(How) Is it Possible to Optimize SME Extreme Performance?

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Abstract

The level and timing of investments is analyzed in view of forecasting SME subsequent performance at financial crisis times.

The "investments level" is taken as the yearly total tangible assets (TTA). The financial/economic performance indicators defining "growth are sales or total assets variations, or "profitability", are returns on investments or returns on sales. Companies on the Italian Stock Exchange STAR Market serve as example. These SMEs belong to a variety of industrial sectors, whence are considered representative of an economy, thus are useful in order to draw general considerations and suggest rules. It is argued that the outlier companies are those giving a better view of the success or failure of the investment strategies. Their performance is analyzed.

It is found that the outlier companies with positive performance are those with the lowest TTA, the outlier with negative performance has also a low TTA, but the company which did not increase its TTA, before the crisis, becomes "negative outlier". It is concluded that it is possible to obtain extreme performance from investment strategies, for SMEs, at time of financial crisis; there is no question: it is "To be, - Not to do".

Keywords : investments; business performance; financial crisis; SME

1 Foreword or Introduction

There is no need to elaborate much on the presence of economic recessions, and financial crises, nor whether, *ca.* such a time, one should plan and implement some strategy in order to improve (or maintain) one's firm performance. Indeed, much thought has been given to strategic action in response to economic crises, e.g., by Sternad (2011) as in his book "Strategic Adaptation: Cross-Cultural Differences in Company Responses to an Economic Crisis". He considered the output of an organization's strategic adaptation process, after going through the phases of strategic issue diagnosis, creation, and selection of strategic alternatives.

Any research on strategies for reaching business excellence under an economic crisis aims at revealing the appropriate course of actions any executive should consider, under the limitations and particular conditions that arise in an economic crisis environment (Afthonidis, and Tsiotras, 2014). The first reaction is often to implement cost saving policies, to interrupt investment plans and proceed to business restructuring with cost cutting in mind. This may have some direct results, yet will not secure the future of the enterprise (Koksal and Ozgul, 2007). Others consider that the first step of the management should be to secure adequate resources, especially liquidity, - but again, history has shown that, very rarely during a recession, has this defensive strategy brought satisfactory results in the long run (Reeves and Deimler, 2009).

Nevertheless, justifying an investment can be frustratingly difficult to suggest when the payback is measured by loosely convincing projected long-term increases in sales, assets, and other profitability performance measures. Thus, discussions take place on how effective a performance measurement system can be estimated, validated, or credible (Vitale and Mavrinac, 1995)

Thus, despite the episodic pervasiveness of recessions and their destructive impact on firms, and such mentioned considerations, a void exists in the management literature examining the intersection between recessions, strategy, and performance (Latham & Braun, 2011). In fact, it can be asked whether there an "initial condition" which in this non-linear set of plans and activities determines, and the more so allow to forecast, the future performance. That does not seem to have been studied. It might be a forgotten question, nowadays, as being too much introverted or retrograde. The answer might be depressing or even frightening if it leads to a "no choice" conclusion. Yet, this should not be considered as a backward step. On the contrary, it might be an unavoidably basic corner stone, pre-constrained. In fact, as stressed by Afthonidis and Tsiotras (2014): "as shown in a survey by Kambil (2008), in a sample of the Fortune 500 companies, the most profitable companies were those which retained or accelerated their investment plans". Furthermore, honestly reading, "retained or accelerated " means that there is no simple conclusion on investment strategies.On the other hand, it was not expected that "reduced" should be a realistic idea. Nevertheless, it is claimed that "verifying the assumption that the best policy during recessions is to seek growth" should be a pertinent investigation subject.

It should be well read again that this survey by Kambil (2008) is for Fortune 500 companies. Thus, "is that also true for SME?" is a question, but moreover, can one find an adequate measure on the performance result due to whatever level of investment, *and* on the timing of such investments? Is it obvious that a

control of the investment strategy will lead to an improved (hopefully optimal) performance? Some answers to these questions are the aims of this report.

2 A little bit more literature review on the "state of the art", beside the work stressed here above

On performance measure suggesting investment policies, at a time of crisis, let us not go back too far before a recent one "THE crisis", for considering immediately connected thoughts to the above questions. Nevertheless, for some completeness on a historically major crisis, let it be mentioned that adopted strategies to manage companies during "THE recession" were much examined by many authors (Schendel et al., 1976; Hofer, 1980; Pearce and Robbins, 1993; Barker and Mone, 1994; Bibeault, 1998; Morrow et al., 2004). In particular, Morrow et al. (2004) interestingly compared cost and asset retrenchment in (61) growing, (253) mature and (98) declining industries. It was found that asset retrenchment was positively related to performance in growing industries, but cost retrenchment positively correlated with performance improvement in declining industries. This has to be considered as a wider evaluation than some pioneering research by Hambrick and Schecter (1983) on (260) mature firms showing that (efficient) strategies were more successful than entrepreneurial activity in turning around firms at difficult times. However, both analyses leave open the deterministic aspect whether enterprises that benefit from the economic crisis exhibit certain "initial characteristics". According to De Waal and Mollema (2010), a clear perception of the environment and conditions in which a firm operates is necessarily crucial for the implementation of a well-structured strategic plan.

Notice that one paradox of the economic crisis is that it offers many investment opportunities. Already, Roberts (2003) suggested that companies can gain competitive advantage by investing during recessions. Ghemawat (1993) also recommended investment to create and sustain competitive advantage during such times. Even at times of (great) uncertainty, a strategy that seeks growth through investment policies is wiser than any other policy (O'Callaghan, 2011). Studies in international business have considered both theoretical and empirical analyses of investment strategies by multinational firms in transition economies. Kailasam et al. (2016) identify "audacious" strategies used by Indian information technology firms during the recent global recession and to investigate the effectiveness of offensive and defensive strategies. investigates how these strategies are sequenced. However, there is scant research on the impact of firm-specific factors on the likelihood, timing, etc. (Paul and Wooster, 2008; Hacioglu et al., 2017).

Let us consider the other side of the investigation now: the use of performance measures

Most importantly, the information and feedback from the measures should be used to challenge the assumptions and test the validity of whatever strategy (Eccles and Pyburn, 1992; Kaplan and Norton, 1996; Feurer and Chaharbaghi, 1995). In fact, authors have argued that they should be used for both purposes (Feurer and Chaharbaghi, 1995; Kaplan and Norton 1996). Therefore, "assessing the implementation of strategy" and "challenging the strategic assumptions" are

the two main subdivisions of the use of the performance measures.

Thus, we can now face both "problems" : not only to find an optimal measure on the performance of investment, within the outlined theoretical considerations, but also observe any timing influence of such investments.

It is expected to rejuvenate proposals from Kaplan and Norton (1996) on how a balanced scorecard can be translating strategy into action, and confirm that as re-discussed by Bourne et al. (2000) that first, the initial use of measures should be for measuring the success of the implementation of that strategy (Vitale and Mavrinac, 1995; Kaplan and Norton, 1996), but such measures should be derived from strategy.

Focusing on SME, an increase performance may depend on very appropriate investment strategies, more than for multinational firms. Innovation input and development are surely traditional set-ups, but others can arise from "more internally based" pertinent strategies imagined by the executive board. They can be sometimes audacious (Kailasam et al., 2016).

What "exactly" investments should be made and more generally strategic policies adopted are not the subjects of the paper. There is no discussion below on whether investment has to be made through innovation or marketing; this not only would hugely increase the literature review, but would be out of content. The choices might be likely leading to too many specificities.

Of course, innovation has been often cited by many, economists, engineers, and politicians, as one of the key factors that affects product competitiveness, beside leading to company "better performance". Nevertheless, one must admit that company performance is not necessarily tied to new products, but rather to the management of assets (Bourne & Neely, 2001). Challenges in predicting new firm performance are still in front of us (Cooper, 1993).

Neely & Szwejczewski (2001) have studied the performance of SMEs. Neely (1997; 2002) has much elaborated also on measuring operations performance, - alone or with coworkers (Neely & Hii, 1998; Kennerley & Neely, 2002; Neely & Al Najjar, 2006), distinguishing various points of view and evaluating relevant filters for analysis, even employee and/or customer satisfactions. Such a data is not available here and is in fact not relevant for our aim. Nevertheless, for completeness, and in view of the specificity of the report, using Italy stock market as the case, let us point also to Neely et al. (2001) on the impact of innovation on business performance as perceived by managers and public policy makers, specifically in the Veneto Region in Italy and the East of England, UK. To (*quasi*) quote the authors "This (finding) poses the question Òwhat role, - if any, can public policy makers play in enhancing a companyÕs competitiveness by enabling it to become more innovative?" However, it is fair to ask also whether internal (management board) investments strategy, taking into account, yet sometimes not taking into account, public policy '"advice", has any effect *ca.* crisis time on performance. Thus, beyond discussions on the measurement of performance and psychological prehension, can endogenous strategic investments play a role in such a performance? After Pavitt (1984), many authors (Cesaratto and Mangano, 1993; Dwyer and Mellor, 1993; Hollenstein, 2003; De Jong and Marsili, 2006; Leiponen and Drejer, 2007; Jensen et al., 2007), among many others, tried to classify firms by the intensity with which various investments, often identified with innovation, strategies are considered and implemented, - the purpose residing in measuring the impact of so called innovation on company performance.

To wrap up, it is worth to digress, but still briefly, on the existence of possible roads on which one may be investigating investment policy correlations, for example, as in Roberts (2003), comparing analogous businesses. He highlighted three measures to distinguish between successful and unsuccessful strategies: (i) average profitability during recession, defined as return on capital employed, (ii) change in profitability during first two years of recovery, and (iii) change in market share during the first two years of recovery. In the same line of thought one can point to Slater et al. (1998) who evaluated innovative strategy making frequently conducted" in the midst of unpredictable and even chaotic circumstances and processes".

A recall of such works incites to consider "profitability" as another measure beside "growth" among the indicators of interest below.

3 Thus, the most basic questions are

"Despite the episodic pervasiveness of recessions and their destructive impact on firms, a void exists in the management literature examining the intersection between recessions, strategy, and performance" (Latham & Braun, 2011). This paper seeks directly to address this research

The most basic questions are about the levels of investments that can be used and in what order (high or low, first ?). This level at a given time (over a year) would be better decided upon if one could somewhat estimate with some certainty the final output level which can be reached. In this respect, one needs to rely on a preliminary acceptable measure of the so called "investment efficiency." The measured quantity is far from obvious, as the huge literature demonstrates it. Not only the efficiency level spans a wide range of values, but the measurement itself is sometimes (should one say, often?) questioned, - if it does not fit into some expected scheme. Some complication arises because the executive board is not necessarily perfectly informed, in its Equilibrium Market Hypothesis realm, about all the keys for the best investment aspects. Finally, recent events, like the often called "financial crisis", indicate that forecasting is dubious at complex times, ahead of economic uncertainties, - unexpected or at least unpredicted, or, even better say, when disturbing prophecies prevail.

In the following, one does not provide an answer to all such questions. There would likely be any which could be 100% convincing. However, it seems useful to search for clarifying features about strategies at unsure times, in order to provide some thought for executive and for academic thinkers.

Therefore, to set up our aims, let us briefly sketch the end of a strategic board meeting. The "final" question is: "Should one invest "much" or "enough" in view of reaching some (short term) goal?" Thereafter, the questions appear to be two fold, - with respect to the quantitative aspects: (1) Should one (later) measure the efficiency in terms of the lowest investment, or (2) *a contrario*, is a high amount of investment necessarily leading to a better performance? In fact, it can be hard to decide whether which one of consecutive investments (one "low" followed by one "high", or the other way around, or even with some longer cycling) is responsible for a subsequent efficiency. Thus, these two questions infer that a third one is also relevant for a meaningful deduction: (3) "What is the result due to the global investment, - independently of the up's and down's order?".

The main point ($H1$) to be clarified pertains of course to the definition of the "business performance efficiency" measure. Even though, many measures are of interest, and their role usefully debated, it is here considered that only a few aspects seem relevant. In view of the above literature review, we select four variables, or financial/economic indicators, for representing business performance : 2 for "growth", which can be expressed through (i) sales variations (DS) and (ii) total assets variations (DA), and also 2 for "profitability" through (iii) returns on investments (ROI) and (iv) returns on sales (ROS).

Next, ($H2$) one can admit that a certain time span has to be used for obtaining a reliable measure. However, it should not be "too long". Thus, these indicators will be measured from publicly available results in 2008, 2009, and 2010, AFTER the crisis, averaged over such a 3 year time interval: the notation will be for example $< DS >_3$ for the sales variations, averaged over 3 years: [2008-2010]. The variable of interest measuring some level of investments is taken to be the firm total tangible assets (TTA). The data of interest BEFORE the ("unknown" or incoming) crisis is chosen to cover 2006 and 2007. It will be noted $TTA06$ or $TTA07$; moreover, its average is noted $< TTA >_2$.

4 Methodology

After having performed the 3 year averaging for (i)-(iv), the methodology goes as follows: each (i)-(iv) average values are used as the numerator of the "performance efficiency" ratio in which the denominator is either the lowest TTA (TTA_1) or the highest TTA (TTA_2), value in either 2006 or 2007. Thereafter, the (i)-(iv) averages of the firms are also compared with respect to the TTA average trough their ratio for which the denominator is $< TTA >_2$, equal to $(1/2)(TTA06 + TTA07)$, of course. This leads to 12 indicators. The (62, at that time) SME on the STAR Market Segment of the Italian Stock Exchange are considered to span various types of SME and a convenient sample for examining statistical characteristics leading to conclusions on performance efficiency.

N.B. *The STAR (Segment for High Requirement Shares) market*
(http : //www.borsaitaliana.it/azioni/mercati/star/home − star/segmento − star.en.htm)
is within the Milano electronic share market (Mercato Telematico Azionario: MTA):
(http : //www.borsaitaliana.it/azioni/mercati/mta/home/mta−mercato−telematico − azionario.en.htm)
and includes companies capitalized from 40 million to 100 million Euros: (http : //www.borsaitaliana.it/homepage/homepage.htm)

A very fundamental point is next emphasized: it should be easily understood that the statistical outliers are the companies giving a better view of the success or failure of their previous investment strategy. The outliers overperform or underperform. That is what is to be avoided or searched for, whence to be attracting the discussion. Other values, whence firms, for which the final outcome occurs "near the average" are "uninteresting", - because merely falling within statistical error bars; they should not be considered indeed to be relevant for our purposes. Thus, the outliers are next extracted, shone upon, and discussed for emphasizing the interesting features allowing recommendations.

Variable:	Min.	Max.	Sum	Mean (μ)	St Dev (σ)	Skewn.	Kurt.
$< TTA >_2$	86.5	507 500	2.746 10^6	44 297	92 600	3.3967	12.062
$< DS >_3$	-0.1924	1.1767	4.9303	0.0795	0.198	3.1414	14.013
$< DA >_3$	-0.1436	1.9818	7.8786	0.1270	0.330	3.8060	16.885
$< ROI >_3$	-0.0768	0.3457	3.0115	0.0486	0.067	1.5342	5.1206
$< ROS >_3$	-0.6609	0.2445	2.5316	0.0408	0.118	-3.505	20.046

Table 1: Statistical characteristics of the time average distributions of the growth and profitability indicators for the 62 STAR companies, and of their $< TTA >_2$, in the center of the table, in % and in MiIl. Euro, respectively ; the skewness and kurtosis are dimensionless scalars.

	Company Name			
efficiency indicator ratio	(11) Buongiorno	(13) Cairo Communication	(58) Ternienergia	(45) Mondo TV
$< DS >_3 / TTA_1$	0.4795	*(0.0186)*	0.4457	*(0.0769)*
$< DA >_3 / TTA_1$	*(-0.1155)*	*(-0.0217)*	0.5089	*(-0.0536)*
$< ROI >_3 / TTA_1$	0.1277	0.1573	*(0.0345)*	*(-0.0130)*
$< ROS >_3 / TTA_1$	0.1623	0.1228	*(0.0436)*	-0.2466
$< DS >_3 / TTA_2$	0.1537	*(0.0087)*	0.3962	*(0.0382)*
$< DA >_3 / TTA_2$	*(-0.0370)*	*(-0.0101)*	0.4524	*(-0.0266)*
$< ROI >_3 / TTA_2$	0.0409	0.0733	0.0306	*(-0.0065)*
$< ROS >_3 / TTA_2$	0.0520	0.0573	*(0.0388)*	*(-0.1226)*
$< DS >_3 / < TTA >_2$	0.2328	*(0.0118)*	0.4195	*(0.0511)*
$< DA >_3 / < TTA >_2$	*(-0.0561)*	*(-0.0138)*	0.4790	*(-0.0356)*
$< ROI >_3 / < TTA >_2$	0.0620	0.1000	*(0.0324)*	*(-0.0872)*
$< ROS >_3 / < TTA >_2$	0.0788	0.0781	*(0.0410)*	*(-0.1638)*

Table 2: Main positive and negative outliers of the growth variations and profitability efficiency indicators for the 62 STAR companies in %, i.e. those falling outside the interval $]\mu - 2\sigma, \mu + 2\sigma[$ corresponding to each ratio distribution. The data in italics and in parentheses correspond to those companies which are not truly outliers in a statistical sense for the index of interest, - but almost, like the inefficient Mondo TV.

5 Results

The raw data main statistical characteristics are given in Table . Observe that since there is a negative minimum for each (i)-(iv), some strategies were rather failures. Nevertheless, the mean is always positive. The distributions are quite extended, as indicated by the (easily estimated from the data in the table) so called coefficient of variation σ/μ values. The kurtosis is always positive and large, indicating lesser chances of extreme negative outcomes; the skewness is positive, indicating of a long positive tail (many small losses and a few extreme gains), - except for $< ROS >_3$ which has an unexpected negative skewness, itself thus indicating a long lower range tail (many small gains and several extreme losses).

Next consider the "cause": the histogram for the (stacked) TTA variables, in 2006 and 2007, is displayed in Fig.**??**. The major companies are pointed out. The (up or down) order of investments can be better observed on Fig. that, in 45 cases, there was an increase in TTA, i.e., $TTA06 \leq TTA07$, and of course 17 cases are such that there was a decrease in TTA: $TTA06 \geq TTA07$. It seems relevant to distinguish between these two categories in the discussion of features, below. The TTA magnitudes and the two types of investment classes can be distinguished in Fig.. The variations are not large, but not negligible.

The performance efficiency ratios of the 62 companies are not given for space savings, but those of the outliers, i.e. when the SME having efficiency values fall outside the relevant $]\mu-2\sigma,\ \mu+2\sigma[$ interval are listed in Table . There are 3 SME which are rather systematically, positive outliers : (58) Terrienergia, (11) Buongiorno, (13) Cairo Communications, and 1 SME which is systematically a "negative outlier", (45) Mondo TV. For completeness, Table has been completed with corresponding values for such companies, even when they are not outliers in a statistical sense. However, it is found that all of these are usually close to the end of the interval of statistical confidence. This is particularly the case of Mondo TV, which has all negative efficiency ratios, except for those involving $< DS >_3$. However, such values are almost within the statistical error bars for the whole 69 firm set.

Interestingly, (11) Buongiorno appears most of the times in the top brackets, but appears at the bottom (the worst) for ratios involving $< DA >_3$. Another interesting finding concerns Buongiorno which appears as "almost a negative outlier" in three efficiency ratios; see Table and a quick calculation of $\mu - 2\sigma$ from data in Table . On the other hand, (58) Terrienergia and (13) Cairo Communications have very dissimilar performance efficiency behaviors: the former performing better for "growth", the latter performing better for "profitability".

Due to the presence of such outliers, it is of course ridiculous to attempt a regression-like study. The resulting coefficients are all pointing to a valid null hypothesis. Nevertheless, it should occur to the reader that those 4 companies are those with the lowest TTA; see Fig. . Moreover, Mondo TV is the only one among the outliers which has a $TTA06$ lower than its $TTA07$, - this SME had about a 50% decrease in investment before the crisis. In contrast, Terrienergia, Buongiorno, and Cairo Communications have relatively the highest increases in TTA.

Results of correlations can be illustrated through figures, on which the highest TTA firms are more easily distinguished. However, in view of the above and Table , it should occur to the reader that such companies had not a highly

distinguished strategy. A few of these "not systematically outlier companies" have a mixture of positive (or negative) small efficiency ratio values. One should observe that

- Fig. displays the relationship between $< DA >_3$ and $< TTA >_2$; the largest $< DA >_3$ effect occurs for Esprinet and Ternienergia, both with a low $< TTA >_2$. A small negative $< DA >_3$ for D'Amico which has a large $< TTA >_2$ is observed, in contrast to Cementir Holding and Ascopiave which have a large $< TTA >_2$ also, but with a slightly positive $< DA >_3$;
- Fig. displays the relationship between $< DS >_3$ and $< TTA >_2$: a large $< DS >_3$ effect occurs for Ternienergia (recall that it has a low $< TTA >_2$, as already emphasized); a negative $< DS >_3$ effect occurs for for D'Amico and Cementir Holding;
- Fig. displays the relationship between $< ROI >_3$ and $< TTA >_2$: a weak $< ROI >_3$ effect is found for Cementir Holding and Ascopiave; a negative but much larger occurs for D'Amico; in contrast, a large $< ROI >_3$ occurs for Tesmec, while the negatively largest $< ROI >_3$ is for Eems, - both firms with rather low $< TTA >_2$;
- Fig. displays the relationship between $< ROS >_3$ and $< TTA >_2$; a moderate $< ROS >_3$ positive effect occurs for Sogefi, Ascopiave, D'Amico and Cementir Holding, the four largest TTA companies; a large negative $< ROS >_3$ effect occurs for Mondo TV; on the opposite side, the best $< ROS >_3$ positive effect is for Falck Renewables, Zignago Vetro, and Nice.

6 Discussion

As an introduction to the following discussion, we briefly define the type of companies mentioned here above in Table . Observe that they cover various sectors. This allows us to consider that the 62 STAR market companies represent an interesting and valuable set of SMEs for our investigation.

Recall that two aims are presently envisaged. Finding a convenient measure of investment performance,- whatever the investment, and from such a measure observe at the time of crisis what positive or negative effect has an investment "cause". The key timing separating the cause and its effect is the financial crisis. Notice that the study allows three considerations: not only the investment evolution; up or down, low or high, but also through their average, serving as a control kind of test. It should be obvious that the best performance should be better appreciated if the investment is low. This has been emphasized through Table .

First, let it be observed that the positive outliers belong to different activities : Terrienergia: Utilities; Buongiorno: Technology; Cairo Communications: Media, while the negative outlier Mondo TV is also a Media actor. Therefore, one may admit that the sub-segment is irrelevant, whence one can reach a "SME segment independent universal rule": all those 4 companies have the lowest TTA of the STAR market; see Fig. .

$i =$	Name	"Super sector"
5	Ascopiave	Utilities
11	Buongiorno	Technology *
13	Cairo Communication	Media
15	Cementir Holding	Constructions & Materials
20	D'Amico	Industrial goods & Services
25	Eems	Technology **
30	Esprinet	Technology
33	Falck Renewables	Utilities
45	Mondo TV	Media
46	Nice	Industrial goods & Materials
57	Sogefi	Automobiles & Parts
58	Ternienergia	Utilities
59	Tesmec	Industrial goods & Services
61	Yoox	Retailer ***
62	Zignago Vetro	Industrial goods & Services

* Since July 2012, Buongiorno is part of Docomo Digital
** Eems was moved away from Technology in STAR to MTA Market/Segment
*** In March 2015, Yoox merged with Net-a-Porter

Table 3: The STAR company names which are mentioned in the text, or in figures, in alphabetical order (index i), and their business type

Nevertheless, there are differences: Terrienergia and Cairo Communications have very dissimilar performance efficiency behaviors, the former performing better for "growth", the latter for "profitability". Since Terrienergia, Buongiorno, and Cairo Communications have a high increases in TTA, one might recommend such a strategy. In fact, Mondo TV did not increase its TTA, pointing to a deficient strategy, - again pointing that the timing of "investment" seems relevant; not the average value.

7 Conclusions

Practitioners need knowledge of successful and unsuccessful strategies to help them to make educated decisions about actions, but they should be aware of adequate measurements, and the more so whether there are unavoidable constraints ("initial conditions") on strategic actions. Ghemawat (1993) wrote the classic article "The Risk of Not Investing in a Recession", which addressed a question that every organization now confronts with anxiety. His paper was further discussed in $http://sloanreview.mit.edu/article/the-risk-of-not-investing-in-a-recession-2/$, wondering what management insights apply in the (new) crisis environment: "companies seem to overemphasize the financial risk of investing at the expense of the competitive risk of not investing". Specifically, one of the targets of the present paper has been to discuss the effect of the cause (assets) on the means of variables, representing growth or profitability performance, *ca.* crisis time, - since it can be rightly assumed that

the post crisis impact should be considered as resulting from a global strategy prior to a crisis.

Therefore, we focus the question of efficiency, and its measure, on endogenous (board) behavior. The ($i = 1, 2$) variables of interest concern the level of investments the total tangible assets (TTA). The variables or financial/economic indicators ($i = 1, \ldots, 4$) representing business performance are "growth", expressed in terms of (1) sales variations (DS), (2) total assets variations (DA), and "profitability" through (3) returns on investments (ROI) or (4) returns on sales (ROS). One can wonder if a small investment (TTA) is enough, or if a large investment leads to different forecasts. As some control, one can analyze outcomes in terms of an average TTA input.

In general, the effect of *assets* is very weak, on growth and profitability; and even in some cases, it can be negative. Interestingly, outliers appear, beside an almost "no effect", except for the statistically (understandable) variations, for most firms. Thus, it is argued that it is interesting to look at the extremes, in view of deducing some principle in order to optimize strategies within a forecasting perspective. It seems that the findings can be of particular interest for setting up modelling hypotheses on the relationship between forecasting systems and decision-making processes.

The best resistance and even progress is found to occur for the firms with the lowest (initial) assets. This finding is far from being expected. However, an extremely important point resides in the timing of investments. An increase is much better than a decrease starting form a high level.

Finally, most managers know that strategic investments are essential to their company's long-term survival. Forecasting is a must within a controlled framework, but the basic point does not entirely seem to be the type of strategy. Its timing is also relevant. Here we have studied a few cases indicating whether and how it is possible to optimize SME performance, *ca.* crisis time, deducing outcomes from extreme results based on investment strategies. It seems interesting to know that the relatively smallest investment performs the best, as long as there is a strategic TTA increase..

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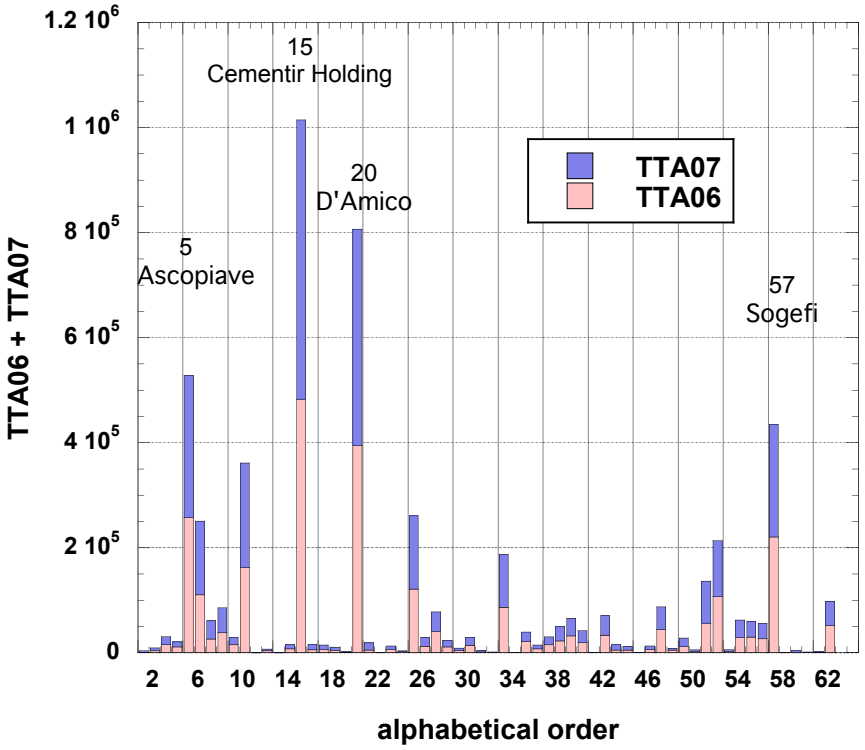

Figure 1: Stacked $TTA06$ and $TTA07$ of the 62 companies listed on the STAR market. The x-axis is the alphabetical index for the 62 SMEs. The four largest TTA firms are indicated.

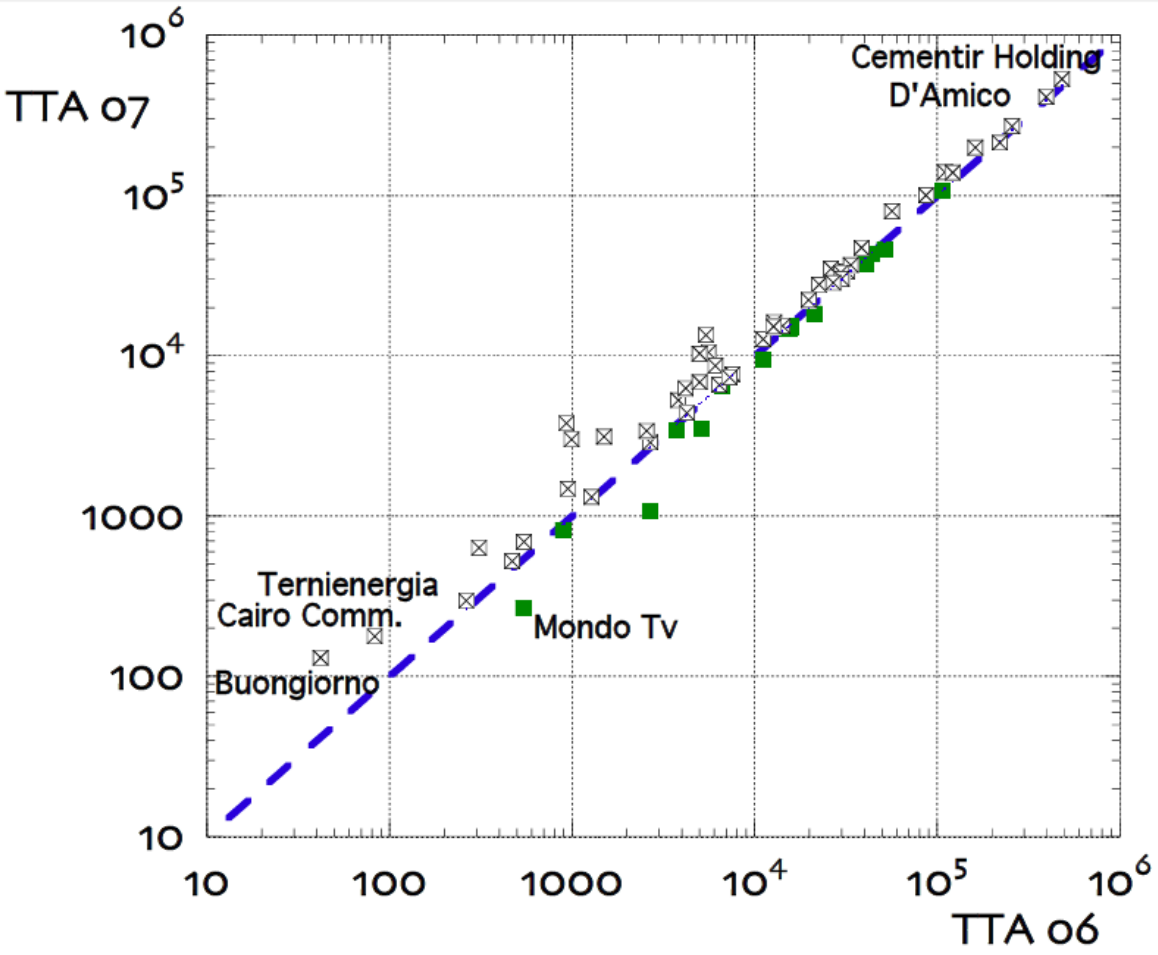

Figure 2: Relation TTA07 *vs.* TTA06 (in EUR) for the 62 companies listed on the STAR market, distinguishing between those with increased (open square with cross) or decreased (full square) TTA. The name of a few "interesting", thus "extreme", companies is pointed out.

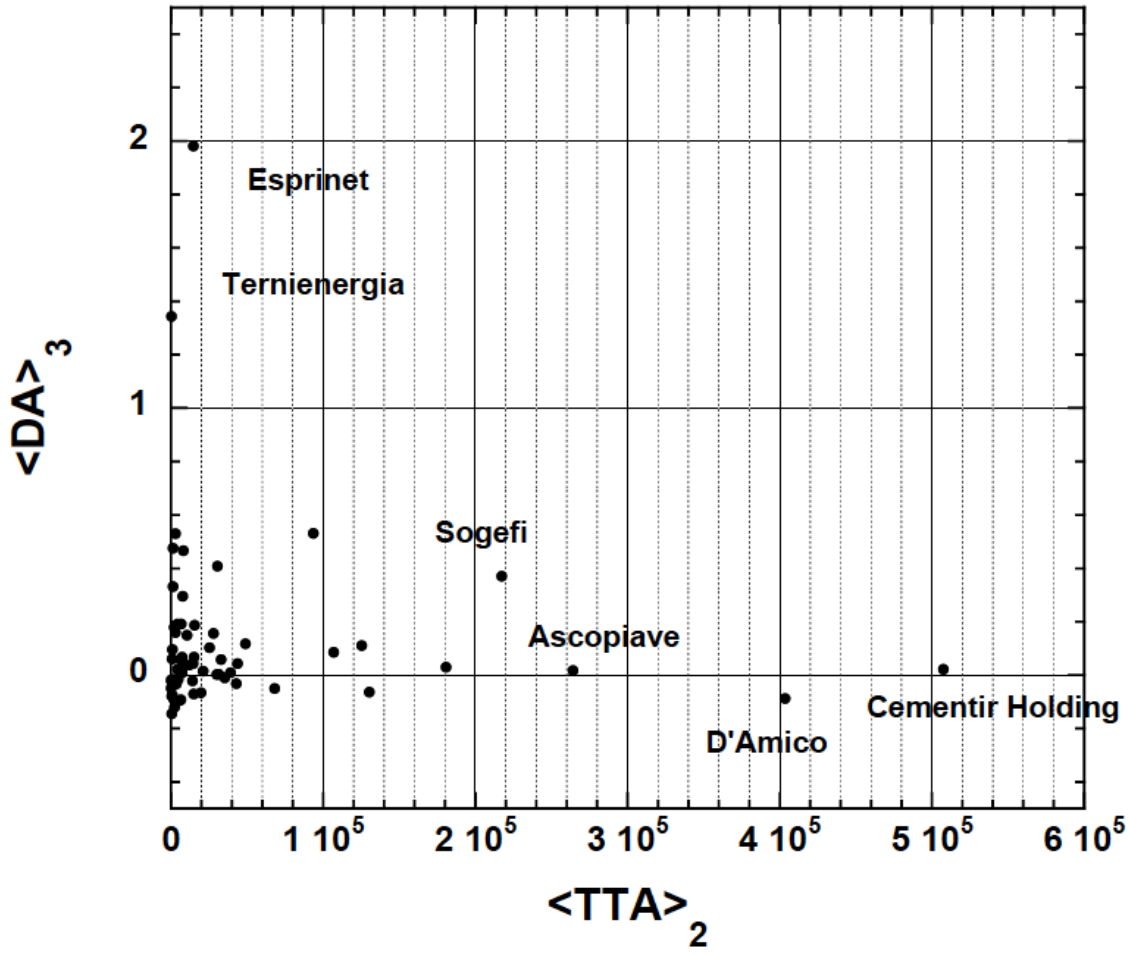

Figure 3: Relation $< DA >_3$ *vs.* $< TTA >_2$ for the 62 companies listed on the STAR market: observe a large $< DA >_3$ effect for Esprinet and Ternienergia without much $< TTA >_2$; a small negative $< DA >_3$ with large $< TTA >_2$for D'Amico and slightly positive $< DA >_3$ with large $< TTA >_2$ for Cementir Holding and Ascoclave.

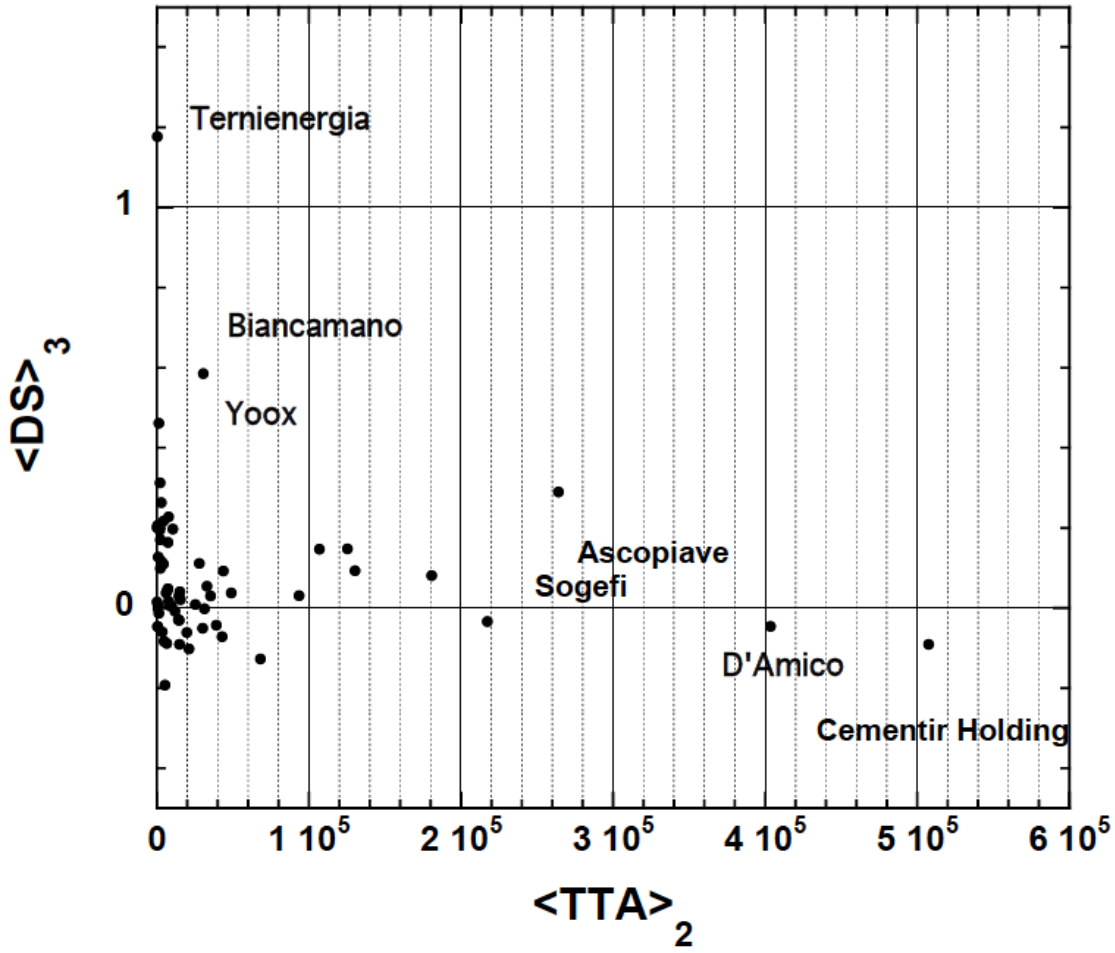

Figure 4: Relation $< DS >_3$ *vs.* $< TTA >_2$ for the 62 companies listed on the STAR market: observe a large $< DS >_3$ effect for Ternienergia without much $< TTA >_2$; a negative $< DS >_3$ with large $< TTA >_2$ for D'Amico and Cementir Holding .

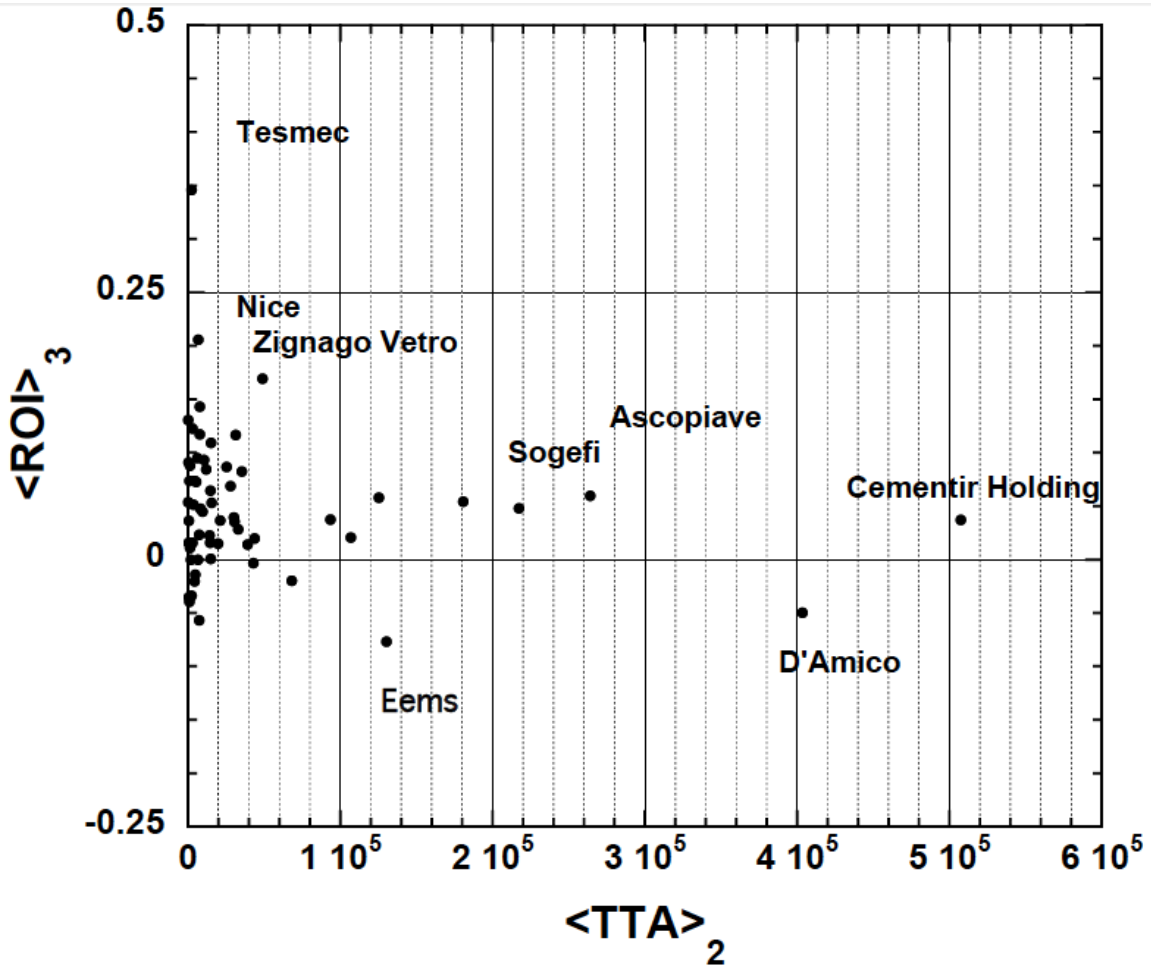

Figure 5: Relation $< ROI >_3$ *vs.* $< TTA >_2$ for the 62 companies listed on the STAR market: observe a weak$< ROI >_3$ effect with large $< TTA >_2$ for Cementir Holding and Ascopiave; a much larger but negative for D'Amico ; a large $< ROI >_3$ with low$< TTA >_2$ for Tesmec; the negative largest $< ROI >_3$ for Eems.

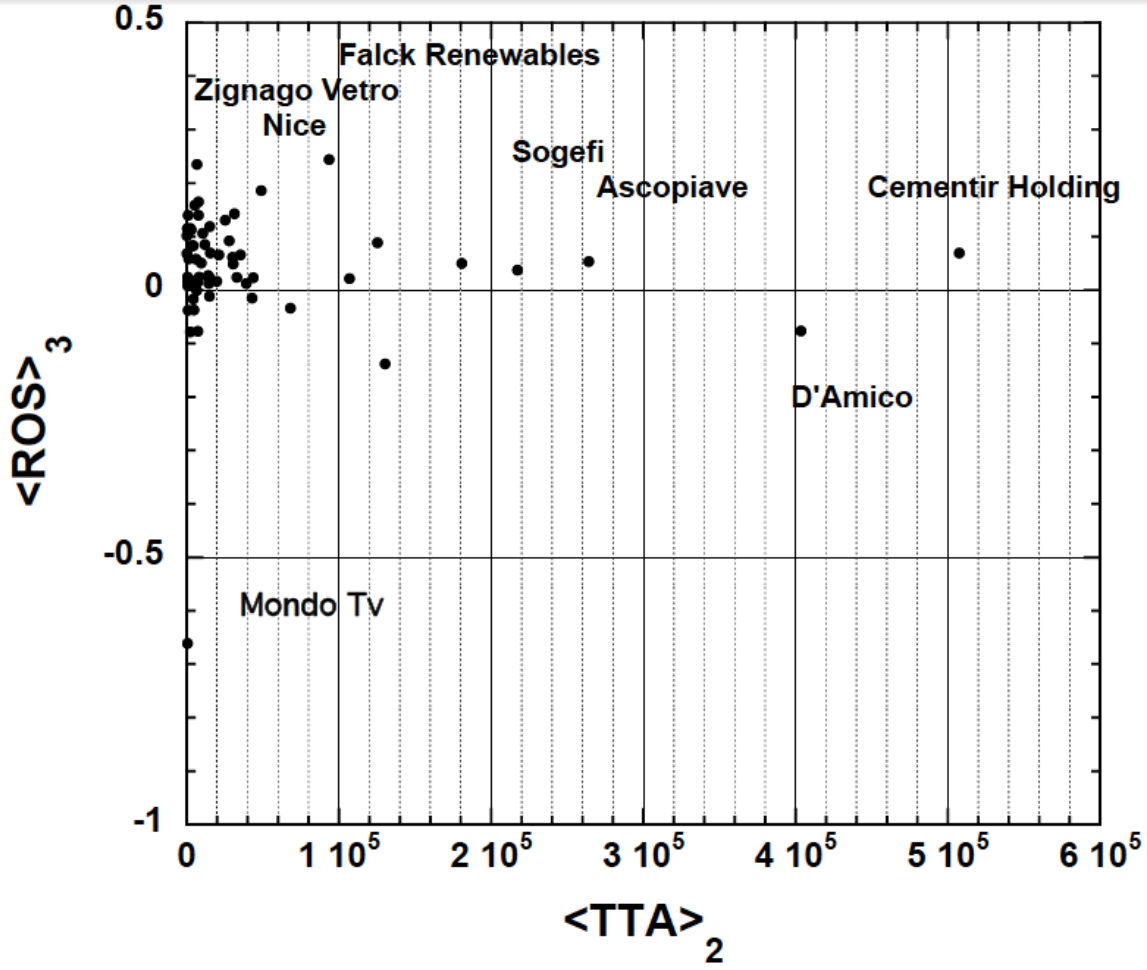

Figure 6: Relation $< ROS >_3$ *vs.* $< TTA >_2$ for the 62 companies listed on the STAR market: see a moderate $< ROS >_3$ effect for Sogefi, Ascopiave, D'Amico and Cementir Holding; a large negative $< ROS >_3$ effect for Mondo TV; the best $< ROS >_3$ effect for Falck Renewables, Zignago Vetro, and Nice.