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Corporate Internal Performance Benchmarking:

Performance Measurements Purification from Macroeconomic Noise

Abstract

Widely open economies along with highly integrated markets with unstable nature, have made all corporations and business units vulnerable to macroeconomic fluctuations. The flow of Macro-changes in performance falsifies the outcome of a firm's action with misleading signals, which does not reflect sustainable competitiveness of the firm. This means that raw performance measurements are inappropriate for benchmarking purposes as well as industry averages. I argue that macroeconomic variables are not only firm-specific, but also division-specific. I have employed MUST-analysis approach to recognize the macroeconomic variables specific to each division and to eliminate their effects, in order to obtain "intrinsic" measure of divisions' performance. Empirical results are presented from a case study of four divisions within Jotun Group, and showed that each unit is exposed to different sets of macroeconomic variables in addition to existence of deviations between traditional performance measurements and adjusted ones. Thus, leads to conclude that performance measurement purification is a necessary-supplementary condition in any benchmarking and strategic decision-making process.

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1. Introduction

1.1 Preview

Macroeconomic was born in 1929, as a result of the “Great Depression” (Shakeri 2008). In reality, one can hardly define a boundary between macro and micro science of the economy. Macro-economy investigate the individual firm’s behavior and market expectations, and micro-economy in return, consider the impact of monetary policies at institutions. Therefore, inseparable interference between business and economics is a fact, which govern the current world.

The subject of macroeconomic is Consolidation. Which means increasing demand during depression and decreasing it during inflation. After emersion of this subject, governments were trying to assure “stability”, and as the time is passing by, they are facing with more and more rapidly changing complex environment, which affect various aspects of firms performances, interactively. Macro-economy is by definition beyond control of even the largest firm’s management (Oxelheim and Wihlborg 2008).

Demand, industry position, market expectations and price variables have become increasingly unstable, terminating the fact that companies might be “lucky” or “unlucky” due to macroeconomic tailwinds or headwinds. Negative or zero growth can be only a reflection of a disturbed macroeconomic environment, which was not under management control. On the other hand, one tricky presumption is to attribute satisfactory results with ‘good’ performance. However, after extracting the macroeconomic effects, the outcome might reveal a not so gratifying truth. Hence, it should be possible to determine whether an increase (decrease) in performance has caused by macroeconomic factors or “intrinsic” factors. By “intrinsic”, we mean that the factors reflect firm’s inherent competitiveness based on firm- and industry specific conditions.

An important challenge in specifying the effects of macroeconomic variables on firm’s performance is that each individual firm is exposed to a different set of variables. For example, since the toy industry may be more affected by Japanese imports while the lumber industry may be more affected by Bolivia, these two industries may experience very different shocks in the same year (Bertrand and Mullainathan 2001). Similarly, different firms within one country, even in the same industry, are impacted differently by a single macroeconomic change. An important part of identifying macroeconomic exposure is to distinguish it from exposure to firm-specific and industry-specific shocks (Oxelheim and Wihlborg 2008).

The argument behind this study is that macroeconomic variables are not only firm specific, but "**Division-Specific**" as well. The intention is to break down the analysis of macroeconomic uncertainties, into one corporation, and manifesting the differences of the macroeconomic variables that each unit is exposed to. It is of a vital importance for corporations to realize channels of exposures for their different divisions, separately. Because only such an inclusive understanding of exposures could be a reliable guidance for decision-making processes, and benchmarking purposes. Distress caused by decline in macroeconomic conditions does not usually require the same kind of corporate restructuring as distress caused by intrinsic factors (Oxelheim and Wihlborg 2012).

Macroeconomic Uncertainty Strategy (MUST) -analysis, developed by Oxelheim and Wihlborg (2008), has made recognition of macroeconomic variables, which influence each particular firm's function, feasible. With this method, we can estimate the sensitivity of each firm and/or division to the macro-variables changes, and cleansing the performance measures from the impacts caused by these changes. The MUST analysis is developed as a managerial tool and builds on representing fool recognition of the interdependence between macroeconomic variables constituting the macroeconomic environment of the firm (Oxelheim and Wihlborg 2008).

This paper is an exploratory research, aimed to benchmark performance of divisions of a single corporation internally, in order to dig into firm's performance with respect to its macroeconomic environment. The suggestion is that each subsidiary is exposed to a set of macroeconomic variables, which are **specific** to that unit. These variables should be identified, their effects on performance should be recognized, and performance measures must be purified from these effects. A "filtered" performance measure is the one which is appropriate to be used as a benchmark value.

Following section is a review of literatures in the field. Section 2.1 and 2.2 introduce the benchmarking theory and benchmarking processes. Firm's vulnerability to macroeconomic fluctuations is outlined in section 2.3. Descriptions regarding what and how macroeconomic variables affects firms is given in sections 2.4 and 2.5. Third part of the paper devoted to introduction of MUST analysis and description of the approach. A case study of Jotun Group is presented in section 4. Conclusions and limitations are provided in section 5.

1.2 Literature Review

During the last two decades, efforts to "filter out" the macroeconomic influences have increased. However, a few number of these studies used the approach proposed by MUST analysis, and none of them have considered benchmarking and MUST analysis simultaneously. A shortage in most of benchmarking studies is the fact that industry average or national economy indicators provide useless or random information without no guiding value in the corporate strategy context. Two areas of research are relevant to the project presented in this thesis: "Macroeconomic Uncertainty Strategy analysis" and "Performance Benchmarking". I will first review the literatures reporting the researches in which MUST-analysis is conceptualized; thereafter I will summarize approaches in Performance Benchmarking.

Oxelheim and Wihlborg (1995) measured macroeconomic exposure, for Volvo cars, using different measures of cash flows as the firm's target variable. Several usages of MUST analysis is illustrated in this case study. They argue that exposure coefficients can be used to derive hedge positions using currency denomination, maturity structure and degree of indexation of long-term debt as well as short term financial instruments sensitive to the same variables. Moreover, they are useful for estimating particular exposure to particular macroeconomic disturbances.

Bertrand and Mullainathan (2001) publish an article regarding the contracting view of CEO pay and skimming view. They have examined the responsiveness of pay to luck using three different measures of luck. For all three measures, they found that CEO pay responds to luck. They acknowledged that, different industries are affected by different country's exchange rates, this allows to construct *industry-specific* exchange rate movements which are arguably beyond CEO's control since they are primarily determined by macroeconomic variables.

Oxelheim and Wihlborg (2003) discuss the benefits of MUST-analysis for managers to forecast exposure caused by macroeconomic events. Here they argue that these exposure coefficients can be useful in a Value Based Management context as well. Authors consider real operating cash flows for Electrolux Group, and decompose the changes into the "Intrinsic" and "temporary" components. They found that macroeconomic price variables explain about 50% of the fluctuations in changes of real operating cash flows for Electrolux Group. They have concluded that macroeconomic fluctuations affect firm's cash flows as well as market values.

Andrén, Jankensgård, and Oxelheim (2005) demonstrate the merits of exposure-based Cash Flow at Risk. They have used MUST analysis, to quantify cash flow exposure to

macroeconomic and market risk for three main business areas of Norsk Hydro, with EBITDA as the target variable. They argued the fact that by this analysis management obtains a set of exposure coefficients that are capable of explaining variability in cash flows, as well as indicating how a hedge contract or change in financial structure influences the risk profile. They identified channels of commercial exposures to exchange rate, interest rate, and inflation risks for their target variable.

In an article by Oxelheim, Wihlborg, and Zhang (2008), share of changes in executive compensation, which is explained by macroeconomic developments, is estimated. In this paper, authors used MUST analysis to decompose changes in "compensation" rather than in a "performance measure" in order to analyze what share of compensation-changes were caused by anticipated and unanticipated macroeconomic developments for the average Swedish publicly traded firms during the period 2001-2006. They found that macroeconomic factors explain a 60 percent increase in compensation during the period.

Chiu et al. (2012) conducted a similar study as above, among US companies. The results indicate that a large share of annual changes in CEO compensation in US is explained by macroeconomic factors while the effect on compensation over the whole period was much smaller. They found that the sensitivity to macroeconomic conditions is greater in the US than in Sweden where the variable share of compensation is much smaller.

Oxelheim and Wihlborg (2012) pointed to the fact that although macroeconomic factors are part of several models for evaluation of credit risk, there is little effort to distinguish between effects of such factors and "intrinsic" factors on changes in credit risk. They argue that lenders, management, courts and traders in distressed securities would benefit from information about the degree to which macroeconomic factors effect changes in the likelihood of default. They have applied MUST analysis, with z-score as the target variable for GM and Ford during the period 1996-2008. For two companies in the same industry and with about the same Z-value in 2005, they end up with different suggested ways of reconstruction once the firm-specific macroeconomic influences on distress probability taken into account.

Drew (1997) presents analysis results of empirical researches into benchmarking practices in a cross section of north American firms, with the purpose of identifying ways in which benchmarking may lead to competitive advantage and superior performance. He challenges the idea of protecting information about key activities. The findings showed that firms which are adopting to evolutionary and revolutionary changes gain more benefits from benchmarking,

and “there is a feeling that the pace of change in the business environment has accelerated.” The results also indicates that internal benchmarking is one of the best tools for promoting organizational learning and changes.

Bhutta and Huq (1999) present a unified understanding of the steps involved in a benchmarking study. They have discussed the two leading international firms –Kodak and Xerox- benchmarking processes. Kodak has conducted an internal benchmarking with the purpose of measuring performance of all its maintenance facilities within the organization. Kodak-Park’s benchmarking had a problem-based focus. Xerox carried out a process oriented external benchmarking. The authors recalled Xerox’s success as the first in the history of benchmarking.

Reichelt and Lyneis (1999) presented an empirical evidence from a sampling of large, complex development projects, with purpose of benchmarking the drivers of cost and schedule overrun. They challenged the traditional tools because of inadequate interaction for dealing with the dynamic complexity of projects. The empirical evidence from 10 projects suggests that while some managers may recognize and budget for rework, they fail to take action which might reduce the amount of rework.

Komonen (2002) introduces the system of maintenance indicators in cost model profitability analysis and creates a benchmarking tool for industrial maintenance on the basis of empirical examination, in order to present a method to find appropriate benchmarking values for key figures. She claimed that benchmarking values are *relevant* industrial averages. Her approach includes six indicators of industrial maintenance. She presented the comparisons of key indicators but not determination of the best practices.

Schmidberger et al. (2009) study the development of a performance measurement system for benchmarking in ground handling services of European hubs airports. They assessed airports performance relative to their competitors in order to remain competitive and sustain long-term competitive advantage. Authors claimed that most of the airport performance measurement approaches mainly focus on financial outcomes; however, a performance measurement system for ramp services is needed which constitute a process-based perspective and reflect the supply chain of airport logistics.

Most of the Benchmarking researches has an ‘internal organizational perspective’ to the firm’s performance. Even if the title of the study is “performance benchmarking”, in effect, it is exercising “process benchmarking” by definition of Andersen (2007). Two main reasoning for omission of performance benchmarking in numbers of these papers can be found. First, is the

fact that “financial measurements” are not adequate for benchmarking, since they only focus on outcomes and not the process of achieving them. Second, because of differing accounting practices there is not enough evidence for accurate ranking (Komonen 2002). Therefore, industrial averages is used as a benchmark value for assessing performances, while process benchmarking ought to offer improvements through inspections in *how* to achieve best results.

I would pose another reason for this trend: “Economics and management are not usually happily married at universities and business schools” (Oxelheim and Wihlborg 2008). Benchmarking projects begin for sake of weakness detections and improvement implementations, in order to ensure long-term sustainable competitive advantage and growth. So, basically, they are all looking for improvements in the “intrinsic” performance of the firm. The point is; beside internal factors, external factors affect the firm’s performance too, regardless of the type of industry. And by external factors, I mean the macroeconomic turbulences. Although the necessity and benefits of process benchmarking is undeniable, as long as we are trying to improve firm’s intrinsic performance, but comparing the unfiltered outcomes, it is most likely that neither performance benchmarking according to gross financial figures, nor process benchmarking, contribute to competitiveness of the firm. Because, rapidly changing macroeconomic events “Falsify” the consequences. Without an estimation of the true performance, we cannot attach development of outcome to achievements of performance and/or process benchmarking.

In conclusion, no matter through which definition benchmarking and evaluation of performances is going to take place, performance measures will give us correct signals if and only if we cleanse out macroeconomic distortions. “Intrinsic” performance should be viewed as an absolute supplementary ingredient in benchmarking.

2. Benchmarking

2.1 Benchmarking theory: types and definitions

“Benchmarking is the process of continuously measuring and comparing one’s business processes against comparable processes in leading organizations to obtain information that will help the organization identify and implement improvements”(Andersen 2007). There are several other definitions of benchmarking. Boxwell (1994) quotes D.T. Kearns, executive director of Xerox Corporation, definition of benchmarking as “the continuous process of measuring products, services and practices through the comparison with its strongest competitors, with companies’ leaders in the field” as cited by Lucertini, Nicolò, and Telmon

(1995). Xerox's success is the first in the history of benchmarking, and it has become a real model, since being in a critical situation in 1972 (Lucertini, Nicolò, and Telmon 1995). According to Boxwell (1994) in 1979 Xerox started benchmarking and by 1989, had won the Malcolm Baldrige National award, cited by (Bhutta and Huq 1999, Lucertini, Nicolò, and Telmon 1995).

Bhutta and Huq (1999) acknowledge that benchmarking raises the standard of competition in an industry, because the gest of benchmarking is weeding out companies that do not or cannot maintain a competitive edge. The authors define the essence of benchmarking as the process of identifying the highest standards of excellence for products, services, or processes, and applying necessary actions to make improvements in order to reach those standards.

Andersen (2007) reasoning for advocating the use of benchmarking as an improvement work:

1. Benchmarking helps the organization understand and develop a critical attitude toward its business processes.
2. Benchmarking encourages an open attitude toward seeking and sharing information and thereby is an active learning process that motivates change and improvement in organization.
3. Through benchmarking, the organization can find new sources of improvement and new ways of doing things outside its own environment.
4. Through benchmarking, reference points are established for performance measurement of business processes. (Andersen 2007)

Types of benchmarking are classified concerning the answers to two different questions: **whom** you use as benchmarking partner and **what** you compare. Andersen (2007) mention six levels of benchmarking:

- *Internal benchmarking :* comparison against the best within the same organization or corporation
- *Competitor benchmarking:* comparison against the best direct competitors
- *Generic benchmarking :* comparison against the best, regardless of industry or market
- *Performance benchmarking:* comparison of key figures or other performance measures.
- *Process benchmarking:* goes beyond performance measures by comparing how business processes are performed as well as how well they are performed.

- *Strategic benchmarking:* comparison of strategic decisions and dispositions at a higher level. This is a less frequently used variant of benchmarking.

Bhutta and Huq (1999) give an additional type to benchmarking as *functional benchmarking,* and define it as a benchmarking study to compare the technology/process in one's own industry or technological area, in order to become the best in that technology/process, which can be said that it is a combination of 'internal' and 'process' benchmarking. Different types of benchmarking can be used in combination to some extent.

The type of benchmarking chosen in this paper, in fact, is the combination of Internal, Performance, strategic benchmarking. Here the objective is comparison of a "purified" key performance measurement among functioning subsidiaries within an organization, for strategic decisions and dispositions at a higher level. In other words, benchmarking performance measures internally, is meant to be accomplished, in order to facilitate corporate management with purified indicators of performance, as qualified signals for making decisions. In the research framework, benchmarking added as *a powerful tool for Business Process Reengineering (H*erzog, Tonchia, and Polajnar 2009*).*

Efficiency analysis is performed not only to estimate the current level of efficiency, but also to provide information on how to remove inefficiency, that is, to obtain benchmarking information (Baek and Lee 2009). Sharing and transfer of knowledge is also tangible evidence of a learning organization – one that can analyze, reflect, learn and change based on experience (Bhutta and Huq 1999). Oxelheim and Wihlborg (2008) state that , two types of information is needed : First, internal and external stakeholders need information of predictive value for assessing a firm's prospects and risks; Second, information allowing for control, taxation and evaluation *ex post.* They claimed that the need of these types of information is essential for the integrated equity markets increasing worldwide. They believe that the information are not necessary only for comparisons across companies, but should generating intertemporal comparisons for an individual company.

Drew (1997) believes that internal benchmarking results a richer network connections amongst individuals within and outside of the firm, by increasing organization memory and trigger 'unlearning'. According to Drew, Benchmarking can lead to broad improvements in strategic thinking and the capacity for change, and empirical research showed that internal benchmarking, was the only approach significantly linked with overall performance improvement.

Howsoever, the challenge is to give performance an opportunity to reveal its dual nature. The reason of this assertion is the fact that improvements are only applicable on the "intrinsic" component of performance, otherwise conditions generated by macroeconomic events are both temporary and beyond governance power of any firm. Performance benchmarking, either at internal or external level, will not add value, unless we filter the macroeconomic noise out. At decision-making level, investments, divestments, or any evaluation based on unfiltered measurements, might lead to un-scheduled results, following by excuses with no real exploratory values.

In conclusion, benchmarking is an important contributor to the imperative of organizational improvement, however it is neither necessary nor sufficient for organizational improvement or survival (Moriarty 2011). Benchmarking, as a tool, will create value when it contributes to development. Therefore, it is crucial for management to plot the strategic plans on purified measurements. These filtered measures will appreciate benchmarking tool to a level that comforts decision-making processes.

2.2 Benchmarking process

A benchmarking process must identify organizational competencies, gauge their value or impact according to some consistent metric (cardinal, real, monetary, etc.) and establish how these competencies contribute to the sustainability of the exemplar organization (Moriarty 2011).

Benchmarking processes consist of a set of steps, which has planned a project with a specific purpose from the sketch. Bhutta and Huq (1999) recall PDCA (plan, do, check, act) cycle of Pulat (1994), as a continuous process that benchmarking should follow. Lai, Huang, and Wang (2011) have gathered several benchmarking processes as:

"Spendolini (1992) divides the benchmarking process into five phases: (1) determine what to benchmark; (2) form a benchmarking team; (3) identify benchmarking partners; (4) collect and analyze benchmarking information; and (5) take action. Young (1993) identifies four steps in the benchmarking process: (1) planning; (2) analysis; (3) integration; and (4) action. Atkin and Brooks (2000) identifies the benchmarking steps as: (1) identify the subject of the exercise; (2) decide what to measure; (3) identify who to benchmark both within your sector and outside; (4) collect information and data; (5) analyze findings and determine gap; (6) set goals for improvement; (7) implement new order; and (8) monitor the process of improvement…"

Andersen (2007) illustrates the benchmarking process as a wheel and describes the steps as:
Step 1. ***Plan****: a)* Determine the process to benchmark based on the organization's critical success factors. *b)* Understand and document the process. *c)* Measure the performance of the process.
Step 2. ***Find****: a)* Identify benchmarking partners.
Step 3. ***Collect****: a)* Understand and document the benchmarking partners' performance and practice.
Step 4. ***Analyze****: a)* Identify gaps in performance and the root causes of the gaps.
Step 5. ***Improve****: a)* Plan the implementation of improvements. *b)* Implement improvements and monitor the implementation progress.

As a matter of fact, all the processes and determined steps are similar in substance. Headstone of benchmarking processes is the objective of the research or project, critical measurements to benchmark, and continuously review and evaluate the project, with improvement purposes. The differences arise according to the focus area of the study, while the essence is the same. Nevertheless, a benchmarking wheel is a benchmarking process model that synthesizes advantages of a large number of existing benchmarking models (Lai, Huang, and Wang 2011).

This study proposes an internal performance benchmarking among divisions of a corporation, using "intrinsic" performance measurement, in order to furnish managers for strategic decision-making. The steps of the benchmarking process for this study, which is inspired from Andersen (2007) benchmarking wheel, is a 6-step approach:

Step 1. ***Plan***
- *What to benchmark? Choice of dependent variable*

Step 2. ***Find***
- *identifying benchmarking partners*

Step 3. ***Recognition of critical measures***
- *Recognition of independent variables (macroeconomic variables)*
- *Recognition of the drivers of corporate macroeconomic exposure*

Step 4. ***Collect data***

Step 5. ***Analyze***
- *Estimation of firm's sensitivity to macroeconomic variables associated with each company*
- *Decomposition of dependent variable to "Intrinsic" changes and "Macro" changes*

Step 6. ***Improve***
- *Feedback*
- *Improvements*

2.3 Firm's vulnerability to macroeconomic fluctuations

Increased openness to international trade and a higher degree of capital mobility, between countries have made individual national economies more vulnerable to real and monetary shocks occurring in global markets (Oxelheim and Wihlborg 2008). Macroeconomic turbulences are observable at all aspects of our daily life. Foreign exchange markets are not reserved for traders or finance professionals only but for almost everyone, from multinational corporations operating in several countries to tourists travelling across two currency zone (Wang 2009). A change in exchange rate, inflation, or interest rate, might affect several decisions of our individual lives, such as where should be the next vacation trip, or where to invest our savings, or should we invest at all? The intensity of these fluctuations may vary from one person to another, depending on the sources of income. Making any decision at the corporate level, means dealing with macroeconomic uncertainties, in a tremendous scale. Banking crises in a number of countries during the 1990s triggered research on the role of the macroeconomic environment in corporate defaults (Oxelheim and Wihlborg 2012).

Managers, one way or another, are struggling with macroeconomic uncertainties in their business strategies. There are costs and losses associated with investments that should had never occurred, or decisions that have never made. Oxelheim and Wihlborg (2003) raise this issue by demonstrating that a project which is expected to have positive results may in effect not be sustainable under normal macroeconomic conditions, if cash flow forecasts for a new project are generated without distinguishing between sustainable demand and cost conditions, and temporary demand and cost conditions generated by macroeconomic events. Alternatively, if forecasts are generated based on macro-economically distressed conditions, then project values maybe underestimated and the project abandoned prematurely. For instance, an exporting firm might perceive that the company is competitive, whereas this is an 'imagination' as a result of an undervalued currency, and in fact, profits, refined from the under-valuation might be decreasing. It is easy to imagine the potentially dramatic effects that a 10% increase in a home country's real exchange rate will have on the profits of a company, in which, the exchange rate change will act as a 'subsidy' to competitors producing elsewhere, and will have an impact on both domestic and foreign markets (Oxelheim and Wihlborg 2008).

Oxelheim and Wihlborg (2008) state that each country has its own accounting and reporting practices, while the world's equity market have become increasingly integrated. They mention that the lack of transparency of new financial instruments and vulnerability of firms and

financial institutions to macroeconomic shocks caused more complexity to the turmoil in credit markets and so called subprime loan crisis in 2007 and 2008. Komonen (2002) express that benchmarking values are not the best or world class values, but relevant industrial averages (Not only one average but also many of them, one in each class of production units). She explains that one reason is different accounting practices. However, in the world today, with this level of integration, industrial averages are not adequate, at least not anymore. Analysis of firms' vulnerability to macroeconomic events, needed to be considered with respect to their own specific macro-environment.

2.4 Interdependency among macroeconomic variables

Management should recognizes the *interdependence* among a number of macroeconomic variables, and that these variables influence the firm through a variety of channels not captured by conventional accounting systems (Andrén and Oxelheim March 12, 2002). For instance, focusing on exchange rates in isolation may give a misleading view of the competitiveness of a firm and of the risks and opportunities to which it is exposed to (Oxelheim and Wihlborg 2008). In addition to this interdependency, each variable influence the firm through a variety of the channels.

Andrén and Oxelheim (March 12, 2002) argue that because of the direct influence of exchange rate on production costs or sales prices, the real exchange rate is used as measure of competitiveness for internationally competing firms, while the real interest rate is not that as commonly used. However, one source of interest-rate-driven competitive advantages for a country and its firms is the Interest-rate differences. This is saying that costs for firms and consumers is borrowing to a large extent to the domestic interest rates. Meaning when there are deviations from real interest rate parity, then firms with investments in countries with lower interest rates will be at a relative cost disadvantage. On the other side, if the firm is financing from a country with lower interest rates, it is at a relative cost advantage. Deviation from international parities, such as Purchasing Power Parity, Interest Rate Parity, and/or International Fisher Parity, lead to an exposure to foreign exchange risks. The same approach could be applied to explain the effects of inflations changes for the firm, in accordance to their cost structures, and their sales market positions. In absolutely efficient markets these international parities hold true, therefore firms don't need to protect against exchange risks (Wang 2009). Such market only exists in theory assumptions.

Andrén and Oxelheim (March 12, 2002) describe that channels of macroeconomic influence can be divided into three groups: “Influences on sales prices and volumes, Influences on production costs, Influences on wealth”.

Influences on sales prices and volumes

Most firms adopt the strategy of keeping foreign currency prices stable, which results in increasing exporters profit margin and sales volumes in domestic currency as a result of depreciation of DC. The story is in opposite for importers. They gain from appreciation of DC, since it means their costs tend to fall. Inflation can affect the purchasing patterns of consumers, to the extent that inflation affects the real values of consumers’ wages, savings, and debts, any such effects would, in turn, lead to changes in sales volumes (Andrén and Oxelheim March 12, 2002). If wages are not fully indexed or asset values and real interest rates are sensitive to changes in inflation, then inflation will affect demand (Andrén and Oxelheim March 12, 2002).

Influences on production costs

Costs in the home country will fall relatively against production costs in other countries, while expressed in in the currency, if the value of domestic currency decreased, which means increased competitiveness for the firm producing in the country with weak currency. Inflation affects the firm’s production costs as well. Inflation affects the firm’s production costs. Real interest rates also affect production costs, since increasing real interest rates mean increasing costs of (real and financial) capital for the firm (Andrén and Oxelheim March 12, 2002).

Influences on wealth

A firm with assets in FC will find that the value of those assets increases when the DC depreciates (Andrén and Oxelheim March 12, 2002). At the same time the values of domestic assets fall when converted to FC, which makes it cheaper for foreign firms to acquire domestic firms after DC depreciation (Andrén and Oxelheim March 12, 2002).

To sum up the above, firms, corporations, and corporations’ subsidiaries have different activities with different partners, and in various countries. Depending on how these transactions are arranged, each unit is exposed to particular macro price variable that are not relevant to the other unit. Therefore, a multivariate framework is required to identify firm/division-specific variables, and estimate the true transition of macroeconomic events. Changes of exchange rates, inflations and interest rates, might be studied in isolation on papers, but the real effect of the changes in these three variables is not equal to algebraic summation of changes in each, independently. It is important to remember how macroeconomic changes could influence

individual firms when drawing implications from the empirical investigation (Andrén and Oxelheim March 12, 2002). A more pedantic look through the sophistication of the relationships govern among these three variables; will arm the importance of in-depth analysis of the macroeconomic environment of the firm.

2.5 The impact of macroeconomic variables on corporate performance

Macroeconomic fluctuations affect firm's performances, by affecting their cash flows as well as market values, even in countries with the most stable economic condition. These influences vary among the firms, because of different cost structures, purchasing partners, as well as domestic or foreign-based competitors. This means that even under complete macroeconomic convergence of price levels, macro-economically generated differences in competitiveness remain (Andrén and Oxelheim March 12, 2002). "By definition, exchange rate risk was removed from intra-EMU transactions, but did firms thereby become less exposed to macroeconomic risk? Not necessarily, since macroeconomic shocks occur under any exchange rate regime, the shocks affect the economy and firms through different channels" (Oxelheim and Wihlborg 2008).

Oxelheim and Wihlborg (2008) remark that many firms still follow procedures more suitable for a world made up of "closed" economies. They declare that accounting methods are static and partial for the effect of a changing macroeconomic environment, and recently developed methods for analyzing corporate performance such as Shareholder Value Analysis (SVA), Economic Value Added (EVA), Market Value Added (MVA), and benchmarking in different forms, do not allow management to "filter" out influences from exchange rates and other macroeconomic variables. This is while there is a need for multinational firms to improve their strategies with respect to the complex elements of macroeconomic uncertainties. The first step is to understand the vastness of macroeconomic fluctuations' impacts on sales and other operations. The misperception that fluctuations in exchange rates, interest rates, and other macro price variables are of concern only to the finance division should be eliminated.

Numbers of factors can be named as key contributors to firm's success. However, firm's international success should not take as granted. One naïve realization of success is the fact that the firm is not exposed to macroeconomic changes, since the consumers buy their products at any price or under any economic situations, as long as they are capable of keeping their position as the best in quality of the product and service. This is exactly the spot in which the analysis of macroeconomic impacts on firm's operations arise. These types of analysis are not of interest

for sake of attractiveness of the topic and discovering of macro variable's behaviors. However, it is extremely important to figure out the range of "intrinsic" profit or growth from profits or growth caused by changes in the macroeconomic environment. Only intrinsic component is an indicator of sustainable growth and long-run profitability. Sorting these things out, is solely feasible by a comprehensive approach which is capable of considering the effects of the macroeconomic impacts simultaneously.

"Manager's incentives" is another motivation for measuring intrinsic performance. Oxelheim, Wihlborg, and Zhang (2008) discuss that macroeconomic fluctuations create noise in the relation between compensation and the under controlled performance. Such "noise" weaken the incentive effects of performance-based compensation schemes if managers are risk-averse. Rewarding mechanism need to be pursuant to "sustainable" performance, since that is an indicator of management's skill and effort rather than luck.

3. Macroeconomic Uncertainty Strategy

3.1 Macroeconomic Uncertainty Strategy (MUST)

Firms differ greatly in their sensitivities to macroeconomic events both in terms of types of events they are sensitive to, and in terms of strength (Oxelheim and Wihlborg 2012). These sensibilities are originated from various sources that are cap-a-pie correlated. Such a condition could be only digested in a multivariate framework, which is capable of simultaneous analysis. MUST-analysis provide the possibility of considering firms' macro-environment in a multifaceted circumstance. "MUST" has two aspects: forward-looking and backward-looking. The forward-looking of the strategy includes measurement and management of the exposure to macroeconomic risk (Oxelheim and Wihlborg 2008). The backward-looking part refers to analysis of sources of a firm's performance (Oxelheim and Wihlborg 2008). The recent aspect implies that macroeconomic influences can be drown out of firm's performance, so that all the stakeholders could be able to see a crystal-cleared picture of "intrinsic" function of the firm.

The need to identify channels, through which changes occur in cash flows, is common primary goal between two aspects of MUST. This is accomplished by identification of a set of macroeconomic variables that are relevant to a specific business unit, with respect to its specific environment. Thereby, estimation of the regression coefficients of these variables on whatever our definition of the performance measure is, as the dependent variable. MUST analysis offers

a basis for: a) identifying the macroeconomic variables that are most important to the particular company, b) determining the effect on performance generated by fluctuations in these variables, and c) formulating a suitable strategy for handling these variables (Oxelheim and Wihlborg 2008).

Regression coefficients are exposure or sensitivity coefficients, and can easily be translated into information about required hedging operations in financial markets or about the currency composition of liabilities (Oxelheim and Wihlborg 2008). These are only a hint at the forward-looking usages of the coefficients. On the other side, by applying these coefficients we will be able to decompose the performance of into changes caused by macroeconomic environment, and changes that are due to the firm's original performance. I argue that, the original or "filtered" performance measure is the component, which is eligible to be used as a benchmark value. Therefore, the focus of this paper is on the backward-looking aspect of MUST-analysis.

3.2 Selected variables

The first step in MUST-analysis is to find a set of exposure coefficients that register the sensitivities of cash flows or value to macroeconomic variables. These exposure coefficients imply that how a change in any macroeconomic variable would affect the value of the firm, and to what extent this influence is. A major advantage of this view is that it captures the exposure to each individual variable while recognizing that they are often correlated (Oxelheim and Wihlborg 2008).

Following the approach of MUST-analysis, Regression coefficients can be measured using the multiple regression analysis method of statistic. Multiple regression analysis is a statistical technique that can be used to analyze the relationship between a single *dependent (criterion) variable* and several *independent (predictor) variables* (Hair et al. 2010). In this case, dependent variable is a performance measure, and independent variables are macroeconomic variables.

Dependent variable

Dependent variable is what we are deliberating; therefore, it is the 'target' of the study. Performance measurement is one of the critical factors that determine how individuals in an organization behave (Jensen and Meckling 1998). It is one aspect of what they called the organizational rules of the game, which consist of (1) the performance measurement and evaluation system, (2) the reward and punishment system, and (3) the system for partitioning decision rights among individuals in an organization (Jensen and Meckling 1998).

It is explained in section 2.5 that, macroeconomic turbulences disrupt outcomes of every single economic player in the market. These influences effect demand conditions, and therefore sales revenues. They have their impact on the cost structure of the firms through different channels, therefore, they touch their profitability, and consequently CEO compensations, the value generated to the shareholders and the firm as a whole. Performance measurement includes the objective and subjective assessments of the performance of both individuals and subunits of an organization such as divisions or departments (Jensen and Meckling 1998). Therefore, measure of performance is the target variables for study.

Cash flows, economic value, book value, as measures of performance, are among the candidates for dependent variables. In previous researches that have applied MUST analysis, measures of risk, probability of bankruptcy, different types of cash flows such as nominal and commercial cash flows, and sales revenues, were adopted as dependent variable. The choice of which to use depends on the firm's overall objective and sub-objective for exposure management (Oxelheim and Wihlborg 2008).

In this paper, "**Sales Revenues**" has been chosen as a measure of performance for a couple of reasons. Initially sales revenues is the most gross figure on income statement showing the amount of money business brought in, independent of the profit generated to the firm. Therefore, it magnitude the concept of the operating cash flows and exposures. A percentage change in sales revenues has a much larger effect on the rate of change in sales minus expenses than it does on sales alone (Oxelheim and Wihlborg 2008). Moreover, sales revenues is picked, in order to avoid the complexity of cost structure, and the influence of financial market contracts.

Independent variables

Study of macroeconomic events, can simply include the study of all the events that actually occur in the world. However, as a feasible framework, a clear picture of the target variables in macroeconomic world is needed. According to Oxelheim and Wihlborg (2008) there are different interpretations of macroeconomic environment of the firm. They acknowledged that currencies, interest rates and consumer or producer prices influences firm's products, services, and financial markets. These factors are interpreted as macroeconomic environment of the firm. It is stated by Andrén and Oxelheim (March 12, 2002) that competitive position of a firm is related to their market power, better finances through a lower average costs, higher productivity, unique factors of production, and to their ability of being more innovative than their

competitors. They claimed that in particular, exchange and interest rates could easily affect a firm's competitiveness by influencing its cost position.

Determination of macroeconomic variables –*independent variables*- is based on two criteria: first, they should reflect the macroeconomic impact on a firm's performance as well as possible, second, they should be observable as quickly as possible after a macroeconomic event (Oxelheim and Wihlborg 2012). The first criterion implies that it is necessary to use a different set of macro variables for different business segments of one corporation. For instance a division producing in China, selling to Turkey, which buys its inputs from Iran, is exposed to different exchange rates, inflations or interest rates to compare with a firm producing in Germany, selling to U.S., even though buying the inputs from the same country as the other divisions.

Generally, The choice of independent variables depends naturally on the purpose of the exercise, but the most common purpose is to identify exposure coefficients for a group of variables so that management can observe and use them as inputs for various decisions (Oxelheim and Wihlborg 2008). The vulnerability of a company to changes in its macroeconomic environment can be expressed by measures of sensitivity to changes in the relative prices of three categories – "**exchange rates, interest rates, and inflation rates"** (Oxelheim and Wihlborg 2008).

Oxelheim and Wihlborg (2008) explain that the choice of these three categories of macroeconomic variables is not *ad hoc* but derived from international equilibrium relationships. Authors argue that these variables reflect the macroeconomic disturbances such as changes in GDP, aggregate demand, monetary policy and other variable. Furthermore, they say that these variables are easily observable without a long lag relative to macroeconomic events. In addition, quantity conditions on macro level is excluded, authors explain that there is a longer lag before GDP and similar variables can be observed. The price variables signal or reveal information quickly about underlying disturbances (Oxelheim and Wihlborg 2012).

3.3 Methodology

The approach applied in this work, is following the Oxelheim and Wihlborg (2012) process for cases of GM and Ford, and Oxelheim and Wihlborg (2008) in case of Volvo Cars, with adjustments necessary for this study. The objective is deriving the "Intrinsic" sales revenues form observed total sales revenues.

According to MUST-analysis approach, regression coefficients of firm- or division-specific macro price variables can be measured with multiple regression method of statistics. I go through statistical issues further in the empirical case study methodology. Sales Revenues is determined as dependent variable. I used the monopolist's **total revenue** function, TR. By definition, total revenue *equals* price × quantity (Lipczynski, Wilson, and Goddard 2013).

$$(1) \quad TR = P.Q$$

The multiple regression equation for this analysis with Sales Revenues as dependent variable, and exchange rate, inflations, and Interest rate, as independent variables, while the data are entered into the equation as percentage change, can be illustrated in the equation below:

$$(2)\ \%\Delta TR_t^i = \beta_0 + \beta_1 \%\Delta e_t^i + \beta_2 \%\Delta i_t^i + \beta_3 \%\Delta r_t^i + \varepsilon_t^i$$

Where

$$(3)\ \%\Delta TR_t^i = \frac{(TR_t^i - TR_{t-1}^i)}{TR_{t-1}^i} * 100$$

$$(4)\ \%\Delta e_t^i = \frac{e_t^i - e_{t-1}^i}{e_{t-1}^i} * 100$$

$$(5)\ \%\Delta i_t^i = \frac{i_t^i - i_{t-1}^i}{i_{t-1}^i} * 100$$

$$(6)\ \%\Delta r_t^i = \frac{r_t^i - r_{t-1}^i}{r_{t-1}^i} * 100$$

And

β_0 = constant

TR_t^i = Total Sales Revenues in period t, for firm i

e_t^i = Exchange rate(s) at the end of period t, identified for firm i

i_t^i = Inflation rate(s) at the end of period t, identified for firm i

r_t^i = Interest rate(s) at the end of period t, identified for firm i

$\beta_1, \beta_2, \beta_3$ = sensitivity coefficients of firm i's performance to each variable (mathematically define as partial derivatives of the dependent variable with respect to each macroeconomic variable)

ε_t^i = error term, for firm i

Identification of division-specific macroeconomic variables is through a fundamental analysis, proposed by MUST-analysis, in which the key independent variables with potential economic explanatory power are determined. Thereafter, by regressing the sales revenues on the identified

macroeconomic variables, the sensitivity coefficients can be estimated. Now, by using obtained coefficient, we decompose the sales revenues into "Intrinsic" changes, which is occurred due to firm's competitive advantages; and the "Macro" part, which is changes in Sales Revenues that has happened as a result of changes in the macroeconomic environment of the firm or its division. This can be outlined as:

$$(7)\ TR_t^i = R_{I,t}^i + R_{M,t}^i$$

In the above equation, TR_t^i, denotes the Total Revenue of firm *i*, in period *t*. $R_{I,t}^i$ is the the intrinsic sales revenue of firm *i*, at period *t*, and $R_{M,t}^i$, is the part of sales revenues of firm *i*, in period *t*, which has been due to the macroeconomic fluctuations.

Similar to an argument by Oxelheim and Wihlborg (2012) in the case of GM and Ford, in which the authors used Z-score as the dependent variable, one approach for decomposition of sales is to analyze 'price' and 'quantity' exposures to macroeconomic changes separately. However, there is an opposite relationship between these two components, which might cause the interpretation of summated results of independent decompositions, weakly supported theoretically and empirically. Alternatively, catalyzing **TR** is more robust, since the relationship between total sales revenues and macro factors is likely to be more stable than the components relationships. Moreover, the impact of the macro economy can shift among the components, making a general conclusion unclear. Therefore, I continue with sales revenues, as the dependent variable in the model.

If partial derivatives (sensitivity coefficients) of percentage changes in total sales revenues with respect to macro-economic variables define as below:

$$(8)\qquad \beta_1 = \frac{\delta \%\Delta TR_t^i}{\delta \%\Delta e_t^i}$$

$$(9)\qquad \beta_2 = \frac{\delta \%\Delta TR_t^i}{\delta \%\Delta i_t^i}$$

$$(10)\qquad \beta_3 = \frac{\delta \%\Delta TR_t^i}{\delta \%\Delta r_t^i}$$

Then the percentage changes in sales revenues caused by Macro events can be calculated as:

$$(11)\qquad \%\Delta R_{M,t}^i = \beta_1 * \%\Delta e_t^i + \beta_2 * \%\Delta i_t^i + \beta_1 * \%\Delta r_t^i$$

Thereby, according to equation (7), percentage changes in sustainable Sales Revenues under neutral macroeconomic conditions would be:

$$(12)\qquad \%\Delta R_{I,t}^i = \%\Delta TR_t^i - \%\Delta R_{M,t}^i$$

Notice that in equation (11), the constant term is not entered. Statistically, if the independent value represents a measure that never can have a true value of zero, the intercept aids to improving the prediction process, but has no explanatory value (Hair et al. 2010). Meaning that it shows that part of the estimation when none of the independent variables has changed. Therefore, with reference to cases of GM and Ford in which the intercept was not included in the decomposition equation, and since we are seeking to measure the part of the dependent variable that has changed according to the changes in independent variables, intercept is not involved in equation 11.

4. The case of Jotun Group

4.1 Introduction to Jotun Group

Jotun Group is a Norwegian chemicals company dealing mainly with paints and coatings. The Group is a matrix organization divided into seven regions responsible for the sales of Decorative Paints, Marine, Protective and Powder Coatings. The company has 33 production facilities in 20 countries, with 9676 employees, 68 companies in 43 countries and is represented in more than 90 countries around the world. Jotun Group is headquartered in Sandefjord, Norway.

According to Jotun's annual report (2014), the Group's share of the net result ended at NOK 356 million compared with NOK 287 million in 2013. They acknowledged that this increase was mainly due to higher sales in North East Asia within the Marine Coatings segment, and higher activity in key markets in the Middle East. "Jotun's positive results in 2014 owe much to the company's strong performance in the second part of the year". However, slower growth in the first two tertiaries of 2014 served as a powerful reminder: "they cannot take their enduring success for granted", the board were reminded that their business is vulnerable to market forces beyond their control (2014).

Group reports claim that Jotun is exposed to a variety of risks relating to credit, interest rates, commodity prices, currency exchange risks, etc. Each business unit according to the Group's established policy, procedures and related controls handles management of the customer's credit risks. Group's financial position is denominated in Norwegian krone, which is also the functional currency of the parent company. However, each entity in the Group determines its own functional currency, and items included in the financial statement of each entity are measured using that functional currency(Jotun 2014). They declare that one exposure is currency translation risk, and arises when the financial statements of subsidiaries, presented in

local currencies, are translated into NOK. According to the annual report for 2014, the differences of foreign currency translation related to loans to subsidiaries, was NOK 149 million in 2014. This amount was NOK 31 million for the previous year. Jotun classified these differences as net investments in foreign operations.

Generally, as a global organization, Jotun is sensitive to the price of raw materials and currency fluctuations, political unrest, sever weather, shocks to local macroeconomic trends. Whether these changes could have positive or negative impacts on the cash follows generated for Jotun, identifying the amount of sustainable changes is crucial in evaluations of the performance.

4.2 Methodology

This study zoom in to four entities of Jotun Group's matrix for a couple of reasons. First, observing all business segments, in all the countries in which Jotun has production facilities, is far above conditions of a Master's thesis, as it requires a team of professionals in cooperation with insiders in order to gather essential information. Second, breaking down the analysis of macroeconomic uncertainties strategy into divisions is the idea of this research. This could be a foundation with possibilities of extensions to the rest of the business segments and units. With reference to section 2.2, the benchmarking process for this research has been identified in six steps. Below, I proceed to each step in details.

4.2.1 Step 1. Plan

- *What to benchmark? Choice of dependent variable*

Among four main business segments of the Jotun's Group, "External Decorative Paints", is picked as the landscape of benchmarking in this case. Pursuant to annual report of Jotun (2014), decorative paints, with NOK 6.401 billion operating revenues, and share of 37%, constitute the largest business segment of Jotun. Activities of this segment consist of manufacturing, selling, and distributing interior and exterior paints to consumers and professionals worldwide, through a global network of about 7000 shops. Although the stronghold of their business in decorative segment is Buy-It-Yourself and Do-It-Yourself homeowner market, but a significant portion of Jotun's business is derived from the project market, which includes malls, hotels, large housing projects, airports and hospitals, etc.

Identification of critical performance measures and their comparison with similar performance measures of "best in class" organizations is at the heart of benchmarking (Bhutta and Huq 1999). I discussed that neither "best in class" values, nor industrial averages, are appropriate for benchmarking purposes. *What is going to be benchmarked* is the "**Intrinsic Sales Revenue**

of External Decorative paints". "Sales Revenues" –in External decorative paints business segment- is the choice of performance measure in this study, as dependent variable, for each subsidiary. Diversity and global presence is one remarkable character of Jotun's Group. This makes the study of dispersed macroeconomic environment of different divisions, and their sensitivities to macro-events, a critical issue for the company.

4.2.2 Step 2. Find

- *Identifying benchmarking partners*

Jotun has a decentralized structure in terms of production. Among 90 countries in which Jotun is present, four has been specified as benchmarking partners: **Norway, Spain, Malaysia,** and **Dubai**. There are several reasons for selecting these four units as benchmarking partners. First, in all of these countries Jotun has production facilities, producing and selling paints to the local market and exporting to neighboring countries. Second, "these companies are similar in terms of company maturity. There is a great difference between performances of a well-established company to a company in its infancy period. The latter could reap very strong sales development from a low base due to the novelty, or it could take quite a few years to develop at all, as the organization is built."[1] Third, each of these companies are located in completely detached markets, in countries with different macroeconomic mechanisms and events.

4.2.3 Step 3. Recognition of critical measures

At this step, functional measures should be identified implicitly and explicitly. These measures ought to reflect the macroeconomic environment of the firm.

4.2.3.1 Recognition of independent variables

Recognition of independent variables, carried out through a fundamental analysis of each unit's operation. In this respect, MUST analysis proposes a set of questions:

a) In which countries does the firm produce?
b) From which countries does it buy its inputs?
c) Where are these inputs produced?
d) Which are the major geographical markets for the products and services?
e) How differentiated is the firm's product?
f) Which firms are the major competitors?

[1] Stolpestad, Svein (Group Vice President, Business development & Strategy), in discussion with the author, April 17, 2015

g) In which countries do the competitors produce?
h) From which countries do they buy their inputs?
i) In which countries are these inputs produced?
j) In which currencies are the firm's financial positions denominated? (in case of financial cash flows)(Oxelheim and Wihlborg 2008).

By exploring the answers to the questions above, we will be able to picture relatively important activities of each entity and their competitors. This information furnish us to define the coherent "interest rates, inflation rates and exchange rates" for each unit. It should be noted that due to confidentiality issues, exact information on how entities are organized geographically cannot be mentioned about chosen units in Jotun. Therefore, analysis of the sources of changes in each macro price variable is not explained with actual information of each company. However, description in this manner is given below.

4.2.3.2 Recognition of the drivers of corporate macroeconomic exposure

Exchange rate

A common mistake among companies that try to give the most important macroeconomic variables for the company without conducting a comprehensive multivariate analysis is, to point to the exchange rate between the local currency and the currencies of the company's greatest sale and purchasing markets respectively (Oxelheim and Wihlborg 2008). Depending on the company's procedure, a change in an exchange rate between **Country A** and **Country B**, could affect sales revenues of "the firm producing in **Country A"** through one or a combination of three different channels. I explain the impact of a depreciation of 'A/B exchange rate' on a firm producing in **Country A** in order to illustrate these channels.

1. *Firm exporting to **Country B**:* a depreciation in A/B exchange rate will affect revenues *Positively*, and increases their competitiveness in that market. The firm can either decrease the price and earn same amount of 'A currency' per unit, and increase its sales and market share. Alternatively, by keeping prices as before, firm will earn more revenues after translation the sales to local currency. Therefore, there is a positive relationship between 'A/B' fraction and sales revenues of the firm producing in **Country A** and export to **Country B.**
2. *Firm import raw materials from **Country B**:* A depreciation of A/B exchange rate means increment in prices of inputs, and is most likely to have either *Zero* or *Negative* affect on sales revenues. However, If the company has pricing power, and

price elasticity of the products are low, by increasing prices, while demand remain the same, the sales revenues of the company will be increased. Although, in effect profit might not change due to the higher production costs. If the demand drop as a result of price increment, to the extent of the increased prices and decreased demand, the effect on sales revenue would be neutral or negative. Finally, if the company does not make any changes in the prices, there will be no observable effects on sales revenues of the firm, though profit will decrease.

3. *Firm's main competitor produce in **Country B***: A depreciation in this exchange rate will act as a cost disadvantage for the companies, producing in **Country B**, since the production costs, expressed in same currency, in **Country B** is now higher than **Country A** . Therefore, they have to either increase their prices and probably face with less sales -if the demand decreased- or accept less profit. They probably have to increase their prices in **Country A** market, to protect their profitability, and this will boost the market position of an **A**-based company, producing and selling in **Country A**. It brings up the opportunity to increase their sales, with the same prices as before, which is now lower than the competitor's price. Therefore, from this channel the relationship between A/B exchange rate and sales revenues can be *Positive or Neutral.*

The effect of a determined exchange rates on sales revenues is the consequence of all channels depending on the presence and relative weight of the distribution of that exchange rate in different channels. Meaning that and **A-based** company, could buy some of its inputs form **Country B,** export its products to the same country, while having a competitor producing in that country as well. Thus, negative/positive effects will sometimes offset/reduplicate by effects from other channels.

Inflation

Similar analysis could pin Inflation influences on Sales Revenues together, from sales market perspective and commodity prices for the company and its competitors. Generally, inflation can affect performance negatively if costs tend to rise faster with inflation than revenues (Andrén, Jankensgård, and Oxelheim 2005). Inflation in the country of suppliers of the raw materials will *Negatively* affect the company. In return, in the serving market's country, company could be *Positive* or *Negative*, depending on where the inputs are supplied. Same argument is applicable for the competitors as well. For instance, even if we could assume that there is no changes in the inflation of the serving market and the commodity prices of our company, still our company

can be affected negatively or positively, by changes in inflation of the countries, in which the competitor is producing its products. In section 2.4, it is explained that how inflations can effect production costs, purchasing patter of consumers, demand and therefore sales volume.

Interest rate

The most direct channel that the interest rate could affect sales, is its impacts on the demand and consumption. Shakeri (2008) explains that The relationship between interest rate and consumption is a negative relationship. Increase in real interest rates will increase savings, therefore it affect demands as the number of those who might spend their savings, or request for a loan, to renew their house will decrease. Moreover, with reference to section 2.5, increasing real interest rates mean increasing costs of (real and financial) capital for the firm.

After identification of critical measures and accurate variables, then it is the time to collect data.

4.2.4 Step 4. Collect data

Historical data for "Sales Revenues" based on monthly periods, starting from 2010 until the end of 2014, is obtained from Jotun for the External Decorative paints in the selected entities. A questionnaire including the questions mentioned in previous section was sent to the four specified entities, and each company provided the answers separately. After exploring the answers and identifying variables for each division, monthly prices of distinguished macroeconomic variables, were collected from "Organization for Economic Cooperation and Developments", and "International Monetary Fund" databases, for the same period (Jan. 2010-Dec.2014).

Econometrically, the macroeconomic influences on the sales revenues are identified in regressions with changes in sales revenues as the dependent variables and macro price variables as independent variables in order to account for possible correlation between macroeconomic factors and factors that affect firm's intrinsic sales (Oxelheim, Wihlborg, and Zhang 2008). The basic inputs are time series of monthly observations of (a) sales revenues, and (b) a group of macroeconomic division-specific variables that are capable of explaining the changes in sales revenues over time.

- *Data transformation*

Exposure can be estimated using data in levels, first differences, or percentage changes (Andrén, Jankensgård, and Oxelheim 2005). As long as the information in one dimension could

be expressed in terms of another, the choice is irrelevant; Instead the statistical properties of the time series should guide the decision (Andrén, Jankensgård, and Oxelheim 2005). Time series data are well-known for not being docile. I have initially done a set of transformations in order to subdue the data! There are 60 cases (five years monthly observations). For all four entities, sales revenues are seasonally adjusted by seasonal decomposition method, additive model type, where all points subjected to equal moving average rate. A general principle in time series analysis is the 'stationarity'. Dependent and independent variables are presented in percentage change for the period. As to creation of time series, smoothing method was applied, since it was the only method which harnessed the data to provide significant results. Smoothing helps to see patterns and trends in time series, and smooth irregular roughness, so that we can see better signals. However, as we will see in the models, a positive autocorrelation of the residuals appears in all models, which can be attributed to the use of this method. I have tried computing variables in logarithmic algorithm, the Durbin_Watson value were centered approximately on 2, but computed variables were still not showing any pattern, but smoothed logarithmic variables indicated autocorrelation in residuals as well. In other words, none smoothed data, at any scale, were showing no significant correlations with dependent variable, but there were no auto correlation in the residuals. Therefore, I had to make a choice between non-autocorrelated residuals, with no clear signals or pattern between variables (non-smoothed data with all methods of first difference, logarithm, percentage change), or smoothed data with significant correlations, but positive autocorrelation of the residuals. I adopted the second alternative! Hence, smoothed percentage changes for all variables is applied. Moreover, in some models there is non-normal distribution of the residuals as well! In conclusion, econometric problems indicating inflated t values. Therefore, we should be cautious regarding the interpretation of the results, and t-test, particularly for cases in which the problems seems to be more severe.

With all the needed data in hand, analysis starts.

4.2.5 Step 5. Analyze

4.2.5.A *Estimation of exposure coefficients for macroeconomic variables associated with each company*

In this stage, sales revenues are regressed on the determined macroeconomic variables for each entity. Macro price variables included exchange rates changes, short-term interest rate changes and inflations. CPI and PPI are included as inflation indicators. I have also considered oil price as industry (chemicals) specific variable.

Furthermore, after the fundamental analysis of each entity, initially a set of variables were identified which expected to have potential explanatory value, but obviously, there are correlations among these variables. If two variables are highly correlated, then multicollinearity arises and, in extreme cases, none of the coefficients can be identified (Oxelheim and Wihlborg 2008). In sum, the two variables compete in expressing the same information (Oxelheim and Wihlborg 2008). Hence, in order to identify the variables that are capable of capturing most of the macroeconomic effects, and not correlated together, a stepwise regression approach was applied. The presented results for each entity are the best models both in terms of explanatory value (adjusted R^2), and economic logic with respect to each entity's operation. Meaning that, in some cases, there were models with higher R-squared, though it was weaker economic logic behind them. Moreover, each entity has its own functional currency, while the functional currency of the parent company is denominated in Norwegian Krone. Therefore, for Spain, Malaysia and Dubai, I presented two models, with different dependent variables: sales revenues in local functional currency, and Norwegian Krone. However, the focus in sales decomposition is on models for sales revenues in local functional currency. Since the evaluation of the entities is in accordance to the growth and development of the entity in their functional currency with respect to the economic growth of the country and not the translated revenues[2]. Following are the results of analysis for each division.

4.2.5.A.1 Norway

For more than a decade the World Bank has rated countries on six governance indicators, and the Nordic countries score consistently higher than USA and the rest of Europe on all indicators (Thomsen and Conyon 2012). These indicators constitute political stability, regulatory quality, rule of law, control of corruption, voice and accountability, and government effectiveness. This makes Norway an interesting location for considering the fact that in such a smooth environment, with a rich economic foundation, to what extent a firm is affected by macroeconomic swings.

According to the World Bank website, Norway is categorized as a high-income country. In a series of annual reports by World Bank, *doing business* presents quantitative indicators on business regulations. Indicators are benchmarked to the regional average, and in total reflect the business environment and ease of doing business in the country. Norway stands at 6 in the ranking of 189 economies on the ease of doing business (2015).

[2] Stolpestad, Svein, (Group vice president, Business Development & strategy), interview by author, personal interview, Jotun, Sandefjord, Norway, May 18, 2015

Jotun is headquartered in Norway, Sandefjord. There are two separate entities in Norway- Jotun AS and Scanox AS- that are both active and compete in the local market. Scanox is a 100% Jotun subsidiary. In this study Sales Revenues of External Decorative paints in Jotun A/S is considered.

Initially ten macro price variables were identified as having potential explanatory value. After the first regression, four of them turns out to have the most contribution in explaining the model. The results are presented in the table I.

Table I.

NOK/EUR	**12,205***
NOK/SEK	**-9,201***
Sweden Producer Price Index	**21,437***
Norway Consumer Price Index	**-41,216***
$\boldsymbol{Adjusted\ R^2}$	**,713**
Durbin-Watson	**,922**

DV: Total seasonal adjusted Sales Revenues of External Decorative paints, Jotun A/S, in Norwegian Krone
***U**nstandardized Coefficients of macroeconomic variables to seasonal adjusted Sales Revenues, Jotun A/S, Norway.
*Significant at a 5% level.

Table I shows that the model explains about 71% of the variance in changes of seasonally adjusted sales revenues. The magnitudes of the coefficients are large, which is due to a couple of reasons. First, as described in section 3.2, Sales Revenue is the grossest figures to compare with profit for instance. Second, as a **unit** change in percentage change of NOK/EUR exchange rate , the percentage changes of sales revenues - and NOT the levels - will increase by 12,2 **unit**, while other variables in the equation remains constant (zero changes). Therefore, they are realistic; however, each coefficient alone is not capable of taking into account the simultaneous influences of all variables. Third, the identified variables were highly correlated, therefore the coefficients of the elected variables stands as a proxy for other variables. Meaning that in reality, changes in a variable that has influence on the firm's performance, but is not presented in the regression model, is reflected in the coefficients of the variables entered into the model. The same argument is applicable in analysis of three remaining entities.

It is found out that a depreciation of the Norwegian Krone versus EURO is beneficial for sales of External Decorative paints in Jotun A/S, while vis-à-vis the Swedish Krona will not favoring the company. The positive coefficient between NOK/EUR and sales revenues indicates that

company has a stronger competitive position in Norway, with relevance to Euro Area producing competitors. PPI inflation in Sweden has a positive effect on the total sales revenues of Jotun Norway, and CPI inflation in Norway negatively affect company's sales revenues to a larger extent. Positive correlation between PPI in Sweden and sales revenues indicates that the competitors were suffering from increases in prices, and this situation strengthen the competitiveness of Jotun A/S with respect to competitors producing or purchasing raw materials from that country (or countries which their inflation rates were correlated with Sweden PPI). A company with exposure to relatively higher inflation rates in its cost base, may find it harder to compete on price and lose market share, or alternatively suffer decreased margins (Andrén, Jankensgård, and Oxelheim 2005). This apply to Jotun A/S, since one of their competitors is a Danish-based company, with all costs based in countries other than Norway.

Statistical results are all presented in the appendix under the title "1. Statistical Results, Jotun A/S". According to Beta values in coefficients table, NOK/EUR exchange rate and CPI in Norway, have the strongest unique contribution to explaining the External Decorative paints changes. Norway short-term interest rate and Central Bank Policy rate did not show any significant correlation with the dependent variable. One reason for no significant correlation between interest rate and sales of Jotun A/S could be that this rate has been constant for most of the observations during the period. World Crude oil Index, did not show direct correlations, however it was highly correlated to other variables, which indicates the changes in oil prices affects the sales indirectly. Minimum R-squared value that can be found statistically significant , with a power of ,80 for a sample size of 50, and 5 independent variable is 23%, at a ,05 significant level (Hair et al. 2010). R-squared in this model is far above this critical measure.

From statistical perspective, there are some problems with autocorrelation and normality of the residuals. In the model summary table, Durbin-Watson statistic shows a positive autocorrelation between residuals. Residuals are not normally distributed as the Shapiro-Wilk statistic in the Tests of Normality table is very significant, which is observable in the Normal P-P plot of residuals as well. Main causes for non-normality seems to be attributed to existence of outliers, (Maximum Mahalanobis distance: 29,330 and Cook's distance: 8,432- the residuals statistics table is not provided in the appendix due to space limitations), kurtosis, and skewness. The skewness is less problematic to compare with the kurtosis (see the Histogram and descriptive statistics table). Therefore, we need to be careful regarding the interpretation of the t-tests as they are inflated. However according to coefficients table, very high t-values, and adequately significant results give us an indication that seems to be plausible. Tolerance and VIF values,

does not show any multicollinearity. ANOVA table shows F(4,55)= 37,642 (P<,05) shows that the null hypothesis that the multiple R in the population is zero, is rejected. After bootstrapping, two-tailed significance test failed to reject the null hypothesize for all the coefficients! However, this test is the most conservative test. In conclusion, it seems that we can trust the results, although they might be overestimated.

4.2.5.A.2 Spain

Spain income category labeled as high income, according to World Bank. Among the benchmarking partners, Spain is member of EU countries, and had been through significant changes in its local macroeconomic conditions. Remarkable fluctuations in key indicators such as inflation rates, decrease in consumption and domestic demand, and increasing unemployment rate, revealing the fact that companies operating in this country has encountered with these conversions. World Bank reported that Spain stands at 33 in the ranking of 189 economies on the ease of doing business (2015).

From the analysis of Jotun Spain's activities, initially eight macro price variables were expected to influence their sales revenues. Since the functional currency of Jotun Spain is Euro, the sales revenues, both in EUR and NOK, were regressed on the determined macro price variables, and the results are shown in tables II and III, respectively.

Table II.

Spain CPI Index	**-18,756**
EUR/GBP	**-4,129**
Spain Treasury Bill Rate	**,143**
Adjusted R^2	**,399**
Durbin-Watson	**,330**

DV: Total seasonal adjusted Sales Revenues of External Decorative paints, Jotun Iberica, in Euro
*****Unstandardized Coefficients of macroeconomic variables to seasonal adjusted Sales Revenues, Jotun Iberica, Spain.
*Significant at a 5% level.

The results showed that 3 out of 7 identified independent variables have a significant correlation with seasonally adjusted sales revenues in Jotun Iberica functional currency (Euro), they can explain about 40% of the fluctuations. CPI inflation in Spain has the highest correlation with the dependent variable while other variables remain constant, and it affect sales revenues negatively. In addition, Spain CPI captured the correlation in crude oil price index as well. This shows that an increase in inflation in Spain will hurt Jotun Iberica, weaken its competitiveness

against competitors producing elsewhere. EURO per Great Britain Pound exchange rate has a negative relation with seasonal adjusted sales revenues, telling that an appreciation of this exchange rate will be beneficial for this company, and will strengthen the company position in the market with respect to U.K.-based competitors. Spain Treasury Bill rate has the lowest correlation with the dependent variable, and the relationship is positive.

Statistical results are provided in the appendix under the title "2.A) Statistical Results, Jotun Iberica". According to the coefficients table, t-values with reasonable significant level reject the null hypothesis for the coefficients. Tolerance and VIF values also indicates there is no collinearity among independent variables. Beta coefficients column saying that the strongest unique contribution to R-squared belongs to EUR/GBP exchange rate changes. Two-tail significance test of coefficients based on 500 bootstrap samples also rejected the null hypothesis for regression coefficients of Spain CPI and EUR/GBP, and Treasury Bill rate is on the border. Overall model fit with F(3,56)= 14,038, (Sig. = ,000) showing pleasant results. There is a positive autocorrelation among the residuals and they are not normally distributed (See Tests of Normality table and Descriptive statistics). Non normal distribution of the residuals seems to be because of the presence of outliers according to Cook's Distance (2,167) and kurtosis; Mahalanobis Distance is below the critical value- Residuals statistics table is NOT attached- (see histogram). Skewness seems to be less problematic.

Afterwards, I regressed the Sales Revenues of External Decorative paints in Norwegian Krone on the identified variables. As we can see in the table III, three variables were entered to the regression with explanatory value: NOK/GBP, and CPI inflation in Spain, and PPI inflation in UK. Treasury Bill rate has lost the correlation after regression on seasonal adjusted sales revenues in Norwegian Krone. In this case, and some other cases in further analysis, by changing the dependent variable from local functional currency to Norwegian currency, some new variables enter to the model –except the translation exchange rate- or some variables lose their correlation with the new dependent variable. One reason could be the correlation among the variables, and the fact that which variable is able to capture the most effects on the 'dependent variable'. In other words, in the fundamental analysis, a set of variables identified which they must have logically correlations with the sales revenues. When we first ran the model for the local currency, variables stayed in the model, are those that has captured the effects of other variables that were correlated together. Therefore, it is to some extend reasonable to see displacements because of changing the dependent variable from local currency to the functional currency of the parent company.

With these three variables, 46% of the fluctuations of the seasonal adjusted sales revenues is explained. Now, Depreciation of NOK versus Great Britain Pound showing negative impacts on seasonal adjust sales revenues in Norwegian Krone too. I have tried NOK/EUR exchange rate since that is the exchange rate of translating the functional currency of Jotun Iberica to Norwegian currency. The results indicate NO significant relation between NOK/EUR exchange rate changes and sales revenues in Norwegian Krone changes. The most probable reason could be the fact that according to the annual reports of Jotun Group, "income statements of the entities with any functional currency other than Norwegian Krone are translated at exchange rates prevailing at the date of the transaction". PPI in UK is has a large negative impacts on Jotun Iberica seasonal adjusted sales revenues, translated in NOK. CPI inflation in Spain showing negative results in this regression as well.

Table III.

NOK/GBP	**-3,451**
U.K. PPI Index	**-18,882**
Spain CPI Index	**-13,439**
$\boldsymbol{Adjusted\ R^2}$	**,465**
Durbin-Watson	**,277**

DV: Total seasonal adjusted Sales Revenues of External Decorative paints, Jotun Iberica, in Norwegian Krone

*****Unstandardized Coefficients of macroeconomic variables to seasonal adjusted Sales Revenues, Jotun Iberica, Spain.

*Significant at a 5% level.

Statistical results are provided in the appendix under the title "2.B) Statistical Results, Jotun Iberica". According to coefficients table, Tolerance and VIF indicates no multicollinearity, and t-values are very high and significant. The highest unique contribution to explaining the dependent variable belongs to NOK/GBP exchange rate. ANOVA table shows F(3, 56) = 18,095, with Sig. = ,000. Coefficients of NOK/GBP and U.K. PPI remained significant after bootstrapping, which witnesses the robustness of these two variables' significance, but not for CPI in Spain. The same story is indefeasible regarding the autocorrelation and non-normal distribution of residuals. The non-normality seems to be due to presence of outliers, however Mahalanobis and Cook's Distance did not pass the critical measures. There seems to be no problem with Skewness, and just a slight kurtosis (see descriptive statistics table and histogram).

4.2.5.A.3 United Arab Emirates

United Arab Emirates, is categorized among high income countries. According to the annually *Doing business* reports of World Bank, United Arab Emirates stands at 22 in the ranking of 189 economies on the ease of doing business (2015). According to Jotun's official corporate website, in 2014 the highest sales of Decorative paints per region were in the Middle East, Asia and Africa.

One distinct characteristic of Dubai is the "fixed exchange rate regime". United Arab Emirates as a member of Gulf Cooperation Council has a fixed exchange rate with all the members, while the AED is pegged to dollar. According to Iqbal (2010) Gulf Cooperation Council, is a regional intergovernmental political and economic union consisting of all Arab states of the Persian Gulf, except for Iraq, with the objective of establishing a monetary union. Author acknowledge that while the monetary union and exchange policy has so far served the U.A.E. economy well, it has started to come under pressure. Instability of non-oil exports and imports has increased over time, and exchange rates fluctuations vis-a-vis non-dollar currencies have led to higher costs by increasing the exchange rate risk for trade and capital transactions (Iqbal 2010).

There were entities in United Arab Emirates. Jotun U.A.E, Jotun FZE, and Jotun MENA. Jotun FZE and MENA are exporting companies. In this case, I only consider the sales revenues of Jotun U.A.E, since the geographical activities of the other two entities were so dispersed regarding the amount of their sales revenues.

By exploring the answers of the fundamental analysis, seven variables were identified to have potential exploratory power. Since the paints are producing and selling in the local market and the neighboring countries, exchange rates among these countries is eliminated. I considered USD real effective exchange rate to see whether it shows any correlation. Real Effective exchange rate of none of the countries with which Jotun U.A.E has transactions, were available on IMF. On the other hand, due to Islamic banking of the Arab countries, interest rates were excluded from the model. Sales revenues both in AED currency –as the functional currency of Jotun U.A.E- and Norwegian Krone were regressed on the identified macroeconomic variables. The results of the regressions are presented in tables IV and V, respectively.

Oxelheim and Wihlborg (2008) point out to one aspect of pegged exchange rates is that an inflation differential relative to trading partners at a pegged exchange rate accumulates over time with an increasingly appreciated real exchange rate, which means inflation exposure under

fixed exchange rate regime could be serious for the firm. Table IV shows that CPI inflation in Dubai and Kuwait, assisting the sales revenues, while CPI inflation in Saudi Arabia seems to hurt revenues harshly. In summary, this model is somewhat un-even due to the lack of two out of three macroeconomic variables (interest rates and exchange change). However, absence of these variables does not eliminate their effects, but it is changing the sources from which they affect the firm.

Table IV.

Dubai CPI Index	**3,405**
Kuwait CPI Index	**6,889**
Saudi Arabia CPI Index	**-17,853**
Crude oil price Index	**,287**
$\boldsymbol{Adjusted\ R^2}$	**,657**
Durbin-Watson	**,429**

DV: Total seasonal adjusted Sales Revenues of External Decorative paints, Jotun U.A.E, in Arab Emirates Dirham

*****Unstandardized Coefficients of macroeconomic variables to seasonal adjusted Sales Revenues, Jotun U.A.E, Dubai.

*Significant at a 5% level.

Statistical results attached in the appendix under the title "3.A) Statistical Results, Jotun U.A.E." The coefficient of crude oil index to sales is low, I have kept it in the model because it has relatively strong unique exploratory value, as to the beta column in the coefficients table. According to adjusted R-squared, these variables are capable of explaining 65% of the variance of the dependent variable. All the variables have high t-values, which are very significant as well. Collinearity statistics does not indicate any problem. The F ratio, F(4,55)= 29,217 Sig.= ,000, indicate that at least one of the coefficients is non-zero. However, after bootstrapping based on 500 samples, only Saudi Arabia CPI index remained significant. Tests of normality table indicates that residuals are still non-normal distributed, the problem is mostly associated with the kurtosis (see descriptive statistics table and histogram). Durbin-Watson value of ,429 telling the story of autocorrelated residuals.

Table V.

Kuwait CPI Index	**7,670**
Saudi Arabia CPI Index	**-15,117**
NOK/AED	**,510**
$\boldsymbol{Adjusted\ R^2}$	**,738**
Durbin-Watson	**,546**

DV: Total seasonal adjusted Sales Revenues of External Decorative paints, Jotun U.A.E, in Norwegian Krone

***U**nstandardized Coefficients of macroeconomic variables to seasonal adjusted Sales Revenues, Jotun U.A.E, Dubai.

*Significant at a 5% level.

By adding the NOK/AED exchange rate to the regression and changing the dependent variable to sales revenues in Norwegian Krone, a very high correlation between this exchange rate and crude oil price were observed. Therefore, the crude oil price index removed from the regression, as well as CPI inflation in United Arab Emirates, which did not show significant coefficient to the dependent variable anymore. As it is observable in table V, R-squared claim that these three variables can explain 73% fluctuations of the sales revenues in Norwegian Krone. CPI inflation in Saudi Arabia still has the strongest effect, and after that comes the CPI inflation in Kuwait. The coefficient of the NOK/AED to sales revenues changes in Norwegian Krone is very low with relevance to other variables.

Statistical results are provided in the appendix under the title "3.B) Statistical Results, Jotun U.A.E." F(3,56)= 56,418 and Sig.= ,000 strongly saying that at least one of the coefficients is non zero. As to the coefficients table, each coefficient has high t-value and they are all very significant. In this model, bootstrap results based on 500 samples, coefficients stayed significant after the two-tailed test. Furthermore, according to Tests of Normality table the residuals are also normally distributed, however autocorrelated. Tolerance and VIF values in the coefficients table are not showing any multicollinearity problems.

4.2.5.A.4 Malaysia

Malaysia is among the business units, in which according to annual report 2014, large investments related to production facilities and buildings, accomplished there. Malaysia is a highly open upper-middle income economy. It was one of 13 countries identified by the Commission on Growth and Development in its Report (2008) to have recorded average growth of more than 7 percent per year for 25 years or more. However, The decline of crude oil prices that started in June compounded the effect of lower commodity export demand, and Growth is

projected to slow in 2015 (Director et al.). Malaysia stands at 18 in the ranking of 189 economies on the ease of doing business (2015).

Ten macroeconomic variables, which suspected to influence Jotun Malaysia's sales revenues, were identified after structural analysis of the firm and its competitors. Sales revenues of the Jotun Malaysia – both in functional local currency (MYR) and Norwegian currency, as the functional currency of the parent company- were regressed on the identified variables. The regressions results are presented in tables VI and VII.

Table VI.

Malaysia CPI Index	**12,906**
Malaysia Treasury Bill rate	**-,473**
$\boldsymbol{Adjusted\ R^2}$	**,265**
Durbin-Watson	**,358**

DV: Total seasonal adjusted Sales Revenues of External Decorative paints, Jotun Malaysia, in Malaysian Ringgit

*****Unstandardized Coefficients of macroeconomic variables to seasonal adjusted Sales Revenues, Jotun Malaysia.
*Significant at a 5% level.

Sales revenues in local functional currency only showed significant correlations with Malaysia Treasury Bill rate and CPI inflation in Malaysia. CPI has a positive effect on sales revenues of Jotun external decorative paints. Although the expectation about the relationship between inflation and sales is negative, however, existence of the competitors in the market, which are British and Japanese based companies, might be the reason of this positive effect. Treasury bill rate correlation with sales is low, but it increased the explanatory value of the model. It has negative effects on the seasonal adjusted sales revenues of External Decorative paints in Jotun Malaysia.

All the statistical tables are attached in the appendix under the title "4. A) Statistical results, Jotun Malaysia". ANOVA table shows F(2,57)= 11,663, sig. =,000. Meaning the null hypothesis that all the coefficients are equal to zero is rejected. However, the results after bootstrapping based on 500 samples show Malaysia Treasury Bill rate's coefficient failed to reject the null hypothesis. Coefficients table shows that t-values are high and significant. Shapiro-Wilk statistic is not significant, indicating that distribution of the residuals is normal; however, autocorrelation among residuals exists. Kurtosis and skewness are both satisfactory.

The results of the regression of sales revenues in Norwegian Krone, is presented in table VII. Three variables entered to the model. The results show that Appreciation of GBP versus NOK contributing to the sales revenues of the Jotun Malaysia anyway. However, depreciation of MYR versus CNY is not favoring the sales revenues in Norwegian Krone.

All the statistical tables are provided in the appendix under the title "4. B) Statistical results, Jotun Malaysia". CPI inflation in Malaysia has the largest regression coefficient (unstandardized) and NOK/GBP, has the strongest unique contribution in explaining the variance of the dependent variable (standardized coefficient). No multicollinearity has detected according to Tolerance and VIF. Moreover, t-values are high and significant rejecting the null hypothesize for all. ANOVA table showing us an overall good model fit with F ratio of F(3,56)= 16,206 Sig. = ,000. The entire coefficients remained significant after bootstrapping base on 500 samples. Shapiro-Wilk statistic is not significant at all, indicating the normal distribution of the residuals. A slight skewness among the variables existed. A positive autocorrelation exists between the residuals.

Table VII.

NOK/GBP	**2,223**
MYR/CNY	**-1,966**
Malaysia CPI Index	**17,077**
$\boldsymbol{Adjusted\ R^2}$	**,436**
Durbin-Watson	**,361**

DV: Total seasonal adjusted Sales Revenues of External Decorative paints, Jotun Malaysia, in Norwegian Krone

*****Unstandardized Coefficients of macroeconomic variables to seasonal adjusted Sales Revenues, Jotun Malaysia. *Significant at a 5% level.

4.2.5.B *Gap analysis: decomposition of sales revenues to "Intrinsic" changes and "Macro" changes*

At this step, we turn back to what has been explained theoretically at section 3.3, and decompose the changes in sales revenues into "Intrinsic changes" and "Macro changes". Percentage of Macro changes can be calculated by multiplying the unstandardized coefficients of each regression model by actual percentage changes in the macroeconomic variables of each entity for each period. I have explained in section 4.2.5.A, that the sales revenues in local functional currencies is going to be decomposed. Therefore, unless otherwise noted, the decomposition has been done on the functional currency of the entity.

4.2.5.B.1 Norway

With reference to equation (11), percentage of Macro changes in sales revenues of external decorative paints in Jotun A/S, is calculated for each period as below:

(13)

$$Percentage\ of\ \textbf{Macro}\ \text{Changes}\ in\ total\ seasonal\ adjusted\ sales\ revenues\ of\ Jotun\ AS =$$
$$12{,}205\ \left(\frac{NOK}{EURO}\ exchange\ rate\ \ percentage\ change\right) -$$
$$9{,}201\ \left(\frac{NOK}{SEK}\ exchange\ rate\ percentage\ change\right) +$$
$$21{,}437\ (Sweden\ PPI\ index\ percentage\ change) -$$
$$41{,}216\ (Norway\ CPI\ index\ percentage\ change)$$

Mathematically coefficients are the partial derivatives, which shows the sensitivity of the sales revenues to changes in each of the macroeconomic factors (see equation 8,9,10, section 3.3), other variables remain constant.

Accordingly, with reference to equation (12), the percentage of "Intrinsic" changes in the sales revenues of Jotun Norway, is calculated as:

(14)

$$percentage\ of\ \boldsymbol{Intinsic}\ changes\ in\ total\ seasonal\ adjusted\ sales\ revenues\ of\ Jotun\ AS =$$
$$percentage\ changes\ in\ \boldsymbol{total}\ seasonal\ adjusted\ sales\ revenues\ of\ Jotun\ AS -$$
$$percentage\ of\ \boldsymbol{Macro}\ changes\ in\ total\ seasonal\ adjusted\ sales\ revenues\ of\ Jotun\ AS$$

The results of the calculations are summarized in table 1.1 and figures 1.1, 1.2, 1.3.

Figures 1.1 shows that intrinsic sales has stayed above the total sales. This is while according to figure 1.2 macro changes has had opposite trends towards intrinsic sales during most of the period. Although at some points, such as May-Aug 2011, June 2013, or December 2014, the intrinsic changes dropped below the total sales. It seems that since May 2013, there is an overall decline in intrinsic sales. Since then, intrinsic sales has been mainly equal and sometimes below the total sales.

Figure 1.3, representing the cumulative "percentage of Macro, Total, and Intrinsic changes" in sales revenues. It means that the graphs connecting the ordered pairs of $(t\ ,\ \sum_{i=1}^{t} \%\Delta R_{I,M,T}^{i})$. This diagram illustrates the process of the changes in Intrinsic, Macro, and Total changes. The cumulative graph for Macro changes in Sales Revenues, has a negative slope, showing that

during the last five years, economic environment of Jotun A/S was not contributing to the sales. As it is visible, the negative effects of the macro economic variables, has kept the graph of total changes in sales revenues beneath the intrinsic changes. If the changes in macroeconomic variables were gifting to Jotun (positive slope in the red line), then the Total sales' graph would have been above all the graphs.

4.2.5.B.2 Spain

The Macro effect at each period for Jotun Iberica is calculated using the following expression:

(15)

$$percentage\ of\ \boldsymbol{Macro}\ changes\ in\ total\ seasonal\ adjusted\ sales\ of external\ decorative\ paints,\ Jotun\ Iberica$$
$$= -18{,}756(Spain\ CPI\ Index\ percentage\ change)$$
$$-\ 4{,}129(\frac{EUR}{GBP} exchange\ rate\ percentage\ change\ )$$
$$+\ {,}143(Spain\ Treasury\ Bill\ rate\ percentage\ change$$

Subsequently:

(16)

$$percentage\ of\ \boldsymbol{Intinsic}\ changes\ in\ total\ seasonal\ adjusted\ sales\ revenues\ of\ Jotun\ Iberica =$$
$$percentage\ changes\ in\ \boldsymbol{total}\ seasonal\ adjusted\ sales\ revenues\ of\ Jotun\ Iberica\ -$$
$$percentage\ of\ \boldsymbol{Macro}\ changes\ in\ total\ seasonal\ adjusted\ sales\ revenues\ of\ Jotun\ Iberica$$

The results of the calculations are summarized in table 2.1 and figures 2.1 ,2.2, 2.3.

According to the diagrams 2.1-2, except the collapse in intrinsic sales in Jun. 2014, the rest of the period intrinsic changes in sales revenues has been equal, slightly above or slightly below total sales. According to the cumulative figure 2.3, the intrinsic component of seasonal adjusted sales revenues for external decorative paints in Spain, has stayed above the actual sales. Since the sudden fall in intrinsic sales, the distance between blue and green graphs has decreased. Tooth-y shape of the red graph indicates more fluctuations in the macroeconomic environment of Jotun Iberica during the period.

4.2.5.B.3 U.A.E

The expression below shows how the percentage of Macro changes in total sales revenues of external decorative paints in Jotun U.A.E. Ltd. is calculated:

(17)

$$percentage\ of\ \boldsymbol{Macro}\ changes\ in\ total\ seasonal\ adjusted\ sales\ of\ external\ decorative\ paints,$$

$$Jotun\ U.A.E, in\ AED$$
$$= 3{,}405\ (United\ Arab\ Emirates\ CPI\ percentage\ change)$$
$$+ 6{,}889\ (Kuwait\ CPI\ Index\ percentage\ change)$$
$$- 17{,}853\ (Saudi\ Arabia\ CPI\ Index\ percentage\ change)$$
$$+ ,287\ (World\ Crude\ oil\ price\ Index\ percentage\ change)$$

Similarly, for intrinsic changes in total sales of the external decorative paints of the Jotun U.A.E will be:

(18)

$$percentage\ of\ \boldsymbol{Intinsic}\ changes\ in\ total\ seasonal\ adjusted\ sales\ revenues\ of\ Jotun\ U.A.E$$
$$= percentage\ changes\ in\ \boldsymbol{total}\ seasonal\ adjusted\ sales\ revenues\ of\ Jotun\ U.A.E$$
$$- percentage\ of\ \boldsymbol{Macro}\ changes\ in\ total\ seasonal\ adjusted\ sales\ revenues\ of\ Jotun\ U.A.E$$

The results of the calculations are summarized in table 3.1 and figure 3.1, 3.2, and 3.3.

According to the figure 3.1 intrinsic sales in Jotun U.A.E has been beyond the total sales, during almost all the first four years, but from 2014, it has been equal to total sales. The third diagram, representing the cumulative "percentage of Macro, Total, and Intrinsic changes" in sales revenues. Intrinsic and Total components are rising steadily, with a positive slope. Cumulative percentage of Macro changes on the other hand has a negative slope, with gentle changes. The negative slope of the graph indicates that the macroeconomic environment of the firm has influenced firm's sales revenues negatively overtime. It means that changes in the macroeconomic variables that are specific to Jotun U.A.E. made the company's performance look worse or better to say lower than its potential.

4.2.5.B.4 Malaysia

Similarly, percentage of Macro changes in total sales revenues of external decorative paints in Jotun Malaysia is calculated using the following expression:

(19)

$$percentage\ of\ \boldsymbol{Macro}\ changes\ in\ total\ seasonal\ adjusted\ sales\ of\ external\ decorative\ paints,$$

$$Jotun\ Malaysia$$
$$= 12{,}905\ (Malaysia\ CPI\ Index\ percentage\ change)$$
$$-\ ,473\ (Malaysia\ Treasury\ Bill\ Rate)$$

And,

(20)

$$percentage\ of\ \boldsymbol{Intinsic}\ changes\ in\ total\ sales\ revenues\ of\ Jotun\ Malaysia$$
$$= percentage\ changes\ in\ \boldsymbol{total}\ sales\ revenues\ of\ Jotun\ Malaysia$$
$$-\ percentage\ of\ \boldsymbol{Macro}\ changes\ in\ total\ sales\ revenues\ of\ Jotun\ Malaysia$$

The results of the calculations are summarized in table 4.1 and figures 4.1, 4.2 and 4.3.

Figures 4.1 shows intrinsic changes in sales revenues of Jotun Malaysia has been either equal to total changes or less and since 2013, it has slightly fallen from total sales. Figure 4.2 shows relatively stabilized, but above zero, macro changes graph. Recall that this model had the least R squared, meaning that a lower amount of the variance of the sales has been explained by macroeconomic variables. Figure 4.3 in this case is giving a better overview. Total and macro changes in the sales have positive slope in this diagram. Intrinsic sales has started to change negatively, form November 2010, and it remained at the same level - while zig-zagged and below the total sales- until May 2013, when it starts to have larger negative process. Positive slope of the macro changes in sales showing that although the red graph is almost levelled off in figure 4.2, but it has gradually had positive effects on sales during the period.

After observing the results of the sales decomposition for this entity, I decided to decompose the sales revenues translated in Norwegian Krone as well, since the regression model for the translated revenues has three variables and higher R squared. I was suspected to existence of other variables that could be entered to the model, and terminate other results. The table of the

monthly decomposed sales revenues is not presented due to space limitations. The results are displayed in Figures 4.4, 4.5, and 4.6.

Diagrams show that the second model also confirm previous conclusions. figure 4.4 now shows a bit larger interval between the total changes in sales and intrinsic sales. Figure 4.5 shows more fluctuations in “macro” sales, and yet it is mainly above zero. In fact, this model, in which all the coefficients were significant after two-tailed significant test too, shows more changes in the macro component of sales revenues, which have been effecting the sales revenues positively. In figure 4.6, the positive slope of the macro changes in cumulative graph has become steeper and the green graph’s slope dropped sharper. This negative travel, has affected “Total” sales revenues, in a way that ‘macroeconomic subsidies’ seems to become helpless, late in the period.

In conclusion, extracting out the macroeconomic effects form sales revenues, trigger the warning alarm for Jotun Malaysia, which has been underperforming during the period, in addition to the fact that this process has recessed overtime. This is while the changes in total sales revenues is not making us aware of this situation. In such a case which macroeconomic environment has been contributing to the sales, measuring the intrinsic sales is extremely crucial because by the day when macro conditions turns inverse the sales revenues of this entity will experience dramatic falls, far more than expectations.

4.2.6 Step 6. Improve

At this stage the analysis of the results will be shaped to guidelines for the company, therefore this step is of a high importance. According to Bhutta and Huq (1999), when analyzing results, the realization of the rationale for collecting more than statistics from benchmarking partners emerges. Authors emphasize that the understanding of variations in different companies’ processes along with enablers of superior performance, will help to identify strategies for improvement. According to Richman et al. (1993), the value of benchmarking does not lie in what can be copied, but in its ability to identify goals (cited by Herzog, Tonchia, and Polajnar (2009)).

4.2.6.1 Feedback

Table VIII. Sensitivity Coefficients of Macroeconomic variables to Sales Revenues of external Decorative paints, in company's local currency, and Norwegian Krone

	Jotun A/S	**Jotun Iberica**		**Jotun U.A.E.**		**Jotun Malaysia**	
Macroeconomic Variables*	NOK	EUR	NOK	AED	NOK	MYR	NOK
NOK/EUR	12,20 (,000)						
NOK/SEK	-9,20 (,000)						
Sweden PPI Index	21,42 (,001)						
Norway CPI Index	-41,20 (,000)						
NOK/GBP		--	-3,45 (,000)			--	2,223 (,000)
EUR/GBP		-4,12 (,000)	--				
Spain Treasury Bill rate		,143 (,027)	--				
UK PPI Index		--	-18,88 (,000)				
Spain CPI Index		-18,75 (,000)	-13,43 (,013)				
United Arab Emirates CPI				3,40 (,028)	--		
Kuwait CPI Index				6,88 (,000)	7,67 (,000)		
Saudi Arabi CPI Index				-17,85 (,000)	-15,11 (,000)		
World Crude Oil index				,287 (,000)	--		
NOK/AED				--	,510 (,001)		
Malaysia Treasury Bill Rate						-,473 (,006)	--
Malaysia CPI Index						12,906 (,016)	17,077 (,001)
MYR/CNY						--	-1,966 (,001)
Adjusted R-Squared	,713	,399	,465	,657	,738	,265	,436
D.W.	,922	,330	,277	,429	,546	,358	,361

According to table VIII, empirical results affirm that macroeconomic variables of four divisions that are not only in one industry, but within one corporation, are specific to that division, whether the sales were expressed in the local functional currency, or Norwegian Krone. One variable were mutual between Jotun Iberica and Malaysia: NOK/GBP, while sales revenues were expressed in Norwegian Krone. It turns out that Jotun Malaysia enjoy a depreciation in Norwegian Krone vis-à-vis Great Britain Pound, while this is NOT beneficial for Jotun Iberica.

Identified macroeconomic variables for Jotun U.A.E. and Jotun A/S were capable of explaining around 70% of the fluctuations in the sales revenues of External Decorative paints. Variables of Jotun Iberica explained 40% of the variance of the sales revenues, and for Malaysia, 26% of the fluctuations in local currency, and 43% of the fluctuations in sales in Norwegian Krone were explained by the identified variables.

Comparing figures 1.2,2.2,3.2, and 4,2, Jotun A/S' and Jotun Iberica's, sales revenues is more fluctuated than the other entities. "Intrinsic" component of the sales revenues were mainly above the "Total" changes in the sales revenues of external decorative paints, for the entities in Norway, Spain, and United Arab Emirates, however, it seems that a slight decline in intrinsic performance of these entities has started since 2013, which should not be overlooked. In general, these companies, have performed well, however, influences of macroeconomic environment of the firms, affected them negatively, therefore the actual (Total) sales revenues were underneath the "Intrinsic" changes in sales. The situation for Jotun Malaysia has been exactly in opposite. "Intrinsic" changes in sales revenues for Jotun Malaysia has been below the "Total" sales in almost all observations. Contribution of the macroeconomic environment of the firm has increased total sales. This means that if a world, net of macroeconomic events could be imagined, the Sales Revenues of Jotun Malaysia would be far below the current numbers in that world.

The mean value of the percentage of "Macro" changes in sales revenues is negative for all under-study Jotuns, except Malaysia (table IX). Negative impacts of macro price variables for Jotun A/S and Iberica has been more than Jotun U.A.E during the period. This can be seen from comparing cumulative graphs (figures 1.3, 2.3, 3.3, 4.3) and from mean value of the changes in sales due to macroeconomic fluctuations (table IX). This is not representing a better or worse economic regime for any of these countries. Its demonstrating that macroeconomic environment of Jotun U.A.E., is less "noisy". This macroeconomic environment is specific to Jotun, in United Arab Emirates, and not necessarily other competitors active in that region. Close

competitors could therefore be affected differently by one and the same macroeconomic change (Andrén and Oxelheim March 12, 2002).

Table IX.

Company		%Total changes in Sales Revenues	%Intrinsic changes in Sales Revenues	%Macro changes in Sales Revenues	$\frac{Mean\ \%\ Intrinsic}{Mean\ \%\ Total}$
Jotun A/S	Mean	17,03	23,73	-6,70	1,62
	Std. Dev	41,89	53,07	30,58	
Jotun Iberica	Mean	4,67	6,69	-2,02	1,43
	Std. Dev	19,99	24,20	17,55	
Jotun U.A.E	Mean	1,02	4,11	-3,09	4,02
	Std. Dev	9,42	11,16	6,41	
Jotun Malaysia	Mean	3,57	1,46	2,11	0,40
	Std. Dev	28,36	27,80	2,96	

Table IX show that The highest proportion of average "Intrinsic" changes in "Total" changes of sales revenues belongs to Jotun U.A.E and thereafter, to Jotun A/S, and Jotun Iberica, respectively. This proportion for Malaysia is lower than one. The results for both models of Jotun Malaysia, showed that the process of negative changes in "Intrinsic" sales of Jotun Malaysia has started from July 2010, and continued until now. Table IX also say that if we look at total seasonal adjusted changes, in average Jotun A/S has had highest growth, however, the proportion of average intrinsic growth to total, shows that Jotun U.A.E. has the best performance in terms of sustainable growth.

In the annual Report of 2014, Jotun mention that its geographical footprint and presences within its different business segments reduce the Group's net exposure by way of natural hedge. Moreover, I mentioned earlier that Jotun translates the incomes of entities to Norwegian Krone with the rate at the date of transaction. It is true that adopting such actions might aid management in "risk sharing" context, howsoever, the results specify that sources of macro-impacts might changes, but cannot be blocked. Divisions are exposed to fluctuations of their macroeconomic environment even in a region such as United Arab Emirates, which Exchange rate and interest rate is removed, but this removal is only a superficial action. "By definition,

exchange rate risk was removed from intra-EMU transactions, but did firms thereby become less exposed to macroeconomic risk? Not necessarily, since macroeconomic shocks occur under any exchange rate regime, the shocks affect the economy and firms through different channels" (Oxelheim and Wihlborg 2008).

In conclusion, the results authenticate the fact that first, macroeconomic variables affecting firms' performance are division-specific, therefore industrial averages or individual companies are not adequate scales for benchmarking. Second, actual results of performance are not able to send correct messages for management, because they are distorted by influences of macroeconomic variables.

It is worth mentioning that after decomposing sales revenues for Malaysia in both currency, I have tried the sales decomposition for other entities, for sales in Norwegian Krone as well. For all the cases, the results lead to a same conclusion, as decomposition of sales in local currency.

4.2.6.1 Improvements

According to Drew (1997) benchmarking is now one of the most popular tools for strategic management, and an empirical research shows that benchmarking is closely associated with the success of business processes. However, Macroeconomic fluctuations affect firm's cash flows as well as market values, and these fluctuations are beyond management control (Oxelheim and Wihlborg 2003). By filtering out the (temporary) macroeconomic "noise" from corporate performance as a first step, a picture is obtained of the "intrinsic" performance, that is a measure of the company's competitiveness (Oxelheim and Wihlborg 2008).

"The whole point behind benchmarking is understanding where to make the improvement", "the number is only the trigger" (Bhutta and Huq 1999). Identification of special character of each subsidiary, related to its macroeconomic environment is of a high value since, the economic conditions of a country or an industry, are not capable of explaining the Macro fluctuations in firm's performance. Efficiency analysis is performed not only to estimate the current level of efficiency, but also to provide information on how to remove inefficiency, that is, to obtain benchmarking information (Baek and Lee 2009). Therefore, the first step in process benchmarking, and/or strategic benchmarking, is extracting "intrinsic" performance. Thereafter, by comparing the intrinsic function of each subsidiary, the 'best practice' could be determined. Bearing this knowledge about the divisions of a firm, then the investigation in processes could be started in order to find out HOW the successful division achieved those results. The essence of benchmarking is the process of identifying the highest standards of

excellence for products, services, or processes, and then making the improvements necessary to reach those standards (Bhutta and Huq 1999).

Jotun evaluation mechanism is based on several factors. Nevertheless, as a very general formula, evaluation of different entities' performance in Jotun Group, is according to their performance expressed in functional local currency, since the divisions are not supposed to be punished by out of control changes in the translation exchange rates[3]. Each company's performance is assessed according to the national economic growth of the country in which it is located, and normally, whenever there is 4-5% growth in the GDP, 6-7% growth is expected to occur in Decorative segment[4].

In order to illustrate the consequences of such evaluation mechanism, in figure 4.7, I have compared the quarterly growth in total sales of external decorative paints for Jotun A/S with the quarterly GDP growth in Norway. The first criticism point out that it is not possible to explain how much of the rise and falls in the sales revenues is attributed to GDP changes. In addition, there is a false reasoning issue which is associated with this evaluations mechanism. For instance, actual sales for Jotun A/S, had a negative growth in the third quarter of 2013, while the GDP growth in that quarter was positive. If we take a look at the decomposed sales revenues for this unit (table 1.1), the intrinsic sales has been positive during that period, while macro changes were negative. Meaning that during the same period where economic growth has been positive according to GDP index, macroeconomic environment of Jotun A/S has impacted this entity negatively. Relevant story is appointed to other intervals during this five years period for Jotun A/S and other entities. It is well known in the incentive contract literature that if risk-averse manager's remuneration is linked to noise factors beyond their control without strong linkage to shareholder value, then their incentive to exert effort on behalf of shareholders may be weakened (Oxelheim and Wihlborg 2003).

The economic motivation for analyzing the impact of macroeconomic fluctuations on executive compensation is that changes in performance-based compensation caused by macroeconomic events may weaken or distort incentives of shareholders value (Oxelheim, Wihlborg, and Zhang 2008). According to Thomsen and Conyon (2012), Nordic countries corporate governance is close to stakeholder model, executive compensation is more modest and less incentivized than

[3] Stolpestad, Svein, (Group vice president, Business Development & strategy), interview by author, personal interview, Jotun, Sandefjord, Norway, May 18, 2015
[4] Stolpestad, Svein, (Group vice president, Business Development & strategy), interview by author, personal interview, Jotun, Sandefjord, Norway, May 18, 2015

in other high-income countries. Though, this does not make less of manager's incentives in stakeholder models. Performance evaluations of the subsidiaries must be according to the Intrinsic changes, and manager's compensation and reward system should be adjusted by these changes rather than actual changes.

On the other side, cash flow effects caused by macroeconomic changes can sometimes be influenced by management to the extent macroeconomic developments can be forecast, or if firms can invest in flexibility with respect to sourcing, pricing, location of production, or location of sales in response to anticipated and/or unanticipated macroeconomic development (Oxelheim and Wihlborg 2003). Such investment decisions, ought to be made on an understanding of specific macroeconomic situation of the firm. The objective of decomposition of components is the fact that this knowledge could affect the strategy for dealing with a distress situation by restructuring of assets, liabilities or management change (Oxelheim and Wihlborg 2012). Investments in flexibility or so-called real options in the face of uncertainty, increase wealth by reducing the need to incur irreversible costs (Oxelheim and Wihlborg 2008).

Significant growth in results, could distort the evaluations, as the results are brilliant by numbers. However, when it comes to intrinsic growth, which is severely associated with firm's sustainability, these positive outcomes might falsify the focus of the company from an intrinsic growth, to a set of temporary results. The former can be feasible by a comprehend knowledge regarding the potential advantages of the firm, risk exposures and the channels in which these exposures occur.

5. Discussions

5.1 Conclusions

I have discussed that macroeconomic turbulences have impacts on the firms' performance. These actual numbers reporting the performance of the firm, are not always reflecting the "intrinsic" actions, and therefore disrupt any decision-making based on "unfiltered" values. Most of the benchmarking projects have an internal view to the process of the company. Performance evaluations, benchmarking, and strategic decisions, are all aim to ensure sustainability, however, as long as the inherent performance is covered by macroeconomic disturbances, it is not of a guiding value for management. Hence, Benchmarking with process improvement intention, investment or divestment decisions, evaluation objectives, and business developments have to be in accordance to purified measurements.

Performance measurements purification, is only possible through an in-depth perception of channels from which firm is affected. I argued that similar to macroeconomic environment of the firm, which is specific to that very firm, macroeconomic variables effecting different subsidiaries within one firm are also specific to that particular unit. Therefore, internal performance benchmarking will not contribute to the competitiveness of a firm, unless these variables are identified and their effects are removed. "Cleansing" macroeconomic actions need to be viewed as a definite complementary process in benchmarking.

In order to illustrate the consequences of these arguments, I have considered 'Sales Revenues of External Decorative paints' for four divisions of Jotun Group from 2010 until the end of 2014. Benchmarking steps are inspired from Andersen (2007) benchmarking wheel. Analysis of macroeconomic environment of the divisions, is according MUST-analysis approach, developed by Oxelheim and Wihlborg (2008). The results showed that macroeconomic variables, affecting sales revenues, are completely different for each entity, affirming the division-specific idea of the study. Thereafter, sales revenues of each entity decomposed into "intrinsic" and "macro" components. The results from sales revenues decomposition showed that not only intrinsic changes in sales revenues and observed results are unequal, but also they can be opposite in some cases. This certifies the claim that actual results can falsify the interpretations of the firm's performance. Therefore, benchmarking processes must be obliged to adopt a comprehensive internal and external analysis of factors influencing firm's performance, otherwise they are paralyzed of providing constructive guidelines.

5.2 Limitations and Suggestions

Aside from the econometric problems of the time series that is described in the paper, there are a few more obstacles, which might have consequences on the results.

Benchmarking partners in this study, are all at the same level of maturity with production facilities, however, not at the same size in terms of sales revenues of External Decorative paints. One reason is that I had to be flexible in terms of the scope of the cooperation with the company. Therefore, among the offered options in which Jotun confirmed to provide data, these four companies were the best alternatives. The second reason is that, since the focus was on external decorative paints, considering that each company is active in almost all the business segments, discovering a group of partners at the same size in sales revenues of the "External Decorative" paints was somewhat over demanding. Therefore, in the step for choosing benchmarking decisions, I dropped the size option, and chose the companies that have production facilities, in countries with interesting economic characters, and at the same maturity level.

Narrowing down the scope of the study, to this extend might have altered some of the results. The undertaken study area is shrank to "part" of one out of four business segments of Jotun Group, meaning External part of Decorative paints. Whereas, each company is producing and selling other products as well, there are definitely items such as purchasing raw materials, or marketing activities that are affecting overall sales or costs of the company, but their influences might be totally extracted from, or heavily loaded on the considered model. This could be one reason why some coefficients were so large and some so low, in addition to the probable effects that might had on the model prediction power. I guess considering the total sales revenues of each entity, could revealed a clearer pattern in the coefficients. However, there were constraints regarding gathering all the information needed.

Finally, "time Lag" hasn't been considered in this paper. There is a time lag between changes in the selected macroeconomic variables - exchange, interest, inflation - and changes in sales[5]. Meaning whenever the exchange rate of importing goods depreciates, the price of the products or the sales revenues will not drop at the same period, however it will happen with a time lag. "This information can be obtained if lags of independent variables are included. With this specification, the sensitivity of cash flows in the current period to macro variables in the current period and the previous periods is obtained. This information enable management to hedge

[5] Stolpestad, Svein, (Group vice president, Business Development & strategy), interview by author, personal interview, Jotun, Sandefjord, Norway, May 18, 2015

exposure every six month with a one-year time horizon" (Oxelheim and Wihlborg 2008). I explained that the focus of this paper is on backward-looking aspect of MUST-analysis, but anyhow, considering time lag in the analysis, is of high interest and importance for further researches, and forecasting purposes.

It has been pointed out that the choice of dependent variable has to do with the objective of the study and exposure management. Different measures could be used for different strategic decisions. For instance, price or quantity, which constitute the sales revenues function, can separately participate in such analysis, for a particular product, instead of a company or firm. Price and its correspondence to macroeconomic events for pricing strategies, and quantity can be the dependent variable for considering the product life cycle and launching of an innovative product into the market. In the end, fruits of MUST-analysis are a set of regression coefficients, which can be translated into useful information.

MUST analysis, is a multi-task managerial tool, which is not just a suggestion for improvement, but it is a necessity for survival. Firms at different level and size, with global or domestic activities, are doomed to deal with macroeconomic uncertainties. Neglecting this issue will take the opportunity of being prepared for the upcoming events from management.

Appendix

1. Statistical results, Jotun A/S

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,856[a]	,732	,713	13,40990282	,922

a. Predictors: (Constant), S(Norway_CPI), S(Sweden_PPI), S(NOK_EURO), S (NOK_SEK)

b. Dependent Variable: S(NOK_Seasonal adjusted sales_Norway)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27075,878	4	6768,970	37,642	,000[b]
	Residual	9890,402	55	179,825		
	Total	36966,281	59			

a. Dependent Variable: S(NOK_Seasonal adjusted sales_Norway)

b. Predictors: (Constant), S(Norway_CPI), S(Sweden_PPI), S(NOK_EURO), S(NOK_SEK)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	19,696	1,962		10,040	,000	15,764	23,628					
	S(NOK_EURO)	12,205	2,138	,457	5,708	,000	7,920	16,490	,370	,610	,398	,759	1,318
	S(NOK_SEK)	-9,201	2,325	-,344	-3,958	,000	-13,860	-4,542	-,430	-,471	-,276	,642	1,557
	S(Sweden_PPI)	21,437	5,823	,296	3,682	,001	9,767	33,106	,374	,445	,257	,751	1,332
	S(Norway_CPI)	-41,216	6,894	-,457	-5,978	,000	-55,031	-27,400	-,666	-,628	-,417	,832	1,201

a. Dependent Variable: S(NOK_Seasonal adjusted sales_Norway)

Bootstrap for Coefficients

Model	B	Bootstrap[a]				
		Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
					Lower	Upper
1	19,696	-,748	2,052	,002	15,182	22,800
	12,205	-2,294	5,079	,168	-1,356	17,310
	-9,201	1,686	4,377	,242	-14,139	1,507
	21,437	-2,335	8,831	,182	2,015	35,978
	-41,216	5,700	15,401	,150	-58,704	-4,311

a. Unless otherwise noted, bootstrap results are based on 500 bootstrap samples

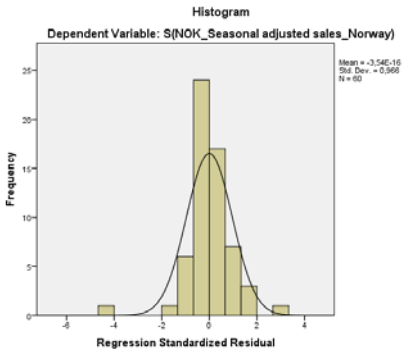
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Studentized Residual	,180	60	,000	,769	60	,000

a. Lilliefors Significance Correction

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Studentized Residual	60	-6,31683	3,36888	-,0195399	1,16298108	-2,211	,309	14,815	,608
Valid N (listwise)	60								



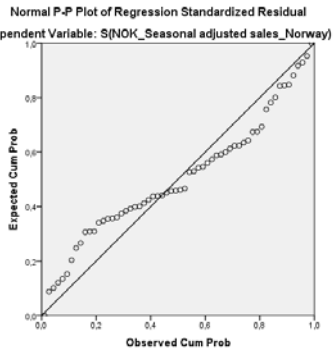


Table 1.1 Sales Revenues decomposition, External Decorative paints, Jotun A/S, Norway, Norwegian Krone

Date	**%Total** changes in seasonal adjusted Sales Revenues	**%Intrinsic** changes in total seasonal adjusted Sales Revenues	**%Macro** changes in total seasonal adjusted Sales Revenues
Jan 2010	-	-	-
Feb 2010	15,34	139,38	-124,04
Mar 2010	19,24	33,51	-14,27
Apr 2010	30,71	40,08	-9,38
May 2010	-26,07	-50,25	24,17
Jun 2010	72,77	49,68	23,09
Jul 2010	5,05	-3,10	8,16
Aug 2010	13,67	15,94	-2,27
Sep 2010	45,95	91,13	-45,18
Oct 2010	-13,91	-18,97	5,06
Nov 2010	61,74	77,20	-15,47
Dec 2010	29,75	74,87	-45,12
Jan 2011	-140,08	-151,94	11,86
Feb 2011	19,94	42,17	-22,23
Mar 2011	46,71	31,24	15,46

Apr 2011	-13,51	-7,79	-5,72
May 2011	32,33	44,25	-11,93
Jun 2011	5,64	-45,21	50,85
Jul 2011	20,69	5,59	15,09
Aug 2011	30,89	-2,27	33,16
Sep 2011	1,37	31,77	-30,40
Oct 2011	27,14	64,86	-37,72
Nov 2011	11,08	-4,96	16,03
Dec 2011	26,01	44,50	-18,49
Jan 2012	-72,36	-71,62	-0,73
Feb 2012	30,30	71,00	-40,71
Mar 2012	23,12	4,05	19,07
Apr 2012	4,63	4,38	0,25
May 2012	5,32	19,58	-14,25
Jun 2012	44,77	45,43	-0,66
Jul 2012	-1,59	46,74	-48,33
Aug 2012	9,39	-0,46	9,85
Sep 2012	12,47	67,19	-54,72
Oct 2012	20,56	35,22	-14,66
Nov 2012	7,19	1,99	5,19
Dec 2012	20,01	31,14	-11,13
Jan 2013	50,52	32,07	18,45
Feb 2013	1,63	50,01	-48,38
Mar 2013	-7,95	53,80	-61,74
Apr 2013	58,21	73,47	-15,27
May 2013	-13,06	-21,91	8,85
Jun 2013	-0,78	-65,13	64,35
Jul 2013	34,91	47,74	-12,84
Aug 2013	16,23	8,95	7,27
Sep 2013	10,54	31,53	-20,99
Oct 2013	35,42	43,27	-7,85
Nov 2013	-11,94	-25,07	13,13
Dec 2013	-1,88	-38,41	36,53
Jan 2014	230,85	230,72	0,13
Feb 2014	17,16	59,73	-42,56
Mar 2014	5,68	1,79	3,89
Apr 2014	16,97	24,71	-7,74
May 2014	43,87	15,13	28,75
Jun 2014	13,23	-14,86	28,09
Jul 2014	6,27	38,70	-32,43
Aug 2014	-3,99	-15,74	11,75
Sep 2014	30,84	67,80	-36,96
Oct 2014	12,04	-5,83	17,87
Nov 2014	-5,43	8,51	-13,94
Dec 2014	39,14	42,90	-3,76

Mean	17,03	23,73	-6,70
Std. Dev.	41,89	53,07	30,58

Figure 1.1

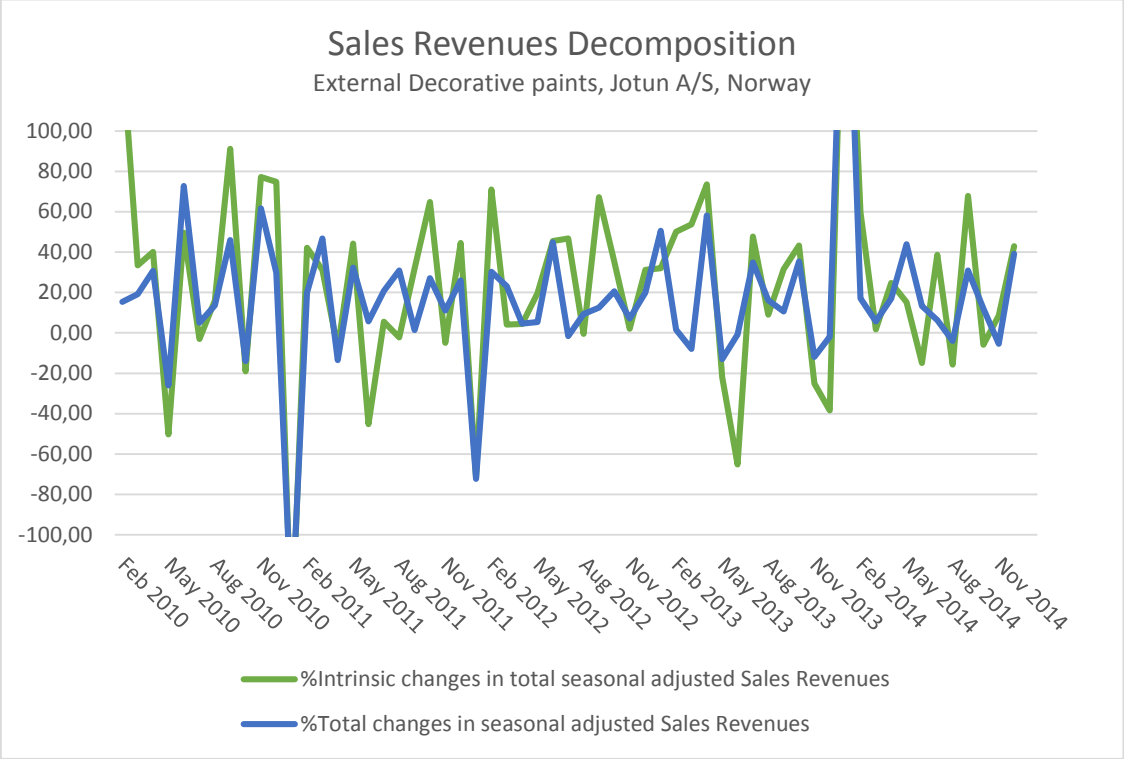


Figure 1.2

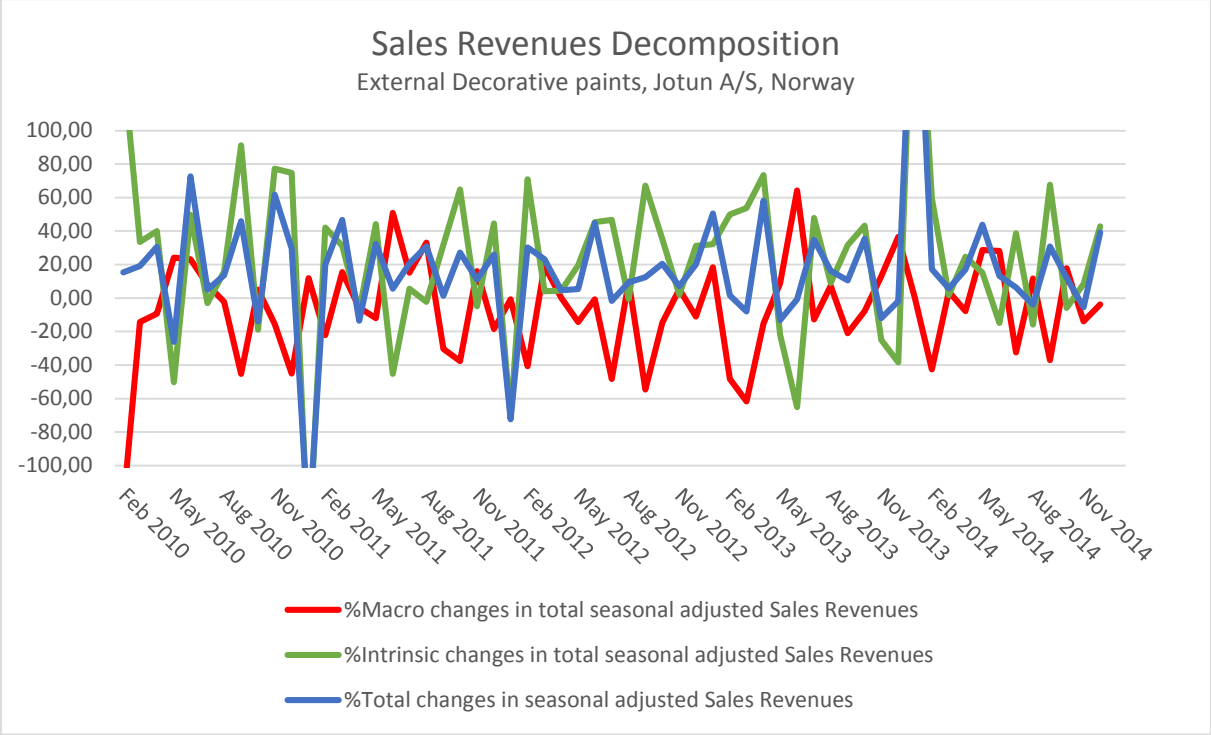
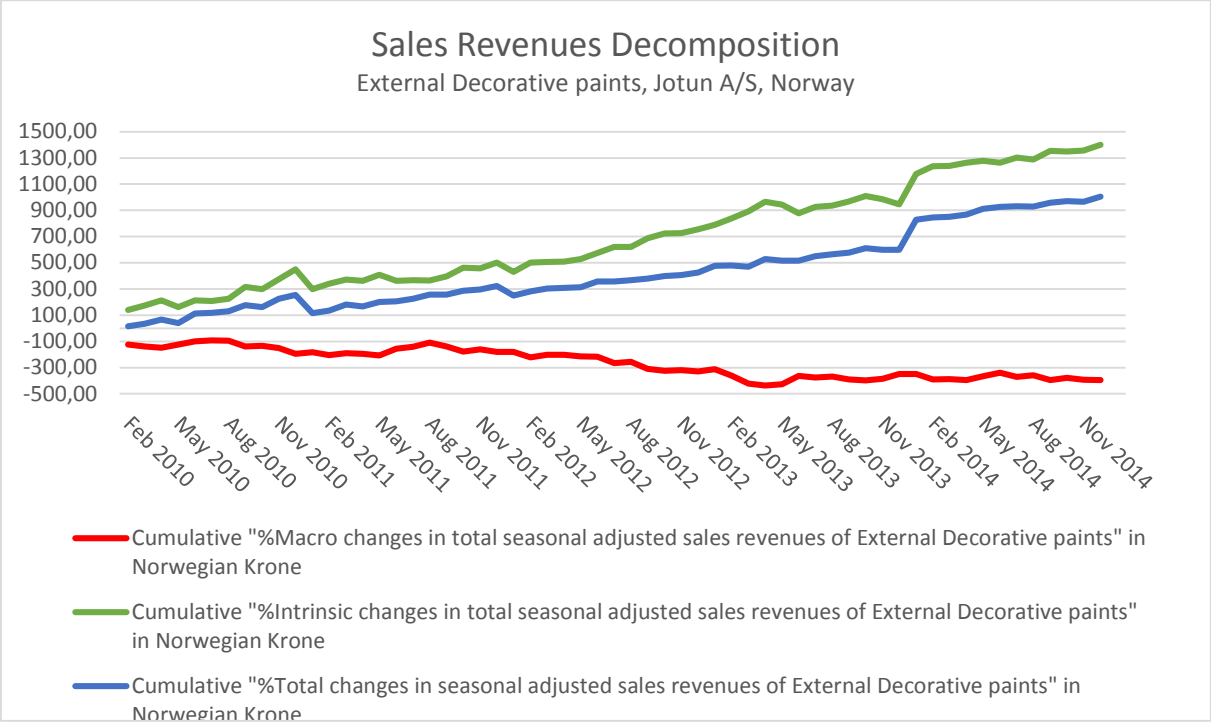


Figure 1.3



2. A) Statistical Results, Jotun Iberica

DV= Total Sales Revenues of External Decorative paints in Euro, Jotun Iberica

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,655[a]	,429	,399	5,82415108	,330

a. Predictors: (Constant), S(Spain_Treasury Bill rate), S(Spain_CPI), S(EUR_GBP)

b. Dependent Variable: S(EUR_seasonal adjusted sales_Spain)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1428,555	3	476,185	14,038	,000[b]
	Residual	1899,561	56	33,921		
	Total	3328,116	59			

a. Dependent Variable: S(EUR_seasonal adjusted sales_Spain)

b. Predictors: (Constant), S(Spain_Treasury Bill rate), S(Spain_CPI), S(EUR_GBP)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	9,256	1,143		8,101	,000	6,968	11,545					
	S(Spain_CPI)	-18,756	4,353	-,442	-4,309	,000	-27,476	-10,037	-,375	-,499	-,435	,971	1,030
	S(EUR_GBP)	-4,129	,779	-,578	-5,303	,000	-5,688	-2,569	-,419	-,578	-,535	,857	1,167
	S(Spain_Treasury Bill rate)	,143	,063	,246	2,271	,027	,017	,270	,088	,290	,229	,869	1,150

a. Dependent Variable: S(EUR_seasonal adjusted sales_Spain)

Bootstrap for Coefficients

Model		B	Bootstrap[a]				
			Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
1	(Constant)	9,256	-,263	2,000	,002	5,245	12,857
	S(Spain_CPI)	-18,756	,436	6,731	,014	-31,917	-5,744
	S(EUR_GBP)	-4,129	,298	1,600	,022	-6,590	-,751
	S(Spain_Treasury Bill rate)	,143	-,010	,064	,076	,005	,259

a. Unless otherwise noted, bootstrap results are based on 500 bootstrap samples

Tests of Normality

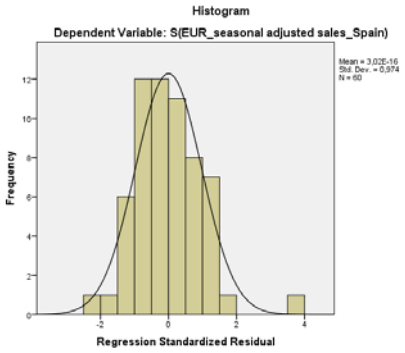
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Studentized Residual	,074	60	,200*	,932	60	,003

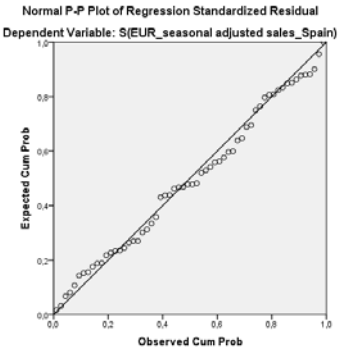
*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Studentized Residual	60	-2,19596	4,39395	,0114420	1,04525355	1,058	,309	4,016	,608
Valid N (listwise)	60								





2. B) Statistical Results, Jotun Iberica

DV= Total Sales Revenues of External Decorative paints in Euro, Jotun Iberica

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,702[a]	,492	,465	5,63668610	,277

a. Predictors: (Constant), S(Spain_CPI), S(NOK_GBP), S(UK_PPI)

b. Dependent Variable: S(NOK_seasonal adjusted sales_Spain)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1724,759	3	574,920	18,095	,000[b]
	Residual	1779,245	56	31,772		
	Total	3504,004	59			

a. Dependent Variable: S(NOK_seasonal adjusted sales_Spain)

b. Predictors: (Constant), S(Spain_CPI), S(NOK_GBP), S(UK_PPI)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	12,629	1,259		10,031	,000	10,107	15,151					
	S(NOK_GBP)	-3,451	,602	-,684	-5,732	,000	-4,657	-2,245	-,252	-,608	-,546	,637	1,571
	S(UK_PPI)	-18,882	4,807	-,559	-3,928	,000	-28,512	-9,253	-,335	-,465	-,374	,448	2,232
	S(Spain_CPI)	-13,439	5,227	-,308	-2,571	,013	-23,910	-2,967	-,431	-,325	-,245	,630	1,586

a. Dependent Variable: S(NOK_seasonal adjusted sales_Spain)

Bootstrap for Coefficients

Model		B	Bootstrap[a]				
			Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
1	(Constant)	12,629	-,991	2,740	,002	5,663	15,947
	S(NOK_GBP)	-3,451	,388	1,398	,016	-5,117	-,066
	S(UK_PPI)	-18,882	,579	4,749	,002	-27,554	-9,405
	S(Spain_CPI)	-13,439	2,700	6,953	,108	-23,501	3,126

a. Unless otherwise noted, bootstrap results are based on 500 bootstrap samples

Tests of Normality

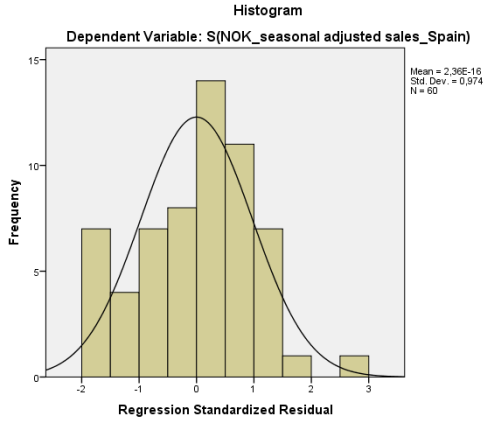
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Studentized Residual	,097	60	,200*	,956	60	,030

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Studentized Residual	60	-1,96451	3,77348	,0259777	1,05495269	,426	,309	1,481	,608
Valid N (listwise)	60								



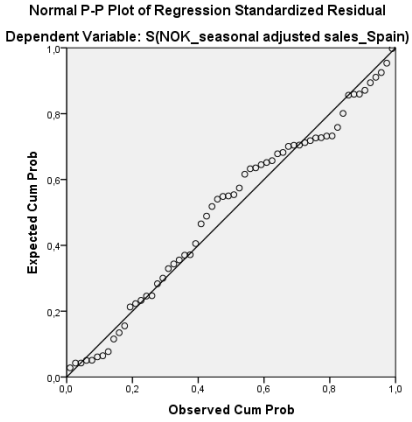


Table 2.1 Sales Revenues decomposition, External Decorative paints, Jotun Iberica, Spain, Euro

Date	%Total changes in Seasonal adjusted Sales Revenues	%Intrinsic changes in total seasonal adjusted Sales Revenues	%Macro changes in total seasonal adjusted Sales Revenues
Jan 2010	-	-	-
Feb 2010	11,44	-4,36	15,81
Mar 2010	57,49	73,75	-16,26
Apr 2010	-20,25	3,14	-23,39
May 2010	-7,59	2,00	-9,59
Jun 2010	29,29	40,24	-10,95
Jul 2010	-4,83	-21,89	17,06
Aug 2010	-1,65	12,23	-13,88
Sep 2010	29,40	13,61	15,78
Oct 2010	-6,26	4,55	-10,81
Nov 2010	21,48	44,38	-22,90
Dec 2010	-42,77	-45,17	2,40

Jan 2011	33,98	18,52	15,46
Feb 2011	-11,86	-2,05	-9,81
Mar 2011	9,54	9,72	-0,18
Apr 2011	-15,85	0,42	-16,27
May 2011	4,30	13,65	-9,35
Jun 2011	12,88	-5,05	17,93
Jul 2011	-3,13	-3,89	0,76
Aug 2011	9,03	6,44	2,60
Sep 2011	-9,59	4,86	-14,44
Oct 2011	-8,09	2,37	-10,46
Nov 2011	7,21	16,30	-9,09
Dec 2011	-4,88	12,74	-17,61
Jan 2012	-5,48	-19,11	13,63
Feb 2012	45,50	46,09	-0,58
Mar 2012	-10,94	7,84	-18,78
Apr 2012	-26,81	0,63	-27,44
May 2012	27,03	25,76	1,27
Jun 2012	-10,93	-21,95	11,02
Jul 2012	0,65	9,24	-8,59
Aug 2012	12,72	19,89	-7,17
Sep 2012	-24,92	-5,58	-19,34
Oct 2012	18,48	31,01	-12,53
Nov 2012	-2,28	-5,23	2,95
Dec 2012	32,17	20,91	11,26
Jan 2013	-7,57	-37,04	29,47
Feb 2013	-30,76	-30,63	-0,13
Mar 2013	6,58	22,75	-16,17
Apr 2013	52,52	64,43	-11,91
May 2013	4,56	3,03	1,53
Jun 2013	-16,70	-17,00	0,30
Jul 2013	11,02	-5,91	16,94
Aug 2013	-4,53	8,55	-13,08
Sep 2013	20,66	26,29	-5,63
Oct 2013	7,33	12,77	-5,44
Nov 2013	-13,05	1,42	-14,48
Dec 2013	27,56	23,50	4,06
Jan 2014	-9,07	-23,25	14,18
Feb 2014	11,25	9,31	1,94
Mar 2014	8,40	14,40	-6,00
Apr 2014	2,54	21,05	-18,51
May 2014	-22,96	-16,09	-6,87
Jun 2014	26,72	44,43	-17,71
Jul 2014	22,45	-68,79	91,24
Aug 2014	-8,40	-1,91	-6,48
Sep 2014	15,28	25,45	-10,16

Oct 2014	0,19	-3,16	3,34
Nov 2014	9,81	2,67	7,14
cDec 2014	17,42	12,57	4,85
Mean	4,67	6,69	2,02
Std. Dev.	19,99	24,20	17,55

Figure 2.1

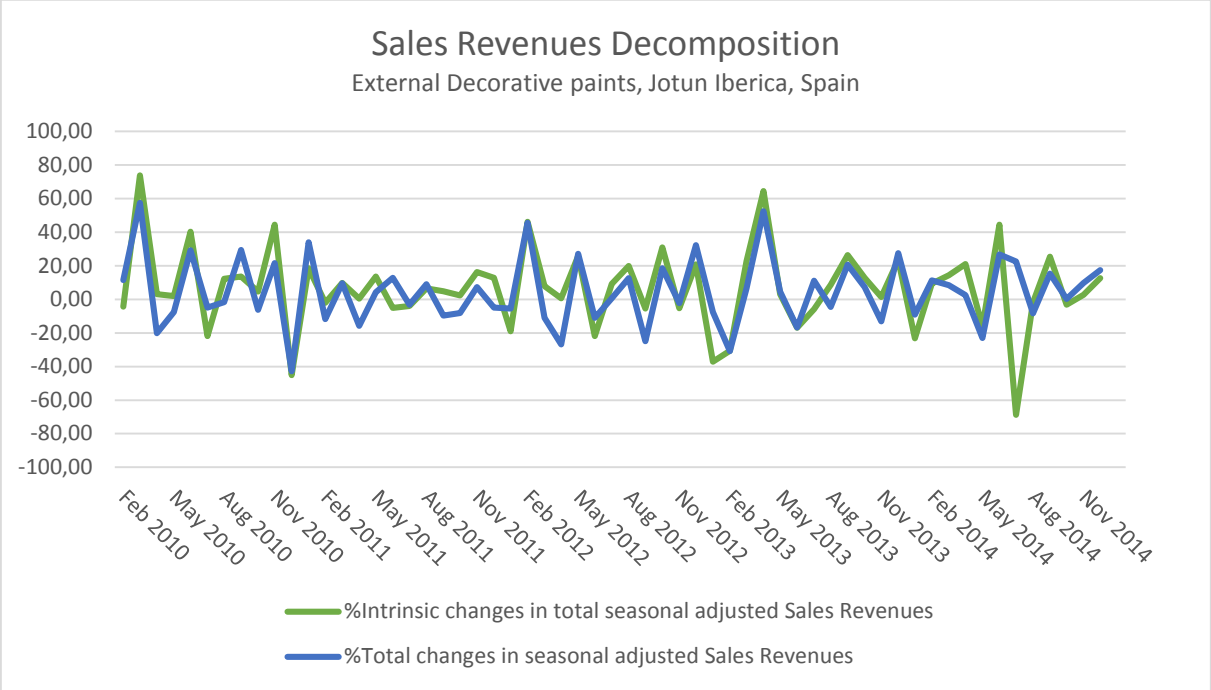


Figure 2.2

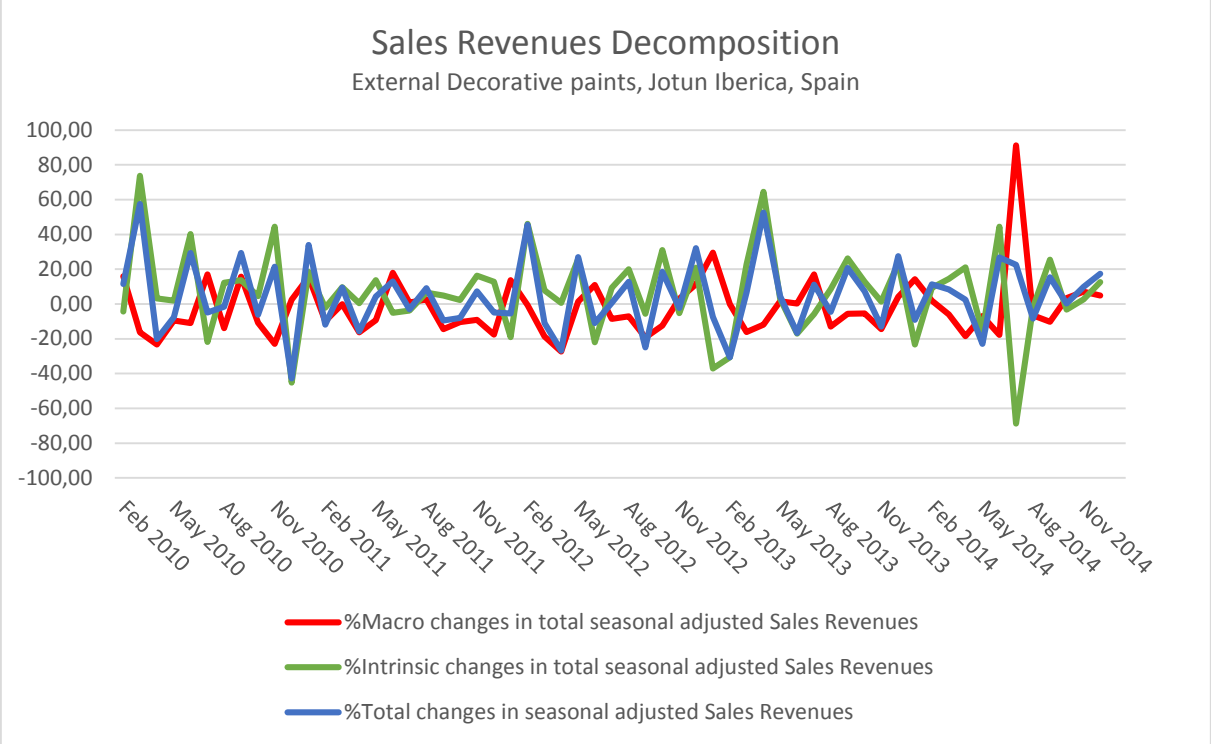
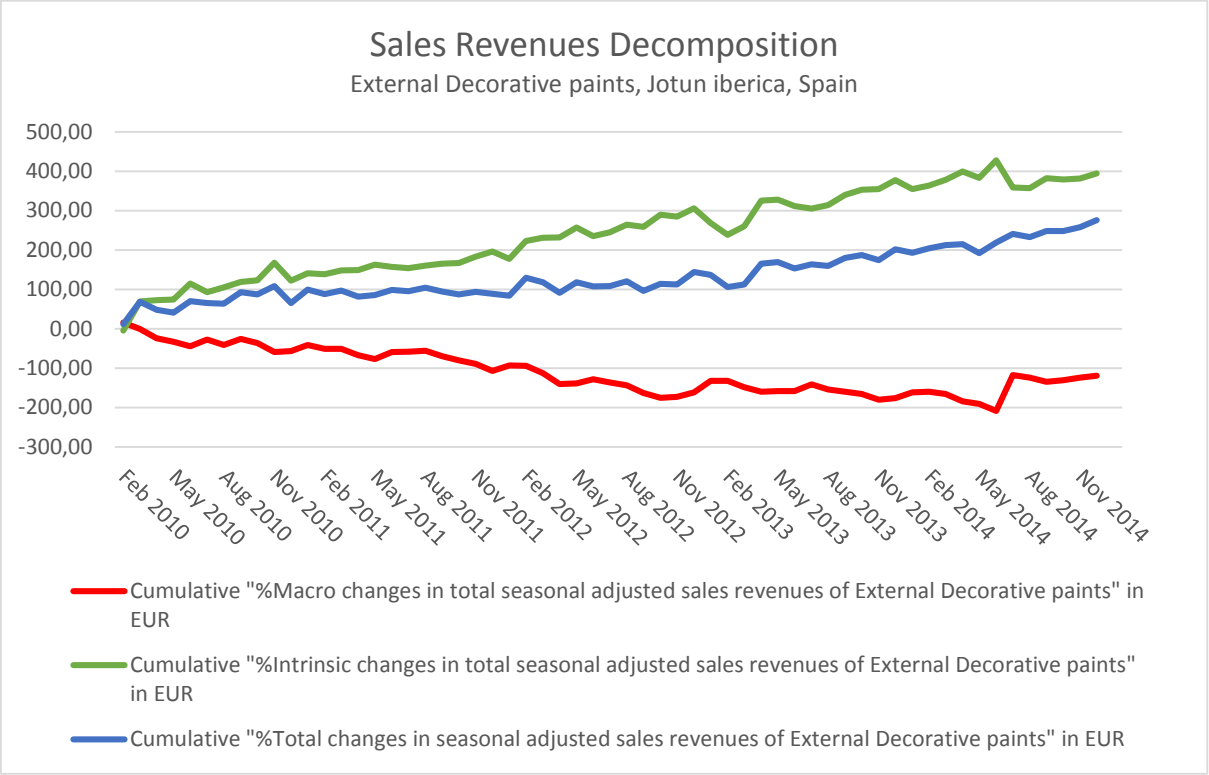


Figure 2.3



3. A) Statistical Results, Jotun U.A.E

DV= Total Sales Revenues of External Decorative paints in Arab Emirates Dirham, Jotun U.A.E.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,825[a]	,680	,657	1,62182079	,429

a. Predictors: (Constant), S(Crude_Oil), S(State of Kuwait_CPI), S(Kingdom of Saudi Arabia_CPI), S(United Arab Emirates_CPI)

b. Dependent Variable: S(AED_Seasonal Adjusted Sales_U.A.E)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	307,397	4	76,849	29,217	,000[b]
	Residual	144,667	55	2,630		
	Total	452,063	59			

a. Dependent Variable: S(AED_Seasonal Adjusted Sales_U.A.E)

b. Predictors: (Constant), S(Crude_Oil), S(State of Kuwait_CPI), S(Kingdom of Saudi Arabia_CPI), S(United Arab Emirates_CPI)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3,601	,659		5,464	,000	2,280	4,921					
	S(United Arab Emirates_CPI)	3,405	1,505	,207	2,262	,028	,389	6,421	,221	,292	,173	,696	1,437
	S(State of Kuwait_CPI)	6,889	1,406	,421	4,901	,000	4,072	9,707	,445	,551	,374	,788	1,269
	S(Kingdom of Saudi Arabia_CPI)	-17,853	2,030	-,712	-8,794	,000	-21,922	-13,785	-,587	-,764	-,671	,888	1,126
	S(Crude_Oil)	,287	,056	,447	5,121	,000	,175	,399	,066	,568	,391	,765	1,307

a. Dependent Variable: S(AED_Seasonal Adjusted Sales_U.A.E)

Bootstrap for Coefficients

Model		B	Bootstrap[a]				
			Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
1	(Constant)	3,601	-,265	,649	,002	2,171	4,677
	Sm(United Arab Emirates_CPI Index percentage change)	3,405	-1,274	2,642	,255	-4,041	6,120
	Sm(State of Kuwait_CPI Index percentage change)	6,889	1,364	3,650	,112	2,537	16,779
	Sm(Kingdom of Saudi Arabia_CPI Index percentage change)	-17,853	,651	2,117	,002	-20,660	-12,117
	Sm(World Crude Oil Price index percentage change)	,287	-,097	,195	,128	-,306	,419

a. Unless otherwise noted, bootstrap results are based on 500 bootstrap samples

Tests of Normality

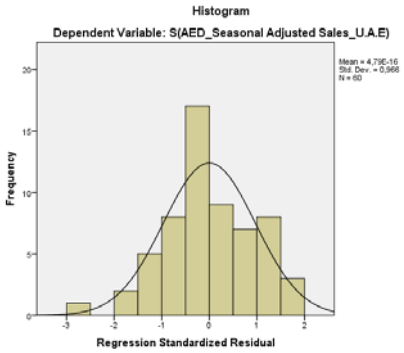
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Studentized Residual	,080	60	,200*	,940	60	,005

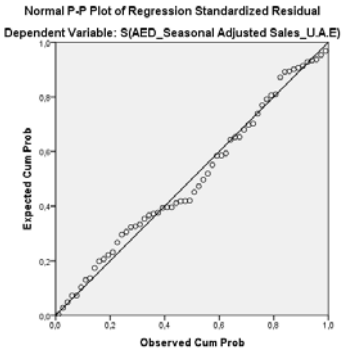
*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Studentized Residual	60	-4,45711	1,96299	-,0366845	1,10269464	-,955	,309	3,097	,608
Valid N (listwise)	60								





3. B) Statistical Results, Jotun U.A.E.

DV= Total Sales Revenues of External Decorative paints in Norwegian Krone, Jotun U.A.E.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,867[a]	,751	,738	1,48639312	,546

a. Predictors: (Constant), S(NOK/AED), S(State of Kuwait_CPI), S(Kingdom of Saudi Arabia_CPI)

b. Dependent Variable: S(NOK_Seasonal Adjusted Sales_U.A.E)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	373,946	3	124,649	56,418	,000[b]
	Residual	123,724	56	2,209		
	Total	497,671	59			

a. Dependent Variable: S(NOK_Seasonal Adjusted Sales_U.A.E)

b. Predictors: (Constant), S(NOK/AED), S(State of Kuwait_CPI), S(Kingdom of Saudi Arabia_CPI)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3,613	,626		5,774	,000	2,360	4,867					
	S(State of Kuwait_CPI)	7,670	1,155	,447	6,642	,000	5,357	9,983	,502	,664	,443	,981	1,019
	S(Kingdom of Saudi Arabia_CPI)	-15,117	1,865	-,574	-8,107	,000	-18,852	-11,382	-,679	-,735	-,540	,884	1,131
	S(NOK/AED)	,510	,138	,264	3,693	,001	,233	,787	,520	,443	,246	,869	1,151

a. Dependent Variable: S(NOK_Seasonal Adjusted Sales_U.A.E)

Bootstrap for Coefficients

Model		B	Bootstrap[a] Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval Lower	Upper
1	(Constant)	3,613	-,074	,528	,002	2,539	4,610
	S(State of Kuwait_CPI)	7,670	,196	1,852	,002	3,705	11,450
	S(Kingdom of Saudi Arabia_CPI)	-15,117	,120	1,738	,002	-18,303	-11,135
	S(NOK/AED)	,510	,061	,177	,006	,233	,908

a. Unless otherwise noted, bootstrap results are based on 500 bootstrap samples

Tests of Normality

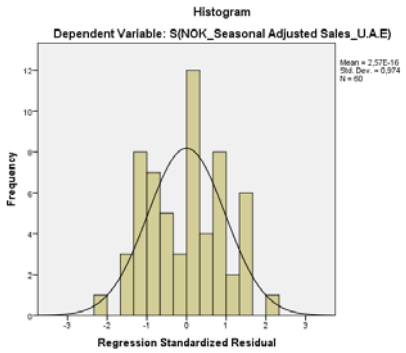
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Studentized Residual	,098	60	,200*	,979	60	,394

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Studentized Residual	60	-2,93360	2,10375	-,0148261	1,03254478	-,199	,309	-,238	,608
Valid N (listwise)	60								



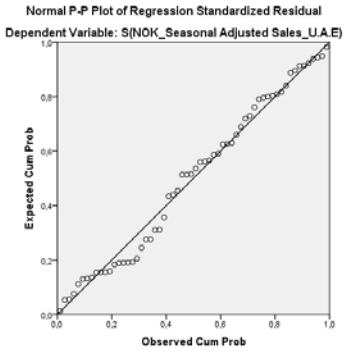


Table 3.1 Sales Revenues decomposition, External Decorative paints, Jotun U.A.E. United Arab Emirates, Arab Emirates Dirham

Date	**%Total** changes in seasonal adjusted Sales Revenues	**%Intrinsic** changes in total seasonal adjusted Sales Revenues	**%Macro** changes in total seasonal adjusted Sales Revenues
Jan 2010			
Feb 2010	-9,06	2,93	-11,99

Mar 2010	0,14	1,09	-0,96
Apr 2010	-6,72	-2,74	-3,99
May 2010	-1,97	9,05	-11,03
Jun 2010	-2,94	-0,86	-2,08
Jul 2010	4,79	18,07	-13,28
Aug 2010	21,63	24,03	-2,40
Sep 2010	-21,87	-21,98	0,11
Oct 2010	-1,30	5,12	-6,42
Nov 2010	-2,20	-2,16	-0,05
Dec 2010	7,33	-2,61	9,95
Jan 2011	0,93	37,22	-36,29
Feb 2011	-4,92	1,46	-6,38
Mar 2011	10,69	9,01	1,69
Apr 2011	-8,19	-6,78	-1,41
May 2011	2,69	4,76	-2,07
Jun 2011	-0,60	1,64	-2,24
Jul 2011	13,92	17,45	-3,54
Aug 2011	-11,33	-8,18	-3,15
Sep 2011	5,01	3,73	1,28
Oct 2011	6,79	9,14	-2,35
Nov 2011	2,82	4,30	-1,48
Dec 2011	-0,25	-1,41	1,16
Jan 2012	8,24	-4,89	13,13
Feb 2012	6,88	8,42	-1,53
Mar 2012	-23,13	-23,42	0,29
Apr 2012	12,51	20,24	-7,73
May 2012	0,61	7,67	-7,07
Jun 2012	-2,21	9,27	-11,48
Jul 2012	5,08	5,50	-0,42
Aug 2012	-4,59	-5,15	0,56
Sep 2012	8,70	15,06	-6,36
Oct 2012	-2,29	6,75	-9,04
Nov 2012	3,86	7,84	-3,98
Dec 2012	-1,79	-1,21	-0,59
Jan 2013	2,07	3,92	-1,86
Feb 2013	-2,81	-0,74	-2,08
Mar 2013	1,05	6,07	-5,02
Apr 2013	2,07	5,31	-3,23
May 2013	9,59	9,98	-0,39
Jun 2013	-2,55	-0,91	-1,64
Jul 2013	-1,32	3,23	-4,56
Aug 2013	-4,05	-3,74	-0,31
Sep 2013	10,91	9,29	1,61
Oct 2013	0,81	7,95	-7,13
Nov 2013	0,03	5,53	-5,50

Dec 2013	-1,29	-6,41	5,12
Jan 2014	-6,02	-2,46	-3,56
Feb 2014	4,08	3,75	0,33
Mar 2014	15,33	15,48	-0,14
Apr 2014	-0,71	3,20	-3,91
May 2014	-8,16	-8,68	0,52
Jun 2014	11,68	12,11	-0,43
Jul 2014	-18,97	-12,91	-6,06
Aug 2014	30,19	36,48	-6,28
Sep 2014	-1,10	-6,05	4,95
Oct 2014	-12,64	-7,36	-5,27
Nov 2014	16,92	23,71	-6,79
Dec 2014	-2,00	-2,36	0,36
Mean	1,02	4,11	-3,09
Std. Dev.	9,42	11,16	6,41

Figure 3.1

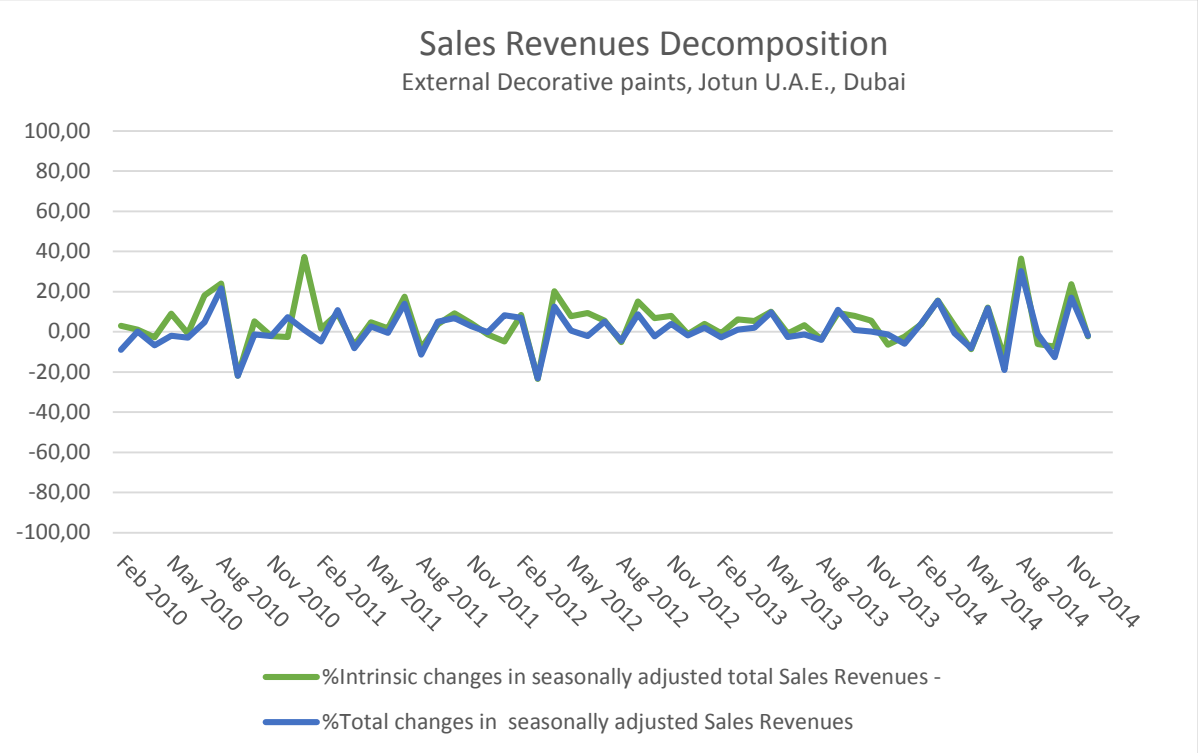


Figure 3.2

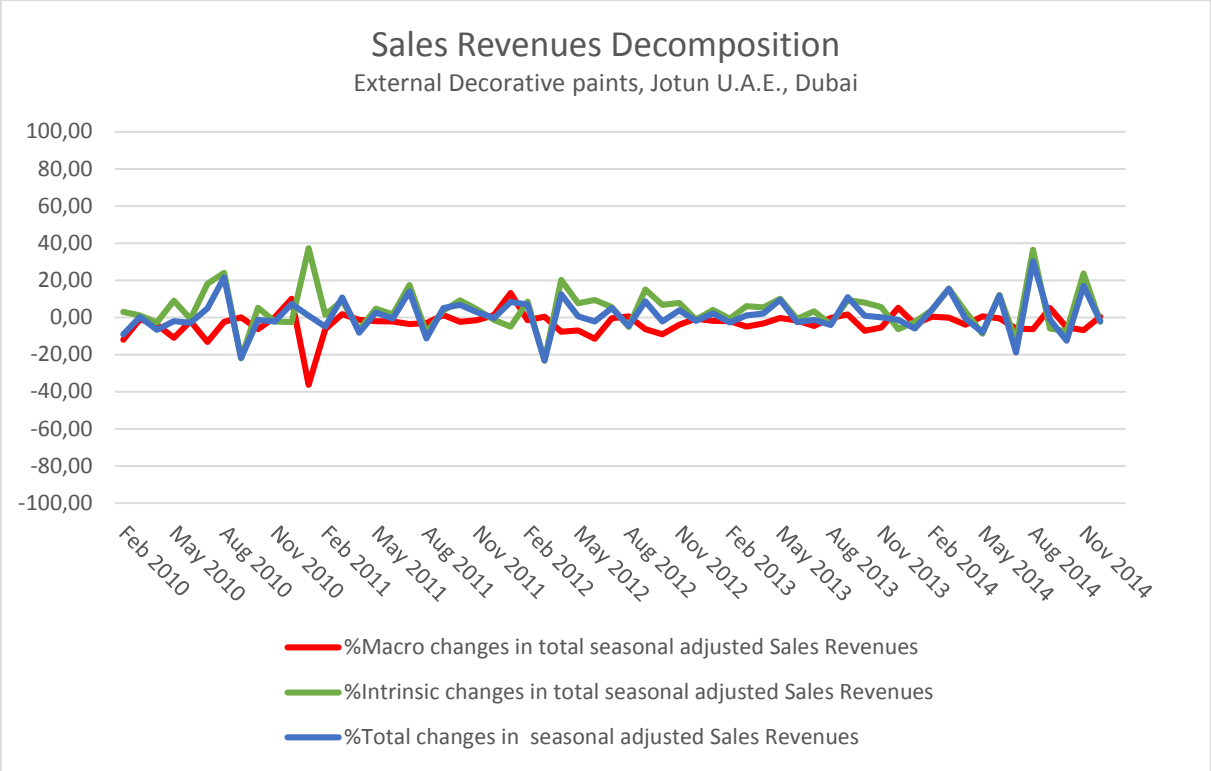
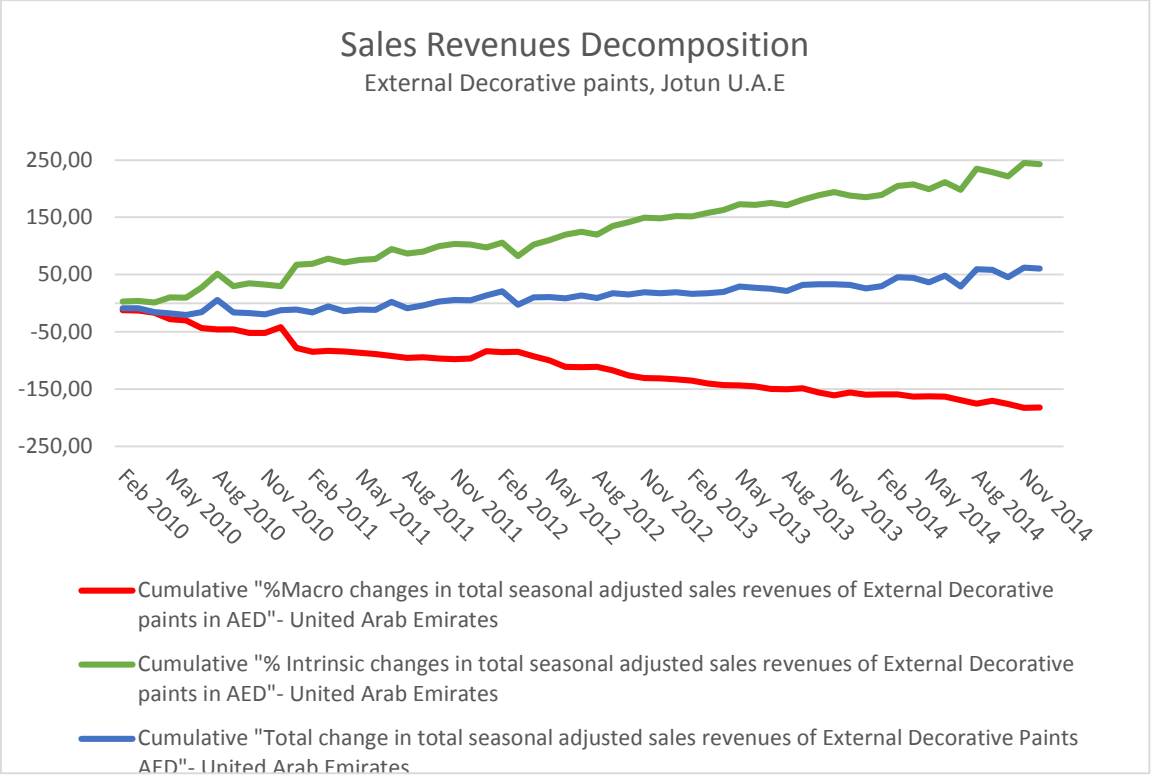


Figure 3.3



4. A) Statistical Results, Jotun Malaysia

DV= Total Sales Revenues of External Decorative paints in Malaysian Ringgit, Jotun Malaysia

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,539[a]	,290	,265	3,86460243	,358

a. Predictors: (Constant), S(Malaysia_Treasury Bill rate), S(Malaysia_CPI)

b. Dependent Variable: S(MYR_seasonal adjusted sales_Malaysia)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	348,384	2	174,192	11,663	,000[b]
	Residual	851,304	57	14,935		
	Total	1199,687	59			

a. Dependent Variable: S(MYR_seasonal adjusted sales_Malaysia)

b. Predictors: (Constant), S(Malaysia_Treasury Bill rate), S(Malaysia_CPI)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1,664	1,150		1,447	,154	-,639	3,967					
	S(Malaysia_CPI)	12,906	5,184	,301	2,489	,016	2,524	23,287	,434	,313	,278	,852	1,174
	S(Malaysia_Treasury Bill rate)	-,473	,165	-,346	-2,863	,006	-,804	-,142	-,462	-,355	-,319	,852	1,174

a. Dependent Variable: S(MYR_seasonal adjusted sales_Malaysia)

Bootstrap for Coefficients

Model		B	Bootstrap[a]				
			Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
1	(Constant)	1,664	-,181	1,005	,110	-,616	3,257
	S(Malaysia_CPI)	12,906	,450	3,910	,008	6,669	21,981
	S(Malaysia_Treasury Bill rate)	-,473	,105	,351	,096	-,791	,689

a. Unless otherwise noted, bootstrap results are based on 500 bootstrap samples

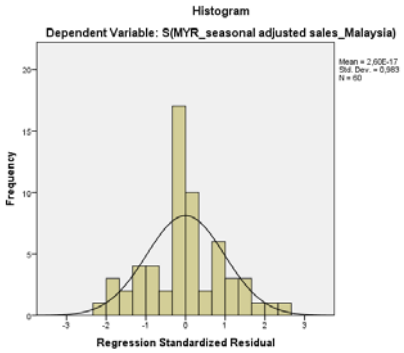
Tests of Normality

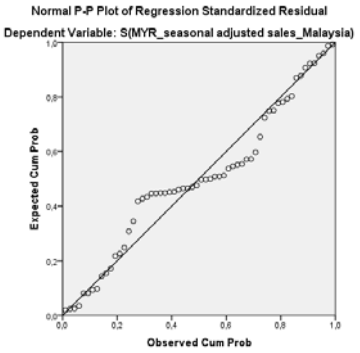
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Studentized Residual	,154	60	,001	,970	60	,152

a. Lilliefors Significance Correction

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Studentized Residual	60	-2,53537	2,46479	-,0073540	1,02349233	-,014	,309	,360	,608
Valid N (listwise)	60								





4. B) Statistical Results, Jotun Malaysia

DV= Total Sales Revenues of External Decorative paints in Norwegian Krone, Jotun Malaysia

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,682[a]	,465	,436	3,55382043	,361

a. Predictors: (Constant), S(Malaysia_CPI), S(NOK_GBP), S(MYR_CNY)

b. Dependent Variable: S(NOK_Seasonal adjusted sales_Malaysia)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	614,017	3	204,672	16,206	,000[b]
	Residual	707,260	56	12,630		
	Total	1321,276	59			

a. Dependent Variable: S(NOK_Seasonal adjusted sales_Malaysia)

b. Predictors: (Constant), S(Malaysia_CPI), S(NOK_GBP), S(MYR_CNY)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-,116	,962		-,121	,904	-2,043	1,810					
	S(NOK_GBP)	2,223	,360	,718	6,177	,000	1,502	2,944	,546	,637	,604	,708	1,412
	S(MYR_CNY)	-1,966	,580	-,425	-3,392	,001	-3,127	-,805	,110	-,413	-,332	,609	1,641
	S(Malaysia_CPI)	17,077	4,814	,379	3,548	,001	7,434	26,720	,316	,428	,347	,836	1,196

a. Dependent Variable: S(NOK_Seasonal adjusted sales_Malaysia)

Bootstrap for Coefficients

Model		B	Bootstrap[a]				
			Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
1	(Constant)	-,116	,114	1,037	,908	-1,935	2,305
	S(NOK_GBP)	2,223	-,028	,364	,002	1,346	2,760
	S(MYR_CNY)	-1,966	,116	,757	,022	-3,126	-,146
	S(Malaysia_CPI)	17,077	-,354	4,392	,004	7,779	25,127

a. Unless otherwise noted, bootstrap results are based on 500 bootstrap samples

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Studentized Residual	,077	60	,200*	,980	60	,423

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Studentized Residual	60	-1,90616	2,47659	-,0062228	1,00682760	,202	,309	,071	,608
Valid N (listwise)	60								

Table 4.1 Sales Revenues decomposition, External Decorative paints, Jotun Malaysia, Malaysian Ringgit

	%Total **changes in seasonal adjusted Sales Revenues**	%Intrinsic **changes in total seasonal adjusted Sales Revenues**	%Macro **changes in total seasonal adjusted Sales Revenues**
Jan 2010			
Feb 2010	-15,76	-8,35	-7,41
Mar 2010	12,79	10,30	2,49
Apr 2010	-2,23	5,24	-7,47
May 2010	36,51	33,92	2,60
Jun 2010	-72,78	-70,47	-2,31
Jul 2010	157,46	155,46	2,00
Aug 2010	-6,42	-8,48	2,06
Sep 2010	-21,81	-23,38	1,57
Oct 2010	10,47	7,85	2,62
Nov 2010	7,23	4,88	2,35
Dec 2010	10,38	4,65	5,73
Jan 2011	25,36	17,58	7,79
Feb 2011	-17,39	-23,48	6,09
Mar 2011	-7,14	-8,50	1,36
Apr 2011	25,57	22,89	2,69
May 2011	-5,23	-6,48	1,25
Jun 2011	6,50	1,95	4,56
Jul 2011	-43,47	-45,70	2,23
Aug 2011	19,11	17,48	1,63
Sep 2011	20,42	18,09	2,33
Oct 2011	-14,55	-17,57	3,02
Nov 2011	18,68	17,52	1,16
Dec 2011	8,33	7,42	0,91
Jan 2012	-11,68	-15,67	3,99
Feb 2012	26,13	25,92	0,21
Mar 2012	-18,42	-16,97	-1,45
Apr 2012	12,58	12,61	-0,03
May 2012	-2,32	-4,70	2,38
Jun 2012	8,96	7,38	1,58
Jul 2012	-27,37	-27,50	0,13
Aug 2012	3,03	0,69	2,34
Sep 2012	4,20	1,81	2,40
Oct 2012	4,75	2,39	2,36
Nov 2012	15,01	13,77	1,24
Dec 2012	-8,51	-8,53	0,02

Jan 2013	7,49	2,53	4,96
Feb 2013	-11,26	-13,63	2,38
Mar 2013	29,57	28,10	1,46
Apr 2013	-20,85	-22,53	1,67
May 2013	20,82	16,68	4,14
Jun 2013	-7,58	-8,50	0,92
Jul 2013	-25,27	-27,97	2,70
Aug 2013	3,54	2,46	1,07
Sep 2013	18,60	7,86	10,74
Oct 2013	20,25	15,09	5,16
Nov 2013	-20,20	-23,54	3,34
Dec 2013	7,40	4,15	3,26
Jan 2014	2,97	-5,04	8,01
Feb 2014	10,20	6,97	3,22
Mar 2014	6,90	6,54	0,35
Apr 2014	-4,64	-4,88	0,24
May 2014	-0,84	-2,55	1,71
Jun 2014	5,61	3,90	1,71
Jul 2014	-40,04	-38,97	-1,08
Aug 2014	32,31	30,59	1,72
Sep 2014	-0,71	-2,09	1,38
Oct 2014	7,51	1,27	6,23
Nov 2014	20,07	14,03	6,04
Dec 2014	-9,68	-8,47	-1,21
Mean	3,57	1,46	2,11
Std. Dev.	28,36	27,80	2,96

Figure 4.1

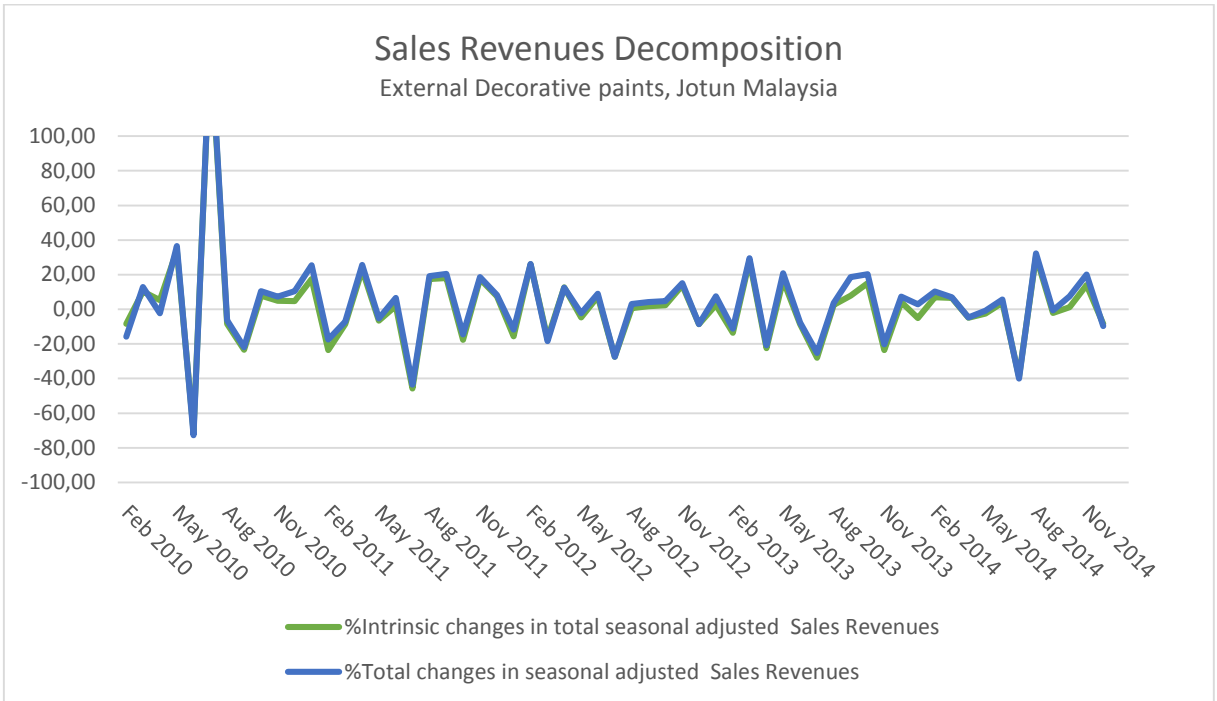


Figure 4.2

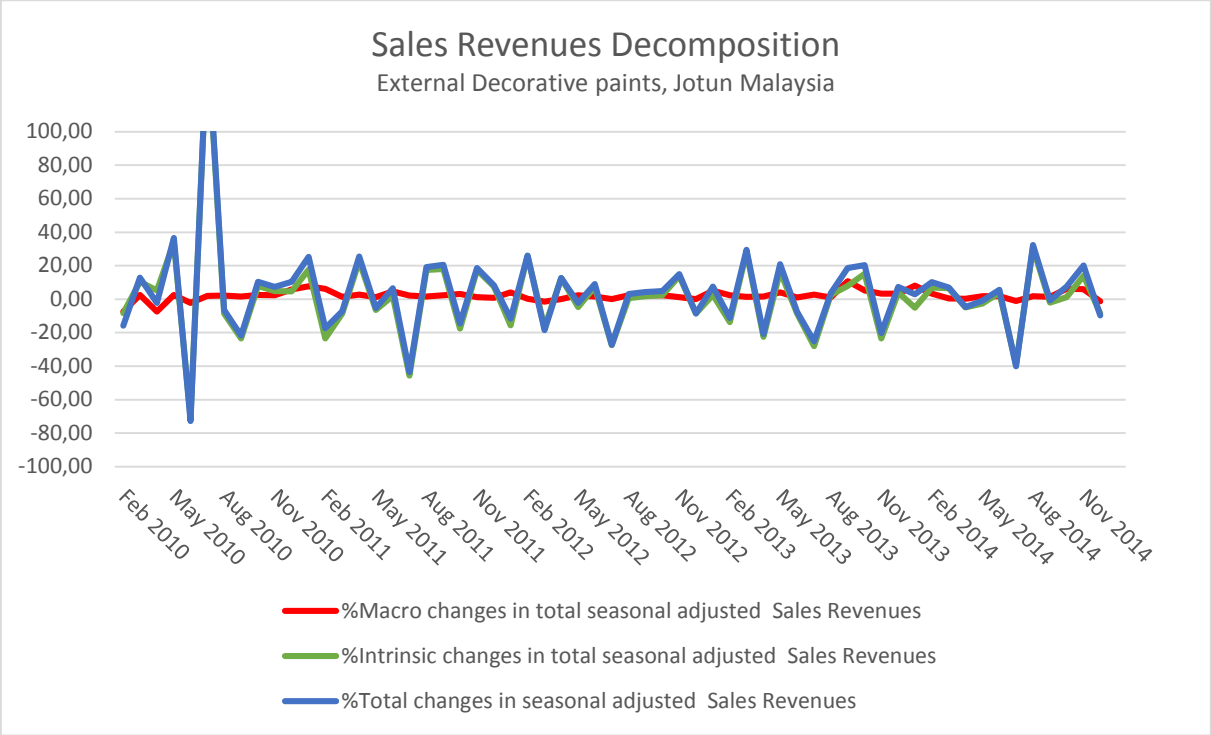


Figure 4.3

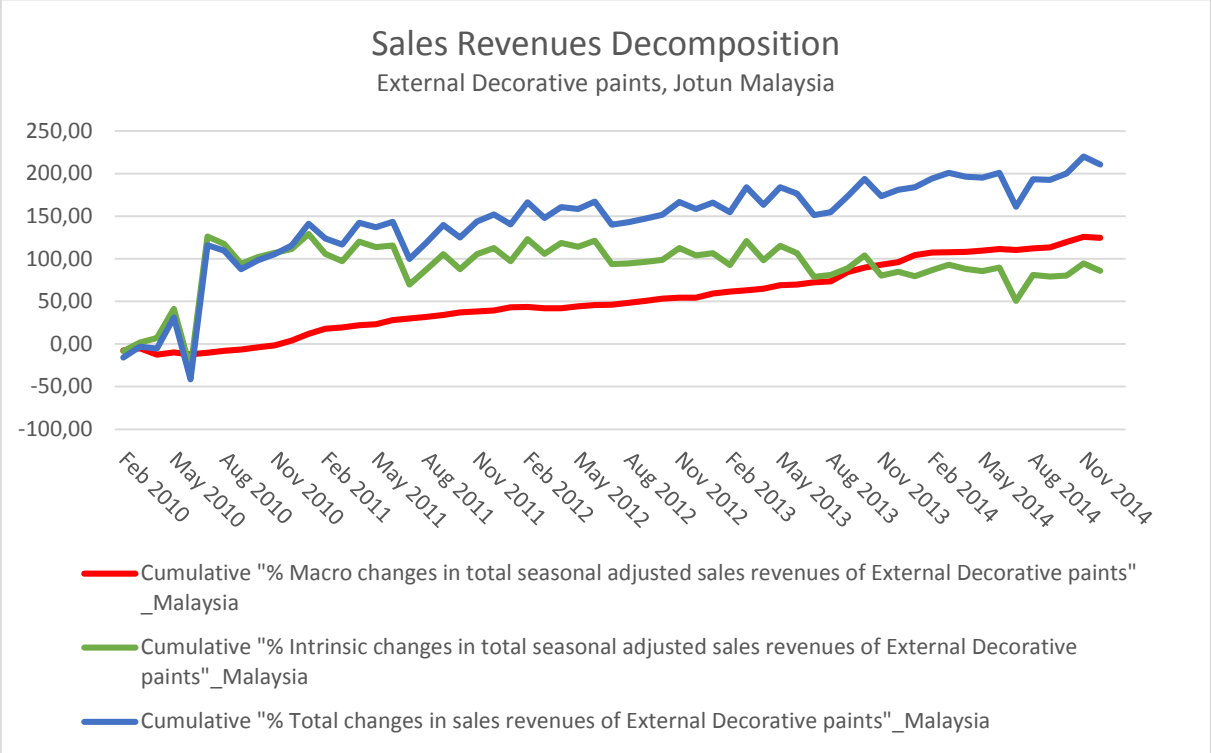


Figure 4.4 Sales Revenues decomposition, External Decorative paints, Jotun Malaysia, Norwegian Krone

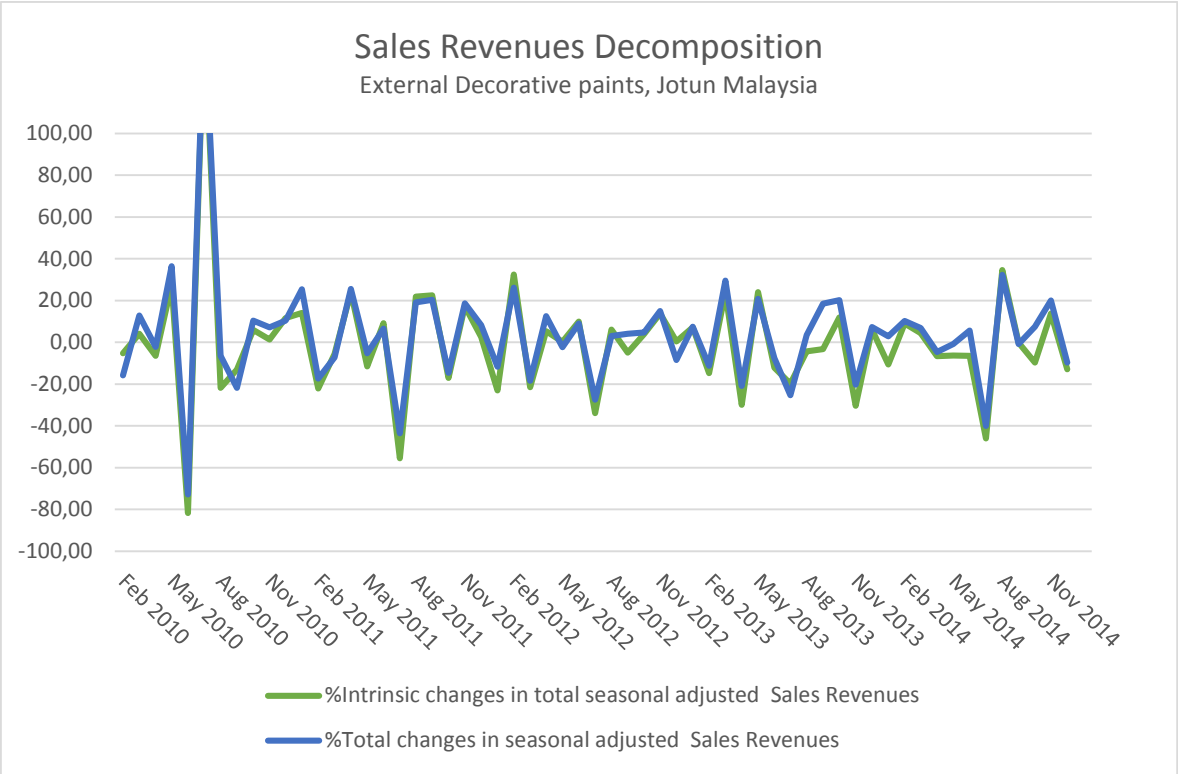


Figure 4.5 Sales Revenues decomposition, External Decorative paints, Jotun Malaysia, Norwegian Krone

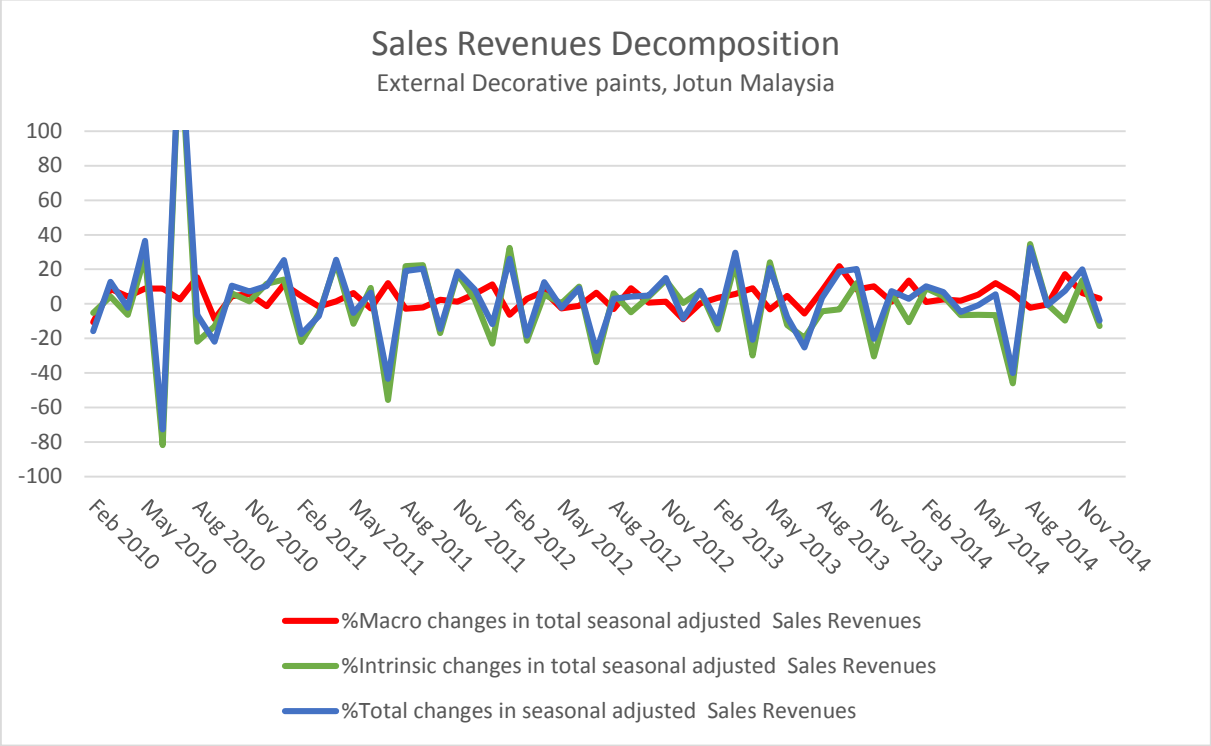


Figure 4.6 Sales Revenues decomposition, External Decorative paints, Jotun Malaysia, Norwegian Krone

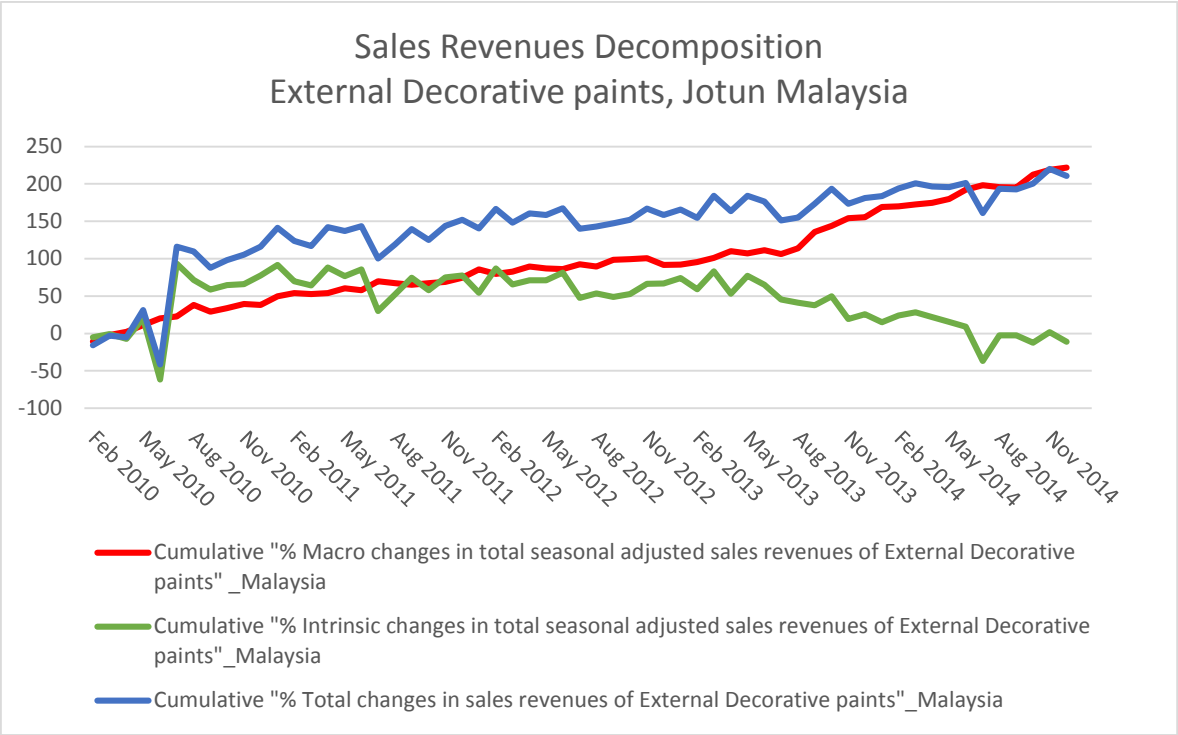
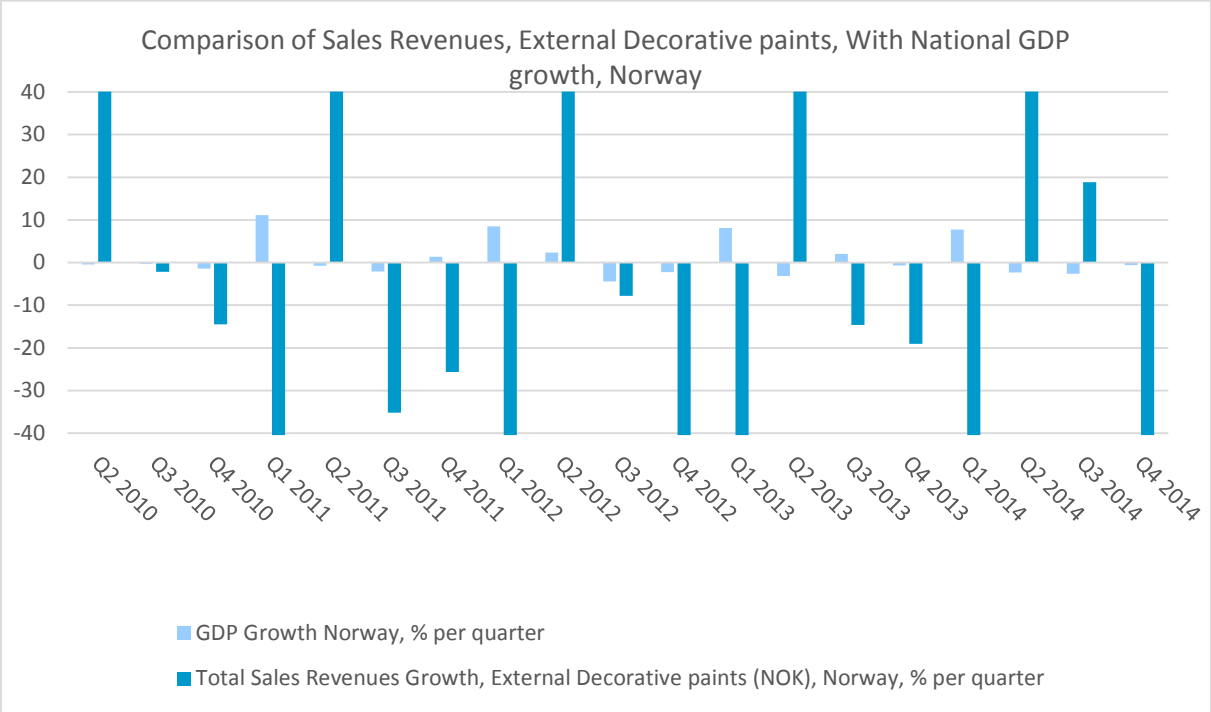


Figure 4.7



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