =	0.1487	
				Adj R-squared =	0.0713	
				Root MSE =	.41459	

  

overall	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dPe2	-.0844281	.1954417	-0.43	0.669	-.4820573	.3132011
dlabor2	.0300493	.1863464	0.16	0.873	-.3490753	.4091739
labour_PE	.4232173	.2744263	1.54	0.133	-.1351072	.9815418
_cons	.1492515	.1381982	1.08	0.288	-.1319148	.4304178

While the literature suggests that there may be either more negative or more positive employment growth in PE backed companies in comparison to non PE backed ones, the results found here, are somewhat surprisingly not as predicted. Even though multiple regressions are performed it could not be found that PE and non PE companies experience the difference in employment growth or that the employment in these two company types majorly differs among sectors. However, one should take this finding with caution since the model is full of limitations, which will be elaborated later on.

#### *4.4. The effects of different private equity types on employment*

It is already mentioned above that the type of PE transaction also matters when the employment impact of PE investments is investigated (Davis et al, 2011). This section will try to investigate separate effects of MBOs and other PE transactions on employment. By analyzing these separate effects, the aim is to see if results will be significantly changed.

The approach for analyzing this effect is same as the one above applied. Dependent variables stay the same-the percentage change in employment over the years. However, independent variable is now dummy variable that indicates if PE transaction is MBO or in the case of other PE, it indicates if PE transaction is some other PE type. Value 1 is assigned if PE transaction is MBO or if PE transaction is other PE type. Furthermore, the effect of sectors is also accounted in the analysis. Two new interaction terms are created in order to account for different sectors'



effect in MBO or other PE financed companies in comparison to companies financed some other way.

After performing regression analysis, the obtained results are statistically insignificant for both MBO and other PE effect on employment. P- values are above assumed significance level of 0.05.<sup>9</sup> Therefore, it follows that the evidence to support both hypothesis 3a and 3b could not be found. Interestingly, as it can be seen in tables 13 and 14, the companies financed by other PE type and from labor intensive sectors experience 0.25 % and 0.81 % higher employment growth in year 3 and in general, respectively than the companies financed some other way and from non-labor intensive sectors. Both results are significant at 0.05 significance level. While, as mentioned above, it is expected that the labor intensive sectors have more layoffs, the findings here show differently. However, this should be taken with caution because of limitations of the model which will be elaborated in the next section.

Table 13: Regression for employment effect of other PE in year 3

```
. reg employment3 dotherpe2 dlabor2 labor_otherPE
```

Source	SS	df	MS			
Model	.171025459	3	.057008486	Number of obs =	36	
Residual	.883569656	32	.027611552	F( 3, 32) =	2.06	
Total	1.05459512	35	.030131289	Prob > F =	0.1245	
				R-squared =	0.1622	
				Adj R-squared =	0.0836	
				Root MSE =	.16617	

  

employment3	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dotherpe2	-.0650326	.0950098	-0.68	0.499	-.2585611	.128496
dlabor2	-.0102024	.0640017	-0.16	0.874	-.1405697	.1201648
labor_othe~E	.2537331	.1285357	1.97	0.057	-.0080855	.5155517
_cons	.063693	.0460865	1.38	0.177	-.0301821	.1575681

<sup>9</sup> See Appendix 1 for detailed output

Table 14: Regression for overall employment effect of other PE

. reg overall dotherpe2 dlabor2 labor\_otherPE

Source	SS	df	MS			
Model	1.57832354	3	.526107848	Number of obs =	37	
Residual	5.08459854	33	.154078744	F( 3, 33) =	3.41	
Total	6.66292208	36	.185081169	Prob > F =	0.0286	
				R-squared =	0.2369	
				Adj R-squared =	0.1675	
				Root MSE =	.39253	

  

overall	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dotherpe2	-.2530849	.2225428	-1.14	0.264	-.7058517	.1996819
dlabor2	.0430707	.1458682	0.30	0.770	-.2537005	.3398418
labor_othe~E	.8021833	.3135553	2.56	0.015	.1642503	1.440116
_cons	.1632786	.1049077	1.56	0.129	-.0501578	.3767149

All in all, the analysis performed in this section shows that there is no enough evidence to support hypothesis 3a and 3b. However, the results found for other PE impact on employment in year 3 and overall, suggest that the type of investments as well as the sector in which investment is made may have an effect upon employment.

### 5. Discussion of the results

As already mentioned, the insignificant results obtained by the above analysis are not expected. However, while they may be surprising, still they are not impossible. There are several arguments for that. Firstly, most of the known research is conducted in USA and UK equity markets, which are by far the most developed ones. Even though Dutch equity market was experiencing boom in 2007, as it can be seen from the number of deals provided in NVP dataset, it may not still be big enough so that the significant employment effects can be observable. Secondly, as Davis et al (2011), point out type of the PE transaction also differently influence the employment. Looking at the type of PE deals in Netherlands, the dominant ones are growth financing, MBOs and different types of venture financing. Interestingly, there are no many LBOs. This could explain why there is no significant negative effect on employment. It is mentioned earlier in the paper that LBOs are the center of research and that very little attention is paid to other types. Therefore, all effects which are found, whether positive or negative, are mainly concerned with LBO impact. The few which find positive overall effects of private equity on employment also include earlier stages of venture capital financing. This type of financing is

not the part of the research in this paper. While this PE type could be the cause for obtaining positive employment effects since new ventures usually create jobs, this effect could not be analyzed here. Consequently, it could be argued that the lack of presence of LBOs in Dutch private equity market in period investigated in this paper is the reason for not being able to prove above mentioned hypothesizes 1 and 2. This all implies that not all PE equity deals influence employment and that the critics might be mistaken after all.

Next, it is possible that some of the PE companies opened new establishments .Opening the greenfield establishments leads to new employment opportunities and this in turn could offset any layoffs in old plants. Consequently, any major changes in employment could not be observed. However, this is just one possible explanation of the results and it would be interesting to investigate it in near future.

And finally, employment effects may not be observable because the labor laws in Netherlands are really strict in terms of dismissals of employees. As Pauwe (2004, as cited in Bacon et al., 2008) points out employment law determines standards which managers need to respect when making decisions about employment, pay and human relation practices. Stricter employment law may cause dismissals to be very expensive and therefore induce manager to abstain from minimizing costs by laying off workers. One may argue that stricter labor law impede process of restructuring and decrease the opportunities for growth thereby decreasing profits and returns to investors. However, while this might be true, it remains to be investigated. All in all, high degree of employment protection in Netherlands seems to be plausible reason for not observing significant employment differences among two types of companies.

While the above arguments look like reasonable explanations, one should not forget that the insignificant results could be obtained because of methodological limitations of the model. Firstly, the sample used is rather small. Forty six companies in total, both PE and non PE backed might not be enough to obtain some significant results. All the previous research is conducted on much larger sample, starting from couple of hundred observations and above. As already discussed in data section, due to lacking employment information the number of PE companies is brought down from around 200 hundreds in NVP sample to only 23. Consequently, only 23 matching non-PE companies could be used. Secondly, there are no many companies involved in LBO for which the employment data is available. As already stated, lack of LBOs in sample

could cause that the results are insignificant. Finally, since the sample is small, each type of the sector do not have large number of observations and therefore, this justifies the result that no significant difference in employment is found among these two sector types.

These limitations may the best explain why the results obtained in the analysis of MBO effect on employment are surprisingly insignificant. As it is explained above, characteristics of an MBO transaction are strong supports for expected positive results. However, sample size may not be enough in order to be able to distinguish among employment effects of different types of PE. Therefore, one should not be discouraged with the findings which fail to support hypothesis 3a and 3b.

While the above analysis may explain why the employment effect is not significant, one should remember that there are many other benefits to the company financed by private equity investors. As Leslie and Oyer (2008) find the PE equity investments in the firm leads to increased managers' incentives which means they will work more in the interest of the firm and thereby in the interest of shareholders, than the managers in public companies will do. Also, PE investors will be more interested in monitoring the managers by taking the seat in the boards and providing them with the professional advice which can help in efficient restructuring of the company (Cornelli & Karakas, 2008). While many researches argue that increasing managers' incentives and orienting them more towards profit maximization leads to many employees being laid off, it appears that there is not significant effect on employment at least in the Netherlands. Therefore, it could be assumed that a new organizational form usually brought by PE investments in the company does not go at the expense of employees and it benefits shareholders. However, before making any fast conclusions, in the section 6 in the paper, it will be investigated whether operating performance differs among PE and non PE companies.

Overall, the reasons described in this section could serve as a base for future research on this topic and if possible with much larger sample.

## *6. Additional Analysis*

As above analysis showed, it seems that there are no major significant layoffs once company is involved in PE transaction in comparison to being involved in non PE transaction. However,

while this shows that the managers’ activities undertaken after PE transaction do not go at the expense of employees, it is also interesting to see if shareholders significantly benefit. Therefore, this section, as an add-on to above analysis, will investigate if operating performance in PE companies increases when transaction takes place, in comparison to operating performance of non PE backed companies. Return on assets (ROA) is taken as the measure of operating performance. Precisely, the percentage change in ROA from initial year to year 3. ROA is calculated as the  $\frac{Net\ income}{assets}$ . One should be aware that calculating ROA in this way will be affected with higher interest payments in PE companies and subsequently, that can result in lower net income and therefore lower ROA in these companies. The main independent variable is again dummy variable for type of the transaction, having the value of 1 if company is PE backed. The effect of sectors is also controlled for through the interaction term.

*Table 15: Regression analysis for operating performance*

```
. reg changeroa dPe2 dLabor2 labour_PE
```

Source	SS	df	MS			
Model	82.101715	3	27.3672383	Number of obs =	41	
Residual	389.085113	37	10.5158139	F( 3, 37) =	2.60	
Total	471.186828	40	11.7796707	Prob > F =	0.0665	
				R-squared =	0.1742	
				Adj R-squared =	0.1073	
				Root MSE =	3.2428	

  

changoa	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dPe2	-3.737452	1.506805	-2.48	0.018	-6.790527	-.6843756
dLabor2	-3.040528	1.382739	-2.20	0.034	-5.842223	-.2388338
labour_PE	4.118681	2.045098	2.01	0.051	-.0250811	8.262443
_cons	2.864208	.9777439	2.93	0.006	.8831106	4.845305

As it can be seen from the table 15, the PE backed companies perform worse than their non-PE counterparts. The ROA in PE backed companies is 3.7 % lower than the ROA in non-PE ones in the time period observed. Furthermore, the coefficient of the interaction term ( labour\_PE) indicates that the ROA in PE backed companies in labor intensive sectors is 4.12 % higher than the ROA in non-PE backed companies in same sectors.

These findings indicate that, at least in the first three years after transaction, the PE backed firms do not have operating advantage. On the contrary, they seem to be less profitable than their non-PE counterparts. However, their performance seems somewhat better if they belong to labor

intensive sectors and if this effect is observed partially. Overall, the ROA of PE companies is 2.59% lower than the ROA of their non-PE counterparts.

It could be concluded that shareholders of PE backed companies do not significantly benefit in the first three years after transaction. This result is due to the fact that usually restructuring takes place after transaction and therefore, three years may not be enough to show improvements in the performance.

## *7. Conclusion*

This paper examines the effect on employment in companies with PE and non-PE financing, three years after transaction and it tries to find if there exists a significant difference. Furthermore, it also investigates if there is difference in employment among two types of sectors-labor intensive and non labor intensive. Compared to previous studies, this research is conducted on smaller sample of only 46 companies, half of which are PE backed and the other half are non-PE backed counterparts of similar size and from same sector. In order to investigate the effect, a univariate Mann-Whitney test and multiple regressions are performed for each of three years and for overall effect. The analysis finds no significant effect on employment, no differences among sectors and limited effects of type of PE investments in different sectors in the time period observed. The possible reasons for the results obtained could be due to the lack of LBO deals in the sample or to the possibility that new plants opened by the company offset the employment losses in old plants. Moreover, the possible explanations may lie also in strict Dutch labor law or in the methodological limitations of the model itself.

Next, this study also briefly investigates if specific types of PE transaction will affect employment differently. It examines if MBO financing has different effect on employment than other PE and non-PE financing as well as if other PE types, excluding MBOs, affect employment significantly in comparison to non PE ones. Surprisingly, the outcome of the regressions is insignificant in both cases. The only significant results found in these regressions are related to the positive employment effect in other PE companies in labor intensive sectors in year three and overall. These findings suggest that the better attention should be given to the type of the investment and the sector effect on employment.

Finally, while it could not be shown that the changes, which occur in the company after it is taken over by PE investors, go at the expense of employees, it is examined if operating performance differs among PE and non-PE backed companies in order to see if shareholders significantly benefit from these deals. It has been shown that the operating performance, measured by change in ROA, slightly deteriorates in PE companies three years after transaction, but PE companies in labor intensive sectors perform better relative to the non-PE companies in non-labor intensive sectors. This all indicates that not even shareholders get large returns in the first years, mainly because the company is going through the restructuring. Even though it could not be shown that PE companies have better operational performance, one should still remember many benefits of PE industry such as creation of the new, superior organizational form in the company, and increasing the incentives of managers to perform in interest of shareholders. These benefits may be realized in the long run.

All in all, this paper provides new insights in the debate regarding the employment effects of private equity. Consequently, it also gives some ideas which should be carefully examined in the future, such as, for example, how law can influence the managers' decisions regarding layoffs or why PE companies in labor intensive sectors show better operating performance and positive employment growth, when the sole definition of this sector type assumes differently. As a final point, the model has some limitations and further research should try to analyze the larger sample.

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*Appendix 1:*

*Mann –Whitney test:*

*Employment in year 0-1:*

Two-sample wilcoxon rank-sum (Mann-whitney) test

pe	obs	rank sum	expected
0	23	413	425.5
1	13	253	240.5
combined	36	666	666

unadjusted variance           **921.92**  
 adjustment for ties           **-0.12**

adjusted variance               **921.80**

Ho: employ~1(pe==0) = employ~1(pe==1)  
           z = **-0.412**  
       Prob > |z| = **0.6806**

*Employment in year 1-2:*

Two-sample wilcoxon rank-sum (Mann-whitney) test

pe	obs	rank sum	expected
0	23	478	425.5
1	13	188	240.5
combined	36	666	666

unadjusted variance           **921.92**  
 adjustment for ties           **0.00**

adjusted variance               **921.92**

Ho: employ~2(pe==0) = employ~2(pe==1)  
           z = **1.729**  
       Prob > |z| = **0.0838**

Employment in year 2-3:

Two-sample wilcoxon rank-sum (Mann-whitney) test

pe	obs	rank sum	expected
0	<b>19</b>	<b>346</b>	<b>351.5</b>
1	<b>17</b>	<b>320</b>	<b>314.5</b>
combined	<b>36</b>	<b>666</b>	<b>666</b>

unadjusted variance      **995.92**  
 adjustment for ties      **0.00**

adjusted variance      **995.92**

Ho: employ~3(pe==0) = employ~3(pe==1)

z = **-0.174**  
 Prob > |z| = **0.8616**

Overall effect:

Two-sample wilcoxon rank-sum (Mann-whitney) test

pe	obs	rank sum	expected
0	<b>20</b>	<b>412</b>	<b>380</b>
1	<b>17</b>	<b>291</b>	<b>323</b>
combined	<b>37</b>	<b>703</b>	<b>703</b>

unadjusted variance      **1076.67**  
 adjustment for ties      **0.00**

adjusted variance      **1076.67**

Ho: overall(pe==0) = overall(pe==1)

z = **0.975**  
 Prob > |z| = **0.3294**

*MBO employment effect:*

Year 0-1:

```
. reg employment1 dmbo2 dlabor2 labor_mbo, robust
```

Linear regression

Number of obs = 36  
 F( 3, 32) = 1.28  
 Prob > F = 0.2984  
 R-squared = 0.3064  
 Root MSE = .34035

employment1	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
dmbo2	.0699983	.0486986	1.44	0.160	-.0291976	.1691942
dlabor2	.0872273	.074422	1.17	0.250	-.0643654	.2388199
labor_mbo	.6463324	.574815	1.12	0.269	-.5245275	1.817192
_cons	-.0069267	.0481578	-0.14	0.887	-.105021	.0911676

Employment 1-2:

```
. reg employment2 dmbo2 dlabor2 labor_mbo
```

Source	SS	df	MS
Model	.172155068	3	.057385023
Residual	1.78984091	32	.055932528
Total	1.96199597	35	.056057028

Number of obs = 36  
 F( 3, 32) = 1.03  
 Prob > F = 0.3941  
 R-squared = 0.0877  
 Adj R-squared = 0.0022  
 Root MSE = .2365

employment2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dmbo2	-.1060624	.1504638	-0.70	0.486	-.4125472	.2004223
dlabor2	-.1043828	.0878864	-1.19	0.244	-.2834015	.0746359
labor_mbo	-.003845	.2008764	-0.02	0.985	-.4130168	.4053268
_cons	.1255373	.0632074	1.99	0.056	-.003212	.2542867

Employment 2-3:

. reg employment3 dmbo2 dlabor2 labor\_mbo

Source	SS	df	MS			
Model	.110648657	3	.036882886	Number of obs =	36	
Residual	.943946458	32	.029498327	F( 3, 32) =	1.25	
Total	1.05459512	35	.030131289	Prob > F =	0.3079	
				R-squared =	0.1049	
				Adj R-squared =	0.0210	
				Root MSE =	.17175	

  

employment3	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dmbo2	.0734808	.0914213	0.80	0.427	-.1127384	.2596999
dlabor2	.1016357	.0655884	1.55	0.131	-.0319636	.2352349
labor_mbo	-.2335007	.1415425	-1.65	0.109	-.5218134	.0548119
_cons	.0267792	.0495802	0.54	0.593	-.0742123	.1277707

Overall effect:

. reg overall dmbo2 dlabor2 labor\_mbo

Source	SS	df	MS			
Model	.481497418	3	.160499139	Number of obs =	37	
Residual	6.18142466	33	.187315899	F( 3, 33) =	0.86	
Total	6.66292208	36	.185081169	Prob > F =	0.4731	
				R-squared =	0.0723	
				Adj R-squared =	-0.0121	
				Root MSE =	.4328	

  

overall	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dmbo2	.112832	.2277545	0.50	0.624	-.350538	.5762019
dlabor2	.2572447	.164002	1.57	0.126	-.0764198	.5909092
labor_mbo	-.1650395	.3334498	-0.49	0.624	-.8434483	.5133693
_cons	.0756953	.1200371	0.63	0.533	-.1685221	.3199127

*Other PE employment effect:*

Year 0-1:

. reg employment1 dotherpe2 dlabor2 labor\_otherPE

Source	SS	df	MS			
Model	.542034394	3	.180678131	Number of obs =	36	
Residual	4.80180214	32	.150056317	F( 3, 32) =	1.20	
Total	5.34383654	35	.152681044	Prob > F =	0.3240	
				R-squared =	0.1014	
				Adj R-squared =	0.0172	
				Root MSE =	.38737	

  

employment1	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dotherpe2	-.0437143	.2196187	-0.20	0.843	-.491063	.4036344
dlabor2	.231668	.1439516	1.61	0.117	-.0615518	.5248879
labor_othe~E	-.2348837	.3290211	-0.71	0.480	-.9050778	.4353105
_cons	.014454	.1035293	0.14	0.890	-.1964282	.2253362

Year 1-2:

. reg employment2 dotherpe2 dlabor2 labor\_otherPE

Source	SS	df	MS			
Model	.233411561	3	.077803854	Number of obs =	36	
Residual	1.72858441	32	.054018263	F( 3, 32) =	1.44	
Total	1.96199597	35	.056057028	Prob > F =	0.2493	
				R-squared =	0.1190	
				Adj R-squared =	0.0364	
				Root MSE =	.23242	

  

employment2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dotherpe2	-.178211	.1478666	-1.21	0.237	-.4794054	.1229835
dlabor2	-.1621827	.0850564	-1.91	0.066	-.3354369	.0110714
labor_othe~E	.3170974	.2079586	1.52	0.137	-.1065004	.7406951
_cons	.1382694	.0621164	2.23	0.033	.0117425	.2647964



Appendix 2:

Data

Companies	Employ. Year 0-1	Employ. Year 1-2	Employ. Year 2-3	Overall Year 0-3	Change in ROA Year 0- 3	Lab. Int(if ==1)
<b>Non-PE</b>						
<b>Finatge House BV</b>	0.166666667	-0.015873016	n.a.	0.111111	-0.03169	0
<b>Graydon Holding N.V.</b>	-0.018218623	0.002061856	-0.024691358	-0.04049	-0.05514	1
<b>Arval B.V.</b>	0.152439024	-0.079365079	-0.022988506	0.036585	0.00781	1
<b>Kropman Holding B.V.</b>	-0.532194481	1.191011236	-0.014102564	0.010512	2.38859	0
<b>Blokker</b>	0.132956623	0.09813701	0.669783596	1.077447	-0.90307	1
<b>Baarsma Wines B.V.</b>	0.16	0.137931034	-0.257575758	-0.02	0.47943	1
<b>Algemene Omroepvereni ng Avro</b>	0.134615385	-0.025423729	0.008695652	0.115385	0.92360	0
<b>Medtronic BV</b>	0.01369863	0.160472973	0.096069869	0.289384	9.81338	0
<b>De Mandemakers Groep</b>	0.210280374	-0.144401544	-0.018501805	0.016355	-2.24068	1

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<b>Apollo Vredestein BV</b>	<b>0.045052293</b>	<b>0.045419554</b>	<b>0.016200295</b>	<b>0.016355</b>	<b>1.32742</b>	<b>0</b>
<b>Comparex Benelux Holding B.V.</b>	<b>0.069306931</b>	<b>0.009259259</b>	<b>-0.027522936</b>	<b>0.049505</b>	<b>0.3965</b>	<b>0</b>
<b>MarjaTextiel B.V.</b>	<b>0.010869565</b>	<b>0.0609319</b>	<b>0.074324324</b>	<b>0.152174</b>	<b>-0.73165</b>	<b>1</b>
<b>Nederijn Schoonmaak B.V.</b>	<b>0.048192771</b>	<b>0.003831418</b>	<b>0.011450382</b>	<b>0.064257</b>	<b>n.a.</b>	<b>1</b>
<b>TCN Assets B.V.</b>	<b>0.525641026</b>	<b>-0.352941176</b>	<b>0.103896104</b>	<b>0.089744</b>	<b>-0.85671</b>	<b>1</b>
<b>Nooijen Beheer BV</b>	<b>0.034782609</b>	<b>-0.058823529</b>	<b>0.1875</b>	<b>0.156522</b>	<b>-1.21493</b>	<b>1</b>
<b>Hansa Flex Nederland B.V.</b>	<b>0.033333333</b>	<b>0.096774194</b>	<b>0.044117647</b>	<b>0.183333</b>	<b>0.14335</b>	<b>0</b>
<b>Electromach B.V.</b>	<b>0.014388489</b>	<b>0.127659574</b>	<b>0.125786164</b>	<b>0.28777</b>	<b>1.08941</b>	<b>0</b>
<b>J.H.C. De Rooy Holding B.V.</b>	<b>-0.037441498</b>	<b>0.220421394</b>	<b>0.039840637</b>	<b>0.221529</b>	<b>-1.71963</b>	<b>1</b>
<b>Chevron Exploration Production NL B.V.</b>	<b>0.031007752</b>	<b>0.067669173</b>	<b>0.077464789</b>	<b>0.186047</b>	<b>-1.13352</b>	<b>0</b>

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<b>Schenker Transport Groep B.V.</b>	<b>0.090909091</b>	<b>0.033333333</b>	<b>0.080645161</b>	<b>0.218182</b>	<b>4.44970</b>	<b>1</b>
<b>NS Opleidingen B.V.</b>	<b>-0.008474576</b>	<b>0.051282051</b>	<b>n.a.</b>	<b>n.a.</b>	<b>0.84538</b>	<b>1</b>
<b>Unilin Beheer B.V.</b>	<b>-0.060773481</b>	<b>-0.011764706</b>	<b>n.a.</b>	<b>n.a.</b>	<b>0.24890</b>	<b>0</b>
<b>Cooler Master Europe B.V.</b>	<b>0.098039216</b>	<b>0.232142857</b>	<b>n.a.</b>	<b>n.a.</b>	<b>16.34036</b>	<b>0</b>
<b>PE companies</b>						
<b>Dutch Filmworks Int. Holding BV</b>	<b>0.176470588</b>	<b>-0.125</b>	<b>0</b>	<b>0.029412</b>	<b>-0.98576</b>	<b>0</b>
<b>Novagraaf Group BV</b>	<b>0.031428571</b>	<b>-0.077562327</b>	<b>0.012012012</b>	<b>-0.03714</b>	<b>0.00238</b>	<b>1</b>
<b>Boemer Beheer B.V.</b>	<b>2.106666667</b>	<b>-0.141630901</b>	<b>-0.0575</b>	<b>1.513333</b>	<b>-0.16310</b>	<b>1</b>
<b>Simac Technique</b>	<b>0.05125</b>	<b>-0.045184304</b>	<b>-0.01743462</b>	<b>-0.01375</b>	<b>3.88520</b>	<b>0</b>
<b>Hema</b>	<b>-0.4712</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>0.11617</b>	<b>1</b>
<b>Delta Wines</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>-0.275</b>	<b>-0.46352</b>	<b>1</b>
<b>ANP</b>	<b>n.a.</b>	<b>n.a.</b>	<b>-0.18852459</b>	<b>-0.01</b>	<b>-3.36449</b>	<b>0</b>
<b>NucletronB.V.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>0.030864198</b>	<b>0.004008</b>	<b>-2.25827</b>	<b>0</b>

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<b>Fabory Mastrers in Fasteners Group B.V.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>1</b>
<b>Schoeler Arca Systems Holding B.V.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>0.060021436</b>	<b>-0.30155</b>	<b>n.a.</b>	<b>0</b>
<b>Itpreneurs Beheer B.V.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>0</b>
<b>Eureteo Holding B.V.</b>	<b>n.a.</b>	<b>-0.118577075</b>	<b>-0.049327354</b>	<b>-0.07826</b>	<b>- 1.01384E -05</b>	<b>1</b>
<b>Vandervalk + Degroot Participaties B.V.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>0.234323432</b>	<b>0.312281</b>	<b>-0.21198</b>	<b>1</b>
<b>Icentre Group B.V.</b>	<b>0.341772152</b>	<b>0.386792453</b>	<b>0.428571429</b>	<b>1.658228</b>	<b>2.22814</b>	<b>1</b>
<b>Aevitae</b>	<b>n.a.</b>	<b>-0.057377049</b>	<b>0.417391304</b>	<b>n.a.</b>	<b>1.22743</b>	<b>1</b>
<b>Resato Industries Holding B.V. Group</b>	<b>0.071428571</b>	<b>0.022222222</b>	<b>0.108695652</b>	<b>0.214286</b>	<b>1.93029</b>	<b>0</b>
<b>Claymount Group</b>	<b>0.046357616</b>	<b>0.196202532</b>	<b>0.248677249</b>	<b>0.562914</b>	<b>-1.05177</b>	<b>0</b>
<b>Sator Holding Group</b>	<b>0.032</b>	<b>0.015503876</b>	<b>-0.045801527</b>	<b>0</b>	<b>2.35582</b>	<b>1</b>

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<b>Nedmag Industries Mining Manufacturin Group</b>	<b>-0.073333333</b>	<b>0.050359712</b>	<b>-0.047945205</b>	<b>-0.07333</b>	<b>-4.99145</b>	<b>0</b>
<b>Fairstar Heavy Transport Nv Group</b>	<b>n.a</b>	<b>n.a.</b>	<b>0.176470588</b>	<b>1.051282</b>	<b>-2.12563</b>	<b>1</b>
<b>ORMIT Group</b>	<b>0.251798561</b>	<b>-0.017241379</b>	<b>n.a.</b>	<b>n.a.</b>	<b>-0.71171</b>	<b>1</b>
<b>Best Fencing Group B.V.</b>	<b>-0.271428571</b>	<b>n.a</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>0</b>
<b>Axon</b>	<b>0.071428571</b>	<b>-0.16</b>	<b>0.301587302</b>	<b>0.171429</b>	<b>-0.14969</b>	<b>0</b>