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# Operational profitability of targets in Central Eastern European manufacturing sector

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Abstract

Starting form the existing literature this paper focuses on providing additional evidence on the financial performance of target companies following mergers and acquisitions. The study analyses abnormal operational returns in pre- and post-acquisition periods for 100 manufacturing targets located in Central Eastern Europe. The deals included in this study were closed between the years 2000-2008. The results show that at a post-acquisition stage targets created on average significant positive returns of around 5-6% above the pre-acquisitions stage. Furthermore, this analysis demonstrates that smaller targets gain on average higher returns then larger targets following the acquisition.

Key words: Mergers and acquisitions, Central Eastern Europe, operational returns, size effect, SMEs

# Introduction

There is a long tradition of studies in the field of mergers and acquisitions to focus and refer to results of deals located in the United States, United Kingdom and developed countries in general. This happens at the expense of other regions that could be of interest form a merger and acquisition perspective. Studying these regions might yield results that confirm or contradict mainstream theories in this field. Among other issues, the intention of this study is to try to introduce the idea that mergers and acquisitions theories might not be applicable worldwide in the same way. Some theories probably explain certain markets better than others. In this paper I also support the idea that the specificities of each market can shed light on the drivers of merger and acquisition behaviour from that market, namely, on the theory that explains this behaviour. To gain specificity, in this paper I look at Central Eastern European manufacturing market in connection with efficiency theory on mergers and acquisitions behaviour.

This study focuses primarily on analysing a sample of deals for which the target is located in a Central Eastern European (CEE) country. The firms under study are active in the manufacturing sector, a sector which has been growing rapidly in this part of Europe in the last two decades. The measurements cover the period between year 2000 and end of year 2008 and try to asses the success or failure of these deals from the perspective of the target firm. By success or failure I understand financial success or failure. Of course success of a merger can be explained in different ways, depending on the objectives at which companies aimed when decided to close a deal. Other possible objectives as uncertainty lowering or size increase will be discussed as complementary to the improvement of financial performance.

With respect to the unit of analysis, most existing studies focused on the performance of the newly formed entity (the combination of acquirer and target) compared to a similar benchmark of non-merging firms (Switzer, 1996). Others focused only on the benefits to the acquirer following acquisitions. These are the most prevalent studies and their results are very often contradictory.

The choice to look at the target rather then the acquirer has come from the hypothesis that most merger and acquisition deals in CEE were likely to be closed with foreign acquirers. This was due to the increasing level of FDI in CEE countries over the last years. If the analysis looked at the acquirer's gains or at the combined entity's gains, the effects related to the specificity of the target (eg. Located in CEE, with everything that this might imply) would be either lost, or difficult to disentangle from the overall results. Foreign acquirers might be interested in the efficiencies that can be reached in CEE countries. The same principle can be used by domestic acquirers because domestic deals are probably cheaper than the international ones. Practically this paper is interested in finding out whether these CEE targets can be restructured via acquisitions and if the subsequent profitability of targets will be significantly different from pre-merger or industry benchmarks. Restructuring and financial performance improvement is tightly linked to the efficiency hypothesis.

I also pay attention to deal and target characteristics that could have an effect on the amount of gains or losses following the acquisition. Namely, more importance will be

given to proving to what extend small targets are different from large targets in terms of subsequent and relative profitability. The motivations, methodology and results of this paper will also be put in context of the larger research landscape on this topic.

This paper is structured in four main chapters. In the first chapter, I introduce the theories that explain mergers and acquisitions behaviour, with a stress on the efficiency hypothesis. Additionally, I provide a short overview on merger and acquisition landscape in CEE countries in the last decade. These specific characteristics are linked to the stages of economic development of these countries. In the second chapter I elaborate on the main research question regarding the financial performance of target companies in CEE countries and state specific hypotheses to be checked against empirical results.

Chapter three is dedicated to the methodology on which my analysis is based. A thorough presentation of the data collection process is given. Similarly, I describe several post-acquisition financial performance measures that I used in the analytical section. For a better understanding, these measures are compared to a benchmark performance, which represents the non-merging scenario and which can be: pre-merger performance level, industry performance level for the same period of time and the change in industry performance from the pre- acquisition to the post-acquisition stage. The choice for these three benchmarks is argued based on previous research in this field.

Chapter four presents the results of the analysis. I firstly introduce the descriptive statistics of the sample and calculate the significance of mean and median values, at the level of the whole sample and for sub samples of small and large companies respectively. Secondly, I perform regression analysis to identify abnormal operational returns for the targets and to control for other factors that could influence the analysis outcome.

In the last part of the paper I discuss the results from chapter four and I link them to the theories stated in chapter one.

# 1. Literature review

This chapter presents the mainstream theories explaining merger and acquisition behaviour. It highlights that one criterion to classify them is to look at the type of drivers of merger and acquisition behaviour. Next, it presents the specificities of CEE market for acquisitions and summarises this activity in the region for last decade.

## 1.1 General drivers of merger behaviour

Merger and acquisition activity has developed as a faster alternative to the more time consuming organic growth. Several reasons can stay behind this type of corporate behaviour. Most frequently advocated are revenue enhancement while maintaining current level of costs, cost reduction while maintaining the current level of revenues or new resources and capabilities generation that leads to revenue growth, or otherwise, to cost reduction. Combinations of these value creating modalities are also possible and equally likely. Achieving these goals requires a comprehensive strategy in which companies struggle to get the most out of the opportunities they are crossed with. Such opportunities listed in Sudarsanam (2003) can be market power consolidation, access to new high potential markets or niches, exploitation of economies of scale and scope, usage of new resources or distribution capacities, lowering of labour costs and so forth.

There is a set of so-called value creating theories of mergers and acquisitions that are based on the reasons evoked earlier. They state at large that when an acquirer and a target merge, this merger is leading to the creation of an extra value which could not have been created in a non-merging scenario. This value is also known under the larger concept of synergies. Synergies increase the overall value of the newly created entity, thus shareholders benefit more.

One theory based on these assumptions is efficiency theory. The efficiency theory uses a minimum efficiency scale to measure the degree to which a firm can minimize its long term average costs. It proves that an increase in production could lower overall average costs, thus leading to a more efficient production. A merger that happens for efficiency reasons is very likely to be a friendly deal, accepted by both parties. As such, efficiency theory predicts value creation with positive returns for both acquirer and target. Banerjee and Eckard (1998) and Klein (2001) evidence this suggestion.

There is however a distinction between efficiencies created by economies of scale and scope and efficiencies created by increased market power and an improved ability to extract consumer surplus. These types of synergies are referred to as collusive synergies (Chatterjee, 1986). However, operating synergies in the form of lower costs are the more significant source of gain as Devos et al. (2008) find out, but market power theory remains a valid merger motive. This happens because firms with greater market power charge higher prices and earn higher margins through the appropriation of consumer surplus

Besides economies of scale, scope and increased market power, a third source of efficiency comes from the bad management assumption. This explains that there are chances that an underperforming firm can be restructured by a new management team. This new team will be more efficient in allocating resources and extracting synergies than

the current bad management. With the same assets, better performance can be reached under better management. In these cases the deals take the form of hostile takeovers in which management in being replaced against its own will.

Nevertheless, this value maximizing behaviour does not represent the whole story. It has been proven on several occasions, via individual cases or via academic articles, that mergers and acquisitions destroy value for shareholders. Yet, merger and acquisition cases continued to grow in number. Additionally, every now and then this behaviour becomes quite popular as a real option that companies consider for further growing. Following these discoveries a set of theories have been developed, meant to explain the uneconomic behaviour of companies. These value destroying theories on mergers and acquisitions appear to contradict efficiency theory.

Agency theory applied to mergers by Morck, Shleifer, Vishny (1980) sustains that management does not act in the interest of shareholders but rather acts for its own benefit. The hubris theory of Roll (1986) elaborates on the overconfidence of management and escalading of momentum, that is when management over rates its power of extracting future synergies from target or over estimate these synergies. The free cash flow theory (Jensen, 1986) advocates for the disciplinarian pressure of debt that can turn against the firms if debt burden is too high. When companies have to pay credits, management will be more focused on extracting the profits that can repay the debt (Ross, 1977). However, if the debt burden is assumed irrationally the firm will not be able to repay the high debt and the discipline of debt is over rated.

Contrary to these hypotheses, an institutional view on merger behaviour has been developed which defends the idea that firms do not necessarily merge for profit maximizing reasons. One of these theories is the minimax-regret theory developed by Loomes and Sugden (1982). Their theoretical framework has been applied to the acquisitions field to explain why do firms merge for uneconomic reasons. It appears that they rather imitate the merging behaviour of competitors with a view to minimize the regret of not doing so (Schenk, 2006). This theory uses a relative view of profitability, relative to close competitors. If a competitor gets involved in mergers and acquisitions the regret of not imitating competitor's behaviour if that competitor turned successful, is larger than in the situation in which both lose after imitating, because in relative terms they are both on the same level. It follows that from a game theory perspective the strategy of imitating merging behaviour is more appealing than the non-imitating strategy. The regret aversion plays an important role here. Similarly, but earlier than the minimax regret theory, Pfeffer and Salancik (1978) highlighted the idea that firms get involved in mergers and acquisitions in order to lower uncertainty in the environment (see Pfeffer and Salancik (1978) and Schenk (2006) whom discus the market power consolidation or increase in size for a safer future).

Now these few theories are relevant for the choice of this paper to focus on the financial performance of firms. A safe way to consider merger and acquisition behaviour, without possessing accurate information with respect to the real drivers that management teams had at the time of the acquisition, is considering all plausible ideas and starting testing which of the hypothesis can be sustained. In this study I concentrate on efficiency theory. This implies that I will try to identify any financial gains following the acquisition which could support the efficiency theory. The other theories described above will be addressed in this paper to a more limited extent.

Performance-related aspects are essential in assigning success or failure to acquisitions, meaning that a profitability-oriented study is thus justified. Of course, even if profitability can be proven, this will not set the profit maximization incentive as the main real driver of the acquisition. In other words, this does not yet prove efficiency theory, but it contributes in a way to this proof. It could be that firms merge only to lower market uncertainty, and as a side effect, the deal will also be profitable. However, if a larger sample is at study, the chances are very low that most firms in the sample overperform unwillingly their competitors. Furthermore, I believe that these drivers differ along markets. Merger and acquisition activity in CEE for instance could be driven by different incentives than merger and acquisition activity in the US. Acquisitions on markets that grow at a fast pace and have lower tax levels could be better explained by efficiency theory than by minimax regret theory. This happens because efficient production can be more easily reached in low cost and low tax markets. This is also the case for the bad management assumption. Thus, there are quite a few arguments in favour of believing that in CEE countries acquisitions happen primarily for efficiency reasons and other motivations may only be secondary.

## 1.2 Merger activity in the Central Eastern European countries

Why is it of interest to study mergers and acquisition in CCE countries? Two of the main arguments could be their growth opportunities and their distinct market features, as it will be discussed at a later stage.

The merger and acquisition landscape looks quite different along these countries if one considers the incentives behind the merger and acquisition activities. Countries in this area have, without doubt, a set of commonalities: the emergence of markets, the ongoing restructuring and privatisation, and their orientation towards Western Europe. One would expect that merger behaviour in this area, given the commonalities of these countries, is driven by similar reasons. However, it appears that some regions are favoured for acquisitions which lead to synergies coming from lower costs, otherwise said operating synergies. Other areas are attractive for the potential of their new markets. Looking at Poland, Czech Republic, Hungary, and Slovakia, in the 90's and early 2000, these countries were interesting to investors for their low cost labour or for their undervalued plants and low performance firms with a restructuring potential. Now the quest for cheaper labour moves eastbound, to Romania, Bulgaria, and Croatia. This wave probably will go even further to Ukraine, Moldova and Russia, as a PricewaterhouseCoopers (2006) report highlights. Indeed, the merger activity does not stop at the search for cheap labour. So countries such as Poland, Czech Republic will remain attractive for buyers but rather for the market potential and collusive synergies than for operating synergies that have been disappearing due to the increase in salaries over the last few years.

The set of drivers of merger and acquisitions in the area is largely the same; all pointing to the efficiency theory, but their predominance by country is given by the level of economic development in each country. CEE countries are different from this perspective because they do not have the same development pace, so each country is in a different economic development stage at which certain types of synergies are more likely to appear. A mixture of more value creating factors is, without doubt, possible if it is to

take into account the quite intensive merger activity in the region between 2000 and end of year 2009. Table 1 shows the number of deals closed over eight years in which the target was a CEE firm. Zephyr database has records of 43,076 deals completed in this period while US has 117,005 deals closed over the same period. This shows that the merger and acquisition activity in the region is not negligible.

**Table 1.** Number and value of deals per countries for 2000-2009

| Countries (Target) | No of deals | No of deals with | Total deal value |
|---|---|---|---|
| | | known values | (mil EUR) |
| Albania | 29 | 18 | 803 |
| Belarus | 115 | 46 | 3201 |
| Bosnia And Herzegovina | 261 | 171 | 1416 |
| Bulgaria | 1559 | 940 | 17181 |
| Croatia | 510 | 253 | 12171 |
| Czech Republic | 1182 | 436 | 45971 |
| Estonia | 1345 | 280 | 5575 |
| Hungary | 1438 | 586 | 38634 |
| Kosovo | 11 | 8 | 73 |
| Latvia | 644 | 218 | 2865 |
| Lithuania | 897 | 384 | 8206 |
| Macedonia (Fyrom) | 295 | 257 | 2014 |
| Moldova Republic Of | 142 | 97 | 630 |
| Montenegro* | 23 | 10 | 176 |
| Poland | 3519 | 2287 | 76243 |
| Romania | 1406 | 924 | 27268 |
| Russian Federation | 25481 | 7200 | 597343 |
| Serbia And Montenegro | 161 | 138 | 3690 |
| Slovakia | 439 | 196 | 13482 |
| Slovenia | 451 | 212 | 6631 |
| Ukraine | 3148 | 839 | 27446 |
| Yugoslavia | 20 | 11 | 32 |
| **Total** | 43076 | 15511 | 891051 |

Source: Zephyr Database[1]

Interestingly enough, little scholarly research has been carried out with respect to merger and acquisition behaviour in CEE. Fritsch, Gleisner, Holzhäuser (2007) show in an event study performed on CEE bank mergers that excess returns to target are significantly driven by country specific factors such as GDP growth or income tax level, also pointed out in a later paper of Fritsch (2007). This sustains the possibility that merger behaviour

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[1] The reader should be aware that the numbers presented in this table are according to the number of deals that could be recorded by Zephyrus. It is possible that this number to be larger as long as it is quite unlikely to keep accurate record of each deal. This number is always subject to changes as the database is under continuous construction.

can have different explanations along different markets. With respect to the bidder, they show that the main driver for value creation is the level of development of the country: the less developed the country, the higher the abnormal return for the bidder. This is a sheer example of how emergent markets in CEE are exploited in the merger and acquisition activities. Additionally Fritsch (2007) finds significantly higher returns for targets in CEE compared to their domestic industry benchmark group. Such fact can be kept as a reference for the CEE area, however it refers to returns of bank mergers which have been pointed out in several papers to have a distinct behaviour compared to that of other industries; in other words this hypothesis needs further testing before it can be applied to manufacturing, energy, retail, or other industries.

**Table 2.** Number and value of deals per major sectors in CEE countries, 2000-2009

| Classification | No. of Deals | No. of Deals with known value | Total deal value (mil. euros) |
|---|---|---|---|
| Agriculture & Livestock | 1054 | 401 | 3386 |
| Mining & Extraction | 1905 | 824 | 229144 |
| Construction | 1262 | 466 | 8491 |
| Food & Tobacco Manufacturing | 3474 | 1330 | 28978 |
| Textiles & Clothing Manufacturing | 666 | 256 | 924 |
| Wood, Furniture Manufacturing | 825 | 332 | 3342 |
| Chemicals, Petroleum, Plastic | 1959 | 845 | 105746 |
| Printing & Publishing | 542 | 213 | 2896 |
| Leather, Stone, Glass products | 1151 | 408 | 7182 |
| Metals & Metal Products | 1811 | 702 | 68581 |
| Industrial, Electric Machinery | 2842 | 935 | 20954 |
| Transport Manufacturing | 1211 | 382 | 11728 |
| Transport & Travel Services | 2327 | 783 | 43298 |
| Communications | 1715 | 797 | 88971 |
| Utilities | 2898 | 1254 | 186357 |
| Wholesaling | 3179 | 1226 | 71148 |
| Retailing | 1780 | 735 | 65899 |
| Banking, Insurance & Financial | 8449 | 2903 | 194654 |
| Public Administration & Health | 525 | 153 | 11310 |
| Hotels and Restaurants | 777 | 402 | 4548 |
| Property Services | 1282 | 369 | 15691 |
| Personal & Business Services | 4483 | 1463 | 42643 |
| Miscellaneous Manufacturing | 114 | 41 | 251 |
| Computer & Internet services | 1556 | 716 | 20222 |
| Biotechnology, Pharmaceuticals | 444 | 273 | 10900 |
| Total | **41227** | **15078** | **859932** |

Source: Zephyr Database[2]

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[2] The author is aware of the differences between the deal numbers and values between table 1 and table 2 and they are considered to be due to inconsistencies within the filtering system of Zephyr database. In the country breakdown a few countries from outside of the Eastern Europe were listed which were filtered out at a later stage. The difference in deals comes from this filtering inconvenience. This data is not used this

The top most merger intensive industries identified by PricewaterhouseCoopers (2006) include manufacturing, financial services, food and beverages and energy and utilities. The fastest growing sector in terms of deal values is the pharma industry which had in CEE a 344% increase in the average deal size from USD 45m to USD 200m in 2006 PwC (2006: 2). Table 2 shows the distribution of deals with known value across the major industries in all CEE countries during 2000-2009. To notice that financial, energy, chemicals and manufacturing rank high at the total deal value, so the biggest transaction occurred in these sectors.

The study of Roberts, Thompson, Mikolajczyk (2008) performed on Polish manufacturing sector this time, on acquisitions during the 1993-1998 privatisation, discovers that international bidders do not seek after high performance prior to acquisition but rather after underperforming targets. This could support the bad management theory but also a restructuring strategy that foreign acquirers tend to follow. In addition, results show that buyers are rather market seeking than resource seeking. So mainly, acquirers look of cheap labour and high potential markets. This supports the efficiency theory as a theory that could very well fit the merger activity on this market. Bergg et al. (2003) look at the problems that the so called countries in ascension could face in front of new coming large capital inflows. They pointed out the currency risk vis-à-vis the different regimes of pegging the national currencies but also at the capacity of the financial sector to sustain such large capital inflows. These would have a direct impact on the investment choice of foreign investors.

Boycko, Shleifer, Vishny (1996) argue that privatisation of state owned companies leads to zero or more costly political control upon firms and facilitates corporate restructuring. However this paper does not intend to provide evidence on returns after privatization. Such a study requires most certainly a different approach. Less than five transactions in this sample have been made via a national privatization agency. This means that all other transactions have been closed between private parties; so side effects of privatisation can be neglected as far as this sample is concerned. This was one of the strong reasons for which the time window of analysis was chosen to be 2000-2008. This choice excludes the early 90's period in which the privatisation process was more effervescent in CEE countries.

It also appears that the very few studies conducted on merger and acquisition activity in CEE focus primarily on explaining the behaviour of foreign investors. Consequently, little attention is paid to domestic investments and domestic acquirers' strategies. This implies that it would be worth studying also domestic investments even if the relative size of domestic investments in M&A is small compared to the foreign capital flow. On the other side, there is an increasing tendency of CEE countries to make outbound investments. According the CEE M&A Survey 2006 of PwC, Russia is the leading country in investing abroad in M&A ventures, followed by Czech Republic, Poland and Hungary

paper's analysis. It is only meant to offer a rough perspective of the merger and acquisition activity in the region in the period 2000-2009.

## 2. Research question and Hypotheses

In the previous chapter, I argued that merger behaviour is a challenging topic for several reasons and especially for the confrontation between ex-ante expectations (based on a set of drivers) and the actual ex-post outcome, regardless of the way in which this outcome is measured. Earlier I also sustained that the idea of performing a profitability study can be better justified on certain markets. The CEE context comes along with low cost labour, large market potential, continuous economic growth (up to 2008), and more attractive fiscal policies. Thus, it is easier to argue that all these drivers open tremendous opportunities for value maximization and profits seekers, supporting the efficiency theory above others. The importance of uncertainty theory becomes secondary on markets with operational synergies potential. This uncertainty theory could be more appropriate to define merger behaviour on more mature, competitive and concentrated markets such the UK, UK or other countries in Western Europe.

Additionally, the potential operational synergies could be real incentives for foreign and domestic acquirers to the same extent. The inefficient management hypothesis (Weston et. al., 2004) falls also in this category since replacement of management or company restructuring could be carried out with a view to increase efficiency, i.e., profits. Therefore, there are strong reasons for studying the financial performance of targets in markets such as the CEE.

In line with these arguments the main interest of this paper is to study whether merger and acquisitions in the CEE countries have led to an improvement in their financial performance. I set a few hypotheses with respect to this broader research topic two of which are more important. The first one concerning the sign and size of the returns from acquisition and second the effect of target size on this returns.

*H1. Since companies merge to reach new markets or reduce costs, the profitability of companies is significantly higher in the post-acquisitions stage compared to the pre-acquisition stage.*

There is also research that considers the effect of size on profitability levels. Moeller, Schlingemann and Stulz (2004) prove that on the US market smaller acquirers reach significantly higher stock returns compared to larger acquirers. The authors explain that large companies pay higher premiums fro the targets they buy. If they over pay, the amount paid over the fair value diminishes the profits at the end of the year. Another study for acquirers shows the same for the Dutch market (Kräussl and Topper, 2006) small firms benefit of 2.65% higher returns than larger firms at the time of the deal announcement. A similar approach was brought by Weitzel and McCarthy (2009) who explain that most theories of mergers and acquisitions are based on large firms observations. Their contribution is that these theories might be unfitted to the case of small and medium size enterprises (SMEs). In SMEs the owner is also the manager of the firm so the agency theory, which capitalizes on the differences between managers' and owners' incentives, can be excluded. Furthermore, they show that there are more SMEs acquisitions in Europe than in the US and that smaller firms are more likely to withdraw from a merger agreement. SMEs show more flexibility in deal negotiations; they are

primarily financed with stock and prefer merger and acquisitions as a growth strategy more than large firms.. According to these authors a big pool of SMEs deals has been overlooked by researchers.

Following these findings, this paper will also focus on finding out whether there is any difference between returns of small firms and returns of large firms at the level of this sample. The following hypotheses have mainly been tested on stock price abnormal returns but I consider them relevant also in the case of operational abnormal returns, that is, the focus of this paper. So the second biggest hypothesis tests the size effect on target operational returns:

*H2. Smaller targets firms have higher profitability compared to large companies.*

Alongside the first hypothesis, an interesting question has been lately raised by scholars with respect to what differentiates between a value creating and a value destructing acquisition. This was put sometimes on the degree of internationalization which refers to the home countries of target and acquirer. In some studies, the larger the geographical distance between the countries involved, the stronger the internationalization of the deal. In this study I consider internationalization by only looking that the home countries of target and acquirer. If these two countries differ than the deal is international. Other times, the degree of deal diversification was studied, namely if acquirer and target were active in different business sectors. I will incorporate these elements in the analysis in the following paragraphs.

If the two hypotheses H1 and H2 hold, the next step would be to check whether the size effect on profitability is independent of other factors using three control hypotheses:

*H2a. Smaller targets have higher acquisition returns, independently from the degree of internationalization.*

Moeller and Schlingemann (2004) found significantly lower returns on announcement at firms that acquired domestic targets compared to firms involved in cross border transactions. They found that small companies rather acquire domestic firms while large companies have more chance to look for their targets internationally. According to these findings the degree of internationalization of the newly created entity should be accounted for. Now even if these findings have been proved in the case of acquiring firms, they should be controlled for also in the case of targets. Synergies and restructuring plans should have an effect on both acquirers and their targets.

*H2b. Smaller targets have higher acquisition returns independently of whether they are industry diversifying or not.*

Additionally, Morck, Shleifer, Vishny. (1990) show that the announcement returns for companies that engage in diversifying acquisitions are lower than the announcement returns for companies that do acquisitions in a related industry. So there is a need to control for the degree of diversification because it can have an effect on the profitability level. In this sample targets that are taken over by firms in the same niche might have higher returns.

Additionally, Dikova and Witteloostuijn (2005) found that diversification factors play an important role in acquisition choice in CEE countries.

*H2c. Smaller targets have higher acquisition returns independently of whether they are listed on a stock exchange or not.*

In Fuller et al. (2002), announcement returns are lower if firms announce the acquisition of a public firm than when they announce the acquisition of a non-listed company. The authors also suggest that small companies are two times more likely to take over private companies. Additionally, targets in their sample that are listed on stock exchange have more chances to access capital fast and to benefit of 'feedback' from investors that will be reflected in the variation of the stock price. This cannot be the case for non-listed targets so the type of organization, public or private will be controlled for.

## 3. Methodology

To decide on the methods used in this paper I draw on other similar studies and tailor these methods to the specificity of this sample  In the following section two main aspects are considered: the choice of profitability measures and the econometric models to be estimated.

Data collection started from the controversial issue of gains or losses incurred as consequence of acquisitions. It was also my intention to construct the dataset in a way that allows going deeper in researching how gains and losses are distributed across firms. The operational performance analysis is a more data intensive method.  Therefore, this section also sheds light on the decisions I made with respect to the measurements. I especially stress the criteria used to define the performance measures on one side, and the size measure on the other.

### 3.1 Data collection

Due to data availability restrictions and limitations imposed by the time framework dedicated to this analysis the sample had to be filtered in several ways. With no predefined data set at disposal, available data sources were identified and merged in a comprehensive way that met the requirements of the analysis. Bureau van Dijk Electronic Publishing[3] records data in two separate databases, which I mainly used to construct the final dataset. One is *Zephyr* which records merger and acquisition deals worldwide and the second is *Amadeus* which includes financial information of European firms as retrieved in historical annual reports. Both databases include firms from Central-Eastern European countries. Since they are twin databases I could successfully link the commonalities in some cases. Where no compatible aspects could be found the data

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[3] Access to the provider was given via Utrecht University Library. External access can be done on demand at the web link http://www.bvdinfo.com/Home.aspx

merging was done manually for each target and acquirer in the sample. A first set of deals was filtered from Zephyr database using several relevant criteria.

1. Deals which had as target firms located in Eastern Europe[4]. The acquirer and the vendor could be registered in any region of the world.
2. Target companies should be active in the manufacturing industry according to the NACE Rev.2[5] European industry classification. No restriction imposed on the industry of the acquirer or vendor.
3. Deals that have been completed during the period 01 January 2000 and 31 December 2008. The time window is meant to be recent, to capture the period in which most countries in the sample are close to become functional market economies. Few deals are registered in Zephyr database from 1995 to 2000. Deals rumoured or withdrawn have been excluded from the sample.
4. The initial stake of the acquirer had to be lower than 30% before the time of the merger and the final stake after the closing of the deal had to be larger than 70%. Generally a share of 30% or higher offers already enough decisional power at a corporate level. The interest here falls on the new acquirer with no previous (or no important) share in decision making. Any stake acquired which met the two mentioned criteria was allowed in the sample. This criterion is used to make sure that the deal changed in a significant way the ownership structure preceding the completion of the deal. Such a criterion was also used in Kräussl and Topper (2006). A significant change as it was already mentioned, offers the new acquirer the possibility to have enough power to be able to turnaround the target if they plan to. If the stake is not considerably large, it follows that the influence on the company is limited.
5. For compatibility reasons the target and acquirer had to be each registered with a unique identification number (BvdID) which is used in both databases Zephyr and Amadeus.

After applying the five criteria mentioned above I identified a total of 329 deals. Next, I searched the target companies from the deal list in the Amadeus database for the historical financial information. Targets which were not Eastern European or were not under the manufacturing NACE Rev.2 (filtered by mistake) and have been included in the list were filtered out. A remainder of 139 deals was the new sample after the Amadeus matching. For these targets I found available financial data for 4-6 years. This data was manually transferred from Amadeus to the corresponding Zephyr list of deals.

The Amadeus database keeps records for the period 1999-2010. In this case I had to exclude the deals closed in 2009 and 2008 since there is not enough record of post-

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[4] Zephyr database includes in the Eastern European set 19 countries: Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Republic of Moldova, Montenegro, Poland, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Ukraine

[5] NACE Rev.2 is the current Statistical classification of economic activities in the European Community, Retrevied on Eurostat publications at the web link
http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-RA-07-015

acquisition financial performance available to match the requirements of the methodology used. I also excluded certain deals closed in 2000 or 2001 for which data started to be recorded later than 2000 since there were no pre-merger performance measurements. In order not to further lose observations I allowed for deals for which the target had only four or five years record, conditioned that at least two years are recorded before and two years are recorded after the year of the deal closure. A number of nine deals are found in this category. I excluded all deals which had three or less years of financials. The final sample contains 100 deals with available information required by the methodology. Therefore, the analysis was performed on 30.4% of the deals that matched the six criteria from above. The distribution of deals (targets) by country looks at follows: Bosnia-Herzegovina 1, Bulgaria 1, Czech Republic 4, Croatia 3, Estonia 2, Hungary 2, Lithuania 4, Latvia 1, Poland 15, Romania 15, Russia 25, Serbia 20, Slovakia 2, and Ukraine 4.

## 3.2  Performance analysis

### 3.2.2 Abnormal returns methods in mergers and acquisitions

For the performance of the target in the post-merger period I used operational performance measures. Profitability studies in merger and acquisition cases are based mainly on two types of methodologies. First, the abnormal stock returns methodology makes a stock price fluctuation analysis. This was used by Kaplan, Mitchell, Wruck (1997), Andrade, Mitchell, Stafford (2001) and others, especially following the event study methodology of Brown, Warner (1985). The second important option is the operational returns methodology based on revenues from operations and use in studies of Ravenschraft, Scherer (1989), Healy Palepu, Ruback (1992), Clark, Ofek (1994) and others.

There are positive and negative aspects of each choice and the choice of methodology proves to be highly debatable as Meeks (1981, 1994) underlines. Stock price abnormal returns make use of market values. These are more relevant to investors, incorporate fast investors' expectations of growth or failure and benefit of higher transparency. Expectations and information will subsequently change stock prices. If a merger announcement is welcomed by investors, stock prices will have an upward move and the other way around. However, information accuracy is given by the liquidity and efficiency of the stock exchange on which a specific stock is listed (Engelen, 2005).

Operational returns on the other hand measure the real value of subsequent financial performance, as it is declared by companies at the end of the year. It has the advantage of giving a measure of the actual benefits accruing from economic activities, e.g. the level of cash inflows from production activities, the operations profit and so forth. Small and unlisted companies can be easily covered by this methodology choice. As a down side, the operational performance method uses accounting data. This consists of book values and is specially used as an ex-post measure of performance. Compared to stock price abnormal returns, which predicts economic gains before they were realized and accounted, the operational analysis can be performed only after the realization of income. For this reasons operational performance analysis is sometimes called real value

analysis. Unfortunately, for this analysis a larger amount of data needs to be processed for higher accuracy, e.g. more years of financial data have to be available.

Given the hypotheses of this paper, researching the effect of size on post-acquisition performance, the sample had to include both large and small companies so any significant effect of size could be measured. It is known that few small firms are publicly traded, which makes an event study of abnormal returns of stock prices less feasible. Mueller and Peev (2007) sustain that financial markets in CEE countries are less sophisticated than in the West and there is reason to believe that stock prices are less sensitive to firm's investments. Moreover, given that in Eastern Europe there is less activity on the stock exchanges, the liquidity and efficiency assumptions, necessary for an accurate event study analysis, are more difficult to support, thus results could be subject to biases[6].

Using the data sources at hand, a short research on the historical stock prices of Eastern European manufacturing firms showed that the number of firms listed is limited. In addition, there is no historical data available for longer periods of time which could cover the stock price fluctuations during an acquisition event. With very limited stock price data and the small number of listed companies, the event study analysis could be performed in this case. Thus, the abnormal stock returns option was excluded and the operational performance analysis appeared more a feasible and more appropriate method for this topic. To further construct the analysis I used comparable methodologies of Healy, Palepu, Ruback (1992) and Ravenschraft, Scherer (1989). These methods have been adopted at a later stage also by other scholars. Having their models as starting point, I tailored the methodology of this paper in function of the specificity of the analysis and the availability of data.

## 3.2.2 Operational performance methods

In this study I compare three years of pre-merger performance with three years of post merger performance; Comparable studies use different time spans to assess pre- and post-merger performance: five years in Healy Palepu, Ruback (1992), Switzer (1996), two years in Clark, Ofek (1994) and Cornett, McNutt, Tehranian (2006).

The two benchmark studies Ravenschraft, Scherer (1989) and Healy, Palepu, Ruback (1992) use annual operating income or cash flows to measure economic performance. They divide the income from operations and the cash flow by assets and sales to get comparable data among companies of different size. Ravenschraft and Scherer (1989) employ three different ratios: operating income divided by the end of year assets, operating income divided by sales and end of year cash flow divided by sales. The main reasoning behind their choice was to compare and contrast any accounting effect.

Such an accounting effect can exist because at the time when some deals were closed the accounting regulation allowed for two types of merger accounting. These

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[6] Engelen (2005) has a very comprehensive way of explaining the concepts of market efficiency and market liquidity. Market efficiency in this sense refers to the speed with which the stock price incorporates the information newly arrived, so the stock price reaction, while market liquidity gives an idea about how fast a security can be sold or bought, namely, if there are enough available buyers and sells on the market. Of course the larger the market the more sellers and buyers, so from this point of view CEE stock exchanges are smaller compared to Western European ones.

include pooling of interest accounting and purchase accounting. Accounting rules may influence not only post-combination performance but also the financial structure of the deal. Pooling accounting records investment at their nominal values while purchase accounting records them at their fair value (or market value). The execs value above the nominal value in purchase accounting in known as goodwill. Since this is a new important item the purchase accounting needs to take care of it, while that is not the case in the pooling of interest. To mention that companies in this sample were subject to both pooling and purchase accounting. So the effect of goodwill is that it increases the value of assets bought, because goodwill will be added on the balance sheet and activated. This is turn will ultimately affect the ROA ratio. This ratio is on the other hand also affected by the amortization of the goodwill in the following years. Amortization value is subtracted as a cost from the income, leading to its decrease. The ratio will then decrease in a 'fake' manner, because those costs are never incurred in real terms. Under pooling accounting this is not the case.

Since the three measures of performance in Ravenschraft, Scherer (1989) are affected in different ways (both assets and operating income in the first case, only operations income in the second, and no accounting effect in the third) any accounting method difference between these three could be accounted for.

Healy, Palepu, Ruback (1992) focus on operating performance measures but also on investment decision measures. The latter is not covered by this study. For the operating performance annual cash flow is divided to the market value of assets. Other related measures they use are the asset turnover, employee growth rate and the pension expense per employee. Healy et al (1992) mark a possible bias in the Ravenschraft and Scherer (1989) pervious study as they used the book value of assets for their analysis. What is to be mentioned here is that indeed, market values should be used because they represent the real opportunity cost of assets. However Ravenschraft and Scherer used other two measures of performance which are independent of the market value of assets (operating income on sales, respectively cash flow on sales) and they show similar results. So using several performance measures can be relevant for avoiding certain biases.

Having shortly reviewed part of the controversy with respect to performance measures, this analysis I decided to use two different measures to asses the difference between the pre-acquisition and post-acquisition performance. Note that all the data was found in the unconsolidated annual reports of targets, as recorded in the Zephyr database. Unconsolidated reports show the financial performance of individual targets after the acquisition without incorporating the accounts of the acquirer. This is a very important point because otherwise one would not be able to distinguish between the performance of targets and acquirers after the moment of the acquisition.

The ratios have been calculated as follows:

ROA: EBITDA/end of year Total Assets
ROS: EBITDA/Sales

**Table 3.** Description of basic variables used in the database construction

| Variable | Description | Source |
|---|---|---|
| EBITDA | Earnings before interest taxes depreciation and amortization are firm's income unaffected by financing and accounting decisions. The variable is recorded yearly, expressed in target's home country currency. | Amadeus database |
| Total Assets | Total asset base of the target at the end of the year, expressed in target's home country currency. | Amadeus database |
| Total Sales | Total sales of the target at the end of the year expressed in target's home country currency. | Amadeus database |

The size of the annual returns is given by the EBITDA (earnings before interest taxes depreciation and amortization) which are the actual benefits generated. They are independent of amortization and depreciation since depreciation and amortization have not yet been subtracted. As such, any accounting effect specific to the deal is cancelled out. Supporting the EBITDA choice, in a comparative study of different operating performance measurements Barber and Lyon (1996) highlight the necessity of choosing operating income data for two reasons: it does not include tax and accounting effects and is independent of the change in capital structure (e.g. when the debt burden increases, interest to be paid increases which leads to the decline of earnings following the interest costs). It follows that the choice for EBITDA as a measure of earnings holds for several reasons mentioned so far.

In the first metric EBITDA is divided to the end of year book value of assets. Again, some scholars prefer to use beginning of year assets or alternatively an average of beginning of year and end of year assets. As the study of Barber and Lyon (1996) shows there is no major output difference between these differences in methodology concerning beginning versus end of year assets. So the first metric gives the percentage of the gains brought by the assets employed in the target firm. The measure uses book values of assets as in Ravenschraft and Scherer (1989) since the conversion to market values would have been unfeasible in the short period of time dedicated to the analysis.

However, the analysis provides a check for any possible bias caused by asset manipulation. I use a second performance metric which divides EBITDA to the level of sales. This is useful to avoid biases for the cases where companies divest (sell) part of the recently bought assets or subsidiaries in the post acquisition years in order to reduce the asset base. If the asset base is reduced this implicitly increases the ROA ratio. A fake performance improvement due to subsequent asset sale can be avoided by looking comparatively at the returns on sales metric.

$$ROA_{it} = \frac{EBITDA_{it}}{TotalAssets_{it}} \tag{1}$$

$$ROS_{it} = \frac{EBITDA_{it}}{TotalSales_{it}} \tag{2}$$

### 3.2.3 Benchmark performance

This study is first interested in evaluating whether target firms in the sample present any change in performance as an effect of being acquired. However, changes in operating performance can be due to several reasons, distinct from merger and acquisition activity. These can be new investments, new projects or market growth. In order to distinguish as accurately as possible between the performance effect of the acquisition and other adjacent but acquisition-unrelated effects, most similar studies subtract from the annual operating performance of the entity the percentage growth or decline of the relevant industry.

$$IAROA_{it} = \frac{EBITDA_{it}}{TotalAssets_{it}} - IROA_{it} \tag{3}$$

$$IAROS_{it} = \frac{EBITDA_{it}}{TotalSales_{it}} - IROS_{it} \tag{4}$$

The difference between the individual target performance and its counterfactual (the basket of similar companies in the industry which were not involved in merger or acquisitions) will be the percentage change in performance unrelated with the industry, or otherwise said: the industry adjusted operating return.

In order to adjust the performance of targets, the overall performance of relevant the industry was needed ($IROA$ and $IROS$). Alternatively, I used a basket of similar companies which were not involved in merger and acquisition activities. The Amadeus and Zehpyr databases could only provide for each target a peer group of companies which had performance ratios in the same range as the target. However, we needed a group of comparable companies in terms of size (assets, sales or employees) and industry. Additionally, is it common for studies to use industry-median values (the middle returns within a distribution) as a benchmark but authors like Ghosh (2001) prefer not to rely on median which could be source of biases and to rather choose a basket of firms with comparable performance and size. To cope with this stringent issue, in this paper I filtered a set of similar companies for each target in the sample. Similarity is given by sub-industry in which the target is active, following the Nace Rev. 2 European classification. The aggregate EBITDA of all the filtered firms was taken. Then, the EBITDA of the industry was divided, first by the total industry assets (aggregate of the comparable basket of firms) and second by the total industry sales. The aggregation procedure is described in detailed in the rest of this section.

$$IROA_{it} = \frac{\sum_{j}^{i=1} EBITDA_{i,t}}{\sum_{j}^{i=1} TotalAssets_{i,t}} \tag{5}$$

$$IROS_{it} = \frac{\sum\limits_{j}^{i=1} EBITDA_{i,t}}{\sum\limits_{j}^{i=1} TotalSales_{i,t}} \qquad (6)$$

By calculating these ratios it was possible to construct a metric representative for the industry and independent of size. At a later stage I will be interested to find out whether size can explain upward or downward deviations from this industry mean. For each target I took Eastern European peer companies included in the same three-digit industry code as the target.  Ravenschraft and Scherer (1989) went as far as two-digits in the SIC industry classifications. Precision was gained by with using a three-digit NACE Rev.2 code since the size of the sample allowed. The size of the control sample decreased in favour of a more precise matching (three-digit code) between very similar companies.. For years 1999-2009 Amadeus database offers an aggregation analysis that that uses data for all firms selected under the relevant three-digit code. In the manufacturing sector these codes range from 1000 to 3200. Note that the NACE Rev.2 codification has been constructed on four digits sub industries; however the fourth digit does not make any difference in this sample and three digits was the most precise match one could use in order to find the most similar companies for benchmarking. An example of the procedure is the following:

E.g.: 7 of the targets in the sample are part of the three-digit NACE Rev. 2 code: 1100 (1101, 1105, 1106, and 1107). The individual target ratios have been compared to a market index composed of a sample of companies which are part of code 1100, Eastern Europe, with EBITDA and Total Assets available. This summed up 389 comparable companies in Eastern Europe for which I took the profitability ratios EBITDA/Total Assets and EBITDA/Total Sales. For the ratios I used the aggregate numbers for the 389 firms sample. Each of the 7 companies' profitability was compared against the pair market index as in formula (5). Moreover, for each subgroup in the sample a similar market aggregation was performed. The number of companies included in the market index varies sometimes from one year to another, depending on the number of firms with available data for the aggregate EBITDA, assets and sales calculations.

It would have been preferable to keep out those companies in the market index which have been involved in merger or acquisitions because that would insure that the benchmark reflects a real counterfactual. This was not possible to do since not all companies had available information with respect to them being involved or not in acquisitions. However, since each sub industry benchmark group is composed of a large number of companies only the fewer of them might have been involved in acquisitions are unlikely to affect the benchmark. In few industry measures the target firm might have been included as a result of filtering flaws. This issue should not bias the industry overall performance as long as the sample is sufficiently large, even if the target is part of the peer basket.

3.2.4 Performance measures

Following the methodologies used in scholarly articles the actual calculation of the final measure of performance was twofold, using first median values for the annual performances and second average values. Most commonly used estimate is the median value; however I include parallel models using three-year average returns. This is because data was available only for three years in the pre- and post-acquisition analysis, and the median of three entries could lack accuracy and predictability power. Furthermore, Barber and Lyon (1996) debated the issue of the expected post-acquisition performance used to calculate the abnormal returns:

$$AP_{i_t} = P_{it} - E(P_{i_t}) \tag{7}$$

where $AP_{i_t}$ is the abnormal performance of the company after the acquisition, $P_{it}$ is the real post-performance of the target and $E(P_{it})$ the expected post-performance value. For a better understanding of the importance of the expected performance I will specify three models, using different indicators of possible expected performance starting from the more general model in equation (7).

**Model 1** explains the abnormal post-acquisition performance as the difference between three-year average/median actual performance of the target and the past performance of the same firm in the three years before the transaction.

$$ASUPRA1_{post} = avgROA_{post} - avgROA_{pre} \tag{8a}$$
$$MSUPRA1_{post} = medROA_{post} - medROA_{pre} \tag{8b}$$

**Model 2** explains abnormal returns as the difference between the actual average/median post-acquisition performance and the relevant industry average/median benchmark calculated as in equation (5) and (6).

$$ASUPRA2_{post} = avgROA_{post} - avgIROA_{post} \tag{9a}$$
$$MSUPRA2_{post} = medROA_{post} - medIROA_{post} \tag{9b}$$

**Model 3** explains abnormal returns as the pre-acquisition profitability to which the change in industry profitability is added. This is then a combination of the first two models but it can be more explicit because it accounts for both pre-merger and industry profitability.

$$ASUPRA3_{post} = avgROA_{pre} + (avgIROA_{post} - avgIROA_{pre}) \tag{10a}$$
$$MSUPRA3_{post} = medROA_{pre} + (medIROA_{post} - medIAROA_{pre}) \tag{10b}$$

For the return on sales measure, the models remain identical, while only replacing all ROA values with ROS values. In the end twelve measures of performance can be checked against the hypotheses.

The three models can be useful if one looks at them in a comparative way. They all measure the surplus of returns in the post acquisition period. However these measurements are relative to different benchmarks. Model 1 estimates the surplus returns relative to the pre-acquisition years. It is crucial to check if targets performed better as a result of the acquisition. Following the efficiency theory I expect higher returns in the post-acquisition stage. This model is incomplete as long as it does not guarantee that the possible extra returns are due only to the deal. Consequently, model 2 gives a better benchmark, namely a group of comparable firms which were not involved in mergers and acquisitions. Compared to model 1, model 2 isolates better the effect of merger and acquisitions, because it compares firms that have been acquired with similar competitors that have not gone through mergers. I expect that targets in this sample outperform the industry benchmark. This can be seen as a potential effect of operational and allocative synergies discussed is section 1.1. More interestingly, model 3 is a combination of first two models. It is meant to compare the post-acquisition returns with those in the pre-acquisition stage but also gives an estimate of how much was the target growth relative to the industry growth over the same period of time. The contribution of model 3 cannot be neglected, notably because it uses the change in industry performance instead of the level of industry performance as in model 2.  It is more complicated to predict whether the target will grow faster than the industry after the acquisition. However, the changes are the growth of target will exceed the industry growth.

Additionally, each of the three models makes sense from an economic point of view. A firm might wish to increase its performance compared to past performance by means of being acquired, and probably restructured. Then, it is also possible that a firm can try to improve its performance relative to the performance of competitors. Of course the main issue here is to distinguish between the merger effect and other similar effects. In any case, each model offers gives a different angle of analysis for the subsequent profitability of target. The differences between the average and median values are expected to be small and they are assessed in a more accurate manner in the results sections. I expect the signs of both average and median values to be consistent in most of the cases. Table 4 lists all the excess return variables grouped by models.

**Table 4.** Description of excess returns variables and expected sign

| Model | Variable | Description | Expected sign |
|---|---|---|---|
| 1 | ASUPRA1 | Target's average excess returns in the post-acquisition period over target's returns in the pre-acquisition period | + |
|  | MSUPRA1 | Target's median excess returns in the post-acquisition period over target's returns in the pre-acquisition period | + |
| 2 | ASUPRA2 | Target's average excess returns in the post-acquisition period over industry returns in the post-acquisition period | + |
|  | MSUPRA2 | Target's median excess returns in the post-acquisition period over industry returns in the post-acquisition period | + |
| 3 | ASUPRA3 | Target's average excess returns in the post-acquisition period over pre-acquisition target returns plus the industry change in returns in the post-acquisition period | + |
|  | MSUPRA3 | Target's median excess returns in the post-acquisition period over pre-acquisition target returns plus the industry change in returns in the post-acquisition period | + |

Source: Author's calculations

## 3.2.5 Size measures

With respect to size there are a few options to distinguish between large and small companies; according to total assets, total revenues (the level of sales) or the number of employees. This paper I used the classification available on Amadeus databases and I include all criteria mentioned above. Each company is registered within one class of firms depending on four inclusion variables, as follows:

**Table. 5.** Inclusion criteria for size of targets

| Type of Company | Operating Revenue | Total assets | Number of Employees | Other |
|---|---|---|---|---|
| **Very large (VL)** | =>100 mil. EUR | => 200 mil. EUR | =>1500 | Listed |
| **Large (L)** | =>10 mil. EUR | => 20 mil. EUR | =>150 | not VL |
| **Medium (M)** | =>1 mil. EUR | => 2 mil. EUR | =>15 | not VL or L |
| **Small (S)** | if not VL, L or M | | | |

Source: Zephyr Database

In this analysis I included two types of variables to account for the size of the target. Both make use of the same inclusion criteria described in above. Because in this sample the number of observations is limited, very large companies and large companies were overall considered *large* while the last two categories were considered *small* (SMEs). As such, the sample could be dived into small and large companies and separate calculations of performance could be carried out.

# 4. Results

The methodology section was constructed to allow for differences in results by using three estimation models. This section is meant to compare and contrast these results. Based on statistical significance and sensitivity tests, certain models were supported and others dismissed. Some aspects of the analysis required judgments based on rough educated guesses; however these judgments use back up evidence in the form of similar results from previous scholarly research..

## 4.1 Performance measures

According to the methodology, there are two profitability ratios that indicate the performance of targets after acquisitions. These are return on assets (ROA) calculated as EBITDA/Total Assets and return on sales (ROS) calculated as EBITDA/Sales.

**Table 6.** Targets operating returns for the pre- and post acquisition periods

| Year | Firms median ROA | Firms median ROS |
|---|---|---|
| **Pre-acquisition performance** | | |
| -3 | 3.49% | 3.51% |
| -2 | 3.12% | 2.79% |
| -1 | 3.24% | 2.92% |
| Median annual performance | 3.08% | 3.21% |
| **Post-acquisition performance** | | |
| 1 | 4.45% | 4.20% |
| 2 | 6.45% | 6.76% |
| 3 | 7.60% | 8.33% |
| Median annual performance | 6.00% | 4.89% |
| **Difference between pre- and post-performance** | | |
| Change in performance | 2.02%* | 3.02%*** |

***Marks statistical significance at a level of 1%
*Marks statistical significance at a level of 10%

Table 6 shows comparatively the performance of all targets in the sample in the pre acquisitions and post acquisition periods. Both annual and period medians are indicated. The median annual performance stands for the performance during the whole period prior or after the year of the acquisition. Yearly performance is relative to the acquisition year. Prior to the acquisition both ROA and ROS are around 3%. The post acquisition period indicates a growth of ROA and ROS to new profit levels which are 6%

and 4.89%. The improvement in performance is quite high and the changes in ROA and ROS are statistically significant. For the statistical significance of changes I performed the non-parametric Wilcoxon Sign-Rank. It measures whether the median value of a distribution is significantly different from the null hypothesis. The null hypothesis in this case was that the change in performance equals zero. However the null hypothesis could be rejected since the z-scores were 1.654 (p-value 0.0982) and 2.857 (p-value 0.0043) which correspond to 10% and 1% statistical significance levels. Detailed results of the Wilcoxon test can be retrieved in Appendix A1.

## 4.2. Abnormal returns analysis

### 4.2.1 Descriptive abnormal returns

Some firms in the sample the measurements have extreme values that are less representative for the entire sample, so the section dedicated to descriptive statistics of abnormal returns was based on data winsorized at 98%, respectively at 97%. For this procedure each profitability variable (excess returns) was ordered from the smallest to the largest value. Each end of the distribution was set equal to the 98$^{th}$ value, respectively to the 2$^{nd}$ value. This method is frequently used by scholars to reshape the data so that results will not be biased by high or low outliers. Such method is welcome if average values have to be calculated, as in this case. Upper and lower limit values were set in this sample equal to the corresponding 2$^{nd}$ and respectively 98$^{th}$ percentiles of the ordered distribution. The data which comprises the return on sales models has been winsorized at 97% due to unusual skewness of the distribution and large sample variance.[7] The difference in sample variance is still large between the two types of measurements (ROA set and ROS set). Some papers winsorize data at lower percentages (e.g. 1% and 99%) but usually these studies have considerably large samples and in this one percent can be included up to 20 or more outliers,. This is definitely not the case for this smaller sample. The winsorizing was performed individually for each abnormal return variable described in the methodology section.

Table 7 gives an overview of the three different estimation models used to compute abnormal returns on assets for post-acquisition years. The difference in models 1, 2, 3 is given by the use of different benchmarks, or otherwise said different expected returns with regard to the post-acquisition period. Each model has two subsequent variables which are expected to be similar if distributions are symmetric. One variable takes the average value over the years while the other considers the median values. Additionally, abnormal returns are computed for the whole sample and then separately for small firms and large firms. The distinction between small and large targets is given by the Amadeus database inclusion criteria presented in the methodology part. This section is meant to offer a descriptive synopsis of how much targets gained or lost due to being acquired.

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[7] The upper and lower values at which each variable was winsorized can be found in Appendix A2 as well as the histograms corresponding to each variable distribution.

At the level of the whole sample there are obvious differences between the estimated returns. Models 1 and 3 show gains while model 2 specially indicates mixed results.

**Table 7.** Descriptive abnormal operation returns for ROA measures

| ROA Models | Performance Measure | All firms | | Small firms | | Large firms | | Difference | |
|---|---|---|---|---|---|---|---|---|---|
| | No. of firms | 100 | | 57 | | 43 | | | |
| | | Mean | Median | Mean | Median | Mean | Median | Mean | Median |
| 1 | **ASUPRA1** | 2.51%* | 1.25%* | 5.46% | 5.25% | -1.41% | -1.10% | 6.88%*** | 6.35% |
| | t-/z-values | (1.95) | (1.85) | | | | | (2.80) | |
| | Sample variance | 0.0165 | | 0.0176 | | 0.0126 | | | |
| | **MSUPRA1** | 1.99%* | 2.02%* | 3.98% | 2.84% | -0.64% | -0.48% | 4.61%*** | 3.32% |
| | t-/z-values | (1.80) | (1.69) | | | | | (2.07) | |
| | Sample variance | 0.0122 | | 0.0105 | | 0.0135 | | | |
| 2 | **ASUPRA2** | -3.83%*** | 3.39%*** | -2.79% | -2.81% | -5.20% | -6.28% | 2.41% | 3.47% |
| | t-/z-values | (-3.41) | (-3.43) | | | | | (1.04) | |
| | Sample variance | 0.0126 | | 0.0109 | | 0.0148 | | | |
| | **MSUPRA2** | -4.27%*** | 4.37%*** | -3.41% | -2.79% | -5.40% | -6.92% | 1.99% | 4.13% |
| | t-/z-values | (-3.71) | (-3.68) | | | | | (0.84) | |
| | Sample variance | 0.0132 | | 0.0116 | | 0.0155 | | | |
| 3 | **ASUPRA3** | 1.86% | 1.61%* | 3.21% | 1.81% | 0.08% | -0.76% | 3.13%** | 1.85% |
| | t-/z-values | (1.07) | (1.67) | | | | | (1.71) | |
| | Sample variance | 0.0161 | | 0.0115 | | 0.0220 | | | |
| | **MSUPRA3** | 1.32% | 1.04% | 2.74% | 2.05% | -0.03% | 0.06% | 3.50%* | 1.99% |
| | t-/z-values | (1.46) | (1.19) | | | | | (1.45) | |
| | Sample variance | 0.0132 | | 0.0096 | | 0.0176 | | | |

*** Marks a level of statistical significance at 0.001 (1%)
** Marks a level of statistical significance at 0.005 (5%)
*Marks a level of statistical significance at 0.01 (10%)

The first model is quite consistent showing average post-acquisition gains of around 2.51% and 1.99% respectively at the level of the entire sample. Median values of the distributions are very close to and confirm the average. In this case it is likely that the distributions are symmetric and also normally distributed. In appendix A2 can be found the histograms of the variables. All parameters of model 1 are significantly different from zero at a 10% level. For the significance of the mean values a Student's t-test was performed. This parametric test follows a t-distribution under the null hypothesis if the sample is random and normally distributed. The null hypothesis can be rejected at 10%. However it appears that in the case of ASUPRA1 the sample might not be drawn form a normally distributed population. A reliable test for non-normality of small to medium sized samples is the Shapiro-Wilk W-test. In the case of ASUPRA1 the null hypothesis of normal distribution can be rejected at a 1% significance level[8]. In this case more attention could be given to the median value which is significant at a 10% level according to the Wilcoxon sign-rank test. This is more accurate in case of non-normality as shown in Barber and Lyon (1996). The same happens in the case of ASUPRA3 which fails the

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[8] Normality test based on the Shapiro-Wilk W-test procedure are found in Appendix A3.

normally test. Here it is not a real issue since the mean is insignificant. According to model 3 the median abnormal return (above the combined pre-acquisition return and industry change in return) is 1.61%.

Model 2 is left last since it shows mixed results. Mean and median values differ in sign and are both significant. This time, I would rather rely on the median results since they represent the middle of the distribution. It appears that there are more firms with gains if the mid-value is positive. Additionally ASUPRA3 and MSUPRA3, even if they do not fail the normality test, appear both to be skewed and to have high kurtosis. The histograms in Appendix A2 show the extreme values at the tails of the distributions, which are without doubt affecting the mean value and leave the median quasi-unchanged. This could also be interpreted as a sign that winsorizing could have been performed at higher levels but that would have been probably translated into a large loss of accuracy.

Interestingly, when the sample was dived into large and small companies, it appears in the descriptive statistics that small companies benefit of larger gains than large companies as it was hypothesized in the beginning. It can be the case that smaller companies are more easy to manage and also more easy to restructure. According to efficiency theory small companies probably approach the minimum efficiency scale faster (due to the increase in size). They grow faster in size and their average production costs lower faster compare to larger companies. Model 2 does not show any significant differences between the two samples, while models 1 and 3 have significantly higher gains for small firms. Both models are consistent since average and median values approach to each other. To test the significance of the difference in the means of the two samples a Student-t test was performed. A specification for the unequal sample with unequal variances has been chosen. This shows that the difference between the sample means is significant. The exact size of the difference is not of high importance at this point, but the sign and the significance levels. A more precise measure of the abnormal returns difference will be estimated in the sensitivity analysis part in which I performed an OLS regression

Similar to table 7, table 8 presents the abnormal returns on sales for targets in the whole sample and separately for small and large firms. Overall, higher returns on sales are identified. It appears the all abnormal results variables fail the Shapiro-Wilk normality test available in Appendix A3. This is mainly due to the strong outliers of the distributions which can be checked in Appendix A2. Sample variance is also higher for ROS measures than it used to be for ROA measures. Model 2 yields again mixed results at the level of the entire sample. Extremely negative outliers affect the mean values even if more companies in the sample have positive abnormal returns on sales, as indicated by the median. Small firms have higher median returns on sales and less importance will be given to average values since the t statistics might be biased due to non-normality. Note that model 2 uses industry comparison group to measure expected performance without pre-event performance matching. So the ASUPRA2, MSUPRA2 (in table 7) and ASUPRAS2 and MSUPRAS2 measurements (in table 8) are informative but they completely ignore the history of the firm relative to this industry benchmark. If a company was well above the industry in the pre-acquisition period, it might very well continue to outperform benchmark independently of being involved in acquisitions or not. It follows that researchers could interpret this percentage above the industry in an incorrect manner. This is highlighted also in Barber and Lyon (1996). A way to alleviate

this problem is to consider the history firm's performance relative to the performance of the industry. This relationship is comprised in the 3$^{rd}$ model. In this case it practically shows that small firms have on average lower returns on sales.

**Table 8.** Descriptive abnormal operation returns for ROS measures

| ROS Models | Performance Measure | All firms | | Small firms | | Large firms | | Difference | |
|---|---|---|---|---|---|---|---|---|---|
| | No. of firms | | 100 | | 57 | | 43 | | |
| | | Mean | Median | Mean | Median | Mean | Median | Mean | Median |
| 1 | **ASUPRAS1** | 11.10%*** | 3.82%*** | 19.15% | 4.48% | 0.43% | 1.35% | 18.71%*** | 3.13% |
| | t-/z-values | (3.34) | (3.60) | | | | | (3.13) | |
| | Sample variance | 0.1108 | | 0.1510 | | 0.0394 | | | |
| | **MSUPRAS1** | 7.79%*** | 3.02%*** | 15.19% | 4.34% | -2.01% | 0.24% | 17.20%*** | 4.10% |
| | t-/z-values | (2.61) | (2.88) | | | | | (3.14) | |
| | Sample variance | 0.0889 | | 0.1100 | | 0.0457 | | | |
| 2 | **ASUPRAS2** | -4.58%* | 3.27%** | 0.83% | -2.18% | -11.75% | -4.30% | 12.58%*** | 2.12% |
| | t-/z-values | (-1.82) | (-2.37) | | | | | (2.48) | |
| | Sample variance | 0.0634 | | 0.0513 | | 0.0719 | | | |
| | **MSUPRAS2** | -4.94%*** | 3.01%** | -1.28% | -1.87% | -9.78% | -5.30% | 8.50%** | 3.43% |
| | t-/z-values | (-2.65) | (-2.39) | | | | | (2.14) | |
| | Sample variance | 0.0347 | | 0.0171 | | 0.0548 | | | |
| 3 | **ASUPRAS3** | 16.89%*** | 3.49%*** | 19.89% | 4.96% | 25.27% | 4.36% | -14.70%* | -0.98% |
| | t-/z-values | (3.31) | (3.67) | | | | | (-1.32) | |
| | Sample variance | 0.2606 | | 0.1558 | | 0.4371 | | | |
| | **MSUPRAS3** | 7.69%*** | 2.90%*** | 14.07% | 4.45% | 10.51% | 2.28% | -4.96% | 0.79% |
| | t-/z-values | (2.74) | (2.58) | | | | | (-0.81) | |
| | Sample variance | 0.0788 | | 0.0967 | | 0.1326 | | | |

*** Marks a level of statistical significance at 0.001 (1%)
** Marks a level of statistical significance at 0.005 (5%)
*Marks a level of statistical significance at 0.01 (10%)

Median values indicate that sales performance decreases while the asset performance increases. They are significant only at a 10% level, which means that these numbers may lack explanatory power. Models 1 and 2 appear to be more significant and indicate improved performances for the small firms. However, I want to restate that ROS measures are not normality distributed (according to the Shapiro-Wilk W-test). That being the case, the normality assumption is violated and t-tests yield biased results. Again, this descriptive statistics section is more indicative about the sign of the difference in returns than for the actual size of the returns.

## 4.2.2 Sensitivity analysis

This part of the analysis checks whether abnormal returns on assets can be identified independently of the expected performance models. A bivariate ordinary least

squares regression is run for each model in the methodology with the post acquisition performance as dependent variable and the expected performance as independent variable (Healy, Palepu and Ruback, 1992, Ravenschraft and Scherer, 1989). Since there are three different models for expected performance there will be several comparable regression outputs. The econometric relationship looks as follows:

$$P_{it} = \beta_o + \beta_1 E(P_{it}) \tag{11}$$

where $P_{it}$ is the post acquisition performance of the firm $i$ in year $t$ expressed in average or median post acquisition ROA, $E(P_{it})$ is the expected post performance calculated according to the three different models (1-3). $\beta_1$ is the correlation coefficient of expected performance with the actual performance $P_{it}$. The intercept $\beta_0$ gives the actual size of abnormal returns if the expected performance $E(P_{it})$ would have been set to set to zero. This analysis provides a double check for the results of the descriptive section. The regressions were run on unwinsorized data..

**Table 9.** Abnormal returns estimation for ROA models

| Model | Intrecept | avgROApre | medROApre | avgIROApost | medIROApost | avgΔROA | medΔROA | Rsquared |
|---|---|---|---|---|---|---|---|---|
| | 0.0545*** | 0.3950*** | - | - | - | - | - | 0.3984 |
| | (3.73) | (8.06) | - | - | - | - | - | |
| | 0.0659*** | - | 0.1659*** | - | - | - | - | 0.1045 |
| 1 | (3.62) | - | (3.38) | - | - | - | - | |
| | 0.0967** | - | - | -0.1107 | - | - | - | 0.0001 |
| | (2.23) | - | - | (-0.31) | - | - | - | |
| | 0.0353 | - | - | - | 0.4024 | - | - | 0.0114 |
| 2 | (0.76) | - | - | - | (1.06) | - | - | |
| | 0.0562*** | - | - | - | - | 0.3886*** | - | 0.3798 |
| | (3.79) | - | - | - | - | (7.75) | - | |
| | 0.0645*** | - | - | - | - | - | 0.1673*** | 0.1073 |
| 3 | (3.54) | - | - | - | - | - | (3.43) | |

\*\*\* Marks a level of statistical significance at 0.001 (1%)
\*\* Marks a level of statistical significance at 0.005 (5%)
\*Marks a level of statistical significance at 0.01 (10%)

Following equation (11) table 9 presents the output of six bivariate OLS regressions. Each of the three models includes one regression based on average values and one regression based on median values. The dependent variable in all models is the post acquisition return on assets. For each model I estimate two regression in which the dependent variable is first the average return on assets and second, the median return on assets. The logic behind this choice is to check which type of measurement (average or median values) has more explanatory power. The intercept indicates the size of the abnormal return due to acquisition. R-squared values for each regression are indicated in the last column. From the start model 2 can be treated first: *avgIROApost* and *medIROApost* stand for the average and median return on assets at the level of the whole

industry in the post acquisition period. Even if it estimates a 9.67% abnormal return for the targets above the control industry group, it appears to have very limited explanatory power. Moreover the coefficients for the industry do not predict in any significant way the post acquisition return. In the descriptive section (see Table 7) the second model was, as well, less conclusive. Here model 2 estimates a 9.67% average abnormal return but the R-squared is extremely low and has an explanatory power of 0.01%. This outcome points out to the fact that post-acquisition performance of targets does not improve compared to the industry level of performance.

It appears however that post-acquisition returns depend significantly on the pre-acquisition return levels (as in model 1) and also on the change of performance at the level of the industry (as in model 3). The first model predicts 5.45% and respectively 6.59% abnormal returns above and independently of pre-acquisition performance. Variable *avgROApre* and *medROApre* stand for average and median return on assets in the period preceding the acquisition of the target. Both coefficients are highly significant at a level of 1%. Between the two regressions in model 1 it noticeable that the first estimation based on average values has larger explanatory power (R-squared of 39,84%) than the second estimation which uses median values (R-squared of 10,14%). This result points to the fact that average values might describe better the relationship between variables, so they have more explanatory power. In the descriptive section the reverse happened: the median values were more significant and probably more suitable for that type of analysis. This preference for median values in descriptive statistics can be seen along several comparable scholar studies.

In model 3 the estimates for the abnormal returns are similar to the predictions of model 1. The novelty of this model is that it includes the changes in the industry returns in the post acquisition period compared to the pre-acquisition period. Note that this is different from model 2 which considers the level of the industry return in the post acquisition years. Variable *avgΔROA* is calculated as the average pre acquisition performance plus the change in industry ROA. This model implies that following an acquisition the expected return should be compared to the historical returns of the company to which is added the growth or contraction of the industry over that period. Abnormal returns of 5.62% and 6.45% identified. Again a difference in explanatory power can be identified between the two regressions of model 3. So the average change in performance explains more of the variation of the average post returns while the median change in performance explain to a lesser extent the variation of median post-acquisition returns. In the section that focuses on the size effect only I study only the models with the highest explanatory power, namely models 1 and 3 estimated with average values. This is done because I want to avoid re-estimating models will inconclusive results throughout the rest of the paper and focus only on those that yield meaningful results.

Data for ROS models turned out to be very blurry and insignificant. This outcome is similar to the outcome of the descriptive section on abnormal returns. There, the ROS models yielded mixed results and lacked the normality requirement. This issue affects the regression estimates and biases t-statistics as it can be seen on table 10. As a consequence of normality violation the ROS models could not be correctly interpreted and they were left out in the next step of the analysis which treats the size effect.

**Table 10.** Abnormal returns estimation for ROS models

| Model | Intrecept | avgROSpre | medROSpre | avgIROSpost | medIROSpost | avgΔROS | medΔROS | Rsquared |
|---|---|---|---|---|---|---|---|---|
| | 2.4021 | 1.4990*** | - | - | - | - | - | 0.9850 |
| | 1.12 | 80.21 | - | - | - | - | - | |
| | -12.9368 | - | 6.4589 | - | - | - | - | 0.0232 |
| 1 | -0.75 | - | 1.53 | - | - | - | - | |
| | -23.2962 | - | - | 64.4807 | - | - | - | 0.0003 |
| | -0.57 | - | - | 0.17 | - | - | - | |
| | -24.4597 | - | - | - | 75.9380 | - | - | 0.0004 |
| 2 | -0.59 | - | - | - | 0.20 | - | - | |
| | 2.4023 | - | - | - | - | 1.4990*** | - | 0.9850 |
| | 1.12 | - | - | - | - | 80.23 | - | |
| | 12.936 | - | - | - | - | - | 6.4589 | 0.0232 |
| 3 | 0.75 | - | - | - | - | - | 1.53 | |

To round up, it follows from the descriptive analysis and the sensitivity tests that in this sample targets gained around 5-6% ROA due to being acquired. Healy et al. (1992) identify a 2.7% gain above the industry performance and Switzer (1996) 6.9% higher returns. These results confirm the first hypothesis H1 that states that targets have significantly higher returns after the acquisition compared to pre-acquisition years. As well, the models that use average values for the variables have a higher explanatory power compared to the models that use median values. Consequently they are used for the size effect analysis. The ROS models turned inconclusive at this stage of the analysis, so they will not be re-estimated in the size effect analysis.

## 4.3 Size effect analysis

In this paper I introduce the hypothesis that small companies might have larger post-acquisition returns than large companies. This was already indicated in the descriptive abnormal returns section. However, more explicit evidence with respect to the size of this difference is needed. In order to do that, two of the more indicative models from the previous section will be re-estimated: the model 1 with average values and model 3 with average values. The two models will be run this time accounting for the size of the target involved in the deal as well as for the relative size of the target with respect to the acquiring firm. Table 10 describes all variables included in the size effect analysis.

**Table 11.** Description of the variables used in the size effect analysis

| Variable | Obs. | Mean | St.Dev. | Min. | Max. | Source |
|---|---|---|---|---|---|---|
| *Dependent variable* | | | | | | |
| **avgROApost** | Target's average ROA in the post-acquisition period | | | | | |
| | 100 | 0.0844 | 0.1815 | -0.2065 | 1.4830 | Author's calculations |
| *Independent variables* | | | | | | |
| **avgROApre** | Target's average ROA in the pre-acquisition period | | | | | |
| | 100 | 0.0756 | 0.2900 | -0.4807 | 1.8882 | Author's calculations |
| **avgDROA** | Target's average ROA in the pre-acquisition period plus the change in industry ROA pre- to post-acquisition period | | | | | |
| | 100 | 0.0725 | 0.2879 | -0.5115 | 1.8742 | Author's calculations |
| **lassets** | Target's Total Assets at the time of the acquisition in thousand Euros, natural logarithm | | | | | |
| | 100 | 9.3582 | 1.4912 | 6.7017 | 13.4775 | Zephyr database |
| **lrelassets** | Target's Total Assets divided by acquirer's Total Assets at the time of the acquisition, natural logarithm | | | | | |
| | 100 | -1.4279 | 3.3151 | -11.6741 | 6.0161 | Zephyr database |
| *Control variables* | | | | | | |
| **inter** | Dummy variable that distinguishes between international and domestic deals | | | | | |
| | 100 | 0.42 | 0.4960 | 0 | 1 | Zephyr database |
| **divers** | Dummy variable that distinguishes between industry diversifying and non-diversifying deals | | | | | |
| | 100 | 0.6 | 0.4924 | 0 | 1 | Zephyr database |
| listed | Dummy variable that distinguishes between listed and non-listed targets | | | | | |
| | 100 | 0.44 | 0.4989 | 0 | 1 | Zephyr database |

## 4.3.1 Dependent variable

One dependent variable was used for both estimated models and this is average post acquisition return on assets (*avgROApost*). It was calculated as the average of annual returns for the years after the year of deal completion. The same variable was used to estimate also the size of the abnormal returns in the first regressions of model 1 and 3 in section 4.2.2. The variable is expressed is percentages and represents the actual return for that period. The values of *avgROApost* are not winsorized.

## 4.3.2 Independent variables

Each model contains an explanatory variable which is the expected value of the return for the pos-acquisition period, as in the sensitivity analysis. One explanatory variable is *avgROApre* that stands for the pre-acquisition years' average return on assets. It is expressed in percentages. The other explanatory variable for the second model is *avgDROA* which is calculated as the pre-acquisition average return plus the change in

average industry returns between the pre and post acquisition years. It is also expressed in percentages.

In order to check for the effect of the size of target, I use a size measure given by the level of assets of target at the time of the acquisition. The size of the target is measured by the level of assets expressed in logarithmic form and noted as *lasset*. This is also used in comparable scholarly papers that use the same measurement to account for the size of the firm. One issue with respect to the comparability of data had to be addressed. Targets in this sample come from different Eastern European countries which have different currencies. However all targets had the assets size for the year of the acquisition expressed in thousands of euros which made the cross-country comparison possible. As such, the size measure represented by the level of assets is in every observation expressed in thousands of euros. The natural logarithm of assets size was taken in order to estimate the relationship. Moreover, I introduced the relative size of target with respect to the size of the acquirer. I expect that the smaller the target with respect to the acquirer, the more gains will be seen. This is computed as the assets of target divided by the assets of the acquirer both expressed in thousand euros. The ratio obtained was transformed into its natural logarithm when put in the regression model. Both regression have been checked with Breusch-Pagan test for heteroskedasticity and corrected for robust standard errors. (see in Appendix A4).

$$avgROApost = 0.2787 + 0.3688\,avgROApre + (\text{-}0.0241)\,lassets + (\text{-}0.0022)\,lrelassets$$
$$\qquad\qquad\quad (2.83) \qquad (1.61) \qquad\qquad (\text{-}2.43) \qquad\qquad (\text{-}0.44)$$

(12) $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ *Obs=100, Rsquared= 0.4473*

$$avgROApost = 0.2613 + 0.3595\,avgDROA + (\text{-}0.0221)\,lassets + (\text{-}0.0028)\,lrelassets$$
$$\qquad\qquad\quad (2.50) \qquad (1.55) \qquad\qquad (\text{-}2.07) \qquad\qquad (\text{-}0.53)$$

(13) $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ *Obs=100, Rsquared=0.4242*

T-tests reported between parentheses are calculated based on robust standard errors after the heteroskedasticity correction. Estimations 12 and 13 show a significant negative correlation between assets and gains from acquisition. When *lassets* increases by one level ROA decreases by 2.41% or 2.22%. Both coefficients are statistically significant at a 5% level. In the case of *lrelassets* the relationship is negative but is not statistically significant. However joint significance of *lassets* and *lrelassets* can be sustained. The F-test performed for the joint significance of these two variables yields 3.61 (significant at 5%) in the first model and 2.66 (significant at 10%) in the second. Similar to the descriptive abnormal returns prediction, small firms in this sample gain more from acquisitions than large firms in the same sample. This sustains the second hypothesis of this paper. Kräussl and Topper (2006) find similar results for the Dutch market. In their paper the authors show that small firms gain 2.61% more than large firms. Moeller et al. (2004) find that small firms' gain 2.24% more compared to large firms.

### 4.3.3 Control variables

One final step in the analysis is to test the effect of size on acquisition gains by introducing relevant control variables. Three control variables have been introduced in each estimation model. They account for the degree of internationalization of the deal, for the degree of diversification of the deal and for the type of target in discussion, if it is a publicly traded company or not. All these three variables could have an effect on the size of gains from acquisitions as Kräussl and Topper (2006) point out.

The dummy variable *inter* distinguishes between the acquisitions which are industry diversifying or not. To account for this possible diversification effect the NACE Rev.2 codes of the target and acquirer were matched. Whenever the first three digits are identical, the deal is not considered industry diversifying while when the three digits are different, even if the difference is made by the third digit the deal is an industry diversifying one.

A second dummy variable *divers* stands for the type of the deal: whether the deal is an internationally diversifying or not. Cross border deals (when target and acquirer home countries do not match) are marked 1 and domestic deals (between a target and an acquirer from the same country) are marked 0. Finally the last dummy variable *listed* distinguishes between listed (1) and unlisted (0) targets in the sample.

At the level of this sample 60 deals diversify their activity, namely acquirer buys targets that are active in another industry or sub industry, 42 deals are closed between firms residing in different countries and 44 targets are listed after the year of the deal. Targets which were de-listed following the acquisition are recorded as non-listed since it is important for targets to be listed in the post-acquisition period, so that their shares can be traded. This would potentially lead to an additional increase or decrease in value created as an effect of being publicly traded.

The two estimated models have been run again to test the three control hypotheses and check whether the size effect is independent of these variables. The output for the two estimations is:

$$avgROApost = 0.2892 + 0.3664\,avgROApre + (\text{-}0.0234)\,lassets + (\text{-}0.0018)\,lrelassets$$
$$\phantom{avgROApost =}(2.80) \quad (1.61) \qquad\qquad (\text{-}2.41) \qquad\qquad (\text{-}0.34)$$
$$\phantom{avgROApost =}0.0027\,intern + (\text{-}0.0062)\,divers + (\text{-}0.0302)\,listed$$
$$\phantom{avgROApost =}(0.12) \qquad\qquad (\text{-}0.27) \qquad\qquad (\text{-}1.01)$$

(14)                                                                                          *Obs=100, Rsquared=0.4549*

$$avgROApost = 0.2707 + 0.3573\,avgDROA + (\text{-}0.0216)\,lassets + (\text{-}0.0022)\,lrelassets$$
$$\phantom{avgROApost =}(2.47) \quad (1.55) \qquad\qquad (\text{-}2.06) \qquad\qquad (\text{-}0.41)$$
$$\phantom{avgROApost =}0.0063\,intern + (\text{-}0.0057)\,divers + (\text{-}0.0287)\,listed$$
$$\phantom{avgROApost =}(0.28) \qquad\qquad (\text{-}0.24) \qquad\qquad (\text{-}0.95)$$

(15)                                                                                          *Obs=100, Rsquared=0.4313*

T-test scores are based again on robust standard errors since random variables turned to have different variances for the distributions of the residuals. After introducing the control variables can be noticed that smaller targets have higher acquisition returns of 2.34% and 2.16% independent of the degree of internationalization of the deal which confirms H2a. Secondly, smaller targets have higher acquisition returns independently of

whether they are industry diversifying or not, which confirms H2b. Lastly it also appears that ceteris paribus, smaller targets have higher acquisition returns independently of whether they are listed on a stock exchange or not. Regressions 14 and 15 have very similar results. The intercept does not raise much interest since it is meaningless, given that it is not possible to set a zero level of assets and have any performance whatsoever.

**Table 12.** Estimation of target's size effect on post-acquisition gains

| Model | Intercept | avgROApre | avgDROA | lassets | lrelassets | intern | divers | listed | Rsquared |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.2787*** | 0.3688* | - | -0.0241*** | -0.0022 | - | - | - | 0.4473 |
| | (2.83) | (1.61) | - | (-2.43) | (-0.44) | - | - | - | |
| | 0.2892*** | 0.3664* | - | -0.0234*** | -0.0018 | 0.0027 | -0.0057 | -0.0287 | 0.4549 |
| | (2.80) | (1.61) | - | (-2.41) | (-0.34) | (0.28) | (-0.24) | (-0.95) | |
| 3 | 0.2613*** | - | 0.3595* | -0.0221*** | -0.0028 | - | - | - | 0.4242 |
| | (2.50) | - | (1.55) | (-2.07) | (-0.53) | - | - | - | |
| | 0.2707*** | - | 0.3573* | -0.0216*** | -0.0022 | 0.0063 | -0.0057 | -0.0287 | 0.4313 |
| | (2.47) | - | (1.55) | (-2.06) | (-0.41) | (0.28) | (-0.24) | (-0.95) | |

Table 12 presents all the results in equations 12 to 15 in a comparative manner. According to these results a significant size effect can be identified on gains following target's acquisition before and after controlling for other factors. None of the other three variables that account for the characteristics of the deal and target (*inter, divers, listed*) have a significant effect of gains.


## Discussions and conclusions

There are two types of implications that come out of this paper. The most important ones are empirical and related to the profitability of targets in this sample. The secondary ones are theoretical and have a more general nature.

First of all, the empirical implications of this analysis point to the profitability of mergers and acquisitions at the level of this sample, and maybe also at the level of the whole CEE. Besides the increase in performance that has been detected, there is also a significant size effect on gains from mergers. This proves that gains from acquisitions decrease when the size of the target increases. In this paper, I discussed two main issues with respect to target performance: the profitability of targets involved in merger and acquisitions in the CEE countries and the possible size effect of the target on the post-acquisition returns. Following these two research questions, the analysis focused on two broader themes. One was the computation of abnormal returns according to the three main models described in the methodology part. The second was the econometric estimation that measured the actual abnormal returns and controlled for other potential gain factors. The descriptive and analytical parts are in broad lines, consistent with each other and support each other. The descriptive statistics announced a median gain of 2.02% and 3.02%, respectively, for the pre-merger and post-merger period. The intercept of the bivariate relation has indicated significant abnormal returns of 5% to 6%. Both

analyses detect gains in the post-acquisition period compared to the given benchmarks. These numbers, however, are not perfectly comparable because the descriptive statistics in table 6 compare only pre-post acquisition and post-acquisition changes.

At a next step, abnormal returns analysis showed that, at the level of this sample, gains after acquisition are 5.45% higher than the gains preceding the acquisition. There is no significant difference in gains compared to the industry level. However, it was proved that the growth in returns for targets was higher than the growth in returns for the industry over the same period. It follows that the targets grew at a slightly faster pace than the industry grew over the same period. In terms of profitability levels however, the targets had lower returns levels than the market. An example could be useful to portray this situation. Let us assume that a target had underperformed the industry before the acquisition with 3%. So over that period the industry ROA is on average 5% and the firm only 2%. The growth of the industry in the next years is 2% but the growth of the firm is 4% due to some probable acquisition synergies. So the new levels of ROA are 7% for the industry and only 5% for the target, even if target outperformed the industry over the same period of time.

These results can lead to one important conclusion: it is possible that most targets in the sample have been underperforming the industry at the time they were bought. This is a quite realistic possibility that would validate the bad management theory (Ravenschraft and Scherer, 1989) as well as the efficiency theory (Sudarsanam, 2003). According to both theories, targets are chosen because they are considered to have high growth potential. One way to attain growth is to restructure the firm or to change the inefficient management team. This is likely for the targets in this sample and a possible explanation is that targets in the CEE countries do better than the industry over the same period but they probably do not catch up with it over a three-year window. A longer time-frame study would probably settle this discussion point.

However, in this paper the results with respect to profitability measurements can be subject to discussion. Other methodology choices could probably change the results in a significant manner. Probably one of the most controversial choices was the choice of a benchmark. The industry in this study is represented by a large group of firms matched by the sub-industry code. So they are very similar in product portfolios. Nevertheless, some studies prefer to choose benchmarks of the same size as the target or of the same profitability as the target. A similar matching could not be performed in this paper due to data availability restrictions.

The second debatable issue is that there are significant differences between returns on assets models and returns on sales models. The ROS models depict higher returns than assets models. This is probably an effect of higher fluctuations at the levels of sales compared to the fluctuations at the levels of assets. Sales are more sensitive to fast market changes than assets. A decrease in consumption will immediately be reflected in sales but only at a later stage in the asset base. The same argument can be used to explain larger sample variance of ROS measures compared to the smaller sample variance of ROA measures. This points to one reason for which ROS models yield less significant returns compared to asset models. There is no clear evidence whether this difference in variation is also present at the level of small firms to a lesser extent than at large firms or the other way around. But with respect to ROS, small firms have larger variance because they are more easily affected by market changes. Another drawback of

this analysis relates to the limited usage of ROS measures. Even though I have introduced return on sales with the intention to have a good comparison term for returns on assets, the two performance models yielded rarely similar results. The significance of the ROS models was quite limited, so I had to exclude these models from the size effect section.

The third main finding of this study is that smaller targets have higher returns from acquisitions than large companies.. This is in line with Weitzel and McCarty (2009), Kraulss et. al. (2006), Moeller et al (2004) and Switzer (1996). Of course these results contradict several other studies which find little or no significance at all of size on the amount of gains. It appears that small manufacturing firms in this sample perform better after acquisition; they growth more than the industry, even more than larger firms do. In relative terms, it is also discovered that the larger the acquirer, the smaller the benefits to targets. However, this causality is yet to be proven since little significance has been found with respect to this aspect. Further research could try to estimate an interval for the best relative size of the acquirer compared to the target, i.e., an interval in which the profitability of the target is higher.

These results are in line with the efficiency theory. When firms are small enough, merger and acquisition behavior is likely to lead to an increase in performance. This happens because the minimum efficiency scale has not yet been reached. Such conclusion could be sustained in the context of CEE countries. Their need for growth is larger, so small firms in CEE approach faster the minimum efficiency scale at which long run average costs are minimized.  In the case of large companies, they probably reached or are very close to reach minimum efficiency scale so their growth is less robust. These results are also independent of other deal characteristics such as the degree of internationalization, the diversification of the business and the type of company, public or private.  Some articles are more specific in measuring performance by looking at differences given by the level of debt assumed and tax benefits (Kaplan, 1989) and the dividends paid at the end of year (Healy and Palepu, 1988). These aspects are certainly important in profitability studies. However their studying requires an even more detailed data collection that can account accurately for other possible effects. This is very difficult to carry out since there is little information available with respect to investment projects of companies and the exact tax level across countries in the sample at different points in time.

There are also theoretical implications that are supported by these results. However, more extensive research is needed to provide an accurate proof of these broader theoretical implications. Because my results are in line with efficiency theory of mergers and acquisitions (Banerjee and Eckard, 1998 and Klein, 2001), these theoretical implications suggest that efficiency theory may better explain merger and acquisition activity on the larger CEE market. Additionally, this could happen because CEE has a set of characteristics that allow fast extraction of higher efficiencies. These characteristics can be lower competition, non-saturated markets, high growth potential, lower tax levels, faster economic growth and so forth. Papers only referring to Western-Europe and the US lack many of these characteristics, which might indicate that efficiency theory has a poorer fit at these latter markets. There, other merger and acquisition theories might be more appropriate (Pffefer and Salancik, 1987). Note that lower competition markets here do not necessarily mean having problems from a merger regulatory or antitrust point of view; these markets have simply less intense economic activity.

All in all, this paper proved two basic hypotheses that merger and acquisitions activity in the sample lead to an improvement of targets' profitability and small firms have higher returns compared to larger firms. These hypotheses still need to be tested for larger samples and to address more sectors in order to offer a more complete picture of merger and acquisition activity in CEE countries. The idea that less competitive markets, such as the CEE markets, are better 'cradles' for acquisition gains offers a quite challenging topic for further research. This could explain why financial gains on highly competitive markets, as those of the UK and the US, are still disputable. It would be interesting to study differences in gains between less competitive and highly competitive markets. The latter probably do not allow for as high operating efficiencies as the less competitive markets do.

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Zhephr Database

# APPENDIX

## Appendix A1

## Wilcoxon test

```
Wilcoxon signed-rank test

        sign |      obs   sum ranks    expected
-------------+-------------------------------
    positive |       57        3006        2525
    negative |       43        2044        2525
        zero |        0           0           0
-------------+-------------------------------
         all |      100        5050        5050

unadjusted variance    84587.50
adjustment for ties        0.00
adjustment for zeros       0.00
                       ----------
adjusted variance      84587.50

Ho: changeROA = 0
          z =    1.654
    Prob > |z| =   0.0982
```

```
Wilcoxon signed-rank test

        sign |      obs   sum ranks    expected
-------------+-------------------------------
    positive |       59        3356        2525
    negative |       41        1694        2525
        zero |        0           0           0
-------------+-------------------------------
         all |      100        5050        5050

unadjusted variance    84587.50
adjustment for ties        0.00
adjustment for zeros       0.00
                       ----------
adjusted variance      84587.50

Ho: changeROS = 0
          z =    2.857
                          Prob > |z| =    0.0043
```

## Appendix A2

Excess returns histograms
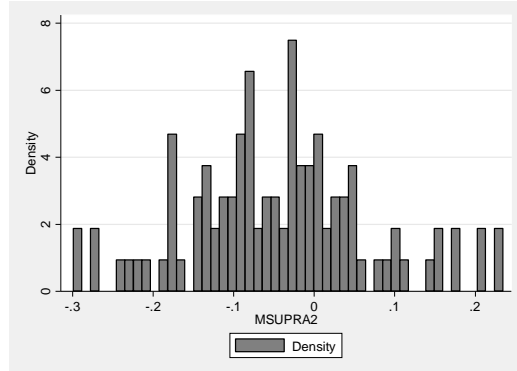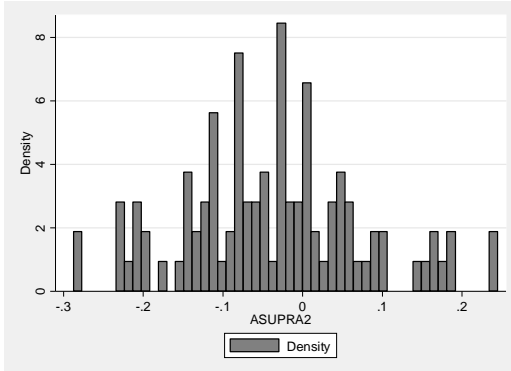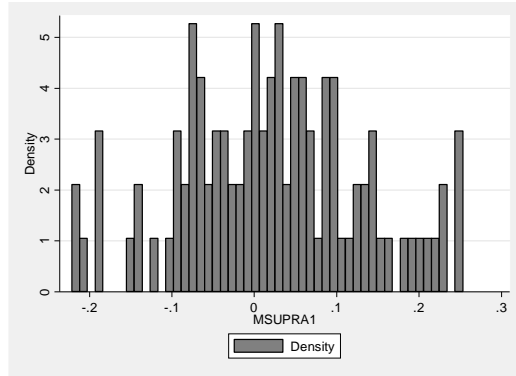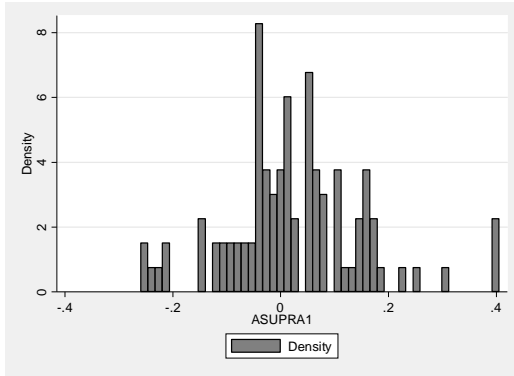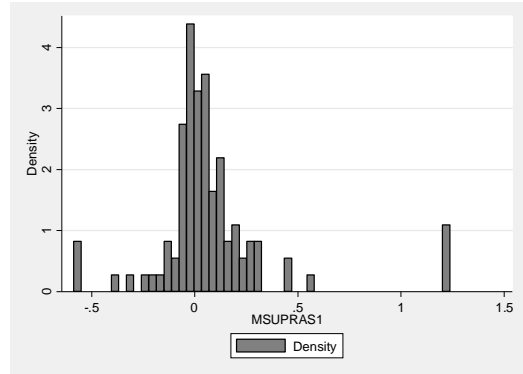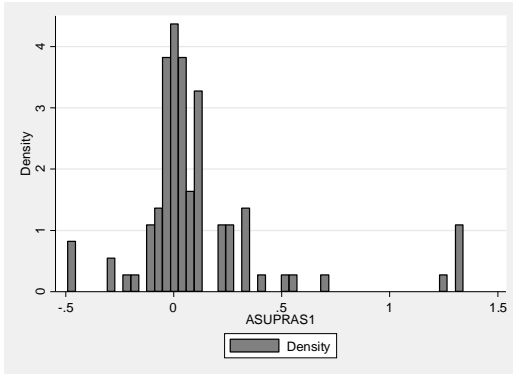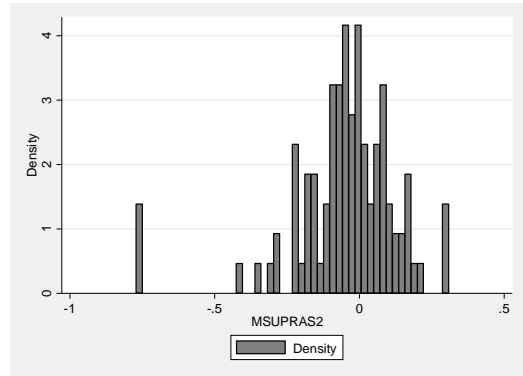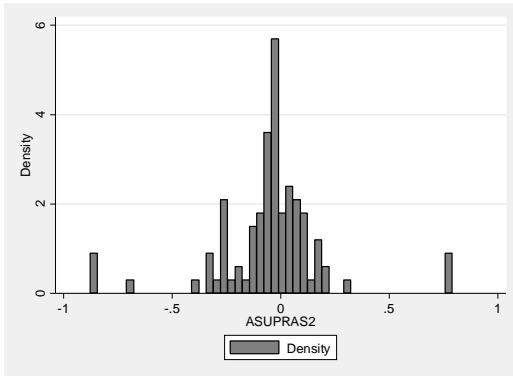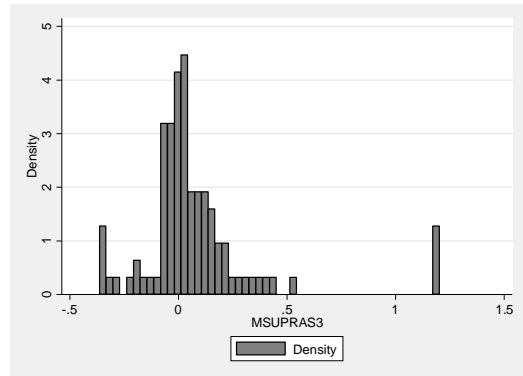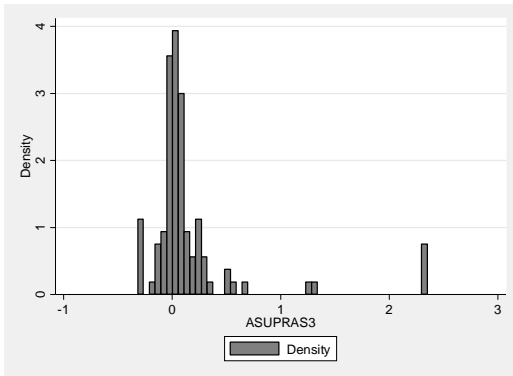
## Appendix A3

Shapiro-Wilk normality tests

```
                     Shapiro-Wilk W test for normal data
   Variable |    Obs        W         V          z     Prob>z
------------+----------------------------------------------------
    asupra1 |    100    0.96612      2.797      2.282   0.01125
```

```
                     Shapiro-Wilk W test for normal data
   Variable |    Obs        W         V          z     Prob>z
------------+----------------------------------------------------
    msupra1 |    100    0.99133      0.716     -0.742   0.77085
```

```
                     Shapiro-Wilk W test for normal data
   Variable |    Obs        W         V          z     Prob>z
------------+----------------------------------------------------
    asupra2 |    100    0.99035      0.796     -0.505   0.69328
```

```
                     Shapiro-Wilk W test for normal data
   Variable |    Obs        W         V          z     Prob>z
------------+----------------------------------------------------
    msupra2 |    100    0.98891      0.916     -0.195   0.57729
```

```
                     Shapiro-Wilk W test for normal data
   Variable |    Obs        W         V          z     Prob>z
------------+----------------------------------------------------
    asupra3 |    100    0.97329      2.206      1.755   0.03965
```

```
                     Shapiro-Wilk W test for normal data
   Variable |    Obs        W         V          z     Prob>z
------------+----------------------------------------------------
    msupra3 |    100    0.98477      1.258      0.508   0.30560
```

```
                     Shapiro-Wilk W test for normal data
   Variable |    Obs        W         V          z     Prob>z
------------+----------------------------------------------------
   msupras1 |    100    0.73433     21.935      6.851   0.00000
```

```
                     Shapiro-Wilk W test for normal data
   Variable |    Obs        W         V          z     Prob>z
------------+----------------------------------------------------
   asupras2 |    100    0.82758     14.235      5.891   0.00000
```

```
                     Shapiro-Wilk W test for normal data
   Variable |    Obs        W         V          z     Prob>z
------------+----------------------------------------------------
   msupras2 |    100    0.87210     10.560      5.229   0.00000
```

```
                     Shapiro-Wilk W test for normal data
   Variable |    Obs        W         V          z     Prob>z
------------+----------------------------------------------------
   asupras3 |    100    0.54244     37.778      8.057   0.00000
```
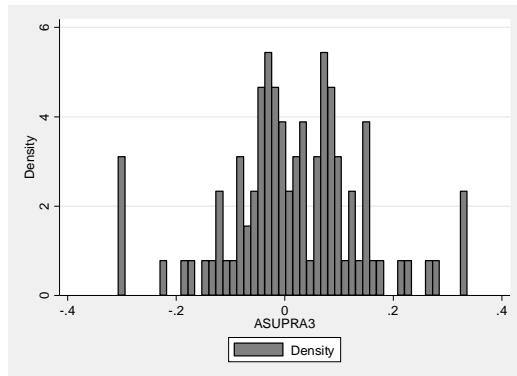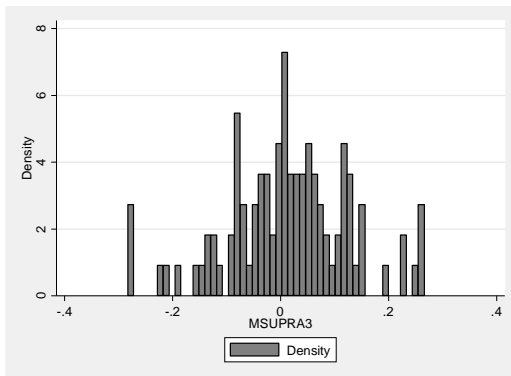
```
                     Shapiro-Wilk W test for normal data
   Variable |    Obs        W         V          z     Prob>z
------------+----------------------------------------------------
   msupras3 |    100    0.72061     23.068      6.962   0.00000
```

## Appendix A4

Breusch –Pagan test for heteroskedasticity

```
reg avgROApost avgROApre lassets lrelassets internation divers listed_tar

      Source |       SS       df       MS              Number of obs =     100
-------------+------------------------------           F(  6,     93) =   12.94
       Model |  1.48422369        6  .247370615         Prob > F      =  0.0000
    Residual |  1.77826629       93  .019121143         R-squared     =  0.4549
-------------+------------------------------           Adj R-squared =  0.4198
       Total |  3.26248998       99  .032954444         Root MSE      =  .13828

------------------------------------------------------------------------------
   avgROApost |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    avgROApre |   .3664378   .0495253     7.40   0.000     .2680904    .4647852
      lassets |  -.0234278   .0115749    -2.02   0.046    -.0464132   -.0004424
   lrelassets |  -.0018224   .0053588    -0.34   0.735     -.012464    .0088192
   internation |   .0027025   .0303799     0.09   0.929    -.0576259    .0630309
       divers |  -.0062439   .0310552    -0.20   0.841    -.0679134    .0554257
    listed_tar |  -.0302285   .0286689    -1.05   0.294    -.0871593    .0267022
        _cons |   .2892613   .1140191     2.54   0.013      .062842    .5156805
------------------------------------------------------------------------------

.
end of do-file

. do "D:\DOCUME~1\Owner\LOCALS~1\Temp\STD02000000.tmp"

. reg avgROApost avgDROA lassets lrelassets internation divers listed_tar

      Source |       SS       df       MS              Number of obs =     100
-------------+------------------------------           F(  6,     93) =   11.76
       Model |  1.40725269        6  .234542115         Prob > F      =  0.0000
    Residual |  1.85523728       93  .019948788         R-squared     =  0.4313
-------------+------------------------------           Adj R-squared =  0.3947
       Total |  3.26248998       99  .032954444         Root MSE      =  .14124

------------------------------------------------------------------------------
   avgROApost |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      avgDROA |   .3573313   .0512488     6.97   0.000     .2555614    .4591012
      lassets |  -.0215844   .0118375    -1.82   0.071    -.0450914    .0019226
   lrelassets |  -.0022181   .0054701    -0.41   0.686    -.0130807    .0086445
   internation |   .0063505   .0310585     0.20   0.838    -.0553255    .0680265
       divers |  -.0057103   .0317203    -0.18   0.858    -.0687006     .05728
    listed_tar |  -.0286972   .0293066    -0.98   0.330    -.0868944       .0295
        _cons |   .2706926   .1166803     2.32   0.023     .0389887    .5023966
------------------------------------------------------------------------------

.
end of do-file

. predict uhat
(option xb assumed; fitted values)

. gen uhatsq=uhat*uhat

. reg uhatsq avgDROA lassets lrelassets internation divers listed_tar

      Source |       SS       df       MS              Number of obs =     100
-------------+------------------------------           F(  6,     93) =   80.78
       Model |  .345369472        6  .057561579         Prob > F      =  0.0000
    Residual |  .066266609       93  .000712544         R-squared     =  0.8390
-------------+------------------------------           Adj R-squared =  0.8286
       Total |  .411636082       99   .00415794         Root MSE      =  .02669
```

```
-------------------------------------------------------------------------------
      uhatsq |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
      avgDROA |     .209385   .0096857    21.62   0.000     .1901511    .2286189
      lassets |    .0033046   .0022372     1.48   0.143     -.001138    .0077473
   lrelassets |    .0007548   .0010338     0.73   0.467    -.0012981    .0028078
   internation |   -.0050633   .0058699    -0.86   0.391    -.0167196    .0065931
       divers |   -.0007505   .0059949    -0.13   0.901    -.0126553    .0111543
   listed_tar |    .0082563   .0055388     1.49   0.139    -.0027426    .0192552
        _cons |   -.0248959   .0220519    -1.13   0.262    -.0686865    .0188947
-------------------------------------------------------------------------------

. do "D:\DOCUME~1\Owner\LOCALS~1\Temp\STD02000000.tmp"

. reg avgROApost avgROApre lassets lrelassets internation divers listed_tar, robust

Linear regression                               Number of obs =      100
                                                F(  6,    93) =    10.69
                                                Prob > F      =   0.0000
                                                R-squared     =   0.4549
                                                Root MSE      =   .13828


-------------------------------------------------------------------------------
             |              Robust
   avgROApost |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
    avgROApre |    .3664378   .2275119     1.61   0.111    -.0853557    .8182314
      lassets |   -.0234278   .0097391    -2.41   0.018    -.0427677   -.0040879
   lrelassets |   -.0018224   .0053089    -0.34   0.732    -.0123648      .00872
   internation |    .0027025   .0232219     0.12   0.908    -.0434116    .0488166
       divers |   -.0062439   .0229539    -0.27   0.786    -.0518258     .039338
   listed_tar |   -.0302285   .0300442    -1.01   0.317    -.0898904    .0294333
        _cons |    .2892613   .1031612     2.80   0.006     .0844036    .4941189
-------------------------------------------------------------------------------

. reg avgROApost avgDROA lassets lrelassets internation divers listed_tar, robust

Linear regression                               Number of obs =      100
                                                F(  6,    93) =     9.94
                                                Prob > F      =   0.0000
                                                R-squared     =   0.4313
                                                Root MSE      =   .14124


-------------------------------------------------------------------------------
             |              Robust
   avgROApost |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
      avgDROA |    .3573313   .2304092     1.55   0.124    -.1002157    .8148784
      lassets |   -.0215844   .0104771    -2.06   0.042    -.0423898   -.0007789
   lrelassets |   -.0022181   .0053693    -0.41   0.680    -.0128806    .0084443
   internation |    .0063505   .0227511     0.28   0.781    -.0388287    .0515297
       divers |   -.0057103   .0233567    -0.24   0.807    -.0520921    .0406714
   listed_tar |   -.0286972   .0303609    -0.95   0.347    -.0889879    .0315935
        _cons |    .2706926   .1097955     2.47   0.016     .0526605    .4887248
-------------------------------------------------------------------------------
```

50