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THE IMPACT OF THE SOVEREIGN-DEBT CRISIS ON THE FINANCIAL HEALTH OF GREEK LISTED COMPANIES: POSITIVE ANALYSIS AND FORECASTING

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Σύνοψη

Τα τελευταία χρόνια έχουν παρατηρηθεί καταστάσεις μείζονος οικονομικής αστάθειας, πολλές φορές προερχομένης εκ των πιο ανθεκτικών κι εξεχουσών οικονομιών του πλανήτη. Από τις καταστάσεις αυτές, μία οικονομία ξεχωρίζει ιδιαιτέρως ως σημείο αναφοράς κακοδιαχείρισης, έλλειψης δικαιοφροσύνης κι απουσίας ορθολογισμού. Την ίδια στιγμή, η συγκεκριμένη κρίση χρέους παρέχει μια μοναδική ευκαιρία για την επαναξιολόγηση των λανθανουσών διεργασιών που αφορούν στον τρόπο εφαρμογής, στην κουλτούρα και στο διαρθρωτικό πλαίσιο των οικονομικών μοντέλων από τους ιθύνοντες, τους ενδιαφερόμενους και τους συμμετέχοντες σε αυτή την οικονομία, προκειμένου να εξοστρακιστεί ο συνολικός κίνδυνος και να ενισχυθεί η δυνατότητα πρόληψης παρόμοιων κρίσεων στο μέλλον.

Όσον αφορά στη χρηματοοικονομική ανάλυση, αυτή διέπεται κυρίως από στοιχεία ποσοτικού χαρακτήρα: τους χρηματοοικονομικούς δείκτες. Εάν δεχτούμε ότι θα ήταν ενδιαφέρον να διερευνηθούν οι δείκτες των υποσυστημάτων που δραστηριοποιούνται σε μια οικονομία η οποία διέπεται από κρίση, μια πρώτη πρόκληση είναι προφανής: να εξαχθεί μια διαχρονική θετική ανάλυση των εν λόγω υποσυστημάτων η οποία θα προσφέρει έναν ικανό αριθμό πληροφοριών ως προς τις μεταβολές των χρηματοοικονομικών τους δεικτών. Την ίδια στιγμή και καθώς η ύπαρξη οριζόντιων οικονομικών στοιχείων μπορεί να οριστεί ως χρονοσειρά, θα ήταν λογικό να αναζητηθεί κι ένα εργαλείο προγνωστικής των εν λόγω δεδομένων.

Μέσω βάσης δεδομένων που ακολουθεί το πρότυπο ICB, μια επιλογή διαφόρων χρηματοοικονομικών δεικτών υπολογίζεται για όλες τις ελληνικές εισηγμένες εταιρείες που κατατάσσονται σε εννέα συγκεκριμένους κλάδους. Οι κλαδικοί μέσοι όροι των δεικτών εξάγονται για τα ετήσια διαστήματα ενός χρονικού εύρους έντεκα ετών (2001-2011). Επίσης εξάγεται ένα γραμμικό μοντέλο παλινδρόμησης για κάθε χρηματοοικονομικό δείκτη, μαζί με καμπύλες ορίων εμπιστοσύνης της ευθείας αναδρομής κι άλλων διαγνωστικών παλινδρόμησης (συντελεστής συσχέτισης, διορθωμένος συντελεστής συσχέτισης, ANOVA, t-test και διαστήματα εμπιστοσύνης παραμέτρων).

Το σώμα των παρατηρήσεων και των υπολογισμών μπορεί να χρησιμοποιηθεί για να αξιολογηθεί ένα ευρύ φάσμα δεικτών που αφορούν στην οικονομική δραστηριότητα και στις χρηματοοικονομικές επιδόσεις, ώστε να διευκολυνθεί εξαγωγή ποσοτικών αλλά και ποιοτικών συμπερασμάτων σχετικά με τις ιδιαιτερότητες των κλάδων που δραστηριοποιούνται σε ένα υπό κρίση μακροοικονομικό περιβάλλον. Επιπροσθέτως μπορεί να διερευνηθεί η αποτελεσματικότητα των μοντέλων γραμμικής παλινδρόμησης τα οποία προέρχονται από χρονοσειρές χρηματοοικονομικών δεικτών, με σκοπό να αξιολογηθεί η ειδική μεθοδολογία ως μια αποτελεσματική μέθοδος προγνωστικής.

Επιστημονικός Τομέας: Χρηματοοικονομική ανάλυση

Λέξεις-φράσεις κλειδιά: Ελλάδα, οικονομική κρίση, κρίση κρατικού χρέους, εισηγμένες εταιρείες, χρηματοοικονομική ανάλυση, οικονομικοί δείκτες, θετική ανάλυση, γραμμικό μοντέλο παλινδρόμησης, προγνωστική, ανάλυση παλινδρόμησης

Abstract

In recent years the world has witnessed instances of major economic instability, many times originating and formulating in the most resilient and prominent global economies. From this situation, one sovereign-economy stands out as a benchmark of mismanagement, inequity and imprudence. At the same time, this particular sovereign-debt crisis provides a unique opportunity for the re-evaluation of tacit processes concerning the modus vivendi, culture and framework of financial models by decision makers, stakeholders and participants within this economy in order to mitigate overall risk and aid towards the prevention of similar crises in the future.

As financial health analysis is majorly governed by quantitative data, a definite profile of the constituents operating within a crisis would be an evident first step for scanning, extracting and analyzing the distinct data that composes the threads of a crisis. These quantitative markers are financial ratios. If we accept that it would be of interest to investigate the financial ratios of the subsystems within an economy undergoing a crisis, one clear challenge is apparent: to offer a positive analysis perspective of these subsystems within their economic framework. At the same time, as the provision of longitudinal financial ratio data can laterally be defined as a time series, it would be logical to venture the composure of a forecasting instrument for said financial ratios.

A data base is created according to ICB taxonomy and a selection of financial ratios is calculated for all listed Hellenic corporations, which are classified under nine specific industries. Average industry ratios are extracted for the annual intervals of an eleven year time span (2001-2011). A linear regression model for each financial ratio is generated along with prediction bands, residuals data and other regression diagnostics (coefficient of determination, adjusted coefficient of determination, ANOVA, t-test and parameter confidence intervals).

The body of observations and calculations can be utilized to assess a diverse range of markers concerned with economic activity and performance in order to facilitate explicit awareness with respect to the particularities of industries within a crisis. At the same time, the effectiveness of financial ratio time series linear regression models can be investigated in order to evaluate the specific methodology as a pertinent forecasting method.

Scientific Domain: Financial analysis

Keywords: Greece, sovereign-debt crisis, Hellenic listed companies, financial analysis, financial ratios, positive analysis, linear model, forecasting, regression analysis

Contents

1. Introduction

1.1 A Qualitative Approach on Financial Discrepancy and Selected Literature Review

"Good people are good because they have come to wisdom through failure" [William Saroyan, Armenian American dramatist and author]

According to the Friedman Doctrine, [8]:

"There is one and only one social responsibility of business – to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud."

Reading these words makes us reminisce of a time where there was leeway for polemics between scholars on the ground of what exactly the corporate executive is obliged to pursue. Things today have changed-to say the least. We have shifted from an era of Neo-Keynesian economics to the widely observed need of reinstating some of the old Keynesian principles (and pursuing the post Neo-Keynesian era); of the necessity of government intervention [3] in order to ensure market stability and by extension the need of central bank (or other institutions') intervention in order to alleviate sovereign-default risk.

A new misery index has been brewed, this time not combining inflation and unemployment, but insolvency, austerity and the "evaporation of liquidity" [4, 7]; said index seems to be escalating rapidly and leading to a novel paradox of thrift, similar in consequences to the benchmark paradox of thrift as John M. Robertson [15] eloquently expresses it:

"Had the whole population been alike bent on saving, the total saved would positively have been much less…industrial paralysis would have been reached sooner or oftener, profits would be less, interest much lower, and earnings smaller and more precarious. This...is no idle paradox, but the strictest economic truth"

The same paralysis can be witnessed if austerity is eminent, but in this instance savings are not to blame, but the absence of the option to allocate savings [18]:

"…what they (*the policymakers*) don't understand is that you cannot ask of the market members to bailout your government by lowering the market's purchasing power; for the economy to retrieve health, the bailout should be pursued through the broadening of the economic cycle… "

Adam Smith's invisible hand [17] seems to have been amputated and the concept of voluntary exchange that drives market efficiency ("…they will listen to buyers, use customer feedback to inform product solutions, and work hard to serve and satisfy prospective

customers. Sellers can surely choose to abuse the customer today, but such an approach is **short-sighted and doomed for failure** in the long run. Only customer-oriented and customer-centric sellers can survive **when buyers have options**, and this dynamic drives seller behavior...and so, in a free market characterized by mutual choice, both buyers and sellers will be driven to form relationships. It is through the ongoing relationship, rather than the stopping and starting of individual transactions, that buyers and sellers realize the **true mutual benefit of the exchange**. Buyers benefit from working with sellers who have built up a cumulative knowledge of their needs, and are uniquely positioned to proactively propose new solutions to even unanticipated problems…", [12]) is an intangible notion stemming from an elusive dream.

"We are amidst the failure of a latent financial model…" [2]

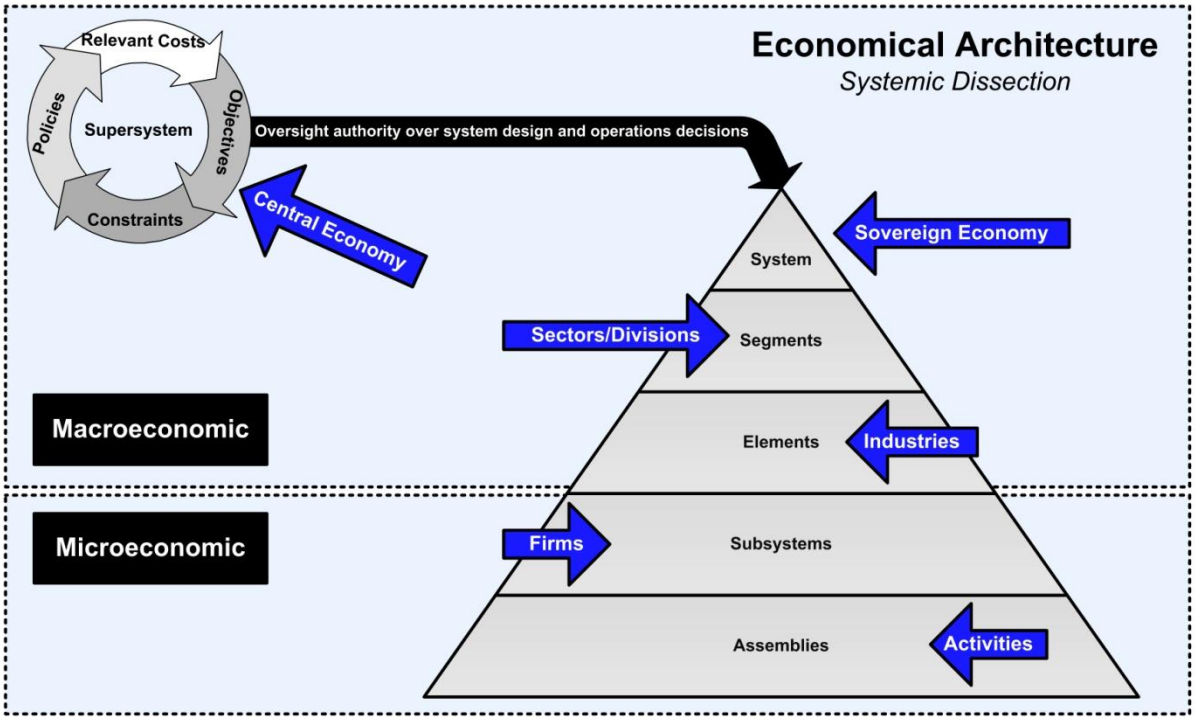
It has been cited that the outcomes observed during the ongoing financial crises are but samples of systemic failures, with causes ranging from the self-evident to the more obscure: From the huge boost of the *effective labor supply* [11] to *behavioral causes* (e.g. herd behavior: "The behavioral tendencies in risk taking described regularly lead banks into **excessive lending during good times**…thus, the delayed effects of credit booms are losses by the banking system and a **deepening of the recession in the real economy**" [16], as well as "…**psychological biases** may cause irrational behavior of investors" [19]), *disaster myopia* that "suggests that **competitive, incentive-based and psychological mechanisms in the presence of uncertainty lead financial institutions to underestimate the risk of financial instability**" [5] and *absence of innovation* [9], to name but a few.

The above mentioned are some of the causes investigated and presented in the currently emerging body of knowledge addressing recent financial crises. In turn, research points to a variety of factors that may serve as a vanguard of a firm in an emerging crisis situation: *Corporate Governance* (empirical evidence points to the conclusion that higher institutional ownership and more independent boards incur worse stock returns, [6]) and more explicitly *the board and the audit committee* may play a vital role in the viability of a firm [10]. At the same time *materiality-based accounting* emanating from a *normative perspective* [1] may provide the ground for solvency and transparency.

We can observe on the one hand research addressing causes and on the other research pertaining solutions. It is proposed that an integral approach as to the causes and solutions of crises be ventured, consolidating research findings into an evidence-based model.

For the purposes of this context and since it is of evident importance to include bodies such as the sovereign-economy, a country's firms, sectors, industries and entities outside the sovereign-economy, a systemic-based depiction according to the NASA Systems Engineering Handbook [13] is proposed in figure i, based on hierarchical system terminology:

Figure i: Systemic dissection model of the economy



Under this approach, the (financial) crisis disrupts the corporate ecosystem from an external perspective but corporate culture (internal origin) is what simultaneously may act as a diffusion/deflection mechanism for the mitigation of corporate peril (intra-derived crises may pose as similar a risk as the extra-derived). If we may hazard the conjecture, a model that takes under consideration a fusion of all these extra/intra parameters has to be formulated.

In this volatile operating environment a novel paradigm shift [14] has to be witnessed; one that takes into account the global environment in which a firm has to operate as well as global and intra changes-threats, etc. A viable model needs to be formulated (incorporating the factors deemed necessary from global research) that will be able to assist management in forecasting the early signs of discrepancies and simultaneously providing the solutions necessary in order to effectively surpass said issues.

The innovative component of this model is that it will take into account crisis scenarios for each particular economic factor and extract the explicit parameters that govern the intrinsic sustainability of each entity. In this manner, management will be able to utilize an effective typology that harbors firm resilience. This research project may assist towards reaching a benchmark in learning from failure, according to a multi-systemic and multi-disciplinary approach.

The road towards this goal must begin from the furnishment of a (positive analysis) body of knowledge that can act as a practical benchmark for the mitigation of a financial crisis. This work aspires to be a first step in addressing this benchmark.

1.2 The Hellenic Sovereign-Economy

Selected extracts from published articles profiling the Hellenic case:

"The Hellenic sovereign-economy was considered very stable, for many years going through a phase of considerable growth. Its economy is the 34th or 42nd largest in the world at $299 or $304 billion by nominal gross domestic product or purchasing power parity (PPP) respectively, according to World Bank statistics for the year 2011. Additionally, Greece is the 15th largest economy in the 27-member European Union.

With an economy larger than all the Balkan economies combined, Greece is the largest economy in the region. It is a developed country with high standards of living. Its economy mainly comprises the service sector (85.0%) and industry (12.0%), while agriculture makes up 3.0% of the national economic output.

Important Greek industries include tourism (with 14.9 million international tourists in 2009, it is ranked as the 7th most visited country in the European Union and 16th in the world by the United Nations World Tourism Organization) and merchant shipping (at 16.2% of the world's total capacity, the Greek merchant marine is the largest in the world), while the country is also a considerable agricultural producer (including fisheries) within the union.

The Greek government-debt crisis was triggered by the arrival of the world economy recession in October 2008, and is believed to have been directly caused by a combination of structural weaknesses of the Greek economy along with a decade long pre-existence of way too high structural deficits and debt-to-GDP levels on public accounts. In late 2009, fears of a sovereign-debt crisis developed among investors concerning Greece's ability to meet its debt obligations, due to a reported strong increase in government debt levels. This led to a crisis of confidence, indicated by a widening of bond yield spreads and the cost of risk insurance on credit default swaps compared to the other countries in the Eurozone.

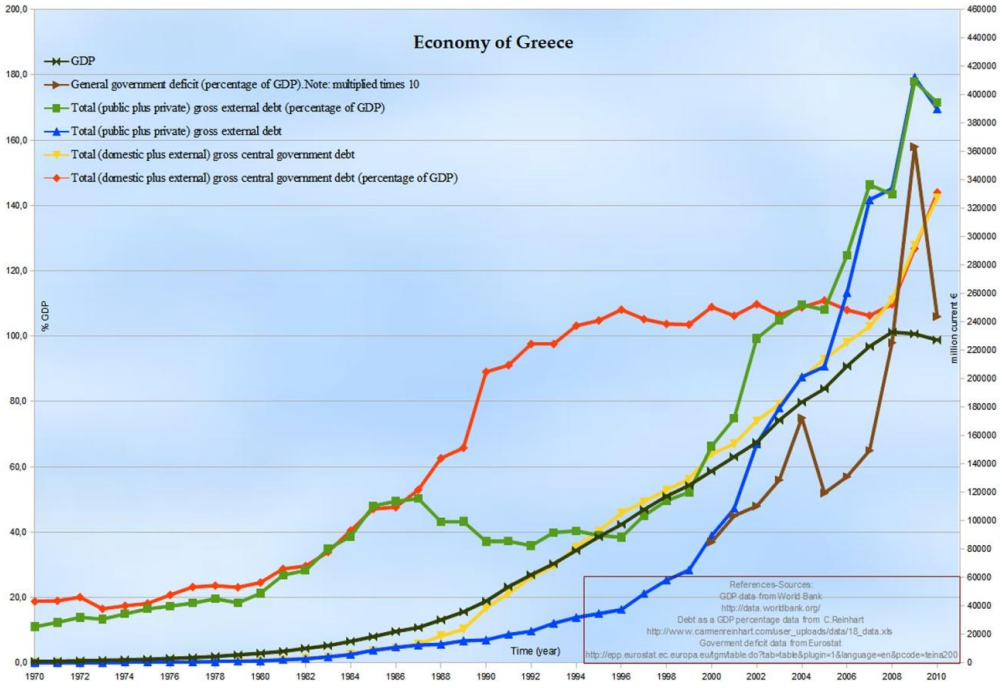
The downgrading of Greek government-debt to junk bond status in April 2010 created alarm in financial markets, with bond yields rising so high, that private capital markets were practically no longer available for Greece as a funding source. On 2 May 2010, the Eurozone countries and the International Monetary Fund (IMF) agreed on a €110 billion bailout loan for Greece."

Sources:

i. http://en.wikipedia.org/wiki/Greek_government-debt_crisis
ii. http://en.wikipedia.org/wiki/Greece
iii. http://www.worldbank.org/en/country/greece
iv. http://epp.eurostat.ec.europa.eu/portal/page/portal/national_accounts/data/main_tables

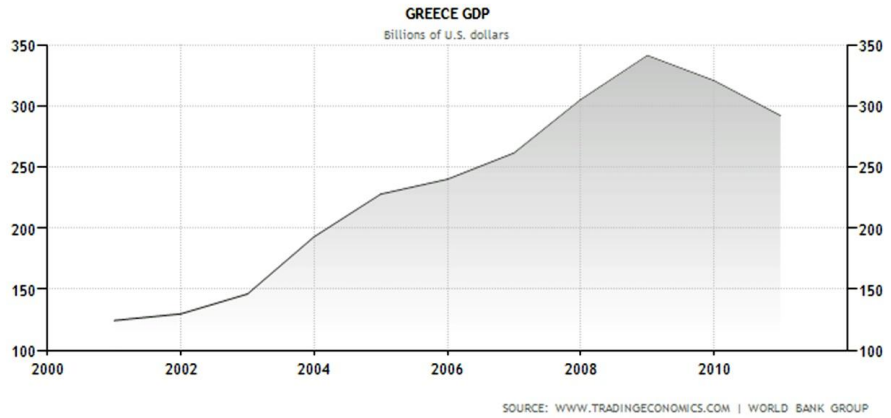
Figures ii-xv provide fundamental information as to the specifics of the Hellenic economy:

Figure ii: The Hellenic economy



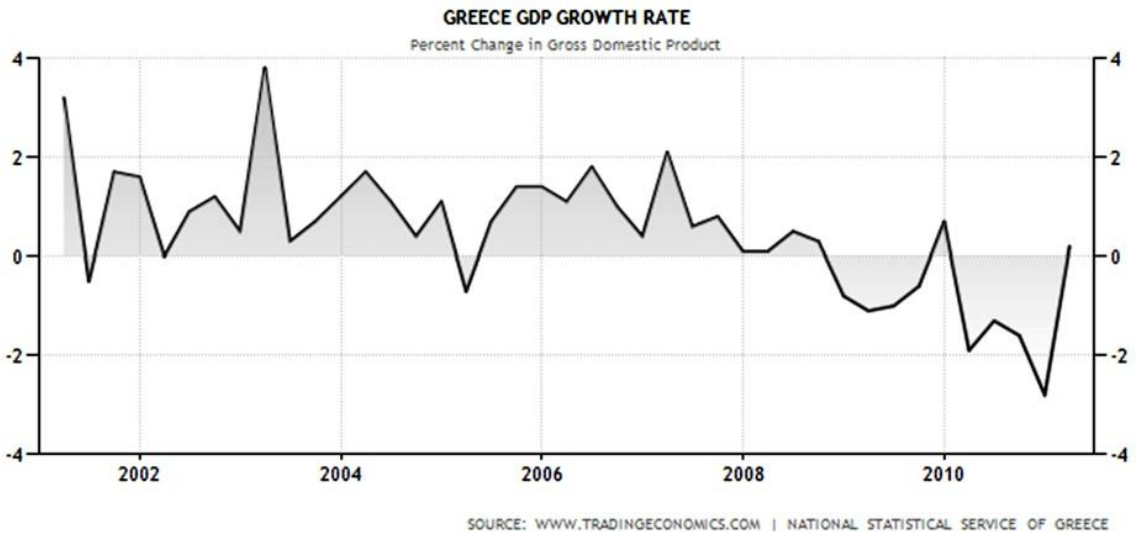
We can observe the augmentation in GDP as well as in the general government deficit, with turning points in 2008 and 2009 respectively. Total gross central government debt has a positive trend until 1996, whence it begins to neutralize at around 100% GDP, only to rise abruptly after 2008. We could perform a query as to the form and need of government expenditures of this magnitude, especially in the final years.

Figure iii: GDP



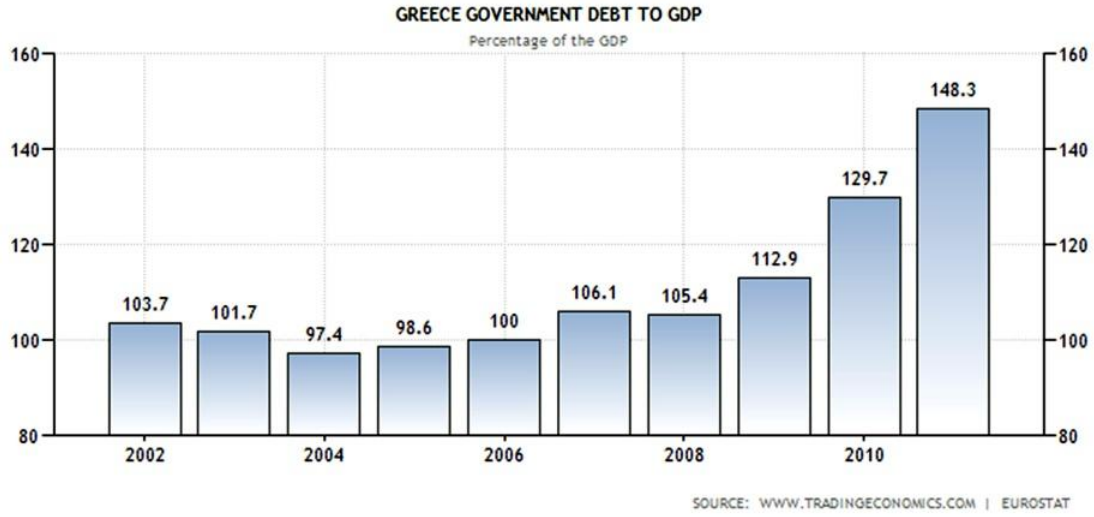
As a fundamental indicator of an economy's health, standard of living, productivity and over-the-counter economic activity, we can observe that for the Hellenic sovereign-economy the GDP rises steadily and more than doubles from 2001 until 2009, rendering the standard of living in the Hellenic sovereign-economy with a positive trend and hinting to the expansion state of the economic cycle with 2009 as the turning point, where said cycle seems to begin to contract.

Figure iv: GDP growth



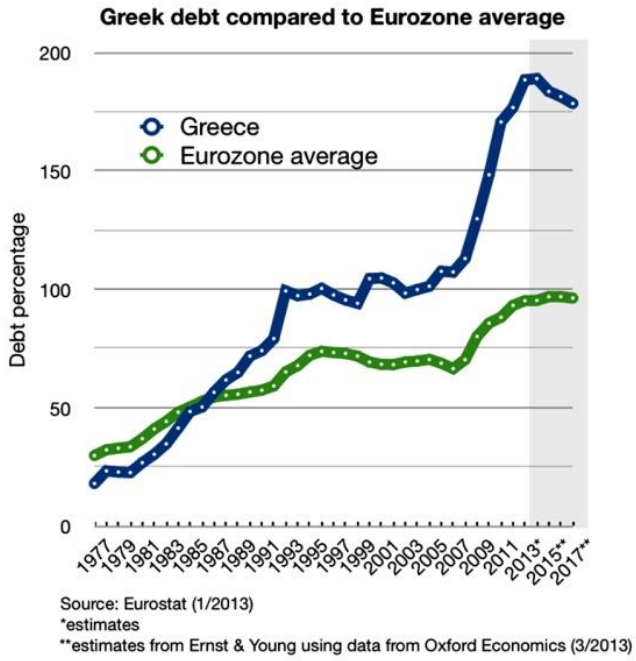
As a value of economic growth and the widening of the economic cycle, the GDP growth rate for the Hellenic economy portrays erratically fluctuating variances in the time span, although the turning point of 2009 in the GDP is evident. It would be of interest to compare the erratic behavior of this marker with other economies, in order to extract if it is a characteristic of the Hellenic economy or a widely witnessed situation due to expected seasonal variations.

Figure v: Debt to GDP



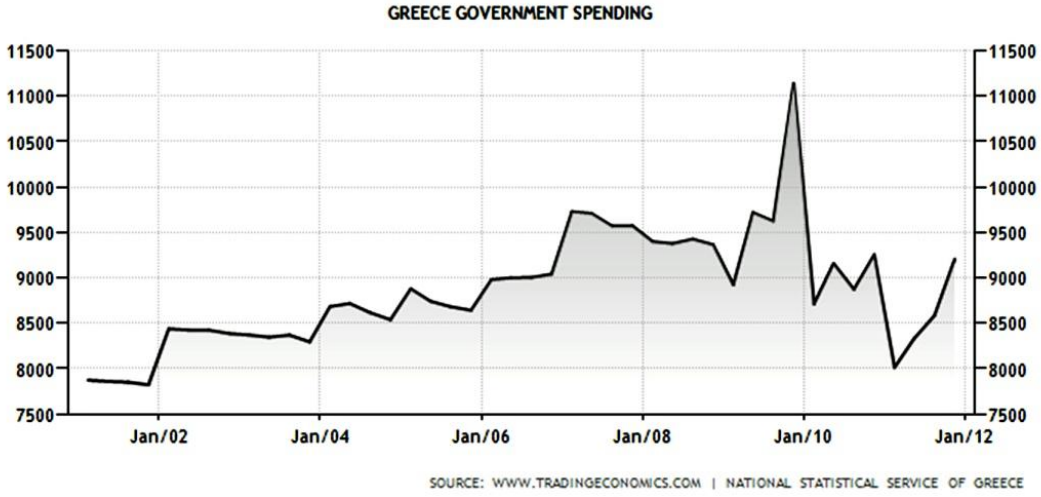
As aforementioned, one constituent in reference to the causes of the Hellenic sovereign-debt crisis was traced in structural weak spots of the Hellenic economy, but the instigating need for the accentuation of government debt has to be cited, for in retrospect we cannot but feel curious as to the need for such debt magnification. If we keep in mind that until 2009 the GDP is rising, then stable debt would obviously diminish this index; instead, until 2008 the indicator is fluctuating around 100% GDP whereas after 2009 it is sharply rising.

Figure vi: Debt to Eurozone average



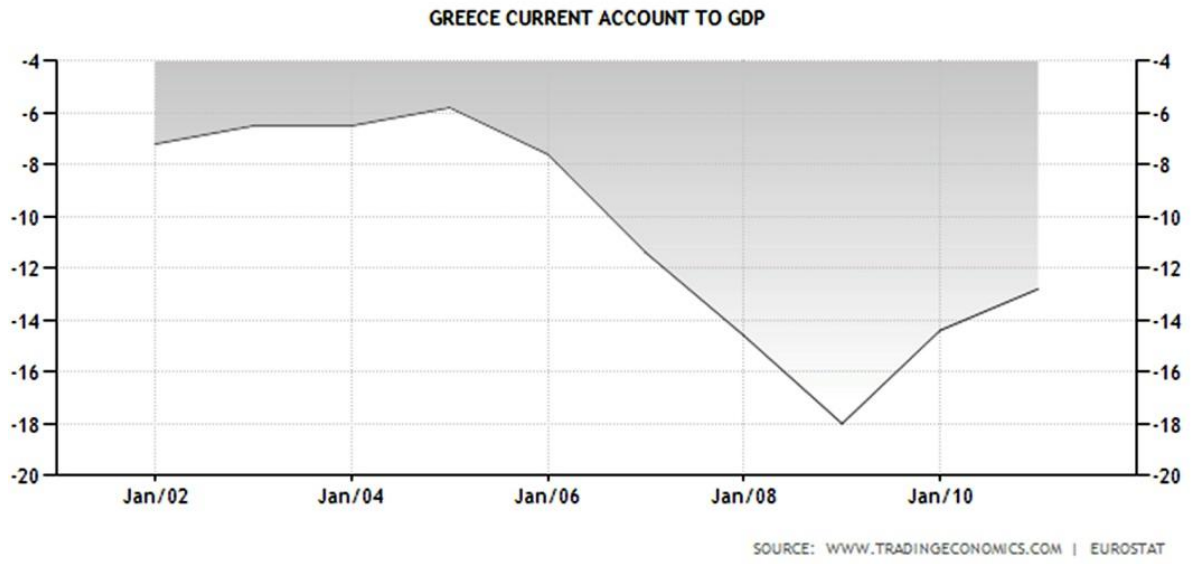
We can observe the major differentiation of the Hellenic debt compared to the average of the Eurozone. Again, the same flags are raised as to the latent parameters that instigated such a decision, whence already the Eurozone average is rising; it could be assumed that the Hellenic economy maybe over-estimated its capabilities.

Figure vii: Government spending



The rapid augmentation in government spending as well as the acute rise in the end of 2009 is evident. We can easily correlate government debt to government spending and reach the aforementioned curious argument as to the latent parameters of this profile; we also observe the acute fall right around the time that government bonds were qualified as high yield.

Figure viii: Current account to GDP

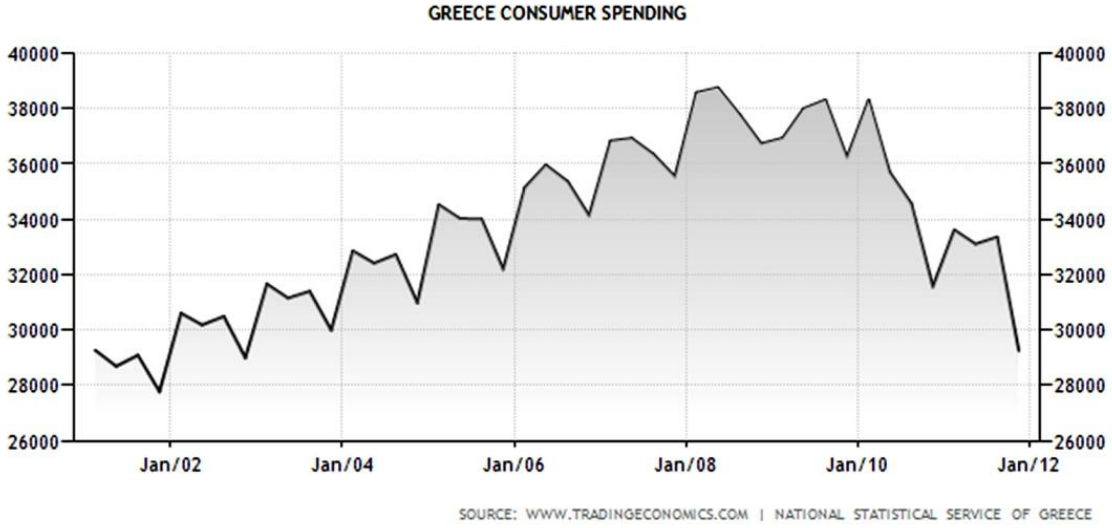


The Hellenic economy portrays a current account deficit (that until 2009 was steadily rising) and is probably heavily dependent on imports. If the negative trend of the current account is overlapped with the rise in GDP then (since clearly imports outweigh exports) one may conclude that the expansion of the economic cycle was performed primarily with debt, since the Hellenic economy hints to the characteristics of a major borrower.

Figure ix: CPI

One of the few indicators without a major turning point, the CPI is steadily rising in the time span and at the same time portrays periodic cyclic variations. The long term trend is evident and pointing to a continuous period of inflation; the index has displayed an augmentation of almost thirty-five currency values in a little over ten years.

Figure x: Consumer spending

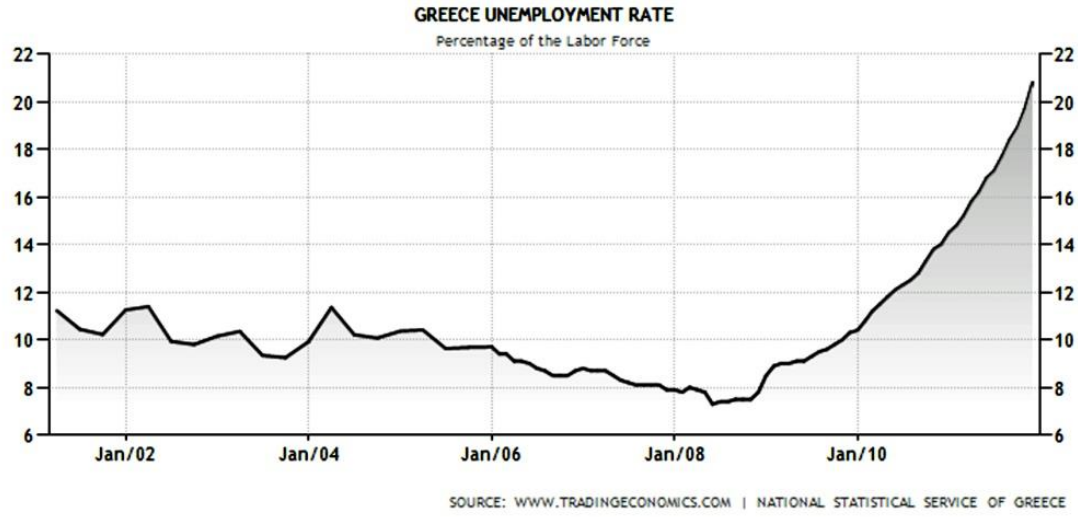


We can observe that consumer spending follows the general trend of the GDP; if it is compared with the CPI we could assume that it has also been fueled by debt. Consumer spending shows cyclical variations but has a long-term trend turning point in 2009, in almost simultaneous accordance to the GDP. It would be interesting to further analyze as to the causes of the cyclic variations, if either they are normal seasonal variations or derive from an intrinsically unstable (as to the purchasing power of its members) economy.

Figure xi: Consumer confidence

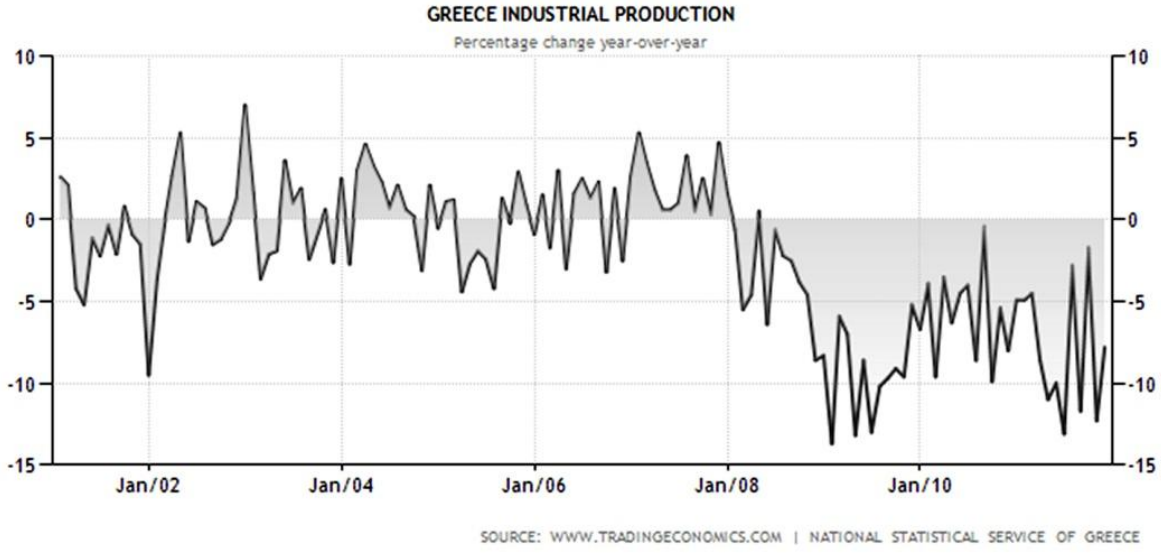
We can observe that consumer confidence portrays cyclical variations, although at the end of 2009 it starts to display an acutely diminishing trend. Within a sovereign-debt crisis this result would be more than expected, especially if austerity is present. What is interesting is to question as to the marker's behavior before the crisis, since it does portray cyclical and periodic variations, but always remains under zero.

Figure xii: Unemployment rate



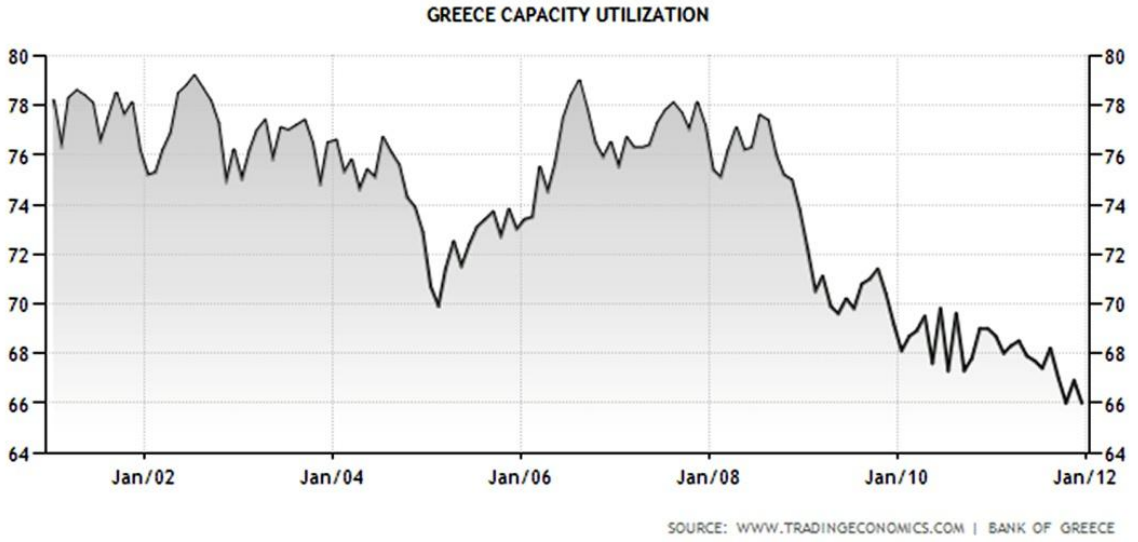
Although it was gradually diminishing until 2009, unemployment started to rise abruptly in the following years hinting to a recession period. It seems that while the world's markets question the ability of the Hellenic economy to ostracize default risk, that within the economy this risk has penetrated through the labor force, if we could coin unemployment as a rendition of sovereign-economy default.

Figure xiii: Industrial production



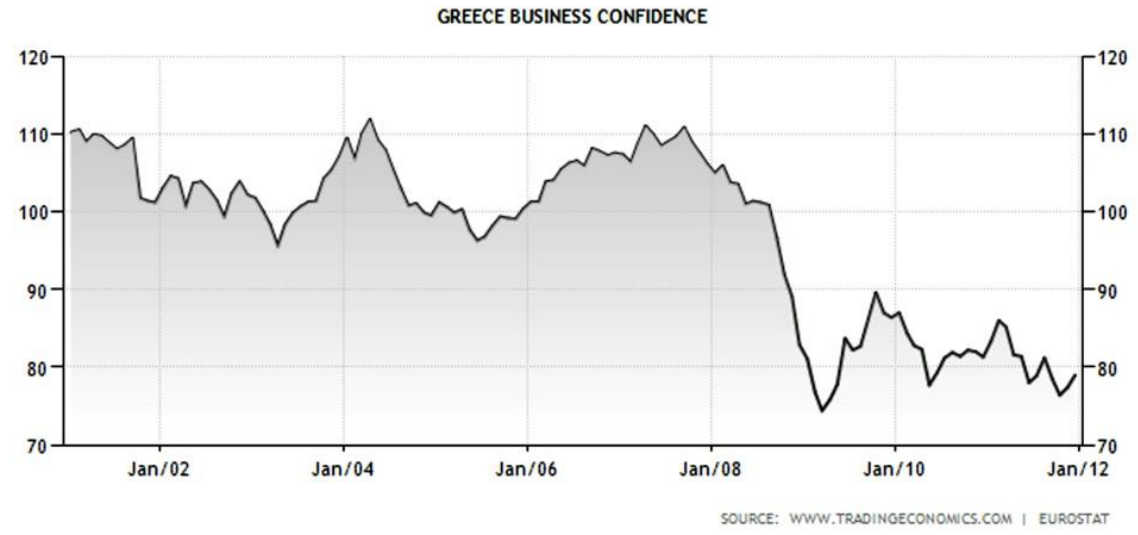
The 2008 sign-change is evident, although we have to point out the erratic nature of the marker. As with previous indices, it would be interesting to compare these results with other economies to extract if the profile before the crisis is an immiscible characteristic of the Hellenic economy or if it is due to normal and expected seasonal variations. Although we can probably be sure that government spending did not manifest in production oriented activities and similar investments.

Figure xiv: Capacity utilization



Comparing the operating rate with industrial production, we can extract that the diminution after 2009 is apparent in both indices, that overall capacity is not utilized and that production could be substantially augmented without significant accentuation of unit costs. Since the current account deficit displays a turning point in 2009 and because the operating rate is falling in conjunction with industrial production we could assume that that imports are diminishing at a higher level.

Figure xv: Business confidence



After 2008 business confidence has diminished sharply although before it portrayed periodic cyclic variations around 100% and for some years reaching maximum values of over 110%. It is not surprising that business confidence holds the above profile, since we would expect that it would follow credit ratings. It maybe is interesting and worthy of further examination that business confidence holds a very similar profile with capacity utilization.

1.3 Economy Profile

What presents itself as evident from the above profile is a clear expansion of the economic cycle until the sovereign-debt crisis made its appearance; an expansion that was probably fueled through debt which in conjunction with structural frailness of the economy expedited the full-blown retrenchment of economic growth after 2008, thus introducing a novel situation that can only be described with the generic term recession.

Although we have to reference the surprisingly high values of government debt and cannot help but wonder as to their manifold purposes, it is outside the scope of this study to analyze any constituent of the sovereign-debt crisis from the sovereign-economy's point of view, or to venture any explanation as to the causes of the crisis; the indices and brief descriptions above were included solely for the purpose of providing an adequate amount of data in regard to the macroeconomic conditions wherein the industries this study analyzes participate. With the data presented above, the profile of the system (sovereign-economy) in which different firms actively participate becomes apparent. We conjecture that the above profile may be very helpful in providing a ground of valuable assumptions as to the aspects of financial and operational performance of the firms within it, but even more, whence particular industry data is available, to offset and compare the three levels (sovereign-economy, industry and firm) of economic activity to monitor said performance within an on-going sovereign-debt crisis.

The sample of this study comprises of all the Hellenic listed corporations (except the firms that are part of the *Financials* industry) and at this point we can only guess as to the behavior of the industries' financial ratios before and during the crisis. We may suppose that many industries will follow the profile of the sovereign-economy's GDP, since the latter is a strong indicator of the trend of the economic cycle, or maybe move to the notion that the industries within the sovereign-economy will exhibit differentiated behavior because they are entities that can or may be able to protect and shield themselves from the sovereign-economy's inefficiencies. Or maybe that it would be a matter of which industries the crisis hit harder, so we would leave any assumption, hypothesis and conclusion procedures up to the specific characteristics that define and set apart the particular industries.

Nevertheless, it would not be illogical to expect to see major turning points in financial ratios around 2008. Since listed companies have the advantage of pursuing capital through debt and equity securities, we could hypothesize that at the same time they may be subject to more volatility in market trends, insecurity and distrust, especially if a financial crisis has surfaced; that whence a securities market is concerned, every bit and piece of information can be potentially valuable, but what is more so, that bad news will travel fast within said market, as have all stock market crashes in history displayed. It would be acceptable to think that since the sovereign-economy is in crisis (and within itself showed signs of a speculative bubble that burst) that the equity market will follow in a rhythm of temporal panic and that so will a number of listed corporations' securities holders. In addition, since once a firm goes public it is up to the market to evaluate its worth, we could expect that many listed corporations are strongly subject to overall market efficiency (and inefficiency).

We do have to point out that the answer to this disruptive situation may find its roots in sounder managerial policy, transparency, materiality-based activities and prudent operations. Surely the Hellenic case has provided the world with a novel Rosetta stone (as did the US react to the 2002 corporate scandals with the SOX act, etc.) as to the practices that should be avoided and alas it would be very disappointing to see future similar downturns of sovereign-economies in other countries. It would be reassuring and hopeful if this particular sovereign-debt crisis could be the turning point in financial model's effectiveness and rudimentary framework. Hopefully the ominous and gloom situation that the Hellenic economy has found itself caught in will mitigate and be the last of its kind.

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2. Problem Formulation

Within the economic climate profiled above, it would be of interest to provide a financial ratio-based approach concerning the public companies that are actively parts of the Hellenic economy, in order to provide insight as to their financial ratio behavior before and during the sovereign-debt crisis. This goal would materialize by conducting a longitudinal study for a selection of financial ratios from a defined subset (industries) of the sovereign-economy. In addition, it would be helpful to provide forecasting information on the selected ratios in order to investigate the effectiveness of a particular forecasting method for the time series constructed from the temporal markers of the financial ratios.

In order to accomplish a longitudinal and at the same time cross-sectional analysis of the Hellenic industries we need to establish and define our data base and its constituents that will be monitored over time (accomplishing the longitudinal or horizontal aspect of the study) and to select the appropriate markers that will be calculated for each specific data base constituent (thus delivering the cross-sectional aspect of the study).

2.1 Data Base

The data base utilized includes rudimentary financial statement information concerning all the Hellenic listed corporations. It is based on the *FTSE International ICB* (Industry Classification Benchmark) industry classification taxonomy [3]. This particular taxonomy divides economic activity in 10 industries, 19 super-sectors, 41 sectors and 114 subsectors. This study monitors and analyzes specific ratios in a longitudinal analysis for nine of the ten industries (the industry of *Financials* has been excluded from analysis).

The industries are divided as follows [4]:

0001. Oil & Gas

- Companies engaged in the exploration for and drilling, production, refining and supply of oil and gas products.
- Companies engaged in the exploration for and drilling, production, refining, distribution and retail sales of oil and gas products.
- Suppliers of equipment and services to oil fields and offshore platforms, such as drilling, exploration, seismic-information services and platform construction.
- Operators of pipelines carrying oil, gas or other forms of fuel. Companies that develop or manufacture renewable energy equipment utilizing sources such as solar, wind, tidal, geothermal, hydro and waves.
- Companies that produce alternative fuels such as ethanol, methanol, hydrogen and bio-fuels that are mainly used to power vehicles, and companies that are involved in the production of vehicle fuel cells and/or the development of alternative fuelling infrastructure.

1000. Basic Materials

- Producers and distributors of simple chemical products that are primarily used to formulate more complex chemicals or products, including plastics and rubber in their raw form, fiberglass and synthetic fibers.
- Producers and distributors of finished chemicals for industries or end users, including dyes, cellular polymers, coatings, special plastics and other chemicals for specialized applications. Includes makers of colorings, flavors and fragrances, fertilizers, pesticides, chemicals used to make drugs, paint in its pigment form and glass in its unfinished form.
- Owners and operators of timber tracts, forest tree nurseries and sawmills.
- Producers, converters, merchants and distributors of all grades of paper.
- Companies that mine or process bauxite or manufacture and distribute aluminum bars, rods and other products for use by other industries. Excludes manufacturers of finished aluminum products, such as siding, which are categorized according to the type of end product.
- Producers and traders of metals and primary metal products other than iron, aluminum and steel.
- Manufacturers and stockholders of primary iron and steel products such as pipes, wires, sheets and bars, encompassing all processes from smelting in blast furnaces to rolling mills and foundries. Includes companies that primarily mine iron ores.
- Companies engaged in the exploration for or mining of coal.
- Companies engaged in the exploration for and production of diamonds and other gemstones.
- Companies engaged in the exploration, extraction or refining of minerals not defined elsewhere within the Mining sector.
- Prospectors for and extractors or refiners of gold-bearing ores.
- Companies engaged in the exploration for and production of platinum, silver and other precious metals not defined elsewhere.

2000. Industrials

- Producers of materials used in the construction and refurbishment of buildings and structures, including cement and other aggregates, wooden beams and frames, paint, glass, roofing and flooring materials other than carpets. Includes producers of bathroom and kitchen fixtures, plumbing supplies and central air-conditioning and heating equipment.
- Companies engaged in the construction of commercial buildings, infrastructure such as roads and bridges, residential apartment buildings, and providers of services to construction companies, such as architects, masons, plumbers and electrical contractors.
- Aerospace Manufacturers, assemblers and distributors of aircraft and aircraft parts primarily used in commercial or private air transport. Excludes manufacturers of communications satellites, which are classified under Telecommunications Equipment.

- Producers of components and equipment for the defense industry, including military aircraft, radar equipment and weapons.
- Makers and distributors of cardboard, bags, boxes, cans, drums, bottles and jars and glass used for packaging.
- Industrial companies engaged in three or more classes of business within the Industrial industry that differ substantially from each other.
- Makers and distributors of electrical parts for finished products, such as printed circuit boards for radios, televisions and other consumer electronics. Includes makers of cables, wires, ceramics, transistors, electric adapters and security cameras.
- Manufacturers and distributors of electronic products used in different industries. Includes makers of lasers, smart cards, bar scanners, fingerprinting equipment and other electronic factory equipment.
- Manufacturers and distributors of commercial vehicles and heavy agricultural and construction machinery, including rail cars, tractors, bulldozers, cranes, buses and industrial lawn mowers. Includes non-military shipbuilders, such as builders of cruise ships and ferries.
- Designers, manufacturers, distributors and installers of industrial machinery and factory equipment, such as machine tools, lathes, presses and assembly line equipment. Includes makers of pollution control equipment, castings, pressings, welded shapes, structural steelwork, compressors, pumps, bearings, elevators and escalators.
- Operators of mail and package delivery services for commercial and consumer use. Includes courier and logistic services primarily involving air transportation.
- Providers of on-water transportation for commercial markets, such as container shipping.
- Providers of industrial railway transportation and railway lines.
- Companies providing services to the Industrial Transportation sector, including companies that manage airports, train depots, roads, bridges, tunnels, ports, and providers of logistic services to shippers of goods. Includes companies that provide aircraft and vehicle maintenance services.
- Companies that provide commercial trucking services.
- Providers of nonfinancial services to a wide range of industrial enterprises and governments. Includes providers of printing services, management consultants, office cleaning services, and companies that install, service and monitor alarm and security systems.
- Providers of business or management training courses and employment services.
- Providers of computerized transaction processing, data communication and information services, including payroll, bill payment and employee benefit services.
- Distributors and wholesalers of diversified products and equipment primarily used in the commercial and industrial sectors. Includes builders merchants.
- Providers of pollution control and environmental services for the management, recovery and disposal of solid and hazardous waste materials, such as landfills and recycling centers.

3000. Consumer Goods

- Makers of motorcycles and passenger vehicles, including cars, sport utility vehicles (SUVs) and light trucks.
- Manufacturers and distributors of new and replacement parts for motorcycles and automobiles, such as engines, carburetors and batteries.
- Manufacturers, distributors and retreaders of automobile, truck and motorcycle tires.
- Manufacturers and shippers of cider or malt products such as beer, ale and stout.
- Producers, distillers, vintners, blenders and shippers of wine and spirits such as whisky, brandy, rum, gin or liqueurs.
- Manufacturers, bottlers and distributors of non-alcoholic beverages, such as soda, fruit juices, tea, coffee and bottled water.
- Companies that grow crops or raise livestock, operate fisheries or own nontobacco plantations. Includes manufacturers of livestock feeds and seeds and other agricultural products but excludes manufacturers of fertilizers or pesticides.
- Food producers, including meatpacking, snacks, fruits, vegetables, dairy products and frozen seafood. Includes producers of pet food and manufacturers of dietary supplements, vitamins and related items.
- Manufacturers and distributors of domestic appliances, lighting, hand tools and power tools, hardware, cutlery, tableware, garden equipment, luggage, towels and linens.
- Producers and distributors of pens, paper goods, batteries, light bulbs, tissues, toilet paper and cleaning products such as soaps and polishes.
- Manufacturers and distributors of furniture, including chairs, tables, desks, carpeting, wallpaper and office furniture.
- Constructors of residential homes, including manufacturers of mobile and prefabricated homes intended for use in one place.
- Manufacturers and distributors of consumer electronics, such as TVs, VCRs, DVD players, audio equipment, cable boxes, calculators and camcorders.
- Manufacturers and distributors of recreational equipment. Includes musical instruments, photographic equipment and supplies, RVs, ATVs and marine recreational vehicles such as yachts, dinghies and speedboats.
- Manufacturers and distributors of toys and video/computer games, including such toys and games as playing cards, board games, stuffed animals and dolls.
- Manufacturers and distributors of all types of clothing, jewelry, watches or textiles. Includes sportswear, sunglasses, eyeglass frames, leather clothing and goods, and processors of hides and skins.
- Manufacturers and distributors of shoes, boots, sandals, sneakers and other types of footwear.
- Makers and distributors of cosmetics, toiletries and personal-care and hygiene products, including deodorants, soaps, toothpaste, perfumes, diapers, shampoos, razors and feminine-hygiene products. Includes makers of contraceptives other than oral contraceptives, which are classified under Pharmaceuticals.
- Manufacturers and distributors of cigarettes, cigars and other tobacco products. Includes tobacco plantations.

4000. Health Care

- Owners and operators of health maintenance organizations, hospitals, clinics, dentists, opticians, nursing homes, rehabilitation and retirement centers. Excludes veterinary services, which are classified under Specialized Consumer Services.
- Manufacturers and distributors of medical devices such as MRI scanners, prosthetics, pacemakers, X-ray machines and other non-disposable medical devices.
- Manufacturers and distributors of medical supplies used by health care providers and the general public. Includes makers of contact lenses, eyeglass lenses, bandages and other disposable medical supplies.
- Companies engaged in research into and development of biological substances for the purposes of drug discovery and diagnostic development, and which derive the majority of their revenue from either the sale or licensing of these drugs and diagnostic tools.
- Manufacturers of prescription or over-the-counter drugs, such as aspirin, cold remedies and birth control pills. Includes vaccine producers but excludes vitamin producers, which are classified under Food Products.

5000. Consumer Services

- Operators of pharmacies, including wholesalers and distributors catering to these businesses.
- Supermarkets, food-oriented convenience stores and other food retailers and distributors. Includes retailers of dietary supplements and vitamins.
- Retailers and wholesalers specializing mainly in clothing, shoes, jewelry, sunglasses and other accessories.
- Retail outlets and wholesalers offering a wide variety of products including both hard goods and soft goods.
- Retailers and wholesalers concentrating on the sale of home improvement products, including garden equipment, carpets, wallpaper, paint, home furniture, blinds and curtains, and building materials.
- Providers of consumer services such as auction houses, day-care centers, dry cleaners, schools, consumer rental companies, veterinary clinics, hair salons and providers of funeral, lawn-maintenance, consumer-storage, heating and cooling installation and plumbing services.
- Retailers and wholesalers concentrating on a single class of goods, such as electronics, books, automotive parts or closeouts. Includes automobile dealerships, video rental stores, dollar stores, duty-free shops and automotive fuel stations not owned by oil companies.
- Producers, operators and broadcasters of radio, television, music and filmed entertainment. Excludes movie theatres, which are classified under Recreational Services.
- Companies providing advertising, public relations and marketing services. Includes billboard providers and telemarketers.
- Publishers of information via printed or electronic media.

- Airline companies providing primarily passenger air transport. Excludes airports, which are classified under Transportation Services.
- Providers of gambling and casino facilities. Includes online casinos, racetracks and the manufacturers of pachinko machines and casino and lottery equipment.
- Operators and managers of hotels, motels, lodges, resorts, spas and campgrounds.
- Providers of leisure facilities and services, including fitness centers, cruise lines, movie theatres and sports teams.
- Operators of restaurants, fast-food facilities, coffee shops and bars. Includes integrated brewery companies and catering companies.
- Companies providing travel and tourism related services, including travel agents, online travel reservation services, automobile rental firms and companies that primarily provide passenger transportation, such as buses, taxis, passenger rail and ferry companies.

6000. Telecommunications

- Providers of fixed-line telephone services, including regional and long-distance. Includes companies that primarily provide telephone services through the internet. Excludes companies whose primary business is Internet access, which are classified under Internet.
- Providers of mobile telephone services, including cellular, satellite and paging services. Includes wireless tower companies that own, operate and lease mobile site towers to multiple wireless service providers.

7000. Utilities

- Companies generating and distributing electricity through the burning of fossil fuels such as coal, petroleum and natural gas, and through nuclear energy.
- Companies generating and distributing electricity from a renewable source. Includes companies that produce solar, water, wind and geothermal electricity.
- Distributors of gas to end users. Excludes providers of natural gas as a commodity, which are classified under the Oil & Gas industry.
- Utility companies with significant presence in more than one utility.
- Companies providing water to end users, including water treatment plants.

9000. Technology

- Companies that provide consulting services to other businesses relating to information technology. Includes providers of computer-system design, systems integration, network and systems operations, data management and storage, repair services and technical support.
- Companies providing Internet-related services, such as Internet access providers and search engines and providers of Web site design, Web hosting, domain name registration and e-mail services.
- Publishers and distributors of computer software for home or corporate use. Excludes computer game producers, which are classified under Toys.

- Manufacturers and distributors of computers, servers, mainframes, workstations and other computer hardware and subsystems, such as mass-storage drives, mice, keyboards and printers.
- Manufacturers and distributors of electronic office equipment, including photocopiers and fax machines.
- Producers and distributors of semiconductors and other integrated chips, including other products related to the semiconductor industry, such as semiconductor capital equipment and motherboards. Excludes makers of printed circuit boards, which are classified under Electrical Components & Equipment.
- Makers and distributors of high-technology communication products, including satellites, mobile telephones, fibers optics, switching devices, local and wide-area networks, teleconferencing equipment and connectivity devices for computers, including hubs and routers.

Note: From this point on, the industries are presented according to their alphabetical order and do not follow the sequence above.

2.2 Financial Ratios

The financial ratios were selected according to their widespread use [1, 2, 5, 6, and 7], case study applicability, clarity, domains (*liquidity, profitability, activity, growth, balance-sheet structure, financial leverage, size, productivity/operating performance, performance/valuation*) and are the following:

i. Cash Ratio = Cash and Cash Equivalents / Current Liabilities

The cash ratio is a basic liquidity ratio and the decimal result of the division of *Cash and Cash Equivalents* to *Current Liabilities.* It essentially indicates the amount of current liabilities that can be covered from cash or near-cash assets and by extension, how easily or quickly a firm can cover its short-term debt.

ii. Return on Assets (ROA) = Net Profit after Tax / Total Assets

Return on Assets (differentiated from Return on Total Assets) is calculated through the division of *Earnings after Tax* to *Total Assets.* It is a profitability indicator relative to total assets; in other words, how profitable a firm's assets are.

iii. Return on Equity (ROE) = Net Profit after Tax / Shareholders' Equity

Coined as the most rudimentary financial ratio, Return on Equity measures the return on the book value of the shareholders' total investment in the company. It is calculated through the division of *Earnings after Tax* to *Shareholders' Equity.*

iv. Net Profit Margin = Net Profit after Tax / Revenue

The division of *Net Profit after Tax* to *Revenue* shows how much net profit is generated for every currency unit of sales.

v. Asset Turnover = Revenue / Total Assets

A basic activity and efficiency ratio, calculated from the division of *Sales* to *Total Assets.* It measures how many sales are generated for each currency unit of total assets.

vi. Capital Expenditures to Total Assets = CAPEX / Total Assets

A growth ratio signifying the amount of capital expenditures carried out for each currency unit of total assets. It can serve of an indicator of the magnitude of investments carried out by a firm and its sign is always negative.

vii. Net Fixed Assets Leverage = Property, Plant & Equipment / Total Assets

The division of *Property, Plant & Equipment* to *Total Assets* is a marker of the "heavy" and non-current assets in the balance sheet, in proportion to total assets. If a firm has close to null intangibles and long-term investments (which is the case for most listed Hellenic corporations), *Net Fixed Assets Leverage* becomes *Fixed Assets Leverage.*

viii. Financial Leverage = Total Debt / Total Assets

This ratio is derived from the division of *Total Debt* to *Total Assets* and measures the extent to which a firm's assets are borrowed. It can serve as an indicator of the equilibrium of financial risk and profitability as well as financial stability; management has got a delicate job in maintaining the balance of financial leverage between profitability and risk.

ix. Size = Total Assets

The longitudinal variance in the value of *Total Assets* is a critical measure of growth and assisted with information on profitability, liquidity, leverage and/or others can indicate as to the prudency of managerial decisions. Even though technically the numerical value of *Total Assets* is not a financial ratio, it has been included in this study as a simple yet conclusive indicator of growth.

x. Operating Performance = Revenue / Number of Employees

The *Revenue* to the *Number of Employees* ratio is an indicator of productivity and operating performance of a firm, since it reveals how much revenue is generated by a single employee.

xi. Tobin's Q = Market Value of Total Assets / Firm's Replacement Value

A measure of performance as much as valuation, Tobin's Q is calculated as the *Market Value of Total Assets* to the *Replacement Value* of the firm. Considering that a firm's debt can be regarded as a current market value, the market value of total assets can be generated from the addition of the *Market Capitalization* (*Market Value of Equity*) plus the book value of *Total Debt.* For the replacement value we consider the book value of *Total Assets.*

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3. Methodology

3.0 Sample, Calculations and Results

The sample of this study is dynamic, since temporally new firms may be founded or others can cease their activities. The analysis is initiated with the calculation (for every annual interval) of the eleven financial ratios for all firms of the sample, based on rudimentary information extracted from published financial statements (*Statement of Financial Position-Balance Sheet* & *Statement of Comprehensive Income-Profit and Loss Account*). We can accept that on average the longitudinal sample consists of 231 listed firms in total. Variations in the number of firms included in each industry that constitute the sample are documented in the following table:

Number of Hellenic Listed Firms / Industry Classification													
		Year											
	Industry	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
1	Basic Materials	24	24	24	25	25	25	25	25	25	25	25	**25**
2	Consumer Goods	66	68	69	69	69	69	69	70	70	70	70	**69**
3	Consumer Services	38	39	39	40	40	40	40	41	41	41	41	**40**
4	Health Care	9	9	9	9	9	9	9	9	10	10	10	**9**
5	Industrials	57	57	57	57	59	59	59	59	60	60	60	**59**
6	Oil & Gas	2	2	2	2	2	2	2	2	2	2	2	**2**
7	Technology	19	20	20	20	20	21	22	24	24	25	24	**22**
8	Telecommunications	2	2	2	2	2	2	2	1	1	1	1	**2**
9	Utilities	3	3	3	4	4	4	4	4	4	4	4	**4**
	Total	220	224	225	228	230	231	232	235	237	238	237	**231**

The eleven selected financial ratios are calculated from the year 2001, giving a total time span of eleven years (2001-2011) rendering a total of 231*11*11=27,951 observations approximately. From the raw data (raw data in this instance is constituted by the ratios of each firm) we classify the firms according to the defined industry taxonomy and calculate an arithmetic mean (average) for each year and for each respective industry; accordingly, from the approximate total of 27,951 observations we are led to 9*11*11=1,086 observations, representing said average industry ratios. These results comprise the positive analysis constituent of the study. Analyses of variance (one-way ANOVA for the industries as groups) for the calculated financial ratios were conducted and can be found in the appendix (tables 130-140).

We are driven to the forecasting component by utilizing the results from the positive analysis aspect as raw data, but this time for the extraction of a linear regression model. The average ratios of the industries are transformed into a time series and a linear model is generated for each ratio and industry. For nine industries and eleven ratios, a total of 9*11=99 linear regression models are calculated. With the regression model, the coefficient of determination (R squared) is calculated as well, alongside its residuals and prediction bands. The time series, the linear model, the (mean and single) prediction bands are all presented in graphical form, whereas the positive analysis and the constituents of the linear models are presented in tabular form. In addition, parameter confidence intervals, ANOVA and t-tests are extracted for all regression models (their tabled results can be found in the appendix, tables 31-129).

Since no forecasting model of a stochastic system can be regarded as deterministic, no explicit arithmetic figure for forecasting is calculated; instead, the linear models' mean and single prediction bands can be utilized in order to graphically portray and extract forecasting results accordingly, within the margin deemed statistically appropriate from the model, based on a widely accepted significance level (5%).

3.1 Explanation of Results Presentation

As aforementioned, results follow two patterns: tabular and graphic. Tables are utilized for the consolidation of results whereas the graphical form is used to portray temporal change and provide detail for a specific result.

3.1.1 Positive Analysis Tables

The positive analysis tables include the results of the calculations of the financial ratios for each industry:

Industry											
Year	Cash Ratio	ROA	ROE	EAT/Sales	Sales/TA	CAPEX/TA	PPE/TA	Leverage	Size	Sales/Empl	Tobin's Q

Rows depict temporal change whereas columns hold the distinct ratios. The ratios are given in either a percentage form or a decimal, according to their literature-based definition. These results are the averages of the financial ratios for each respective industry and they were calculated from the financial ratios of each firm (positive analysis raw data).

3.1.2 Forecasting Tables

The forecasting tables consist of 11 rows (one for each ratio) and 8 columns:

Industry							
Ratio	Domain	Formula	Linear Correlation	a	b	R^2	p-value

The first three columns depict the name of the ratio, its domain (liquidity, profitability, activity, etc.) and its respective formula. The final five columns include the linear model components and selected diagnostics. The linear model is in the common algebraic form $y=a+b*x$ (regression line) and its coefficients a and b are shown on the fifth and sixth column. The fourth column depicts the type of linear correlation, which may be positive (direct) correlation, negative (inverse) correlation, no correlation or long-term trend (low coefficient of determination but with evident temporal trend). If the scatter plot does not exhibit any long-term trend (no relationship between variables x and y) then the type is registered as uncorrelated. The seventh column depicts the coefficient of determination (R squared) for each linear model and the final column portrays the p-value of the regression t-test.

3.1.3 Detailed Results for Each Ratio

The analysis of each industry concludes with the presentation of four plots for each ratio; the scatter plot of the time series, the linear model plot, the model with mean and single prediction bands (confidence bands for mean predictions and prediction bands based on single observations respectively) and the graph of the residuals (the difference between actual and predicted responses) of the model.

These graphs can be utilized along with the data from the forecasting tables in order to obtain predictions with an a priori appreciation of the effectiveness (dictated by the specific coefficient of determination and p-value of each model and/or the rest of the regression diagnostics found in the appendix) of each regression model extracted from a particular ratio and/or industry. In addition, the mean and single prediction bands offer a dual projections margin, for either more precise (but with higher risk) or wider but more probable forecasts. Single prediction bands incorporate both the variation in parameter estimates and the overall variation in response values, while the mean prediction bands incorporate only the variation in parameter estimates. As a result, single prediction bands are wider than mean prediction bands for the same confidence interval. Mean prediction bands also exhibit more variation in width.

3.2 Remarks

It should be noted that in cases that would produce outcomes that may diverge from the materiality concept, action has been taken accordingly. For example, a company may have negative equity for a year, meaning that it is no longer in the hands of its shareholders. To expand this argument, let us suppose that the same year its net earnings are negative (which is the case for most corporations with negative equity). From a sterile calculation of for example the ROE ratio this will give us a positive (and very high in most cases) value for the ratio, but it will not be contingent and will cause severe distortions if included in the calculation of the industry mean. For this reason, instances as the above are ignored and the particular ratio is not included in the calculation of the average since it cannot be considered as a part of an indicative sample.

In addition, in order to be able to produce a right and fair view of the industries, extremely divergent ratios are cut-off from the calculation of the mean industry ratio. The cut-off principle is qualitative (not based on an explicit mathematical cut-off function), i.e. it is utilized if a marker is extremely divergent from the mean of the rest of the values (either extremely larger or extremely smaller) and only in the instance that all other markers show evident signs of clustering around said mean. The goal of this study is to portray a right and fair view of the Hellenic industries in a positive analysis perspective. In order to accomplish this goal, some of the raw data has to be cut-off from the calculation of the average ratio of an industry; to maintain equilibrium between this fact and the actual raw data that was not utilized, any such instance is indicated through a churn percentage.

The qualifier "sample" is used derivatively, since all firms constituting the listed corporations of the nine selected industries of the Hellenic economy are included in this study; as such, this study does not extract any statistical inference based on a random sample taken from a population, but conducts calculations from raw data within a database which is thereafter classified according to certain characteristics, rendering 9 distinct populations, i.e. the 9 industries.

In this text, the term sample is used to denote a subset (industry) taken not randomly but under explicit definition and taxonomy from a larger subset (listed corporations of a sovereign-economy). The unit of measure and analysis is considered to be each and every particular industry and upon this framework all listed companies within their industries constitute a discrete statistical population. It would be of interest to extract samples from said industries in order to perform statistical hypothesis tests, where applicable.

The coefficients of determination and p-values are presented alongside every industry forecasting table. These particular indicators were selected to accompany the presentation of the forecasting models' results as the simplest measures of the regression models' *goodness of fit*. For further insight and analysis on regression diagnostics please refer to the appendix (tables 31-129), whence analyses of variance (ANOVA), parameter confidence intervals, adjusted coefficients of determination and t-tests for all the linear regression models are included. Since the raw data consists of only two variables, the ANOVA and t-tests generate the same p-value (for two groups of values the F-statistic equals the square of the t-statistic), nevertheless they are both included for verification purposes.

The calculations of the ratios were performed on *MS Excel 2007* and the calculations of the linear models on *Wolfram Mathematica V.8*.

Abbreviations used in this text are the following:

i. ROA (return on assets)
ii. ROE (return on equity)
iii. EAT (earnings after tax)
iv. TA (total assets)
v. CAPEX (capital expenditures)
vi. PPE (property, plant & equipment)
vii. TD (total debt)
viii. MV (market value)
ix. BS (balance sheet)
x. Empl. (employees)
xi. Repl. (replacement)

The terms *Activity* and (asset) *Turnover* (Sales/TA), *Valuation* and *Tobin's Q*, *Leverage* and financial leverage, *BS Structure* and (*Net*) *Fixed Assets Leverage* (PPE/TA), *Productivity* and *Operating Performance* (Sales/Empl), coefficient of determination and R squared are used interchangeably in this text.

4. Empirical Findings

As previously indicated, all results (either tabular or graphic) are categorized by industry. N denotes average sample size for each industry and the ratios of *Size* and *Sales/Empl.* are in millions of €. The *Cash* and *Asset Turnover* ratios are expressed as decimals whereas profitability (ROA, ROE and *Net Profit Margin*), *Leverage*, *BS Structure* and CAPEX ratios are expressed as percentages. *Valuation* is depicted in times (times the replacement value in order to obtain the market value of total assets).

4.1 Basic Materials Industry

Table 1: Positive Analysis for the Industry of Basic Materials

Basic Materials (N=25)											
Year	Cash Ratio	ROA	ROE	EAT/Sales	Sales/TA	CAPEX/TA	PPE/TA	Leverage	Size	Sales/Empl	Tobin's Q
2001	0.03	2.99%	5.38%	4.04%	0.81	no data	38.07%	32.04%	157.43	0.20	1.25
2002	0.10	2.41%	1.52%	3.30%	0.81	no data	38.54%	32.44%	171.62	0.16	0.83
2003	0.10	1.28%	-0.44%	1.06%	0.85	no data	37.31%	34.74%	184.39	0.28	0.97
2004	0.10	3.43%	6.42%	4.24%	0.81	-3.28%	40.54%	25.85%	233.03	0.24	0.69
2005	0.09	2.20%	4.20%	3.11%	0.78	-3.43%	46.01%	33.47%	304.57	0.27	0.75
2006	0.13	2.25%	-1.89%	-0.99%	0.86	-3.92%	42.67%	34.04%	334.64	0.34	0.87
2007	0.11	2.25%	11.61%	1.91%	0.88	-4.88%	43.83%	35.40%	351.15	0.35	0.97
2008	0.12	-2.76%	-28.39%	-9.98%	0.92	-5.60%	46.36%	38.21%	358.21	0.38	0.61
2009	0.24	-1.83%	-3.65%	-4.15%	0.77	-3.80%	50.15%	39.05%	346.98	0.28	0.65
2010	0.18	-0.99%	0.70%	-2.56%	0.86	-2.74%	47.23%	38.40%	404.48	0.33	0.56
2011	0.16	-2.83%	-10.45%	-6.89%	0.87	-2.73%	47.83%	39.37%	396.75	0.38	0.58

We are able to observe growth in cash and cash equivalents which in conjunction with diminishing profitability indicates probable tightening of fiscal policy, since the source of these assets does not seem to be solely from operations. As expected, profitability ratios are in sync and since their numerator is the same, they can be compared in order to extract changes in the denominator.

Productivity has almost doubled in the time span whereas *Valuation* changes in an almost analogous manner with profitability. The *Turnover* of this industry is under 100%; if *Size* is taken under consideration, then this may be classified as an impressive find, showing almost stable *Activity* but in accordance with acute growth in TA and sustained *Capital Expenditures*.

An interesting point is that in these eleven years profitability seems to have the tendency to mirror itself, providing an almost symmetric Cartesian profile (ROA from 3% to -3%, EAT/Sales from 4% to -7%). *Capital Expenditures* are diminishing although not very sharply whereas *BS structure* has gained in PPE by approximately 10%, in (trending but not analogous) accordance with *Size*, which has more than doubled.

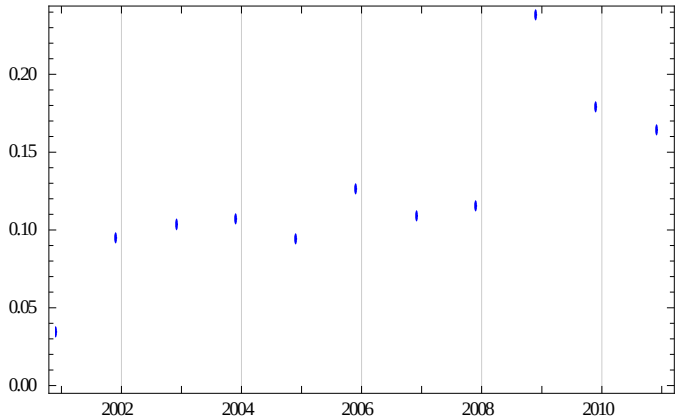
At this point the question may rise as to the source of growth (or even question the decision for growth), since growth not generated and sustained by profits is considered a grave risk and not an intriguing aspect for acquisition from a financial management standpoint. We can observe an abrupt change in sign from positive to negative in profitability and in the same time that the industry has effectively doubled its size. Many flags are raised and surely this is a find worthy of further examination.

Table 2: Forecasting for the Industry of Basic Materials

Basic Materials							
Ratio	**Domain**	**Formula**	**Linear Correlation**	**a**	**b**	**R^2**	**p-value**
Cash Ratio	Liquidity	Cash / CL	Direct	0.0445	0.0132	**64%**	**0.003101**
ROA	Profitability	EAT / TA	Inverse	4.2742	-0.5851	**66%**	**0.002229**
ROE	Profitability	EAT / Equity	Long Term Trend	7.0520	-1.4025	**19%**	**0.179878**
Net Profit Margin	Profitability	EAT / Revenue	Inverse	6.1006	-1.1215	**61%**	**0.004590**
Asset Turnover	Activity	Revenue / TA	Uncorrelated	0.8065	0.0053	**15%**	**0.246392**
CAPEX Ratio	Growth	CAPEX / TA	Uncorrelated	-4.1693	0.0826	**4%**	**0.633165**
Fixed Assets Leverage	BS Structure	PPE / TA	Direct	36.3287	1.1958	**81%**	**0.000146**
Financial Leverage	Leverage	TD / TA	Direct	29.3607	0.9097	**57%**	**0.007177**
Size	Size	Total Assets	Direct	135.9640	26.4795	**92%**	**3.6*10^-6**
Operating Performance	Productivity	Revenue / Empl.	Direct	0.1860	0.0176	**66%**	**0.002429**
Tobin's Q	Valuation	TA (MV) / Repl. Value	Inverse	1.0844	-0.0485	**58%**	**0.006420**

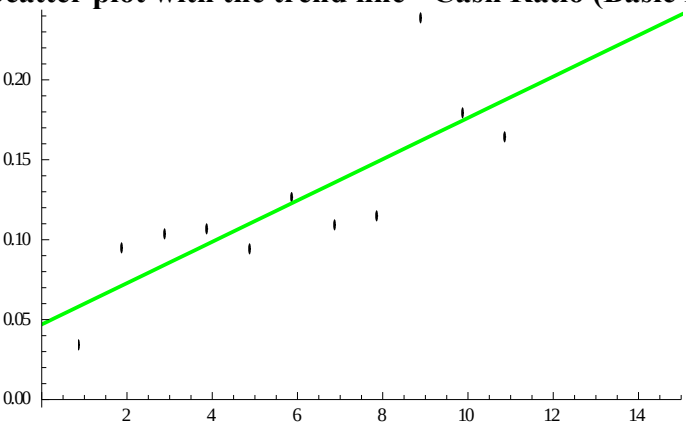
With the exception of ROE, *Activity* and *Growth*, the linear model seems to be an effective regression instrument for this industry, with the coefficient of determination exceeding 50% and in two cases providing an exceptionally high value (92% for *Size* and 81% for *BS Structure*). These results indicate that the linear model could prove highly effective for forecasting many financial ratios in this industry. Graphs 1-44 provide an analysis visualization of all the financial ratios for the *Basic Materials* industry and of the linear models and their constituents:

Graph 1: Plot of the time series - Cash Ratio (Basic Materials)



A positive correlation is evident with periodic cyclic variations.

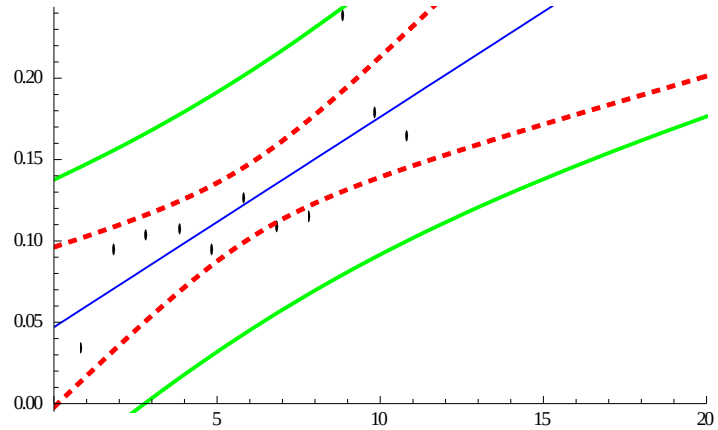
Graph 2: Scatter plot with the trend line - Cash Ratio (Basic Materials)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

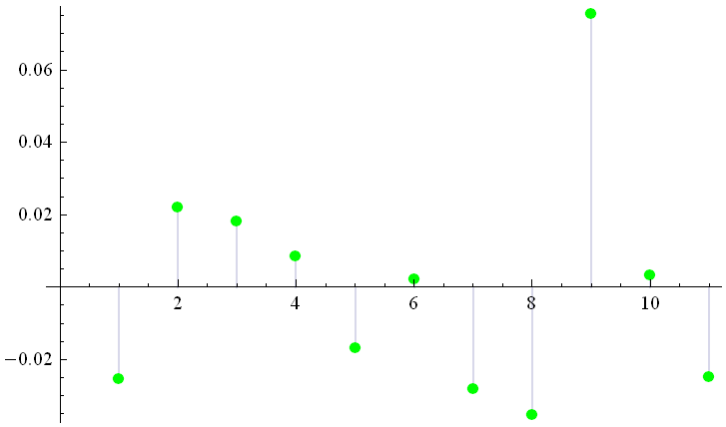
$$0.0445455 + 0.0131818\,x$$

Graph 3: Plot of the time series, trend line, mean and single prediction bands - Cash Ratio (Basic Materials)



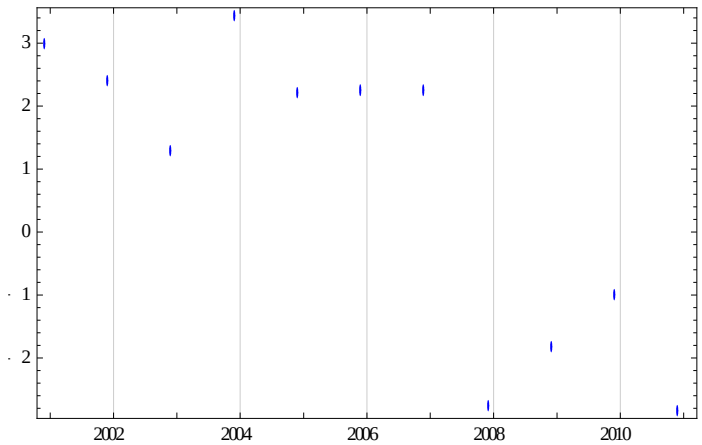
With a coefficient of determination of 64%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 4: Plot of the regression model residuals - Cash Ratio (Basic Materials)



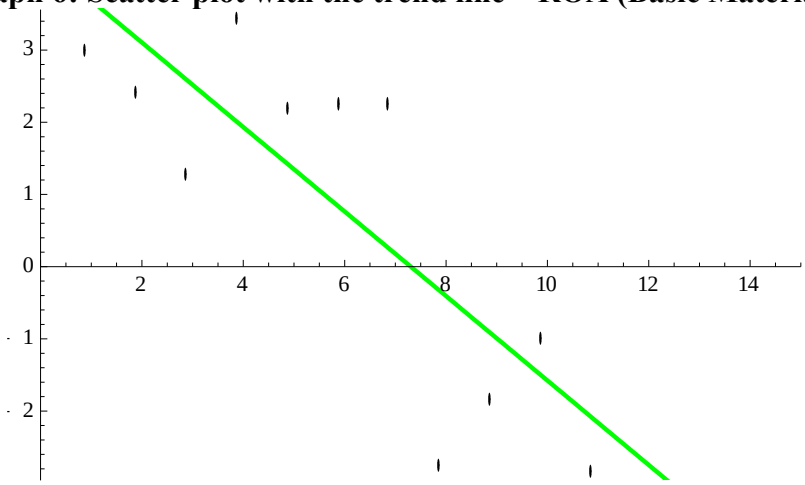
We can observe that most residuals cluster around 0.02 almost symmetrically whereas one value is extremely divergent.

Graph 5: Plot of the time series – ROA (Basic Materials)



We can observe a negative trend with periodic cyclic variations.

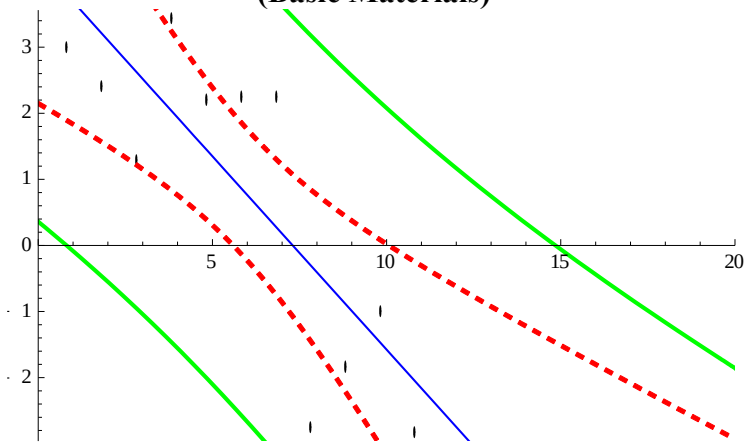
Graph 6: Scatter plot with the trend line – ROA (Basic Materials)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

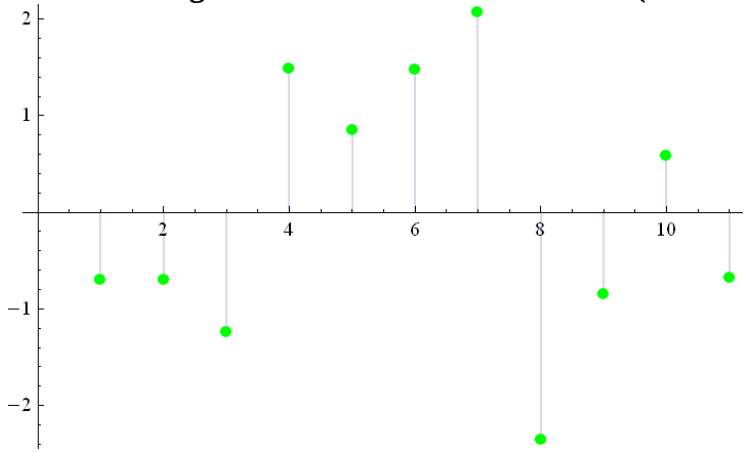
$$4.27418 - 0.585091\,x$$

Graph 7: Plot of the time series, trend line, mean and single prediction bands – ROA (Basic Materials)



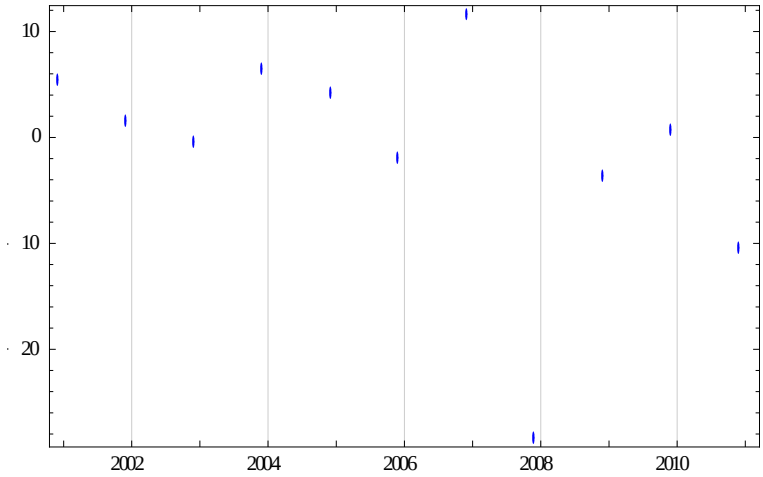
With a coefficient of determination of 66%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 8: Plot of the regression model residuals – ROA (Basic Materials)



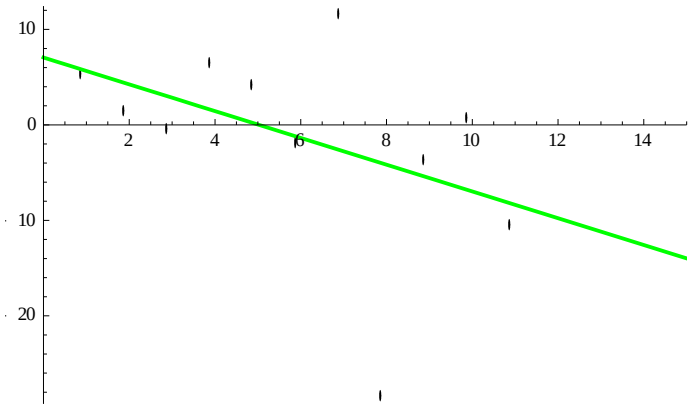
We can observe no evident clustering of the residuals.

Graph 9: Plot of the time series – ROE (Basic Materials)



We can observe negative long-term trend.

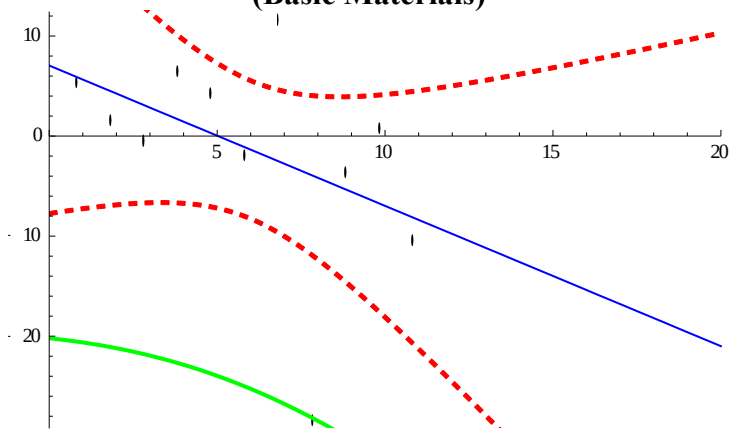
Graph 10: Scatter plot with the trend line – ROE (Basic Materials)



The equation of the trend line is:

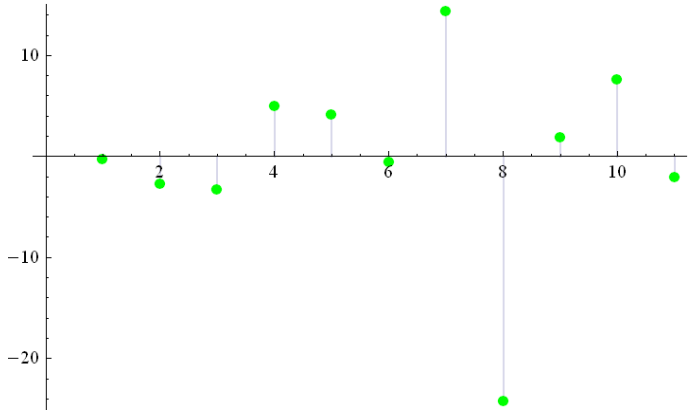
$$7.052 - 1.40245\,x$$

Graph 11: Plot of the time series, trend line, mean and single prediction bands – ROE (Basic Materials)



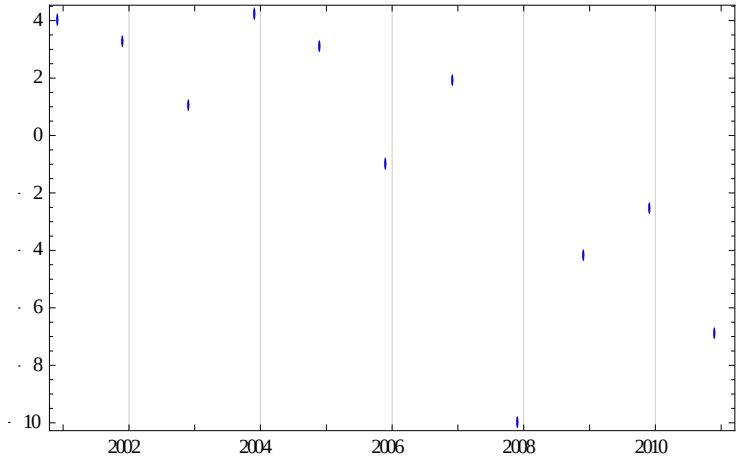
With a coefficient of determination of 19%, we can observe that major parts of the prediction bands are off the chart.

Graph 12: Plot of the regression model residuals – ROE (Basic Materials)



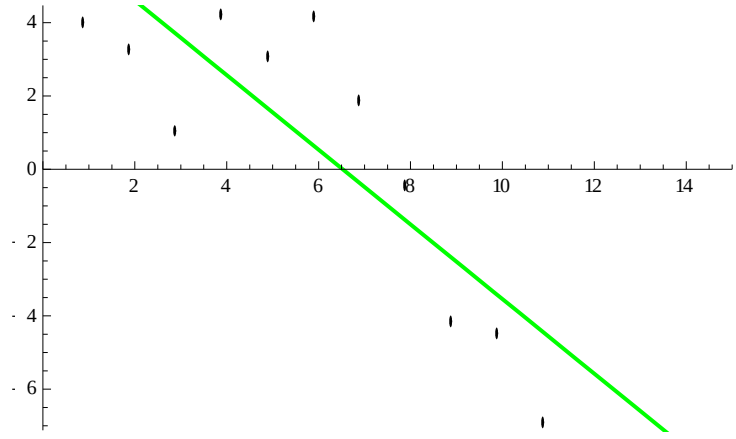
We can observe the most residuals are less than 10 points.

Graph 13: Plot of the time series – Net Profit Margin (Basic Materials)



We can observe a negative trend with periodic cyclic variations.

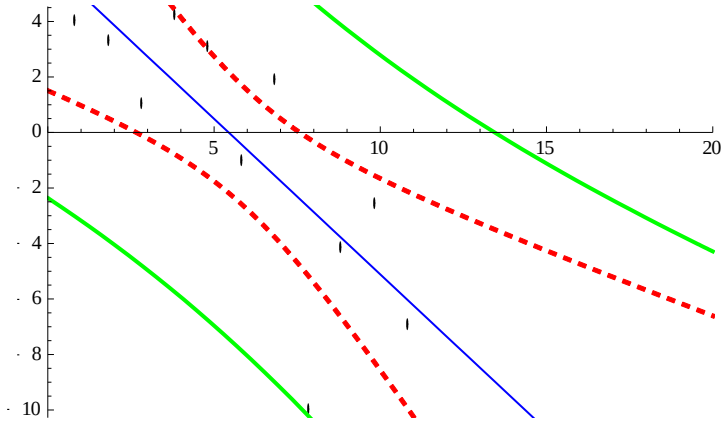
Graph 14: Scatter plot with the trend line – Net Profit Margin (Basic Materials)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

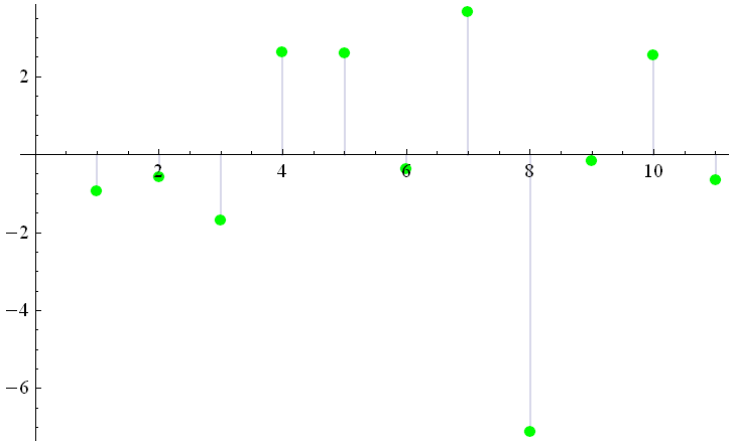
$$6.10055 - 1.12145\,x$$

Graph 15: Plot of the time series, trend line, mean and single prediction bands – Net Profit Margin (Basic Materials)



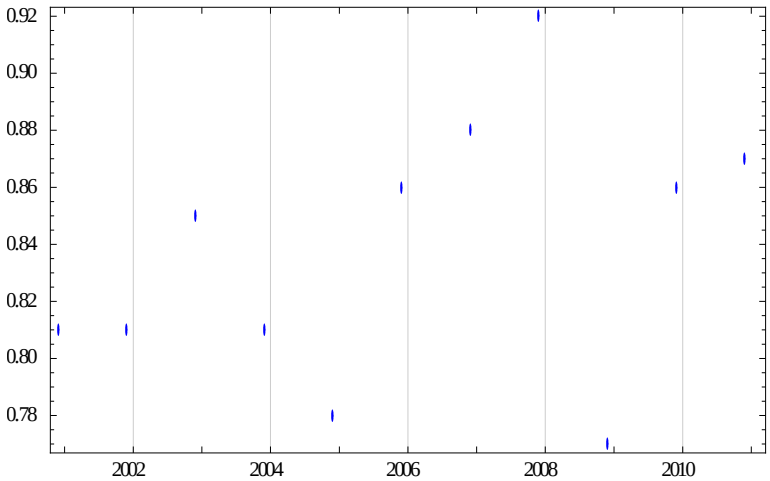
With a coefficient of determination of 61%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 16: Plot of the regression model residuals – Net Profit Margin (Basic Materials)



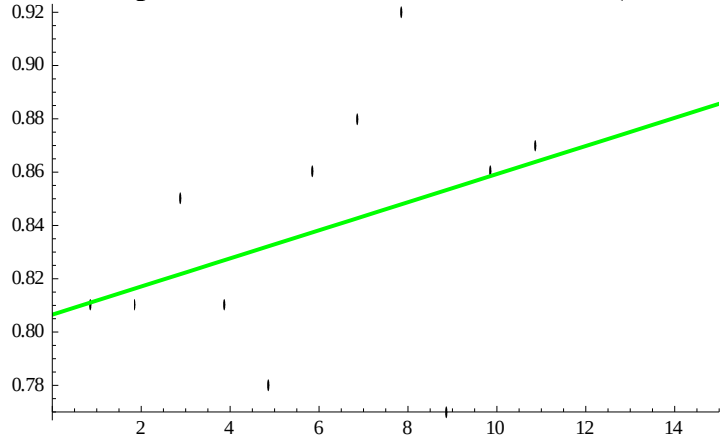
We can observe no evident clustering of the residuals.

Graph 17: Plot of the time series – Sales/TA (Basic Materials)



No explicit trend is evident for all years.

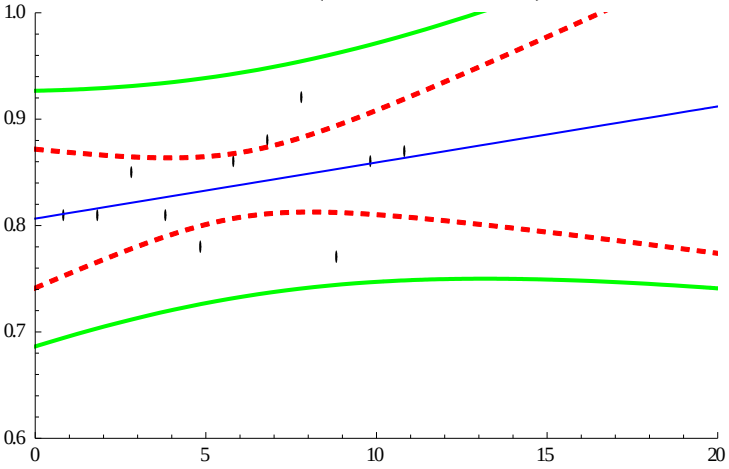
Graph 18: Scatter plot with the trend line – Sales/TA (Basic Materials)



The equation of the trend line is:

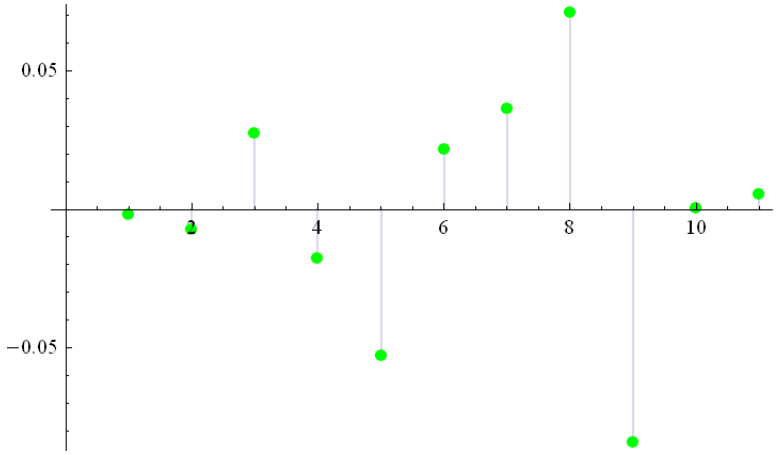
$$0.806545 + 0.00527273\,x$$

Graph 19: Plot of the time series, trend line, mean and single prediction bands – Sales/TA (Basic Materials)



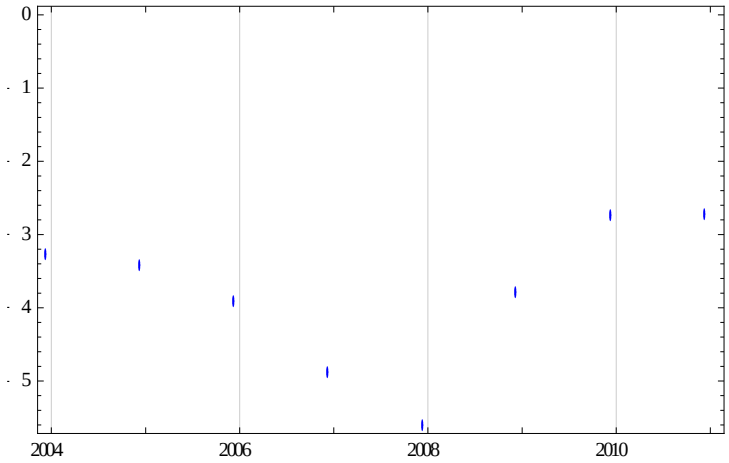
Even with a low coefficient of determination (15%), all data points are within the prediction bands.

Graph 20: Plot of the regression model residuals – Sales/TA (Basic Materials)



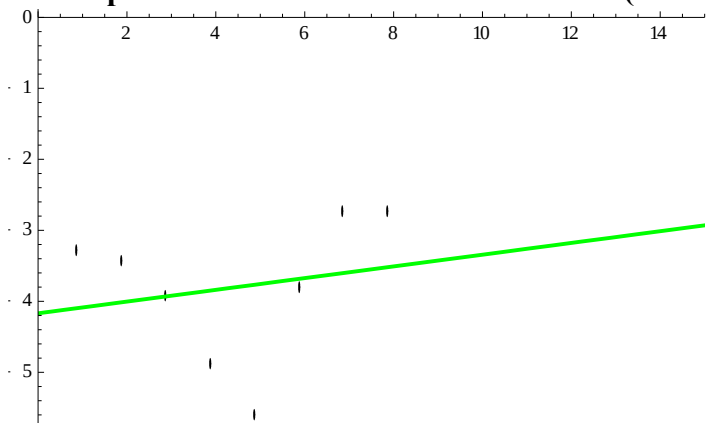
We can observe no evident clustering of the residuals.

Graph 21: Plot of the time series – CAPEX/TA (Basic Materials)



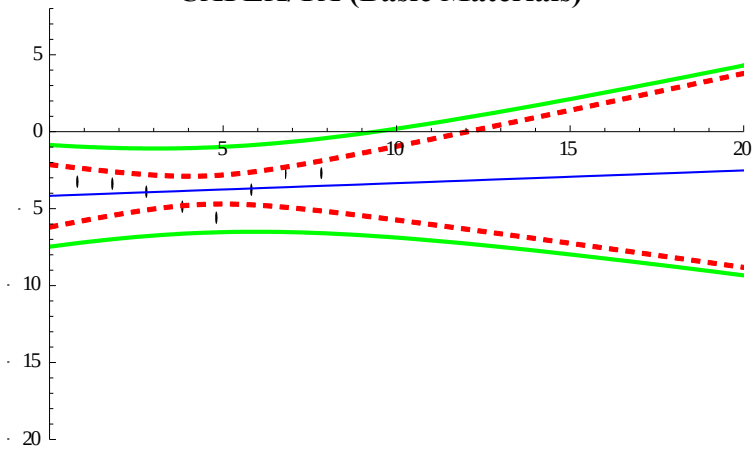
No explicit trend is evident for all years.

Graph 22: Scatter plot with the trend line – CAPEX/TA (Basic Materials)



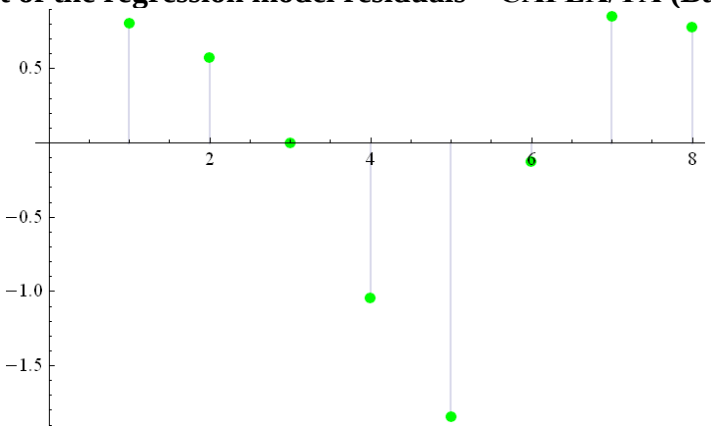
The equation of the trend line is: $4.16929 - 0.082619x$

Graph 23: Plot of the time series, trend line, mean and single prediction bands – CAPEX/TA (Basic Materials)



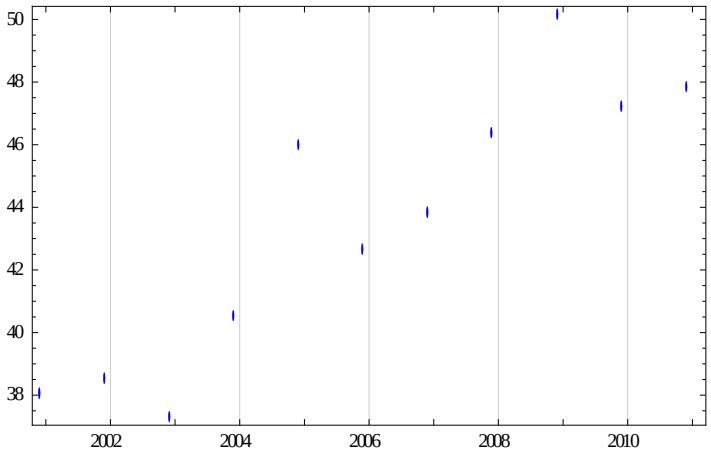
With a low coefficient of determination (4%), most raw data are within the confidence bands and all within the prediction bands.

Graph 24: Plot of the regression model residuals – CAPEX/TA (Basic Materials)



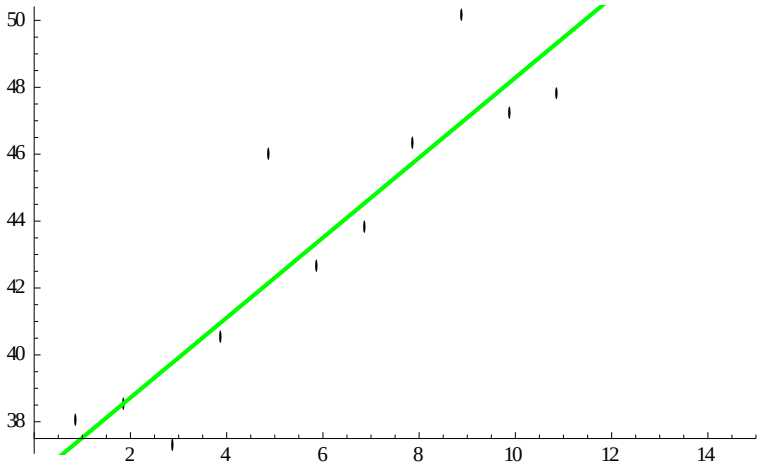
We can observe no evident clustering of the residuals.

Graph 25: Plot of the time series – PPE/TA(Basic Materials)



We can observe a positive trend with periodic cyclic variations.

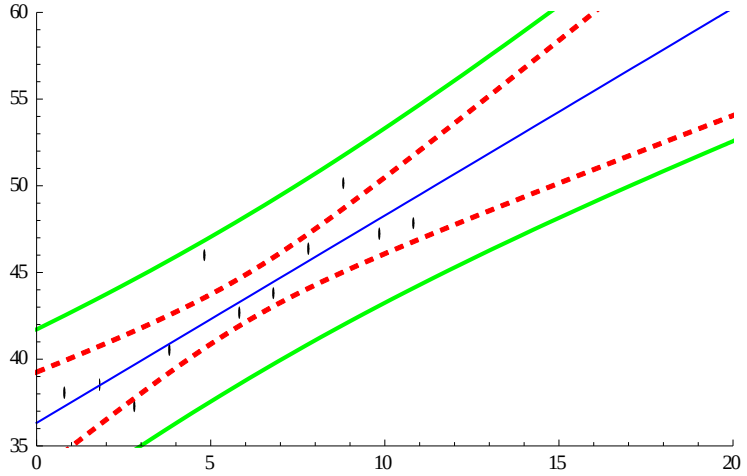
Graph 26: Scatter plot with the trend line – PPE/TA (Basic Materials)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

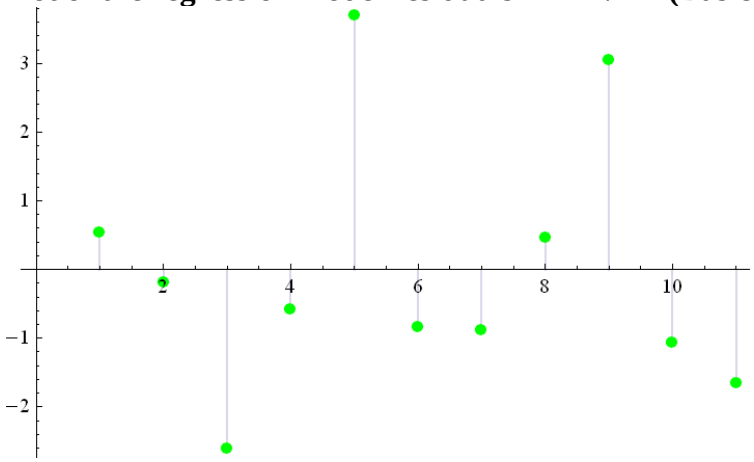
$$36.3287 + 1.19582\,x$$

Graph 27: Plot of the time series, trend line, mean and single prediction bands – PPE/TA (Basic Materials)



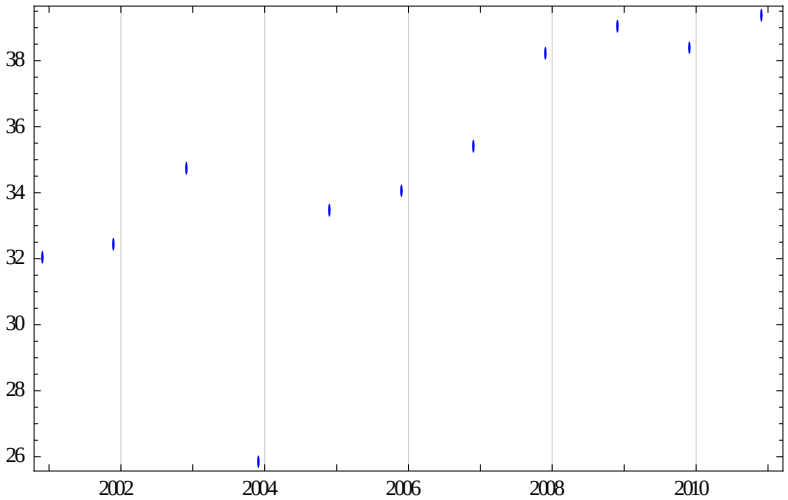
With a coefficient of determination of 81%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 28: Plot of the regression model residuals – PPE/TA (Basic Materials)



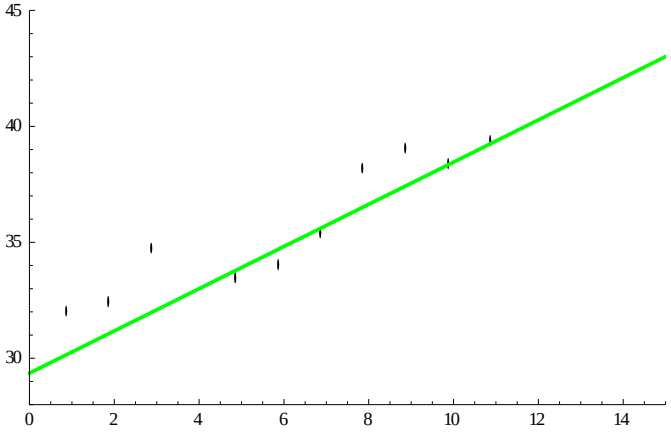
We can observe no evident residuals clustering, although most residual values are very low.

Graph 29: Plot of the time series – Leverage (Basic Materials)



We can observe a positive trend with periodic cyclic variations.

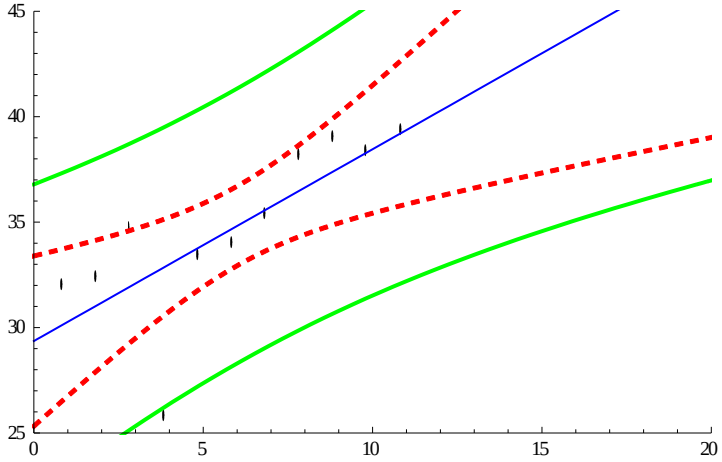
Graph 30: Scatter plot with the trend line – Leverage (Basic Materials)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

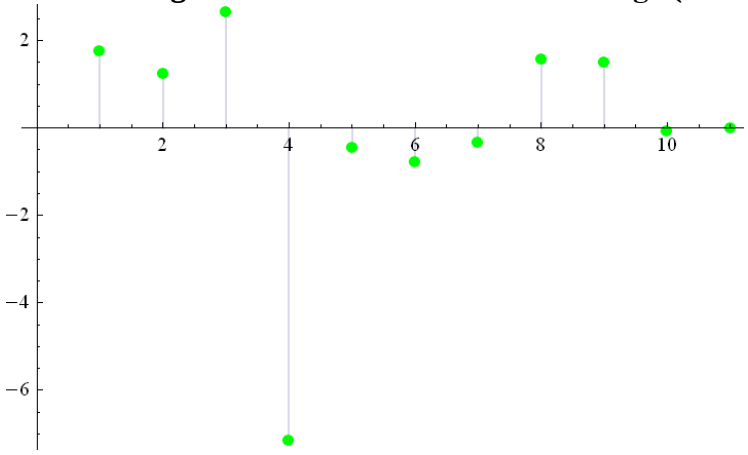
$$29.3607 + 0.909727\,x$$

Graph 31: Plot of the time series, trend line, mean and single prediction bands – Leverage (Basic Materials)



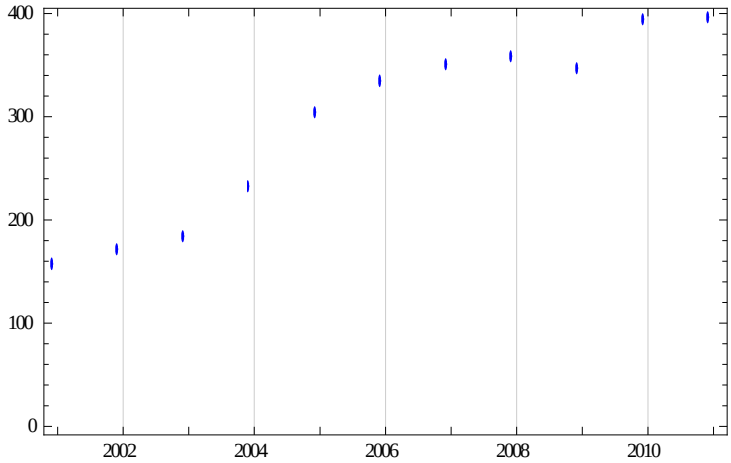
With a coefficient of determination of 57%, we can observe that most raw data are within the confidence bands and that all but one are within the prediction bands.

Graph 32: Plot of the regression model residuals – Leverage (Basic Materials)



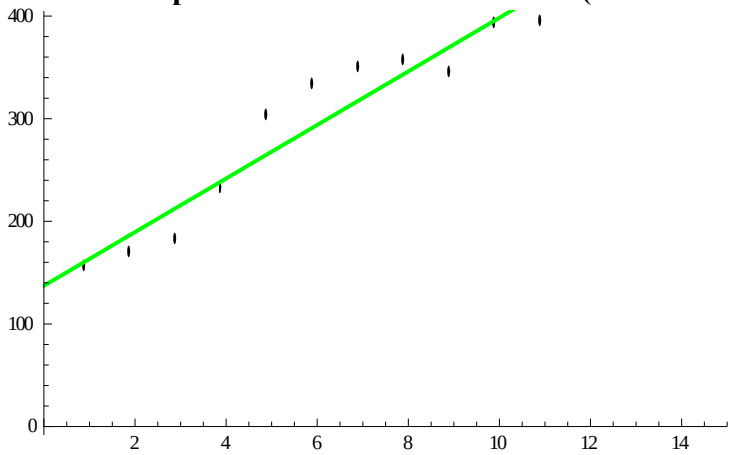
We can observe that most of the residuals are less than 2 points.

Graph 33: Plot of the time series – Size (Basic Materials)



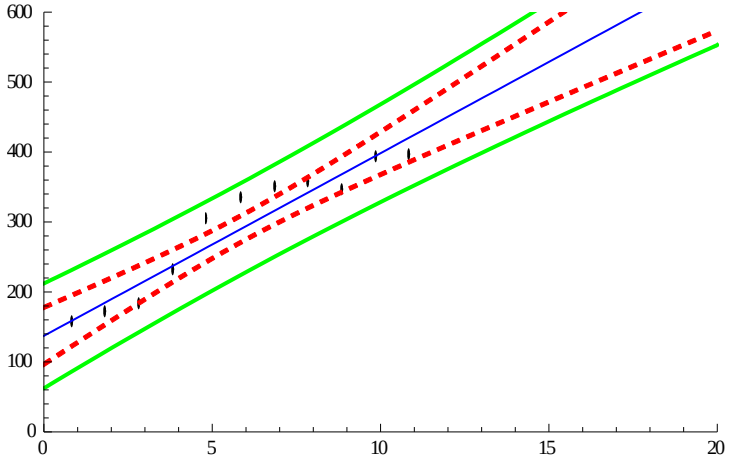
We can observe a positive trend with periodic cyclic variations.

Graph 34: Scatter plot with the trend line – Size (Basic Materials)



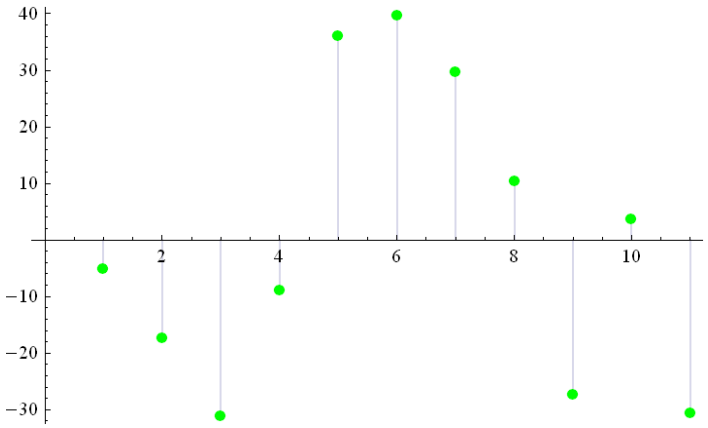
The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is: $135.964 + 26.4795\,x$

Graph 35: Plot of the time series, trend line, mean and single prediction bands – Size (Basic Materials)



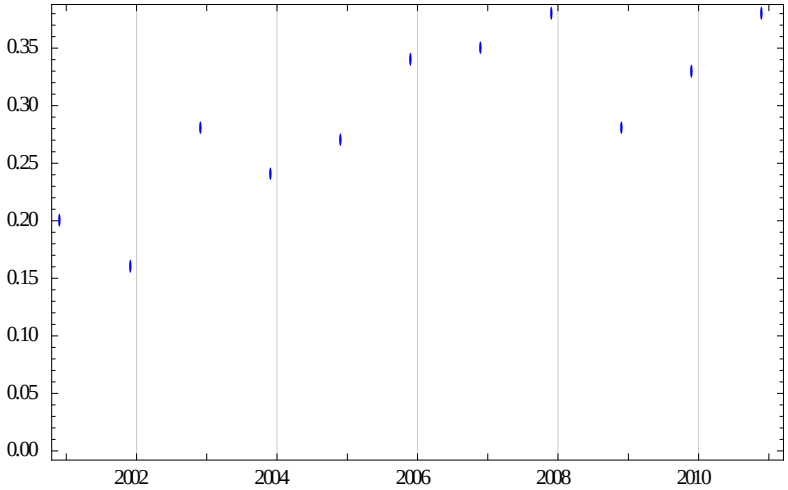
With a coefficient of determination of 92%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 36: Plot of the regression model residuals – Size (Basic Materials)



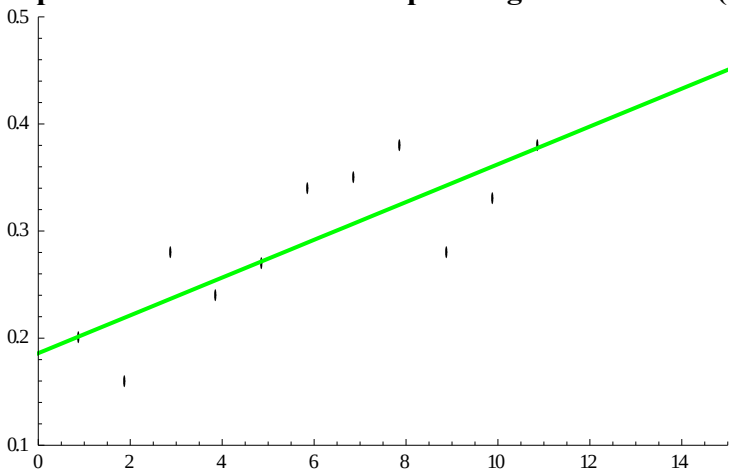
We can observe that most residual values are very low.

Graph 37: Plot of the time series – Operating Performance (Basic Materials)



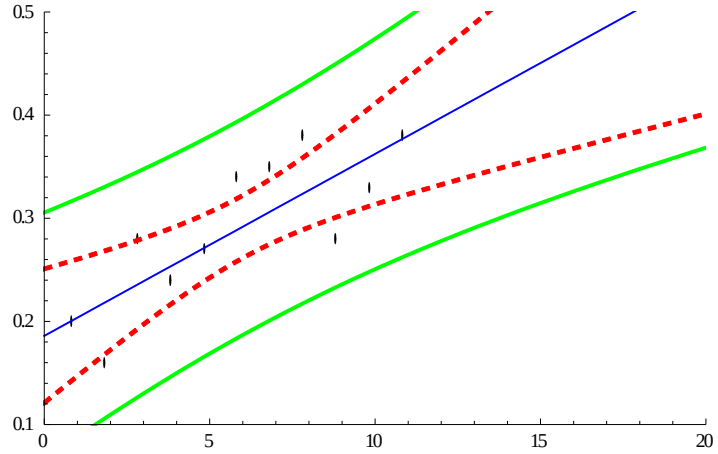
We can observe a positive trend with periodic cyclic variations.

Graph 38: Scatter plot with the trend line – Operating Performance (Basic Materials)



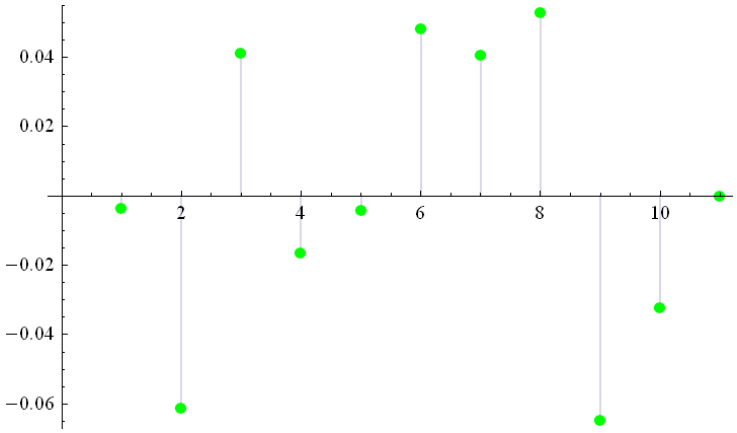
The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is: $0.186 \cdot 0.0176364\,x$

Graph 39: Plot of the time series, trend line, mean and single prediction bands – Operating Performance (Basic Materials)



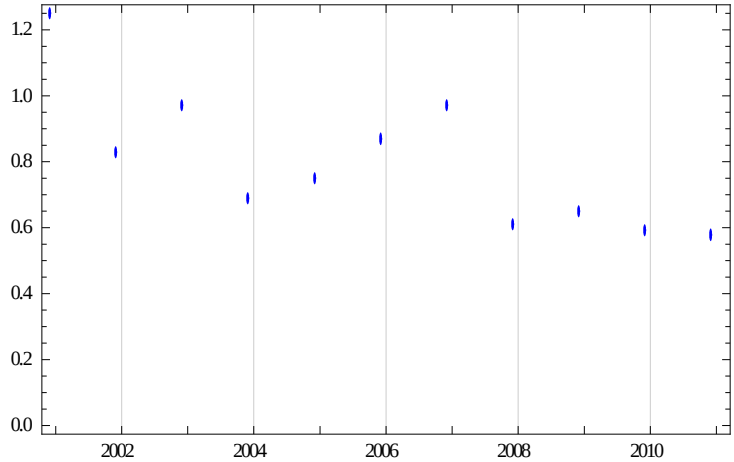
With a coefficient of determination of 66%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 40: Plot of the regression model residuals – Operating Performance (Basic Materials)



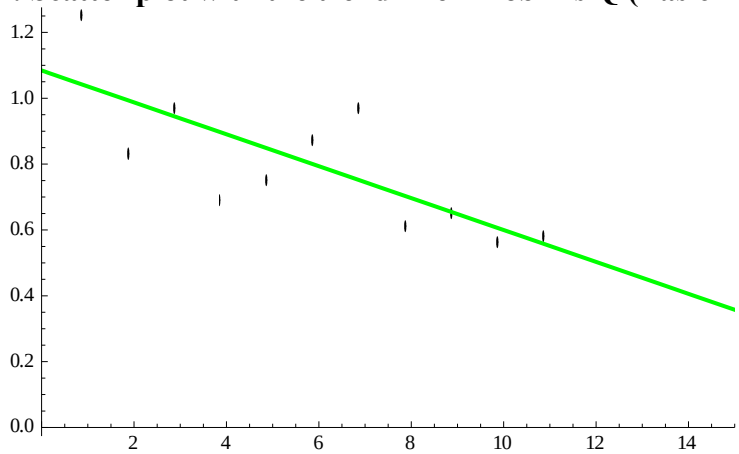
Most of the residuals are less than 0.07.

Graph 41: Plot of the time series – Tobin's Q (Basic Materials)



We can observe a negative trend with periodic cyclic variations

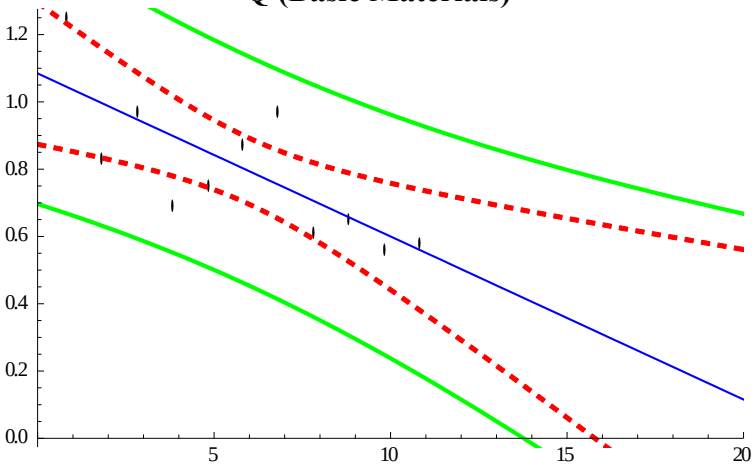
Graph 42: Scatter plot with the trend line – Tobin's Q (Basic Materials)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

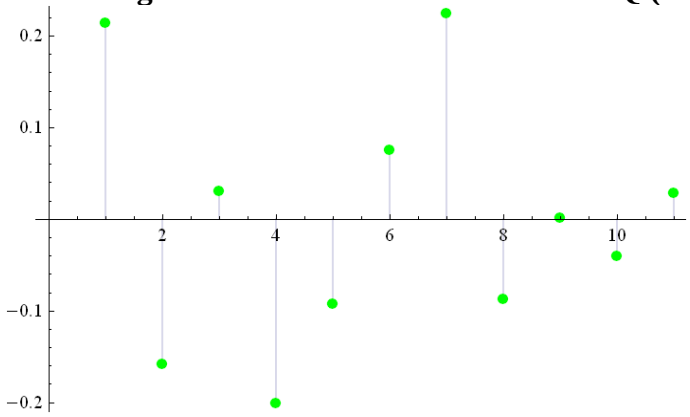
$$1.08436 - 0.0484545\,x$$

Graph 43: Plot of the time series, trend line, mean and single prediction bands – Tobin's Q (Basic Materials)



With a coefficient of determination of 58%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 44: Plot of the regression model residuals – Tobin's Q (Basic Materials)



The residuals are less than 0.25.

4.2 Consumer Goods Industry

Table 3: Positive Analysis for the Industry of Consumer Goods

Consumer Goods (N=69)											
Year	Cash Ratio	ROA	ROE	EAT/Sales	Sales/TA	CAPEX/TA	PPE/TA	Leverage	Size	Sales/Empl	Tobin's Q
2001	0.12	2.02%	4.93%	1.98%	0.71	-6.85%	39.04%	31.57%	165.41	0.18	1.38
2002	0.13	1.28%	3.30%	1.79%	0.7	-6.22%	37.82%	29.07%	185.00	0.20	0.96
2003	0.19	1.82%	5.94%	2.42%	0.72	-7.21%	37.25%	27.60%	187.34	0.30	1.00
2004	0.12	1.67%	5.09%	1.93%	0.72	-4.32%	37.81%	22.66%	185.42	0.17	0.70
2005	0.11	0.90%	-4.27%	0.23%	0.62	-3.26%	46.09%	29.57%	211.11	0.19	0.75
2006	0.13	0.53%	-1.99%	-1.06%	0.63	-4.06%	46.67%	32.18%	228.92	0.20	0.90
2007	0.15	1.57%	-3.71%	-0.74%	0.68	-4.30%	47.80%	33.92%	231.55	0.30	1.01
2008	0.17	-2.02%	-8.59%	-6.28%	0.8	-4.04%	49.86%	37.71%	232.95	0.55	0.65
2009	0.24	-3.67%	-12.18%	-11.46%	0.77	-2.67%	50.53%	38.35%	219.18	0.60	0.71
2010	0.27	-3.66%	-15.04%	-18.82%	0.68	-2.18%	52.12%	39.48%	233.74	0.76	0.65
2011	0.20	-8.16%	-36.96%	-33.45%	0.72	-2.13%	50.41%	42.83%	244.11	0.71	0.63

We are able to observe growth in cash and cash equivalents which (as with the industry of *Basic Materials*) in conjunction with radically diminishing profitability may indicate tightening of fiscal policy.

Profitability ratios are portraying a strong negative temporal trend. *Activity* seems fairly stable with relatively small per annum variations and CAPEX is reduced whereas *BS structure* has gained in PPE by approximately 10%, in (trending but not analogous) accordance with *Size*, which has almost doubled in the time span.

Productivity provides a very interesting find in this industry, since it has more than tripled from 2001. This could be due to technological advances in the industry (especially since this industry includes many production/manufacturing oriented firms), as well as changes in employee policy. Financial leverage has risen by approximately 10% whereas *Valuation* has been diminished by more than half.

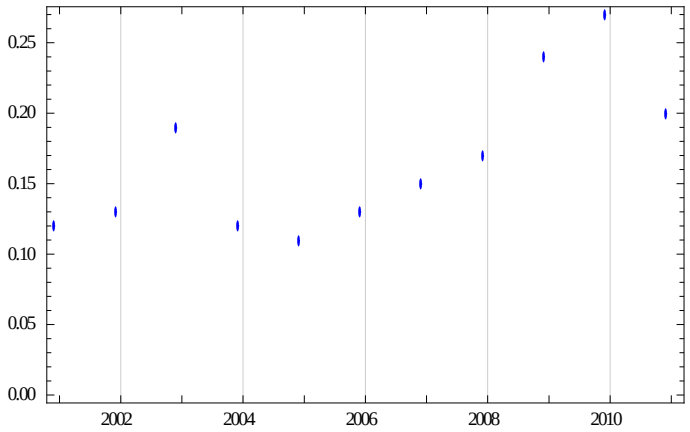
Table 4: Forecasting for the Industry of Consumer Goods

Consumer Goods							
Ratio	Domain	Formula	Linear Correlation	a	b	R^2	p-value
Cash Ratio	Liquidity	Cash / CL	Direct	0.0982	0.0114	**50%**	**0.014563**
ROA	Profitability	EAT / TA	Inverse	4.4167	-0.8531	**74%**	**0.000624**
ROE	Profitability	EAT / Equity	Inverse	14.0820	-3.3088	**76%**	**0.000451**
Net Profit Margin	Profitability	EAT / Revenue	Inverse	11.6102	-2.8966	**71%**	**0.001094**
Asset Turnover	Activity	Revenue / TA	Uncorrelated	0.6860	0.0031	**4%**	**0.568663**
CAPEX Ratio	Growth	CAPEX / TA	Direct	-7.1800	0.4809	**80%**	**0.000194**
Fixed Assets Leverage	BS Structure	PPE / TA	Direct	35.2345	1.6336	**85%**	**0.000052**
Financial Leverage	Leverage	TD / TA	Direct	24.1960	1.4967	**69%**	**0.001489**
Size	Size	Total Assets	Direct	167.7310	7.2680	**85%**	**0.000062**
Operating Performance	Productivity	Revenue / Empl.	Direct	0.0149	0.0605	**76%**	**0.000441**
Tobin's Q	Valuation	TA (MV) / Repl. Value	Inverse	1.1600	-0.0518	**56%**	**0.007761**

With the exception of *Activity*, the linear model seems to prove effective for this industry, with the coefficient of determination exceeding an acceptable value for all ratios and with seven linear models providing an R squared of more than 70%. Consequently, the linear model could prove highly effective for forecasting most ratios in this industry.

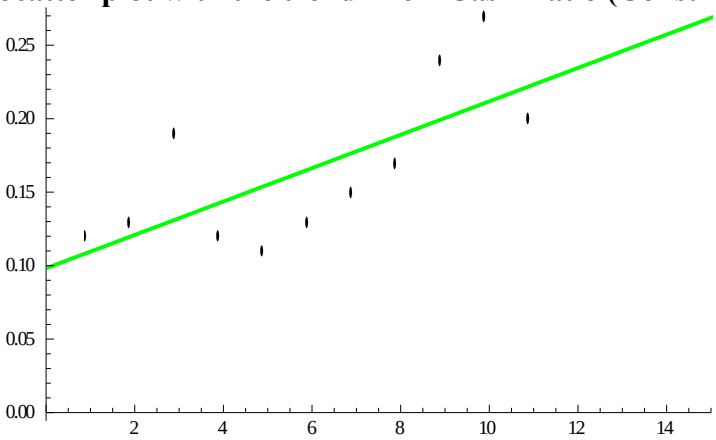
Graphs 45-88 provide an analysis visualization of all the financial ratios for the *Consumer Goods* industry and of the linear models and their constituents:

Graph 45: Plot of the time series – Cash Ratio (Consumer Goods)



We can observe a positive trend with periodic cyclic variations.

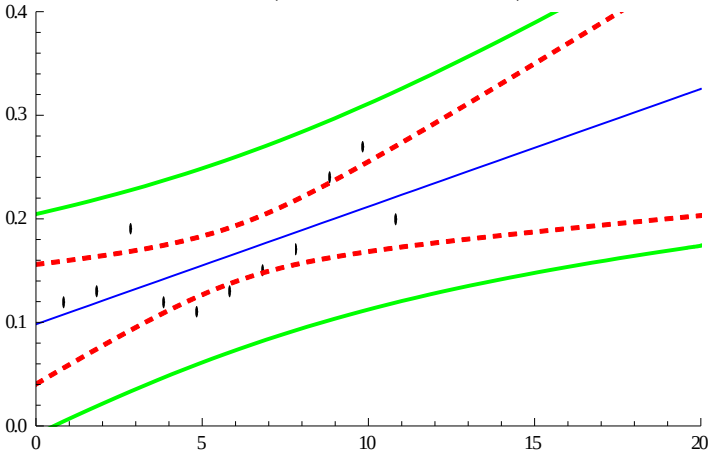
Graph 46: Scatter plot with the trend line – Cash Ratio (Consumer Goods)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

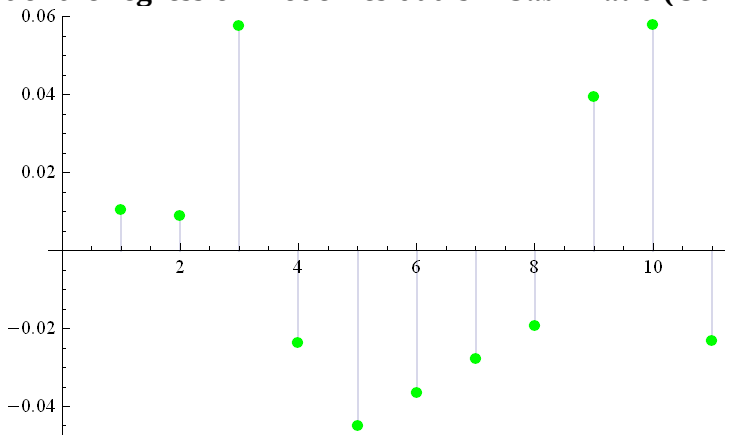
$$0.0981818 + 0.0113636x$$

Graph 47: Plot of the time series, trend line, mean and single prediction bands – Cash Ratio (Consumer Goods)



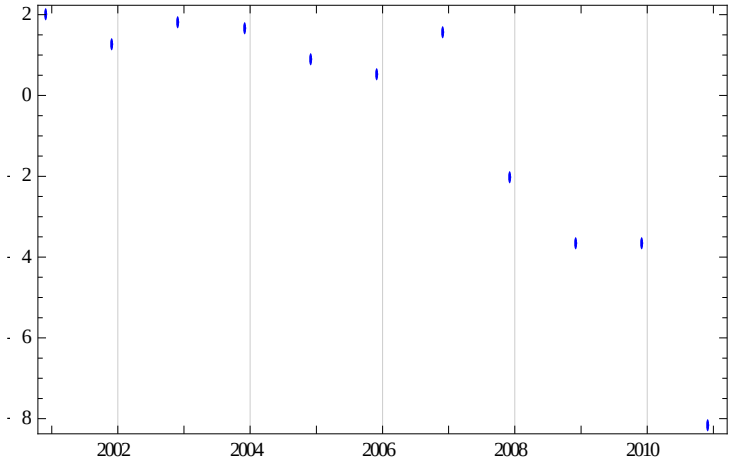
With a coefficient of determination of 50%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 48: Plot of the regression model residuals – Cash Ratio (Consumer Goods)



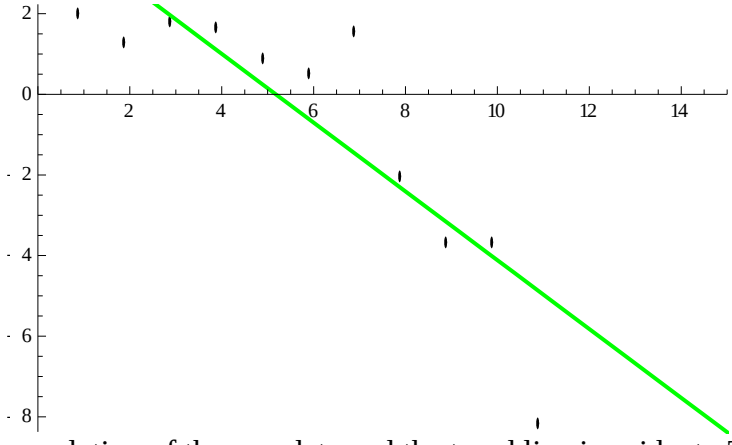
Most of the residuals are less than 0.06.

Graph 49: Plot of the time series – ROA (Consumer Goods)



We can observe a negative trend with periodic cyclic variations.

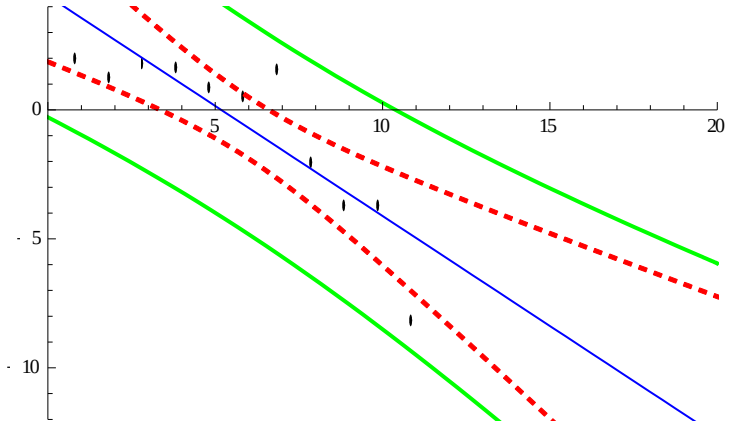
Graph 50: Scatter plot with the trend line – ROA (Consumer Goods)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

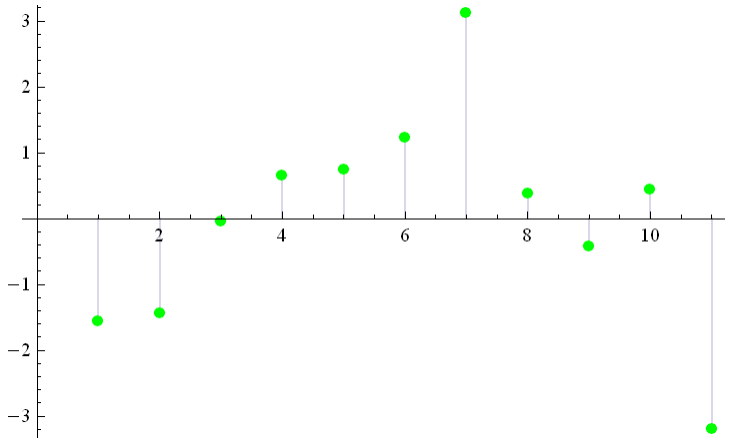
$$4.41673 - 0.853091\,x$$

Graph 51: Plot of the time series, trend line, mean and single prediction bands – ROA (Consumer Goods)



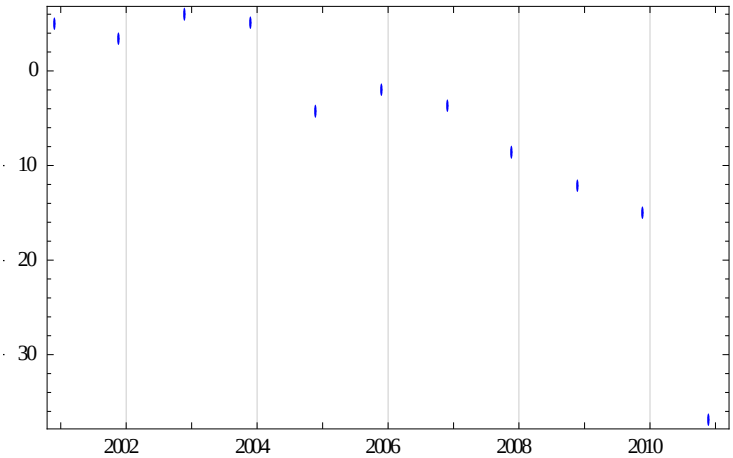
With a coefficient of determination of 74%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 52: Plot of the regression model residuals – ROA (Consumer Goods)



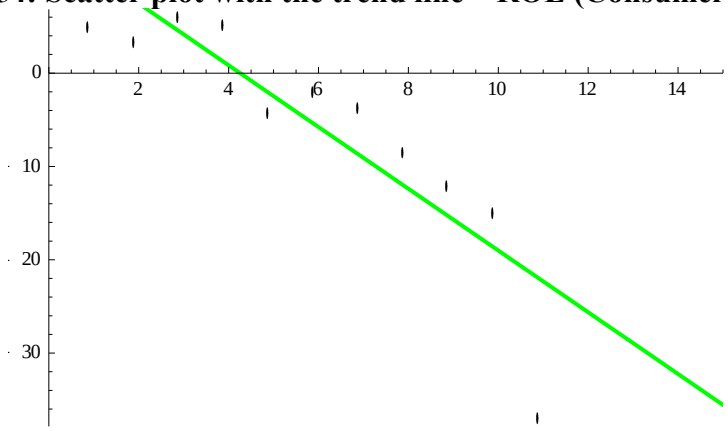
Most of the residuals are less than 2 whereas two values are divergent.

Graph 53: Plot of the time series – ROE (Consumer Goods, churn 1.4% - 10%)



We can observe a negative trend with periodic cyclic variations.

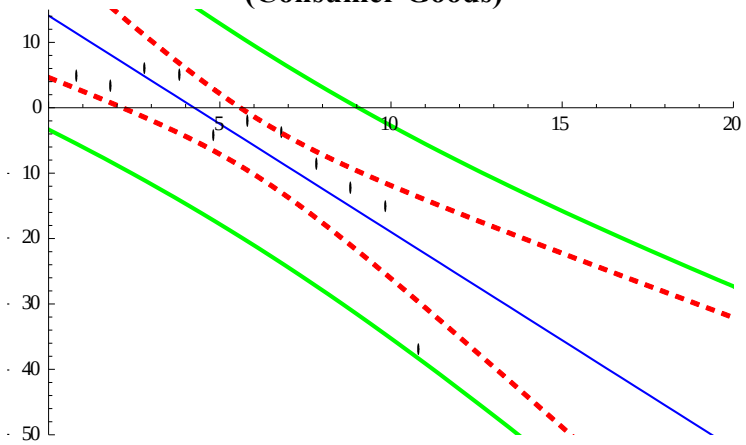
Graph 54: Scatter plot with the trend line – ROE (Consumer Goods)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

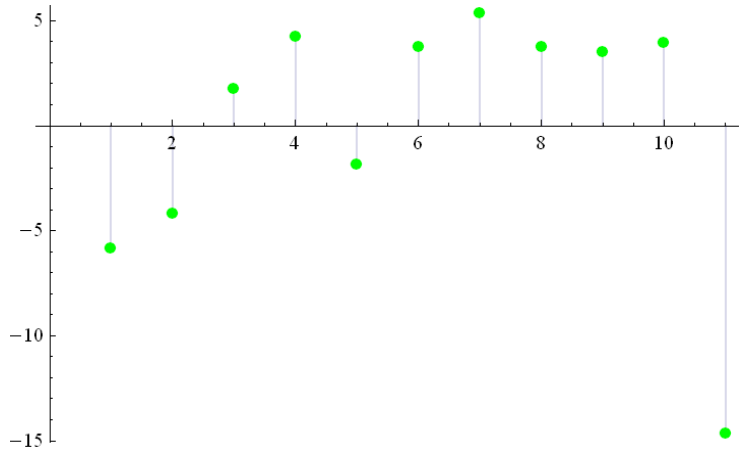
$$14.082 - 3.30882\,x$$

Graph 55: Plot of the time series, trend line, mean and single prediction bands – ROE (Consumer Goods)



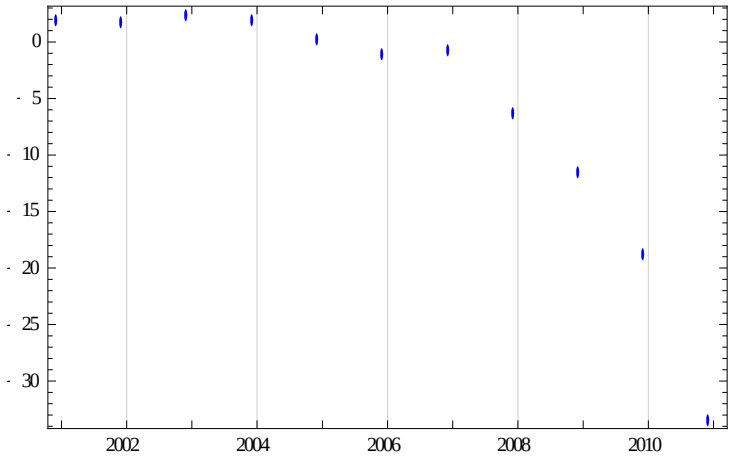
With a coefficient of determination of 76%, we can observe that most raw data are within the confidence bands and that all but one are within the prediction bands.

Graph 56: Plot of the regression model residuals – ROE (Consumer Goods)



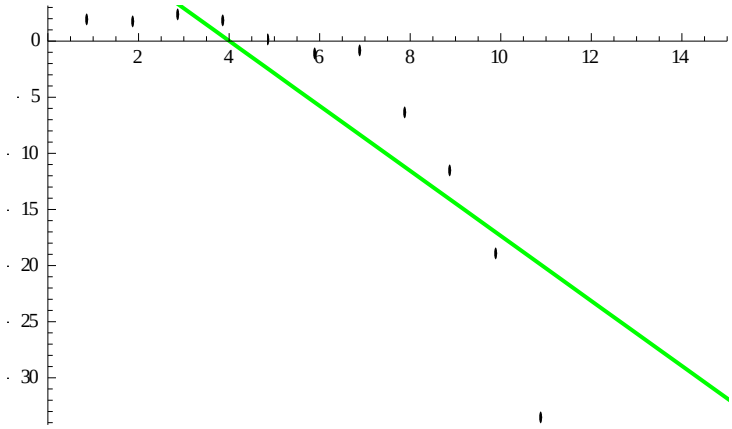
We can observe the most residuals cluster symmetrically around 5 whereas one value is divergent.

Graph 57: Plot of the time series – Net Profit Margin (Consumer Goods)



We can observe a negative trend with periodic cyclic variations.

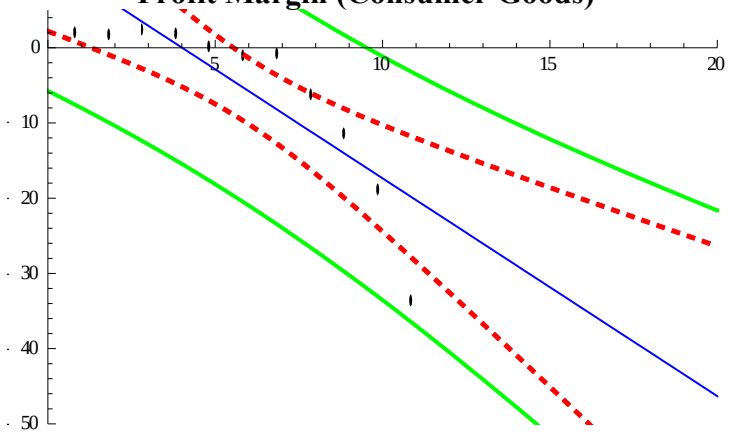
Graph 58: Scatter plot with the trend line – Net Profit Margin (Consumer Goods)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

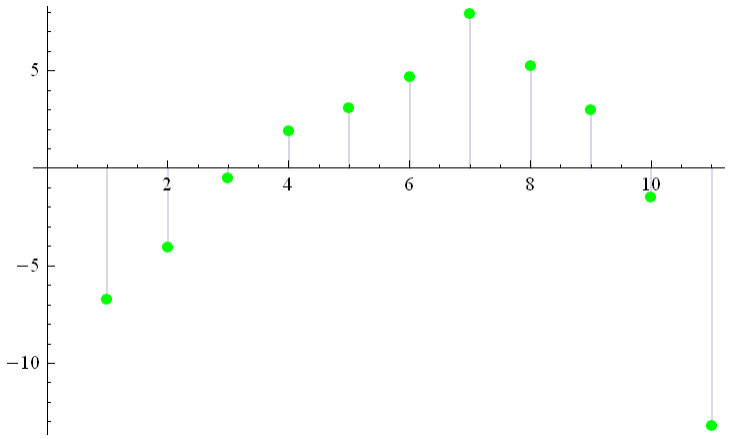
$$11.6102 - 2.89655x$$

Graph 59: Plot of the time series, trend line, mean and single prediction bands – Net Profit Margin (Consumer Goods)



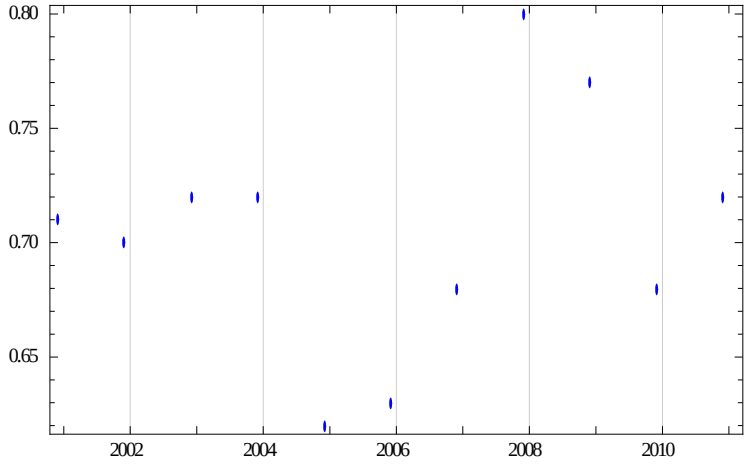
With a coefficient of determination of 71%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 60: Plot of the regression model residuals – Net Profit Margin (Consumer Goods)



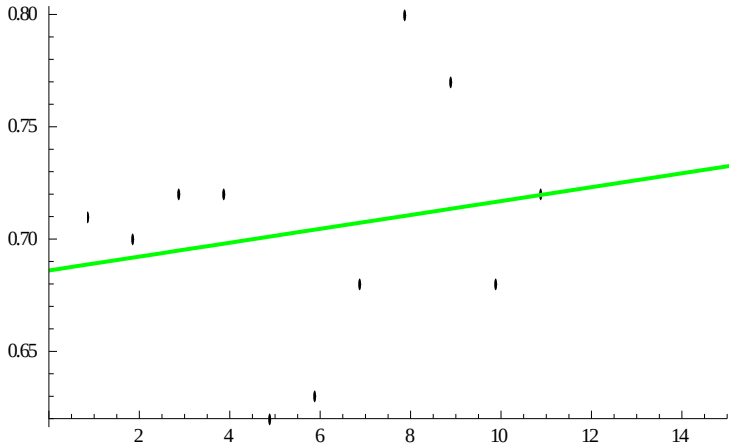
We can observe no evident clustering of the residuals.

Graph 61: Plot of the time series – Activity (Consumer Goods)



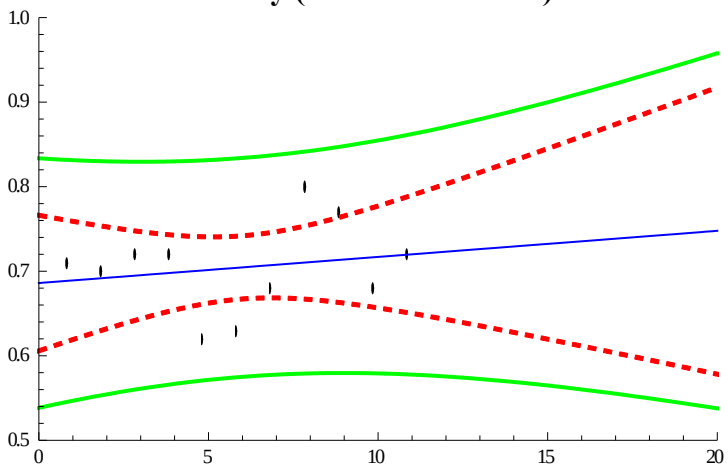
No explicit trend is evident for all years.

Graph 62: Scatter plot with the trend line – Activity (Consumer Goods)



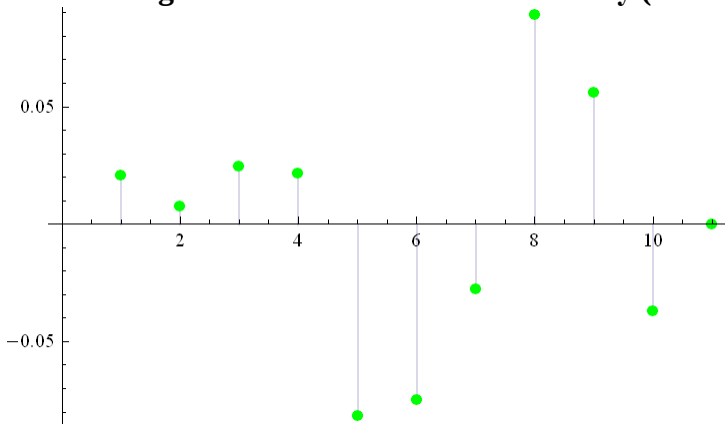
The trend line has a positive trend. The line equation is: $0.686 + 0.00309091x$

Graph 63: Plot of the time series, trend line, mean and single prediction bands – Activity (Consumer Goods)



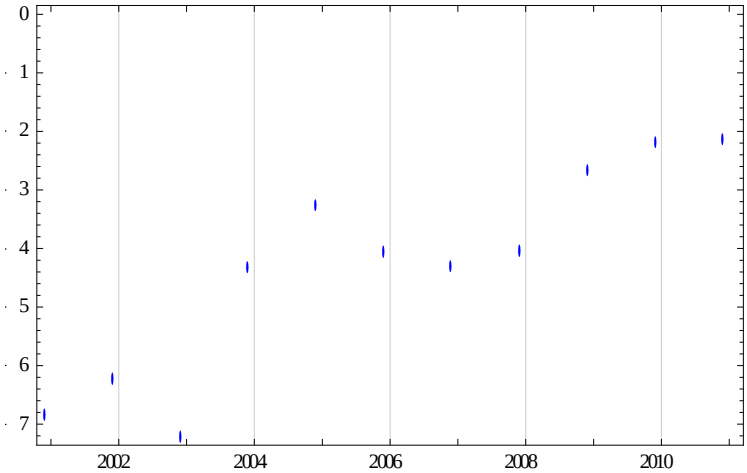
With a very low coefficient of determination (4%), we still can observe that most raw data are within the confidence bands and that all are within the prediction bands, although the prediction bands are of significant width.

Graph 64: Plot of the regression model residuals – Activity (Consumer Goods)



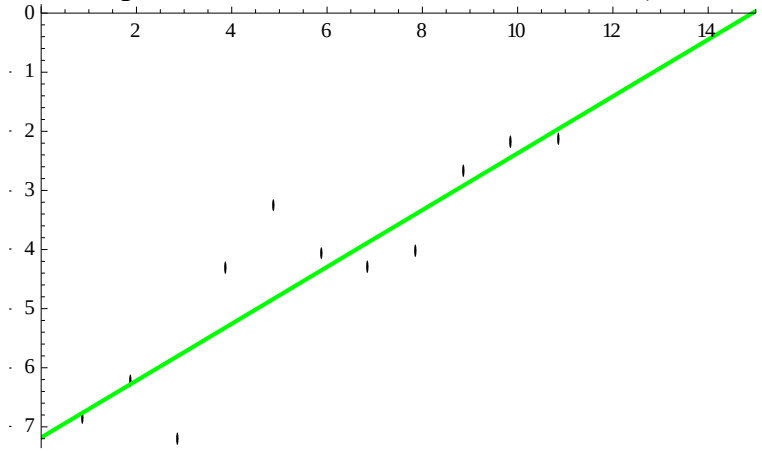
We can observe no evident clustering of the residuals.

Graph 65: Plot of the time series – CAPEX/TA (Consumer Goods)



We can observe a positive trend with periodic cyclic variations.

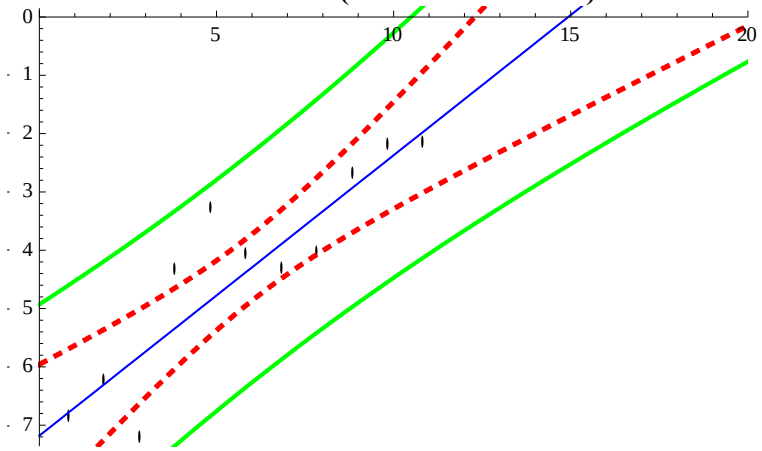
Graph 66: Scatter plot with the trend line – CAPEX/TA (Consumer Goods)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

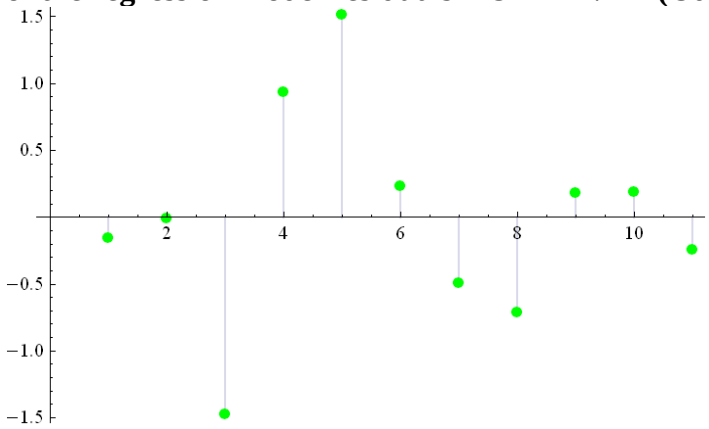
$$7.18 + 0.480909\,x$$

Graph 67: Plot of the time series, trend line, mean and single prediction bands – CAPEX/TA (Consumer Goods)



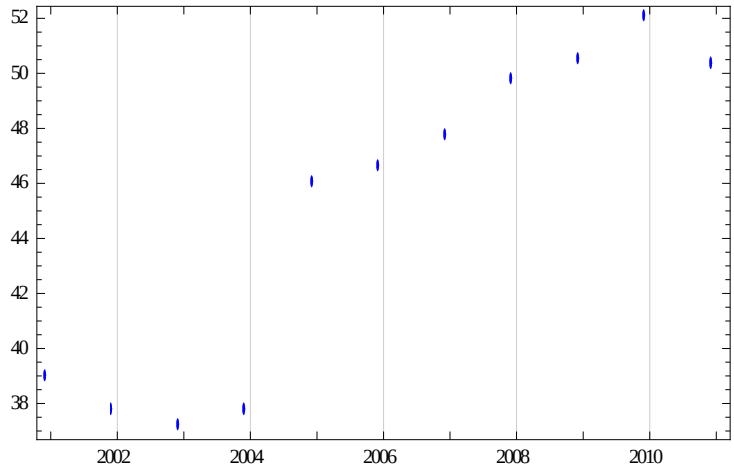
With a coefficient of determination of 80%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 68: Plot of the regression model residuals – CAPEX/TA (Consumer Goods)



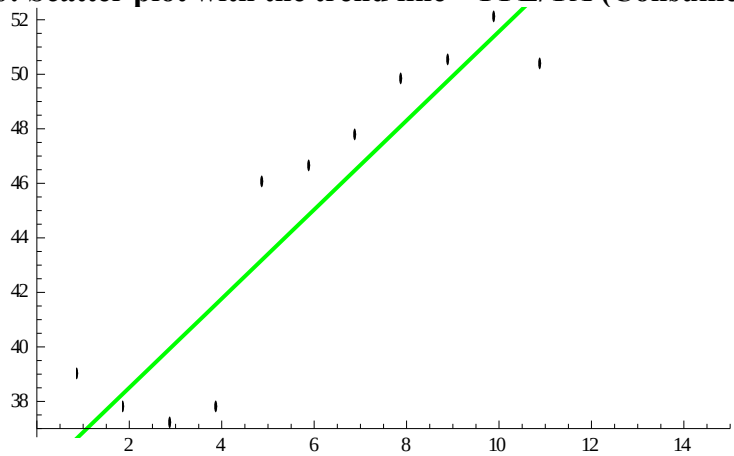
We can observe no evident clustering of the residuals.

Graph 69: Plot of the time series – PPE/TA (Consumer Goods)



We can observe a positive trend with periodic cyclic variations.

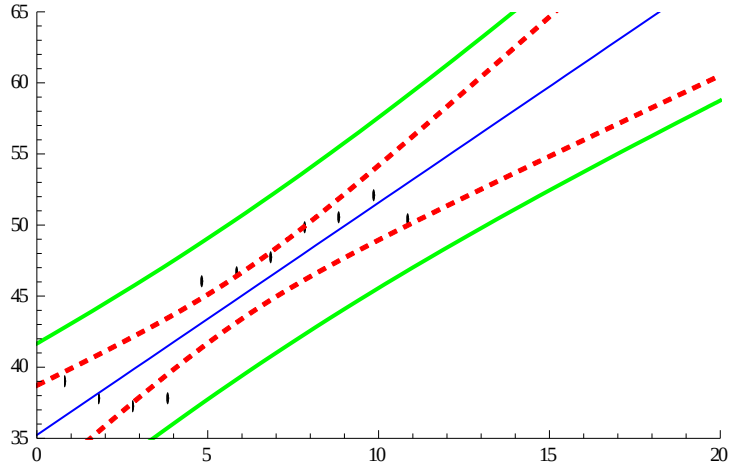
Graph 70: Scatter plot with the trend line – PPE/TA (Consumer Goods)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

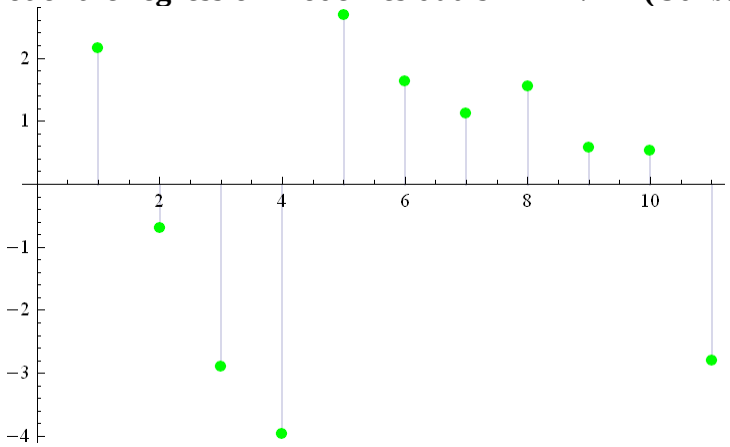
$$35.2345 + 1.63364x$$

Graph 71: Plot of the time series, trend line, mean and single prediction bands – PPE/TA (Consumer Goods)



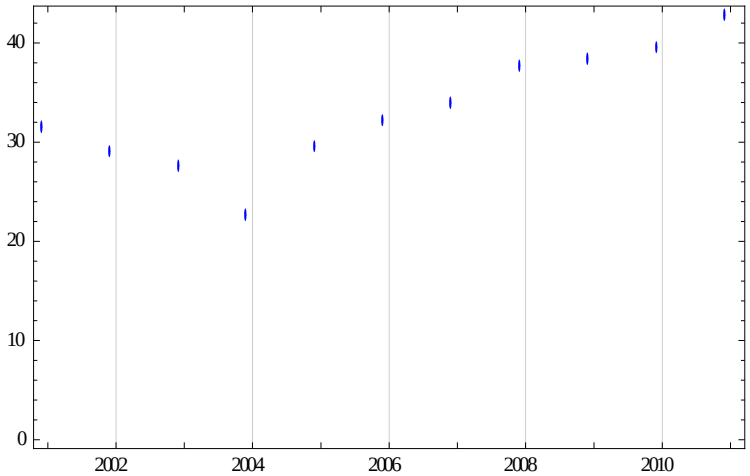
With a coefficient of determination of 85%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 72: Plot of the regression model residuals – PPE/TA (Consumer Goods)



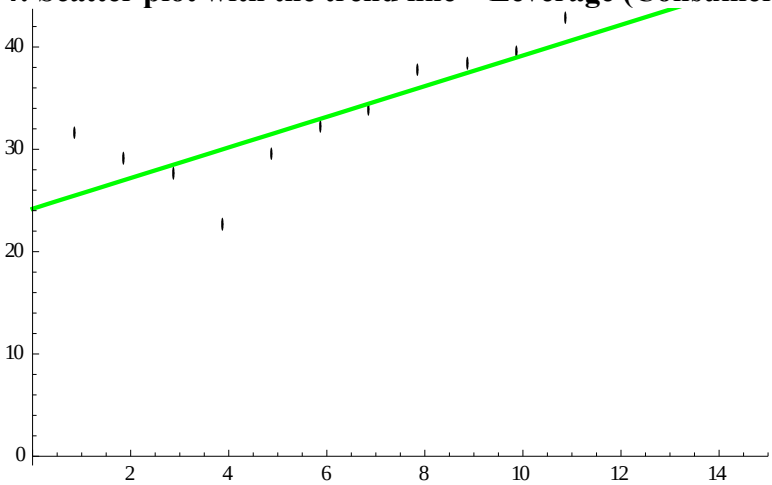
We can observe no evident clustering of the residuals.

Graph 73: Plot of the time series – Leverage (Consumer Goods, churn 1.4%)



We can observe a positive trend with periodic cyclic variations.

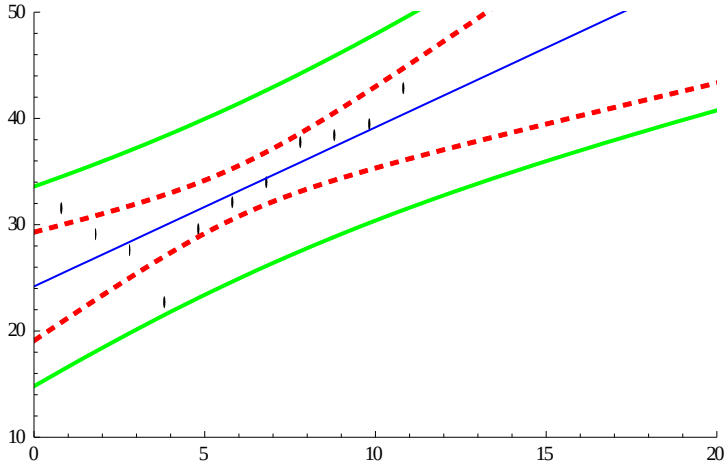
Graph 74: Scatter plot with the trend line – Leverage (Consumer Goods)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

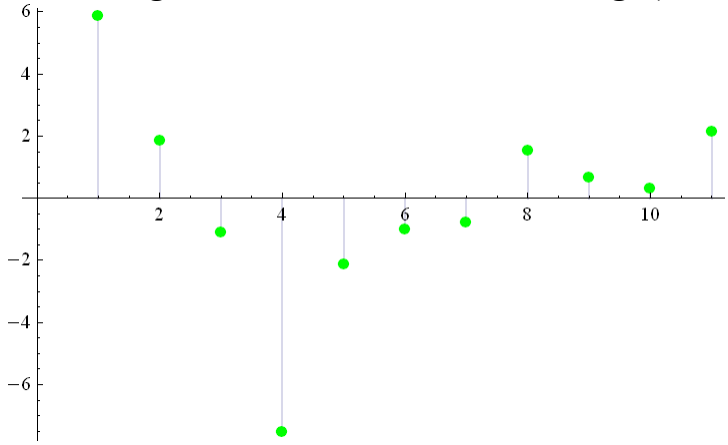
$$24.196 \cdot 1.49673\,x$$

Graph 75: Plot of the time series, trend line, mean and single prediction bands – Leverage (Consumer Goods)



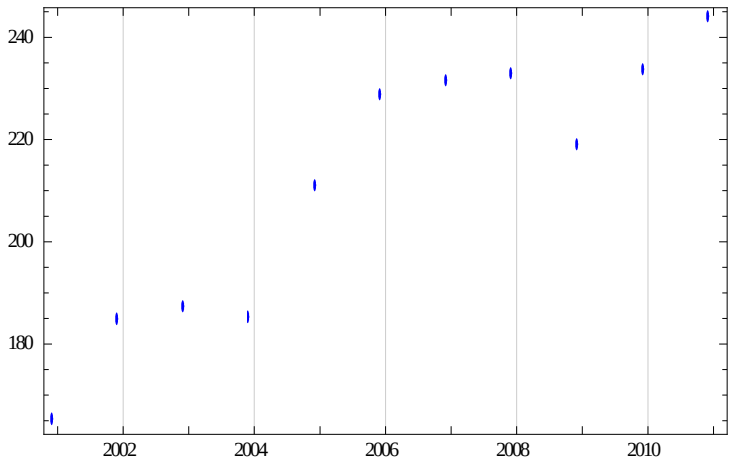
With a coefficient of determination of 69%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 76: Plot of the regression model residuals – Leverage (Consumer Goods)



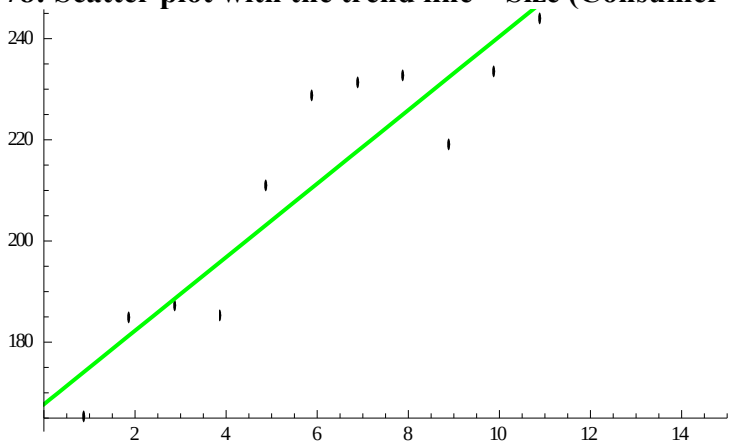
We can observe no evident residuals clustering, although most are less than 2 points.

Graph 77: Plot of the time series – Size (Consumer Goods)



We can observe a positive trend with periodic cyclic variations.

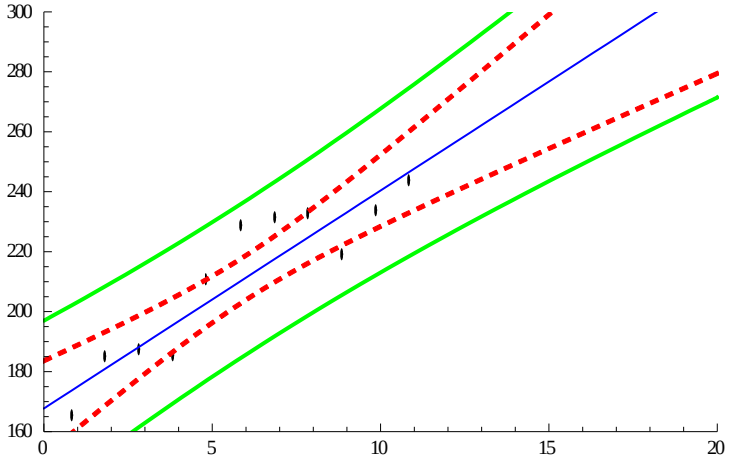
Graph 78: Scatter plot with the trend line – Size (Consumer Goods)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

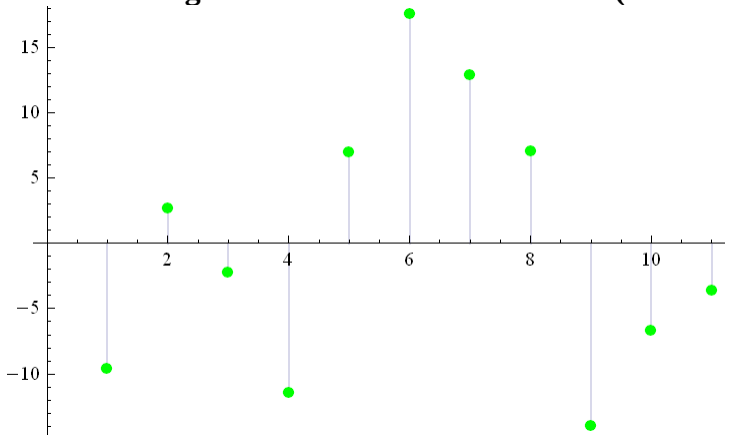
$$167.731 + 7.268x$$

Graph 79: Scatter plot with the trend line – Size (Consumer Goods)



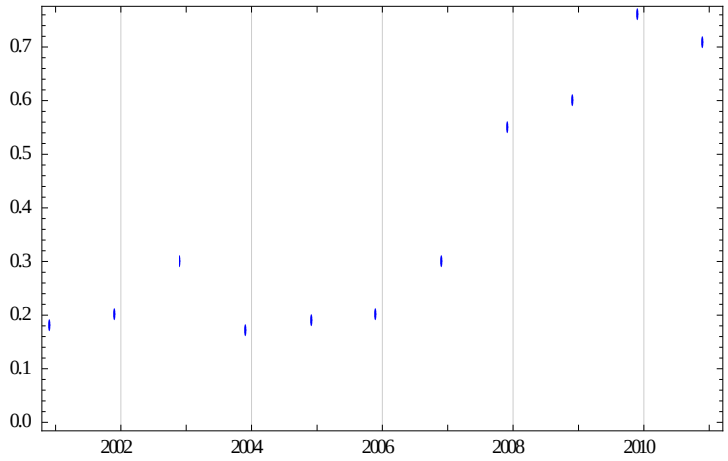
With a coefficient of determination of 85%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 80: Plot of the regression model residuals – Size (Consumer Goods)



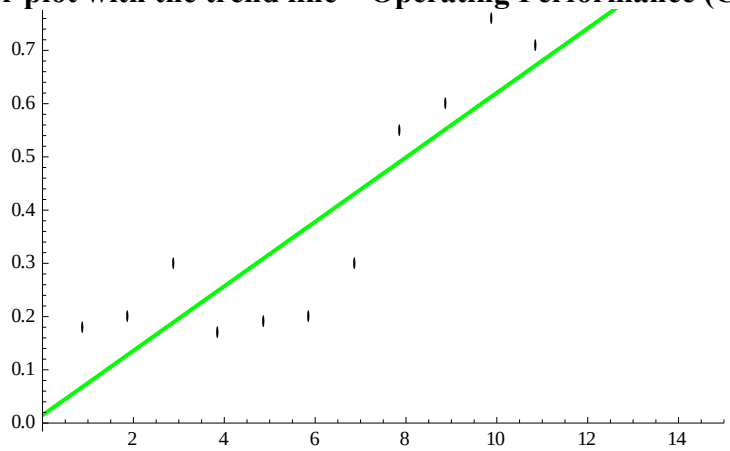
The residuals are scattered.

Graph 81: Plot of the time series – Operating Performance (Consumer Goods)



We can observe a positive trend with periodic cyclic variations.

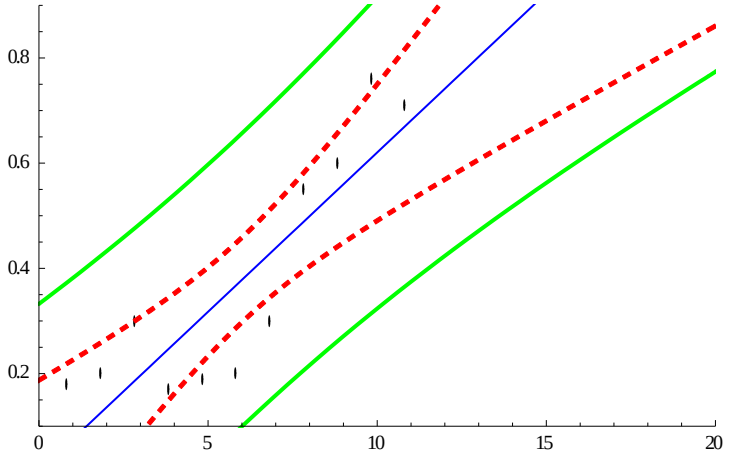
Graph 82: Scatter plot with the trend line – Operating Performance (Consumer Goods)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

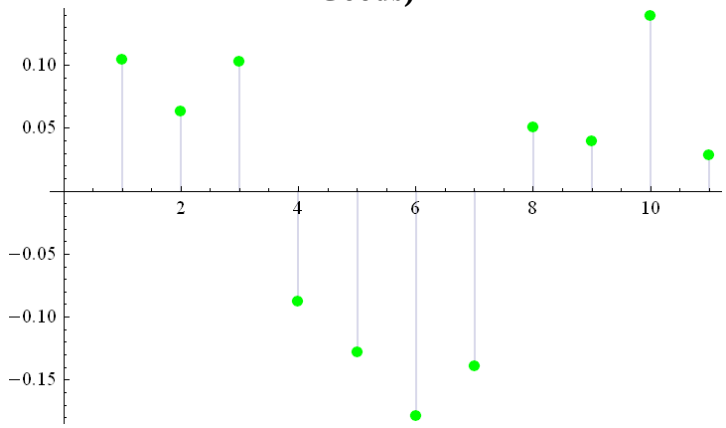
$$0.0149091 + 0.0605455\,x$$

Graph 83: Plot of the time series, trend line, mean and single prediction bands – Operating Performance (Consumer Goods)



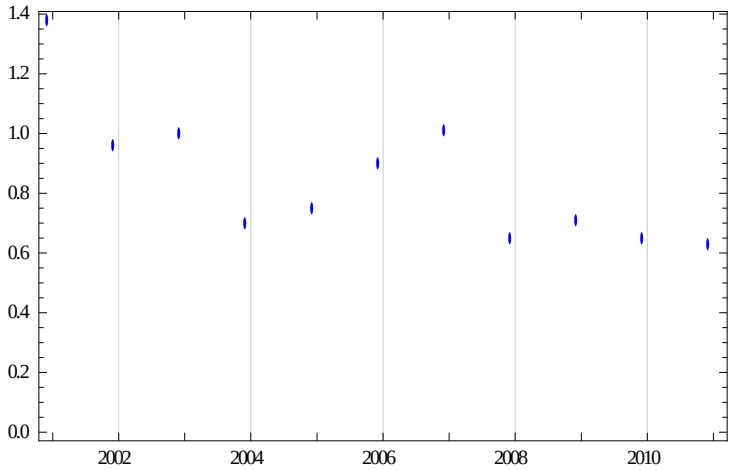
With a coefficient of determination of 76%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 84: Plot of the regression model residuals – Operating Performance (Consumer Goods)



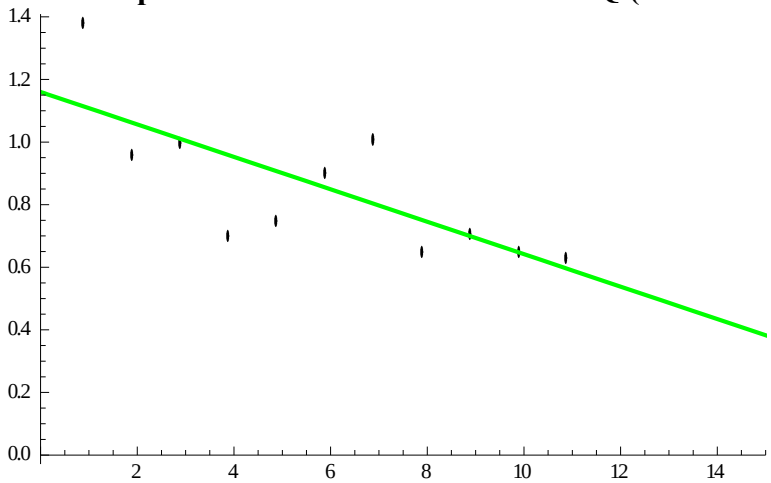
We can observe no evident residuals clustering, although their values are low.

Graph 85: Plot of the time series – Tobin's Q (Consumer Goods)



We can observe a negative trend with periodic cyclic variations.

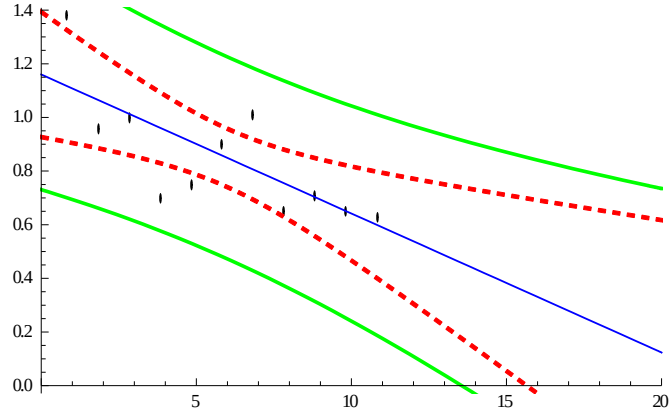
Graph 86: Scatter plot with the trend line – Tobin's Q (Consumer Goods)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

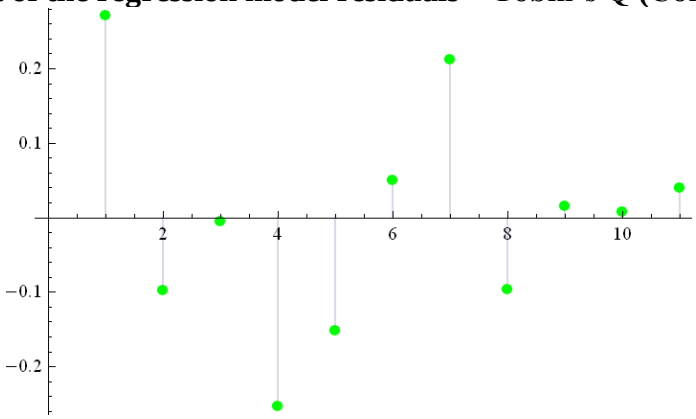
$$1.16 - 0.0518182x$$

Graph 87: Plot of the time series, trend line, mean and single prediction bands – Tobin's Q (Consumer Goods)



With a coefficient of determination of 56%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 88: Plot of the regression model residuals – Tobin's Q (Consumer Goods)



We can observe that although the residuals are scattered they are low.

4.3 Consumer Services Industry

Table 5: Positive Analysis for the Industry of Consumer Services

Consumer Services (N=40)											
Year	Cash Ratio	ROA	ROE	EAT/Sales	Sales/TA	CAPEX/TA	PPE/TA	Leverage	Size	Sales/Empl	Tobin's Q
2001	0.14	4.00%	13.46%	5.18%	1.13	-0.21%	48.00%	24.50%	191.89	0.94	1.36
2002	0.33	3.47%	13.01%	3.25%	1.09	-0.25%	48.31%	27.79%	200.69	0.90	1.09
2003	0.23	3.42%	8.40%	1.63%	1.09	-1.71%	48.84%	25.46%	204.67	0.20	1.34
2004	0.25	5.36%	11.54%	6.08%	1.21	-11.11%	50.71%	26.70%	209.98	0.39	1.16
2005	0.37	3.32%	2.38%	0.54%	1.10	-5.85%	54.46%	25.91%	214.32	0.31	1.31
2006	0.37	1.83%	3.37%	1.51%	1.16	-6.40%	53.52%	28.92%	233.49	0.54	1.41
2007	0.42	4.42%	11.31%	3.63%	1.13	-5.70%	52.94%	26.71%	257.04	0.55	1.34
2008	0.33	-2.34%	8.38%	-3.39%	1.19	-5.79%	53.70%	30.51%	282.65	0.64	0.90
2009	0.28	-5.46%	-5.63%	-4.00%	1.08	-4.14%	53.73%	30.19%	302.14	0.58	0.86
2010	0.36	-6.07%	-22.72%	-13.13%	1.11	-3.36%	57.71%	33.91%	284.70	0.61	0.82
2011	0.35	-8.69%	-53.88%	-13.54%	1.15	-2.91%	61.19%	37.76%	315.08	0.77	0.74

Cash has more than doubled in the time span (as with previous industries we can assume that growth in cash in conjunction with radically diminishing profitability indicates tightening of

fiscal policy).

Profitability ratios are diminishing with especially low figures in the ROE ratio in the last two years. *Activity* seems stable with relatively insignificant per annum variations and CAPEX is augmented whereas *BS structure* has gained in PPE by approximately 10%, in (trending but not analogous) accordance with *Size*, which has grown by more than 50% in the time span. *Leverage* has grown steadily by more than 10% overall.

Productivity started with higher values than the succeeding years, but from 2003 and on started steadily rising each year, but still remaining in lower levels than the first two years. *Valuation* overall is diminishing.

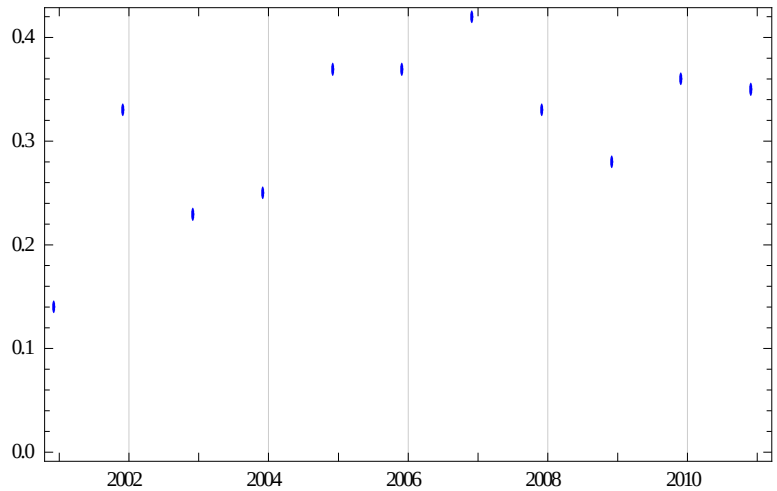
Table 6: Forecasting for the Industry of Consumer Services

Consumer Services							
Ratio	**Domain**	**Formula**	**Linear Correlation**	**a**	**b**	**R^2**	**p-value**
Cash Ratio	Liquidity	Cash / CL	Long Term Trend	0.2284	0.0139	**33%**	**0.063211**
ROA	Profitability	EAT / TA	Inverse	8.0718	-1.2959	**74%**	**0.000659**
ROE	Profitability	EAT / Equity	Inverse	27.3709	-4.7191	**58%**	**0.006329**
Net Profit Margin	Profitability	EAT / Revenue	Inverse	9.3524	-1.7442	**72%**	**0.000901**
Asset Turnover	Activity	Revenue / TA	Uncorrelated	1.1233	0.0013	**1%**	**0.772800**
CAPEX Ratio	Growth	CAPEX / TA	Uncorrelated	-3.0878	-0.2040	**5%**	**0.527668**
Fixed Assets Leverage	BS Structure	PPE / TA	Direct	46.3184	1.1153	**84%**	**0.000066**
Financial Leverage	Leverage	TD / TA	Direct	22.7569	1.0308	**74%**	**0.000732**
Size	Size	Total Assets	Direct	167.0160	13.0224	**93%**	**1.5*10^-6**
Operating Performance	Productivity	Revenue / Empl.	Uncorrelated	0.5916	-0.0012	**0%**	**0.960309**
Tobin's Q	Valuation	TA (MV) / Repl. Value	Inverse	1.4542	-0.0555	**54%**	**0.009901**

The linear model seems effective for seven ratios of this industry. The coefficient of determination is extremely low for three ratios. Consequently, as with previous industries, the linear model could prove highly effective for forecasting many ratios in this industry.

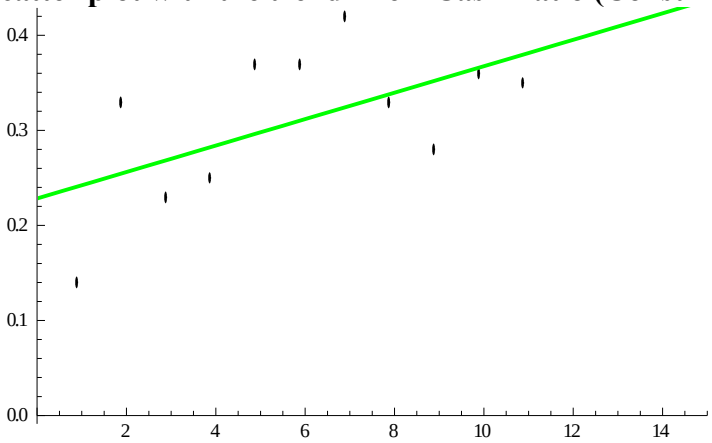
Graphs 89-132 provide an analysis visualization of all the financial ratios for the *Consumer Services* industry and of the linear models and their constituents:

Graph 89: Plot of the time series – Cash Ratio (Consumer Services)



We can observe long-term trend.

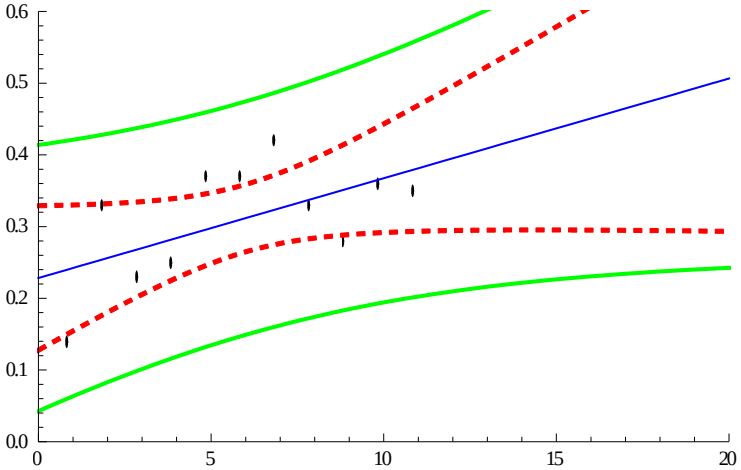
Graph 90: Scatter plot with the trend line – Cash Ratio (Consumer Services)



The long-term trend of the raw data and the trend line is evident. The equation of the trend line is:

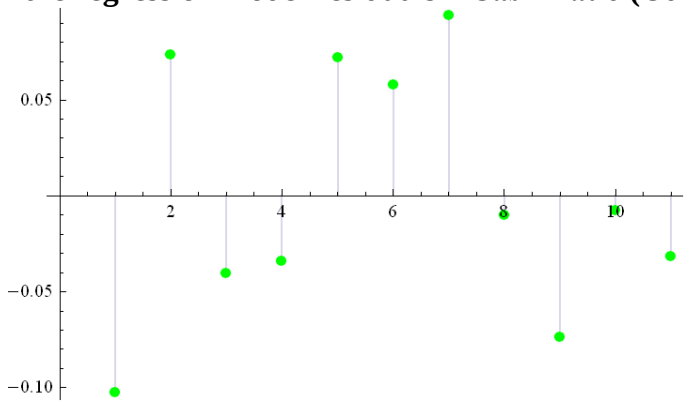
$$0.228364 + 0.0139091\,x$$

Graph 91: Plot of the time series, trend line, mean and single prediction bands – Cash Ratio (Consumer Services)



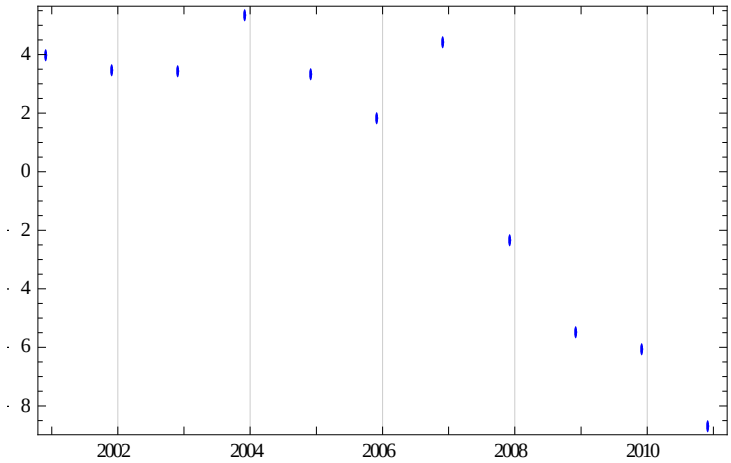
With a coefficient of determination of 33%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 92: Plot of the regression model residuals – Cash Ratio (Consumer Services)



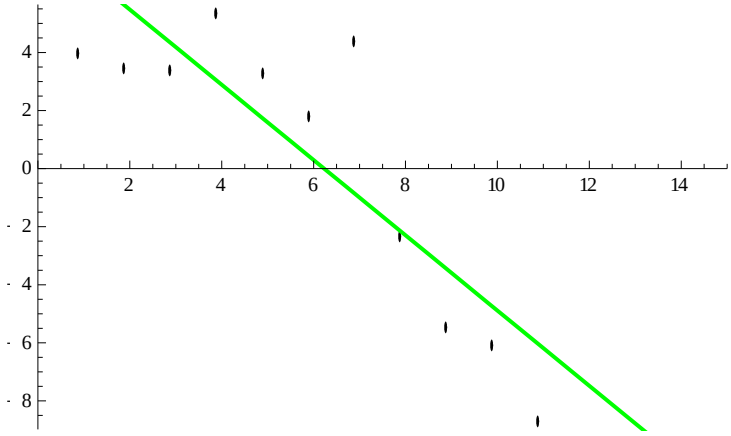
We can observe no evident clustering of the residuals.

Graph 93: Plot of the time series – ROA (Consumer Services)



We can observe a negative trend with periodic cyclic variations.

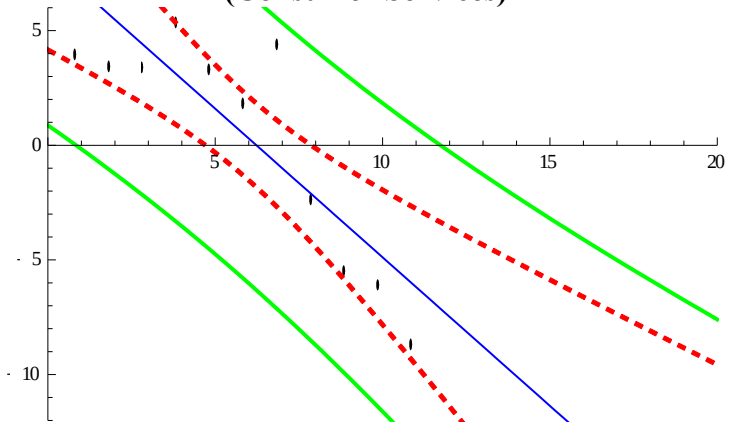
Graph 94: Scatter plot with the trend line – ROA (Consumer Services)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

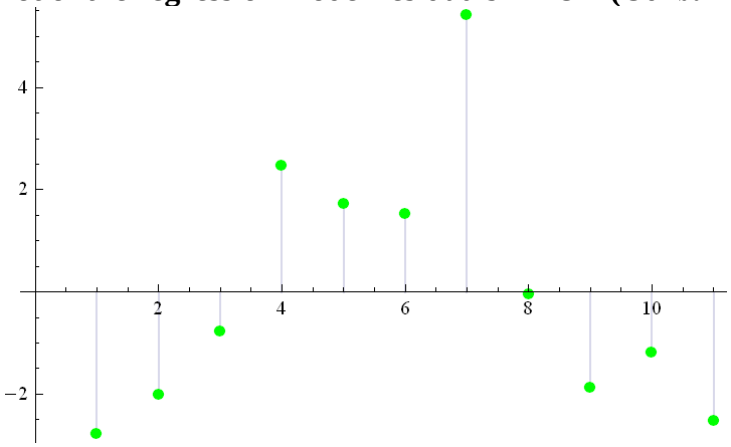
$$8.07182 - 1.29591x$$

Graph 95: Plot of the time series, trend line, mean and single prediction bands – ROA (Consumer Services)



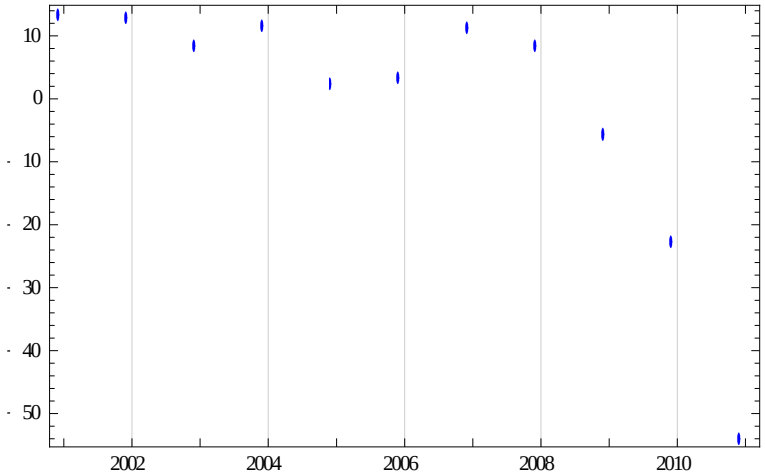
With a coefficient of determination of 74%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 96: Plot of the regression model residuals – ROA (Consumer Services)



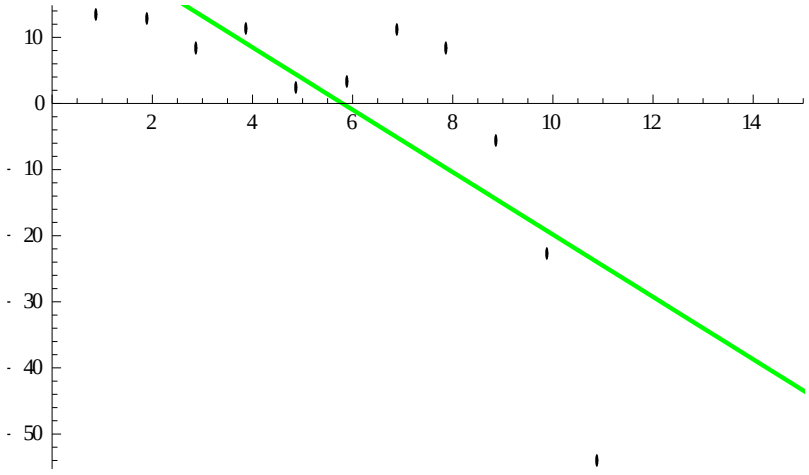
We can observe no evident residuals clustering but all are very low.

Graph 97: Plot of the time series – ROE (Consumer Services)



We can observe a negative trend with periodic cyclic variations.

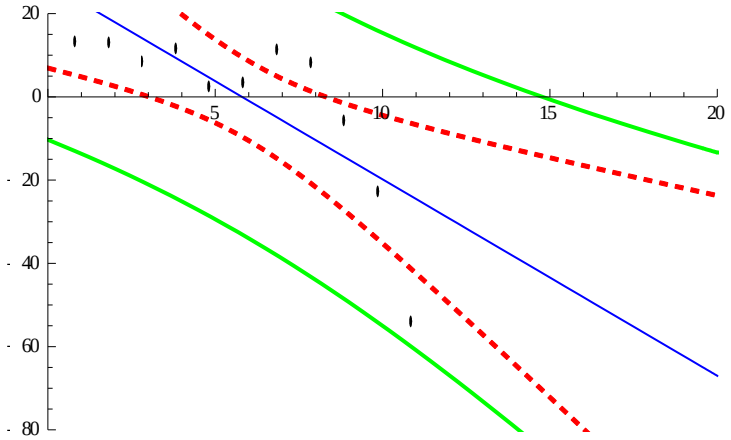
Graph 98: Scatter plot with the trend line – ROE (Consumer Services)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

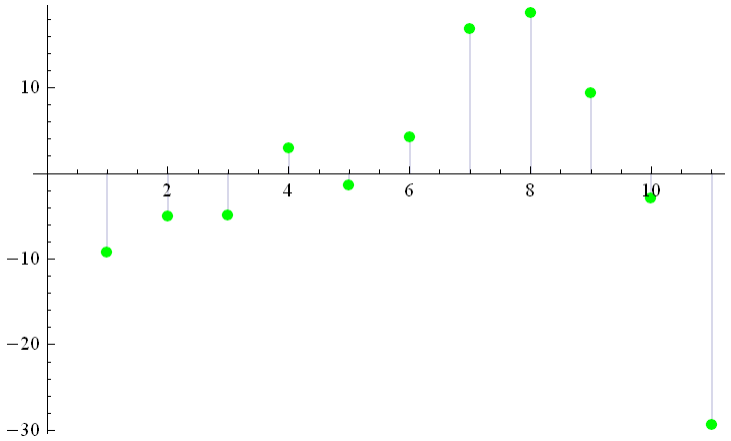
$$27.3709 - 4.71909x$$

Graph 99: Plot of the time series, trend line, mean and single prediction bands – ROE (Consumer Services)



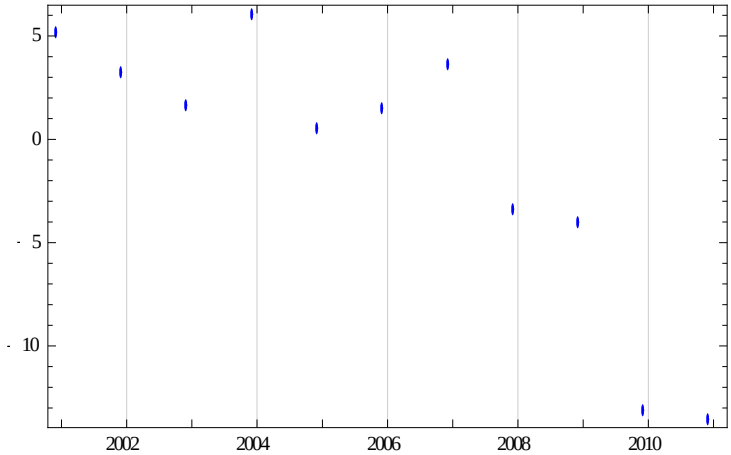
With a coefficient of determination of 58%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 100: Plot of the regression model residuals – ROE (Consumer Services)



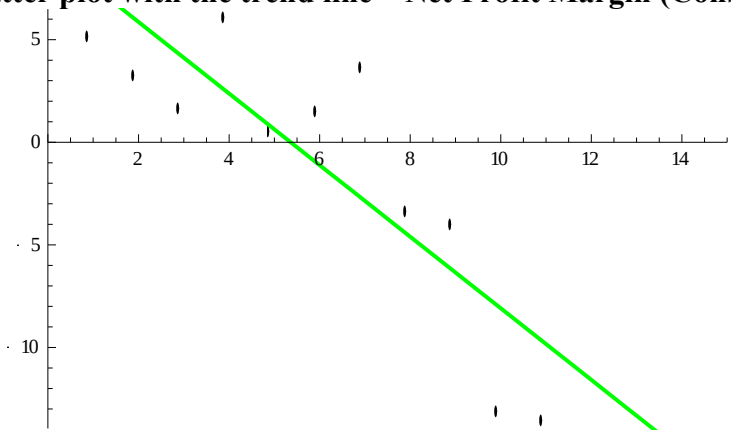
We can observe no evident clustering of the residuals.

Graph 101: Plot of the time series – Net Profit Margin (Consumer Services)



We can observe a negative trend with periodic cyclic variations.

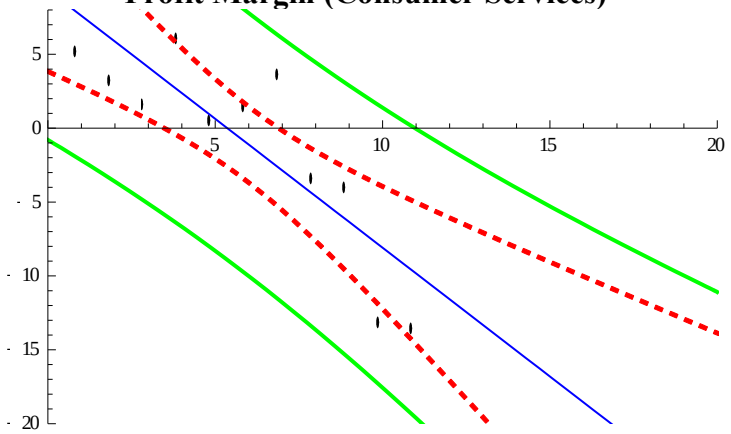
Graph 102: Scatter plot with the trend line – Net Profit Margin (Consumer Services)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

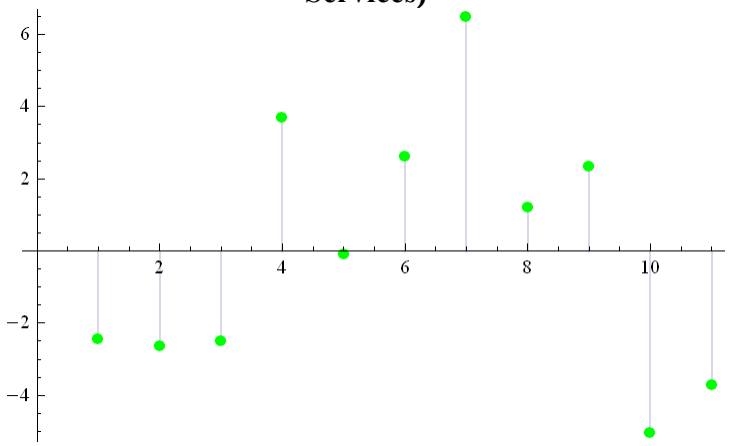
$$9.35236 - 1.74418\,x$$

Graph 103: Plot of the time series, trend line, mean and single prediction bands – Net Profit Margin (Consumer Services)



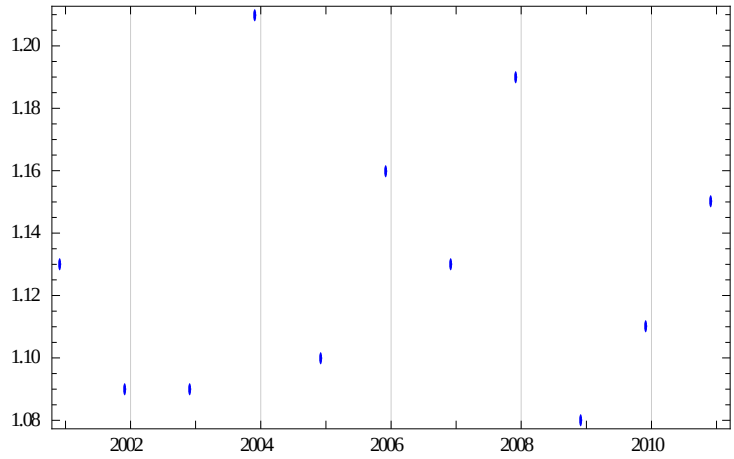
With a coefficient of determination of 72%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 104: Plot of the regression model residuals – Net Profit Margin (Consumer Services)



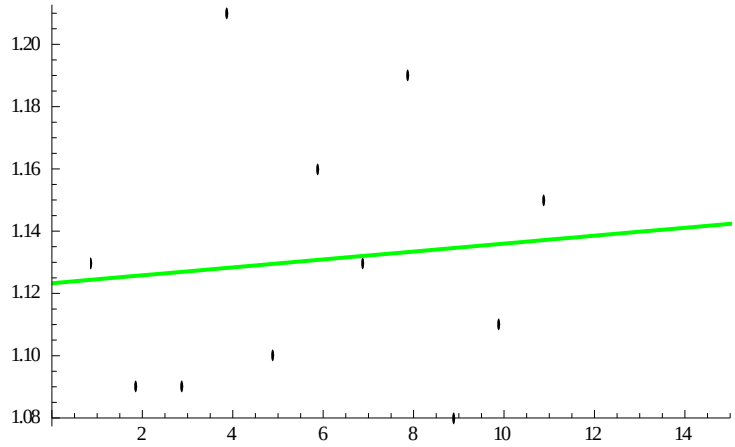
We can observe no evident clustering of the residuals.

Graph 105: Plot of the time series – Sales/TA (Consumer Services)



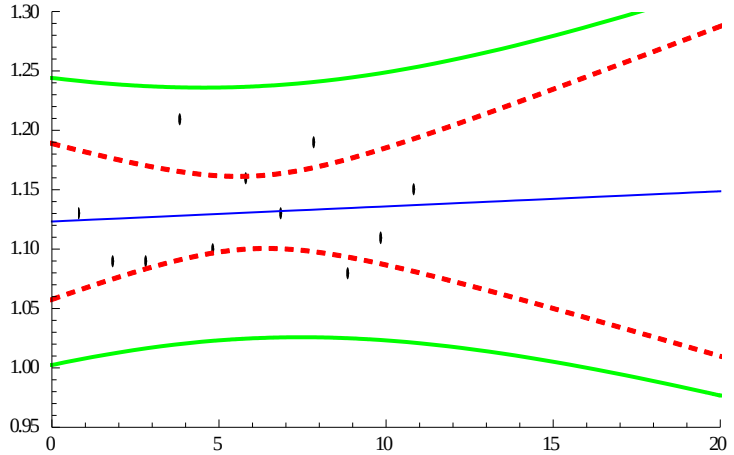
No explicit trend is evident for all years.

Graph 106: Scatter plot with the trend line – Sales/TA (Consumer Services)



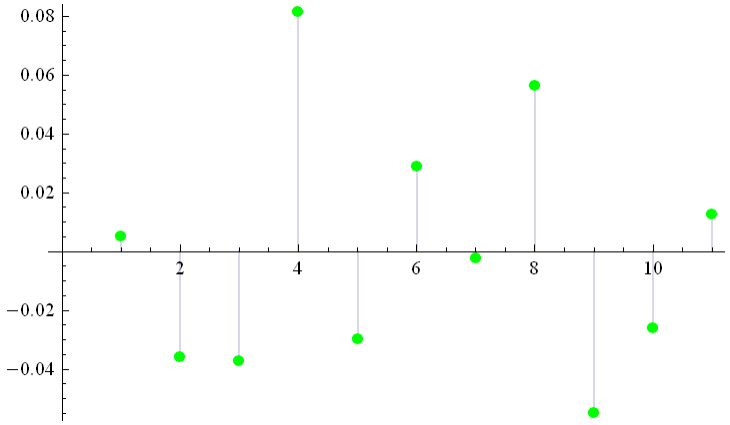
A positive trend of the linear model is evident. The line equation is: $1.12327 + 0.00127273x$

Graph 107: Plot of the time series, trend line, mean and single prediction bands – Sales/TA (Consumer Services)



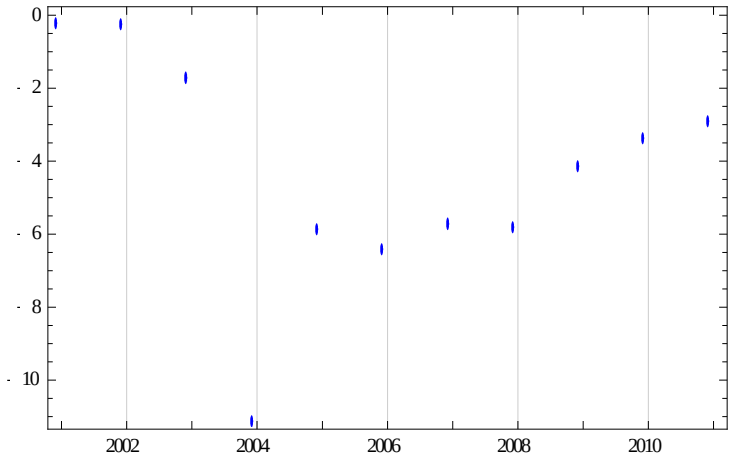
With an almost null coefficient of determination (1%), we can still observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 108: Plot of the regression model residuals – Sales/TA (Consumer Services)



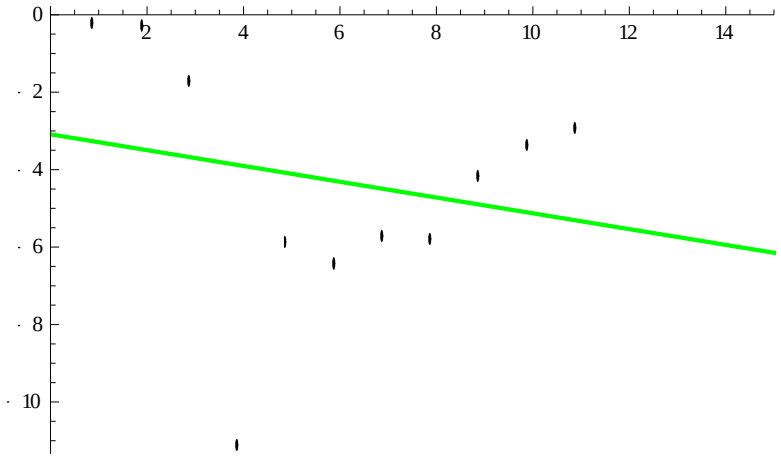
We can observe no evident clustering of the residuals.

Graph 109: Plot of the time series – CAPEX/TA (Consumer Services)



No explicit trend is evident for all years, although a positive trend seems to be formulating from 2006 and on.

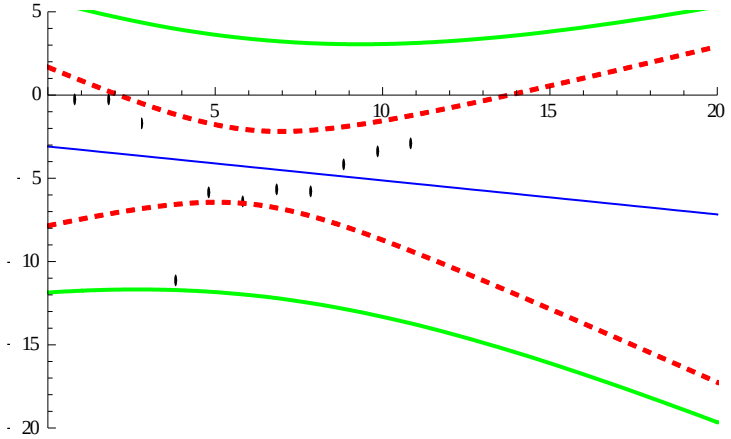
Graph 110: Scatter plot with the trend line – CAPEX/TA (Consumer Services)



The regression line has a negative trend. The line equation is:

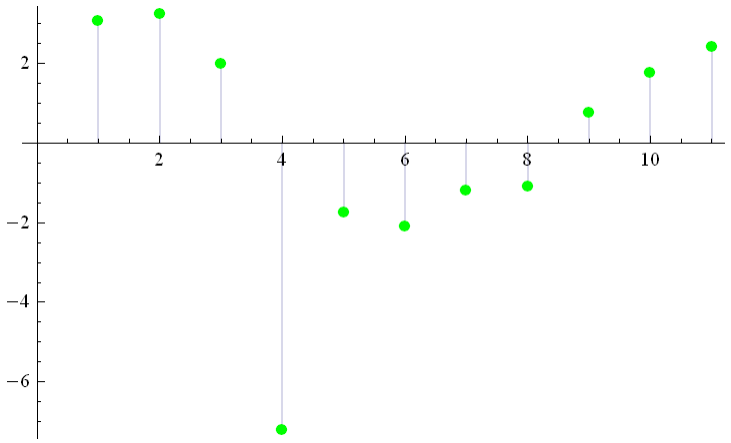
$$3.08782 - 0.204x$$

Graph 111: Plot of the time series, trend line, mean and single prediction bands – CAPEX/TA (Consumer Services)



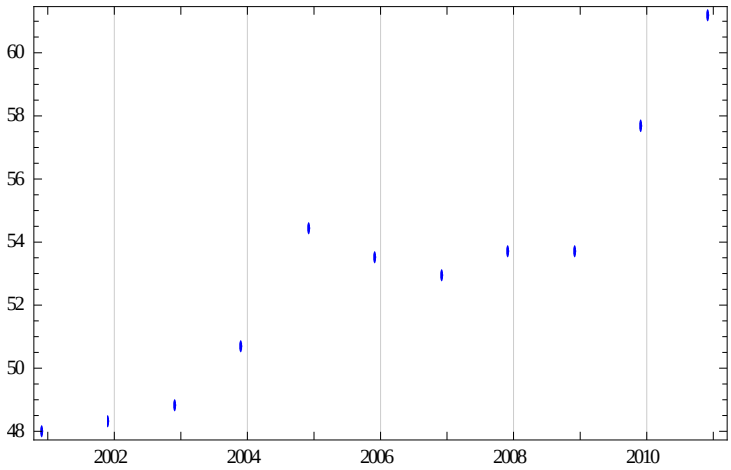
With a very low coefficient of determination (5%), we can still observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 112: Plot of the regression model residuals – CAPEX/TA (Consumer Services)



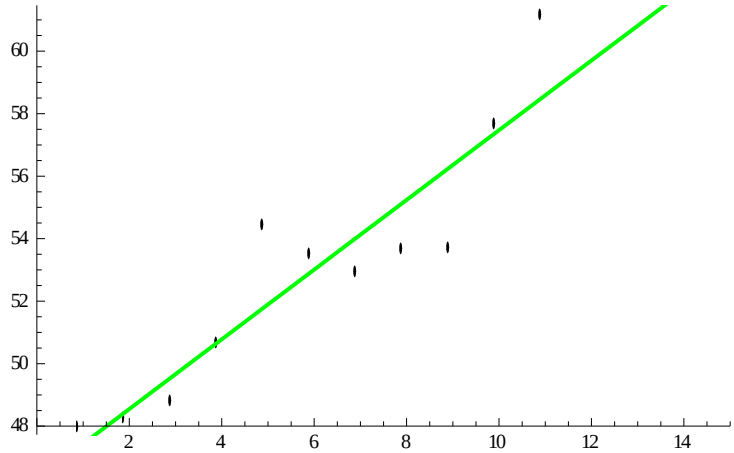
We can observe no evident clustering of the residuals.

Graph 113: Plot of the time series – PPE/TA (Consumer Services)



We can observe a positive trend with periodic cyclic variations.

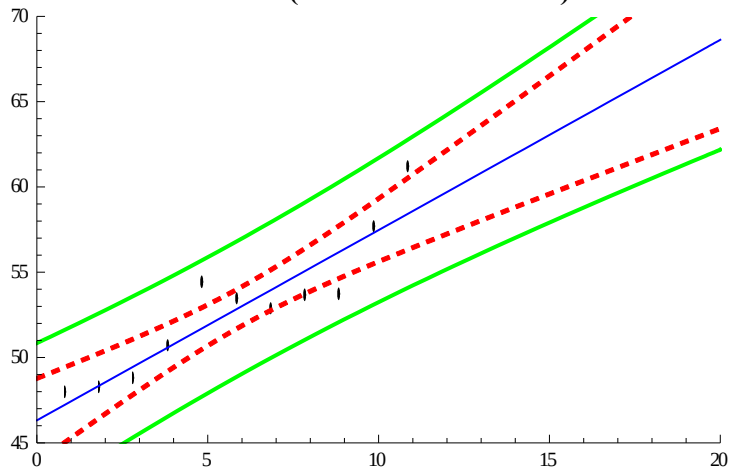
Graph 114: Scatter plot with the trend line – PPE/TA (Consumer Services)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

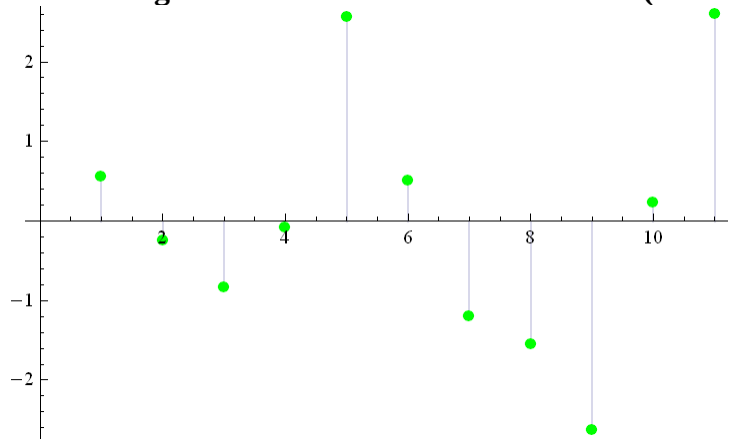
$$46.3184 + 1.11527\,x$$

Graph 115: Plot of the time series, trend line, mean and single prediction bands – PPE/TA (Consumer Services)



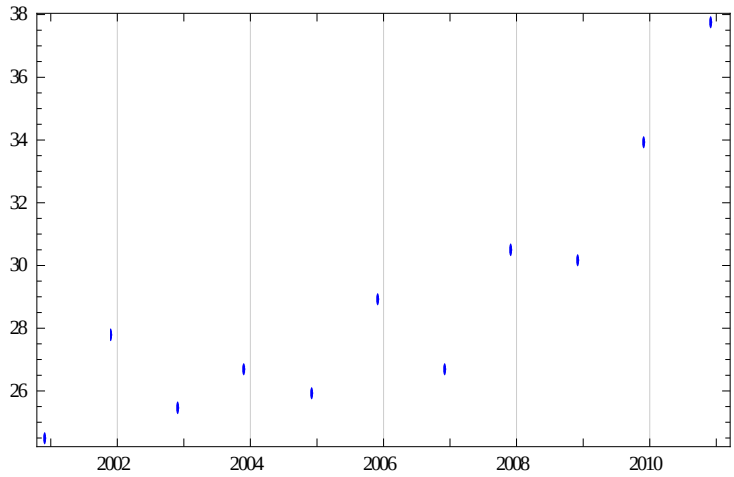
With a coefficient of determination of 84%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 116: Plot of the regression model residuals – PPE/TA (Consumer Services)



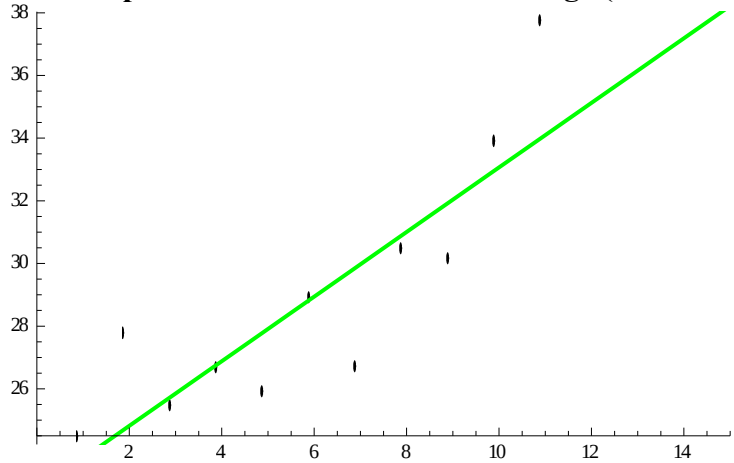
We can observe no evident clustering of the residuals.

Graph 117: Plot of the time series – Leverage (Consumer Services)



We can observe a positive trend with periodic cyclic variations.

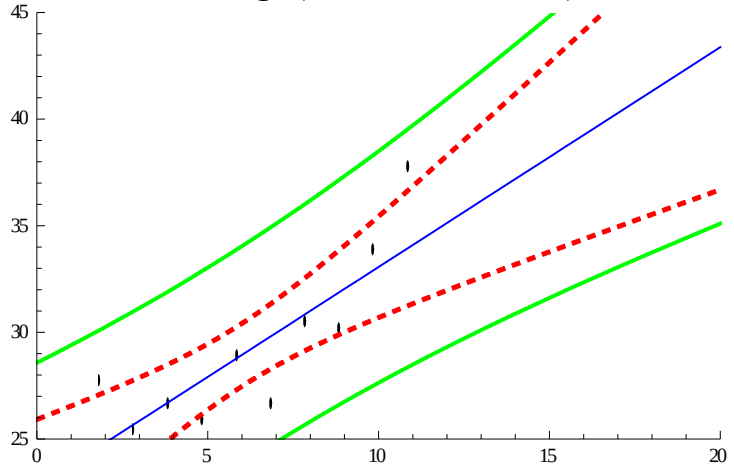
Graph 118: Scatter plot with the trend line – Leverage (Consumer Services)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

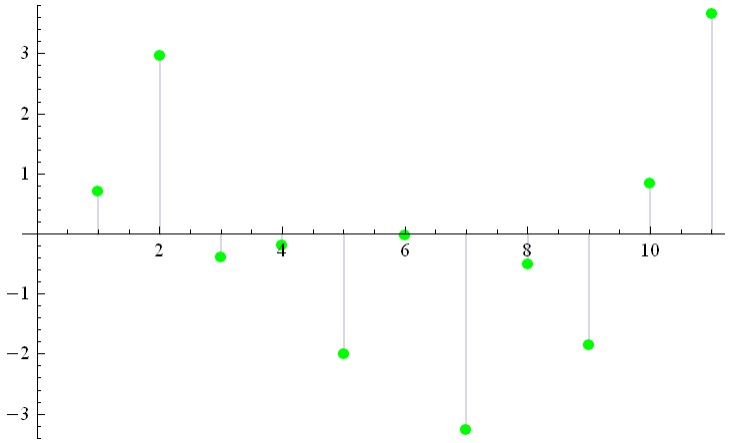
$$22.7569 + 1.03082x$$

Graph 119: Plot of the time series, trend line, mean and single prediction bands – Leverage (Consumer Services)



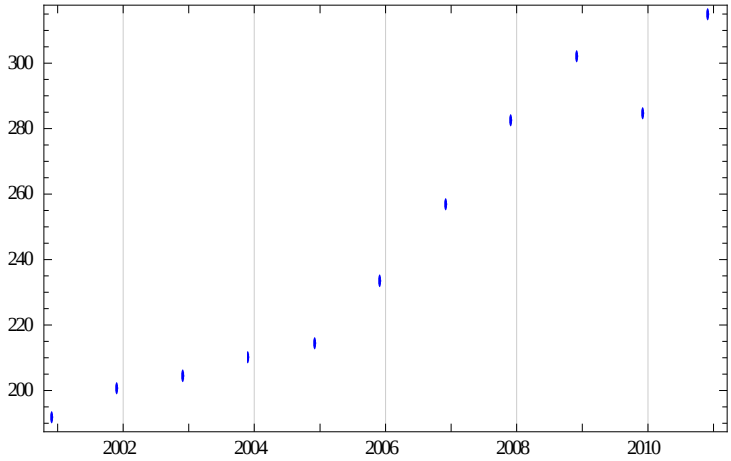
With a coefficient of determination of 74%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 120: Plot of the regression model residuals – Leverage (Consumer Services)



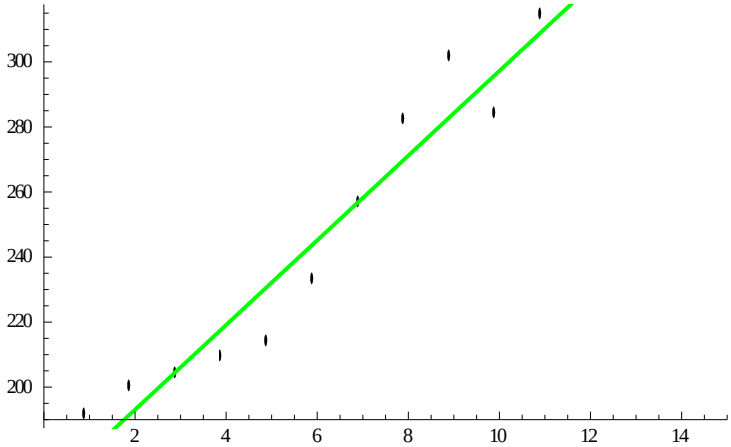
We can observe no evident clustering of the residuals.

Graph 121: Plot of the time series – Size (Consumer Services)



We can observe a positive trend with periodic cyclic variations.

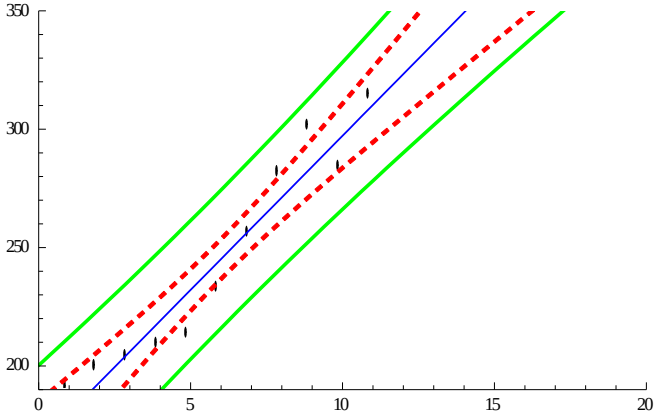
Graph 122: Scatter plot with the trend line – Size (Consumer Services)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

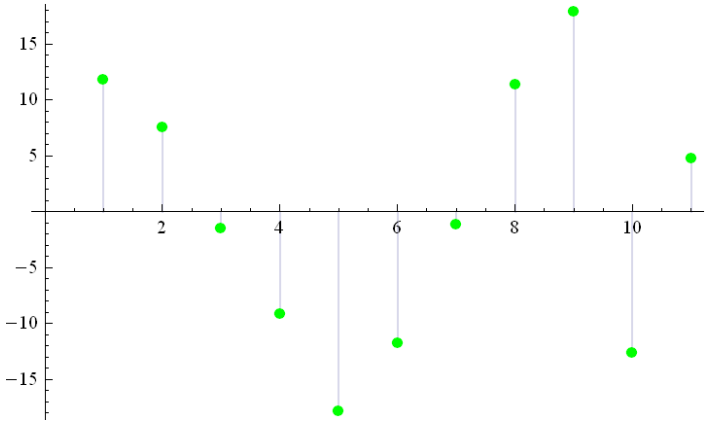
$$167.016 + 13.0224\,x$$

Graph 123: Plot of the time series, trend line, mean and single prediction bands – Size (Consumer Services)



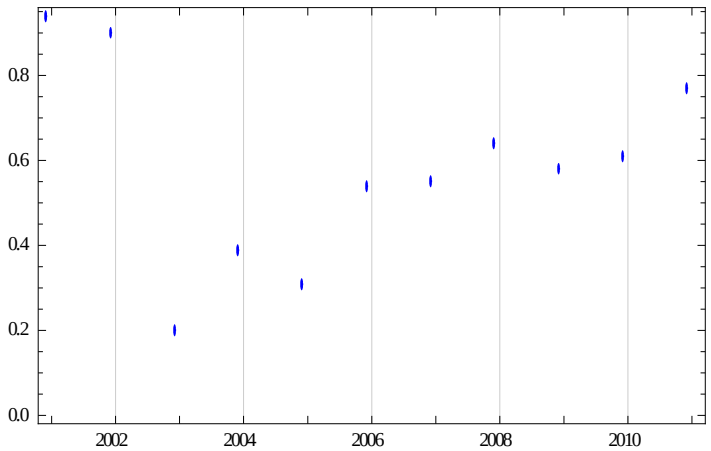
With a coefficient of determination of 93%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 124: Plot of the regression model residuals – Size (Consumer Services)



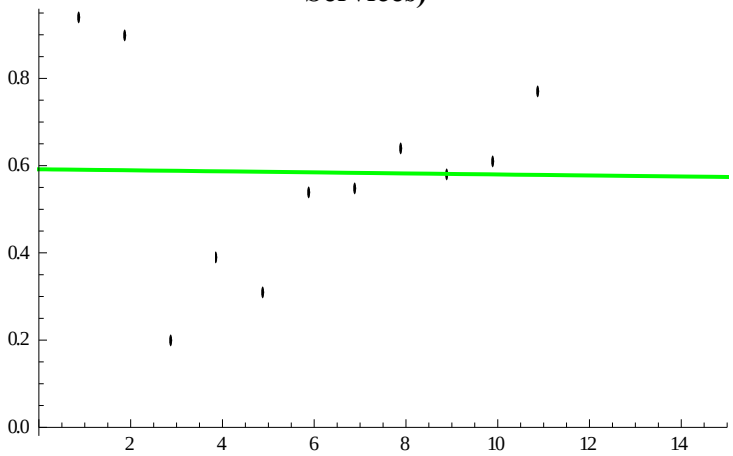
We can observe no evident clustering of the residuals.

Graph 125: Plot of the time series – Operating Performance (Consumer Services)



No explicit trend is evident for all years, although a positive long-term trend is evident from year 2003 and on.

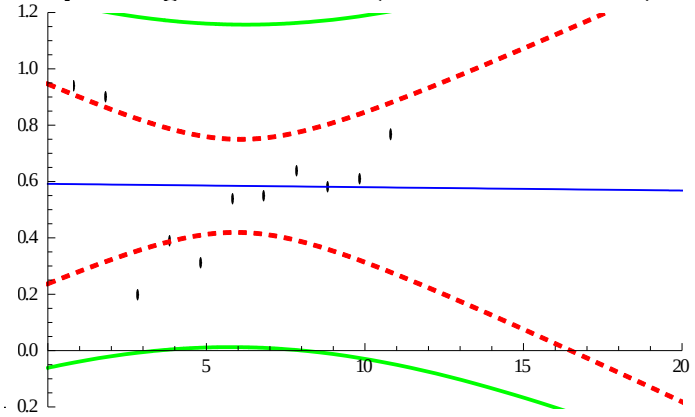
Graph 126: Scatter plot with the trend line – Operating Performance (Consumer Services)



The linear model has a negative trend. The linear equation is:

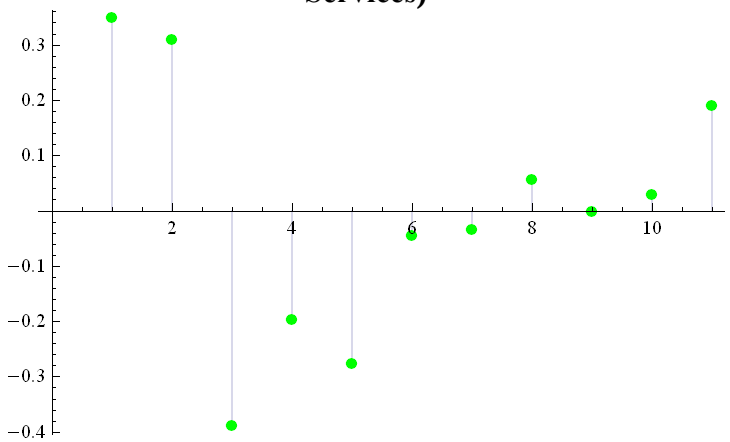
$$0.591636 - 0.00118182x$$

Graph 127: Plot of the time series, trend line, mean and single prediction bands – Operating Performance (Consumer Services)



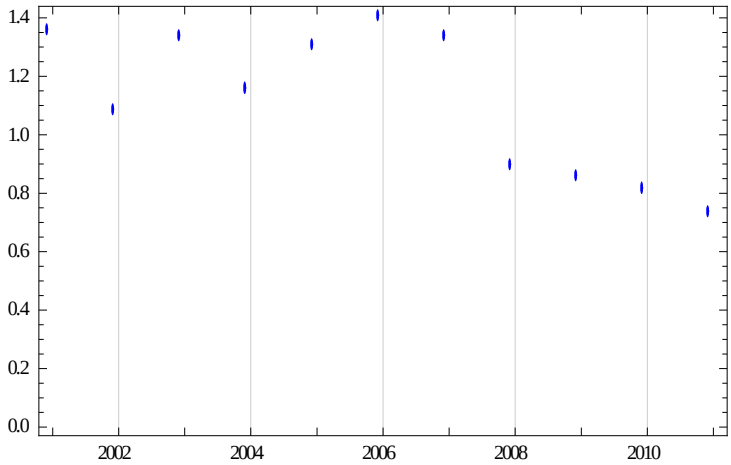
Although the coefficient of determination is 0%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 128: Plot of the regression model residuals – Operating Performance (Consumer Services)



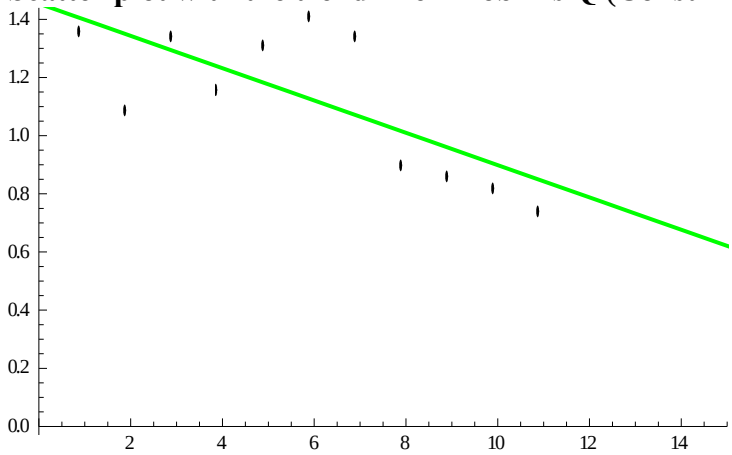
We can observe no evident clustering of the residuals.

Graph 129: Plot of the time series – Tobin's Q (Consumer Services)



We can observe a negative trend with periodic cyclic variations.

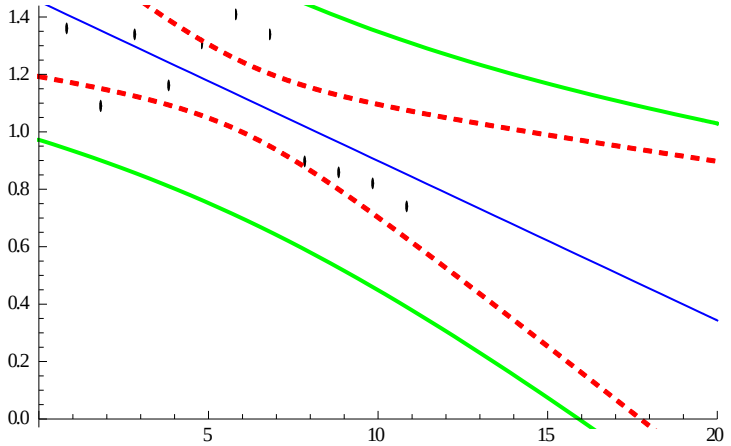
Graph 130: Scatter plot with the trend line – Tobin's Q (Consumer Services)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

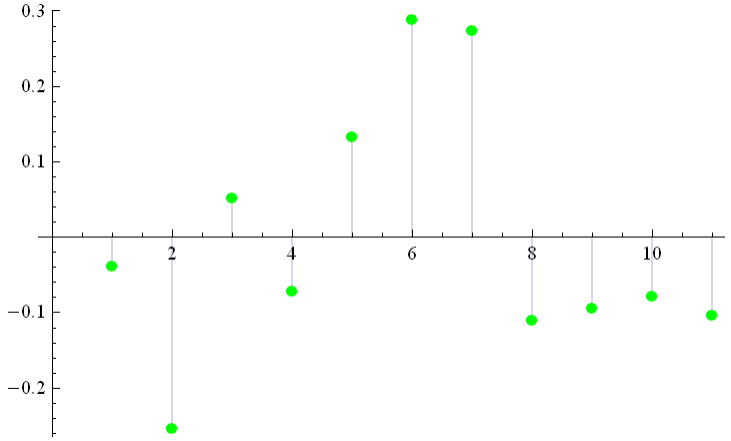
$$1.45418 \cdot 0.0555455\,x$$

Graph 131: Plot of the time series, trend line, mean and single prediction bands – Tobin's Q (Consumer Services)



With a coefficient of determination of 54%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 132: Plot of the regression model residuals – Tobin's Q (Consumer Services)



We can observe no evident clustering of the residuals.

4.4 Health Care Industry

Table 7: Positive Analysis for the Health Care Industry

Health Care (N=9)											
Year	Cash Ratio	ROA	ROE	EAT/Sales	Sales/TA	CAPEX/TA	PPE/TA	Leverage	Size	Sales/Empl	Tobin's Q
2001	no data	3.80%	8.82%	7.86%	0.57	no data	47.83%	28.91%	160.04	no data	1.48
2002	0.12	3.51%	6.61%	8.23%	0.54	no data	51.78%	26.19%	170.31	0.07	0.89
2003	0.08	0.65%	3.50%	0.76%	0.57	no data	50.51%	36.54%	164.01	0.08	0.98
2004	0.10	0.27%	-0.08%	-3.02%	0.52	-3.55%	52.41%	27.23%	198.65	0.16	0.65
2005	0.06	-1.77%	-3.17%	-4.70%	0.56	-2.77%	61.17%	31.94%	234.64	0.14	0.71
2006	0.11	0.10%	6.71%	-9.98%	0.52	-5.44%	62.74%	31.22%	234.18	0.14	1.22
2007	0.43	2.33%	3.95%	8.60%	0.44	-6.39%	60.38%	30.04%	543.05	0.15	1.29
2008	0.21	-1.52%	-6.11%	-2.45%	0.50	-8.83%	60.37%	44.56%	709.48	0.19	0.73
2009	0.17	0.86%	2.26%	2.14%	0.49	-6.17%	61.15%	42.17%	886.37	0.19	0.69
2010	0.08	-9.34%	-26.04%	-24.18%	0.43	-3.78%	68.34%	48.16%	757.62	0.20	0.58
2011	0.07	-32.87%	-211.53%	-64.44%	0.49	-1.80%	65.18%	62.39%	489.30	0.17	0.69

The *Health Care* industry seems one of the less attractive industries of the sample, with erratic variations in most markers and acute losses in profitability. Cash shows varying change in the time span although is significantly lowered in the final years (contrary to the cash ratio of the previous industries, for this industry it does not display a smooth temporal change).

All profitability ratios are diminishing with especially low figures in the ROE ratio in the last two years. *Activity* is also diminishing and CAPEX shows variation in per annum changes whereas *BS structure* has gained in PPE by more than 15%. *Size* reveals acute signs of growth for the industry (as with previous industries, a flag is raised). *Leverage* has grown steadily by more than 100% overall. *Productivity* is temporally rising (with two exceptions) and *Valuation* overall has diminished by approximately 50%.

This industry stands out as the only one with such acute growth and losses of this magnitude simultaneously. With *Leverage* more than doubling, diminishing activity and profits, serious questions may be raised as to the health of this sector and in the same time further analysis is required in order to extract the probable causes of this situation.

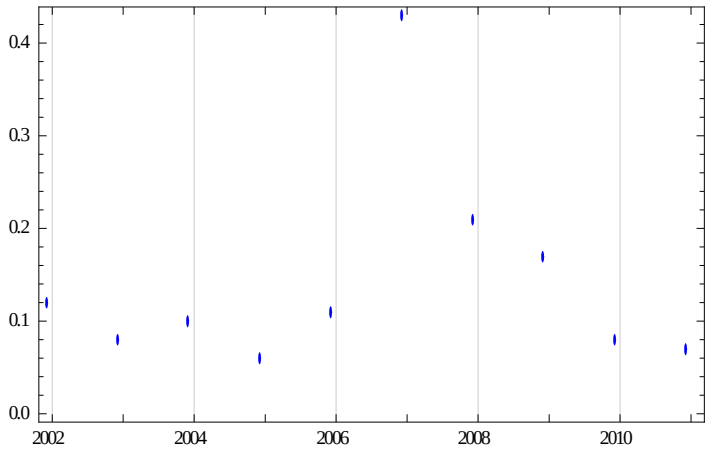
Table 8: Forecasting for the Health Care Industry

Health Care							
Ratio	**Domain**	**Formula**	**Linear Correlation**	**a**	**b**	**R^2**	**p-value**
Cash Ratio	Liquidity	Cash / CL	Uncorrelated	0.1207	0.0041	**1%**	**0.761005**
ROA	Profitability	EAT / TA	Inverse	9.6527	-2.1236	**45%**	**0.023785**
ROE	Profitability	EAT / Equity	Inverse	48.1387	-11.2819	**34%**	**0.060822**
Net Profit Margin	Profitability	EAT / Revenue	Inverse	18.3960	-4.2960	**45%**	**0.023264**
Asset Turnover	Activity	Revenue / TA	Inverse	0.5795	-0.0113	**61%**	**0.004613**
CAPEX Ratio	Growth	CAPEX / TA	Uncorrelated	-4.9789	0.0306	**0%**	**0.938730**
Fixed Assets Leverage	BS Structure	PPE / TA	Direct	47.4396	1.8186	**83%**	**0.000106**
Financial Leverage	Leverage	TD / TA	Direct	20.5811	2.7721	**68%**	**0.001717**
Size	Size	Total Assets	Direct	4.7306	68.1154	**68%**	**0.001731**
Operating Performance	Productivity	Revenue / Empl.	Direct	0.0807	0.0124	**72%**	**0.001913**
Tobin's Q	Valuation	TA (MV) / Repl. Value	Long Term Trend	1.1911	-0.0484	**28%**	**0.093448**

Five linear models possess a coefficient of determination of more than 60%, whereas one model has 0% and the remaining five models' registers lower than 50%.

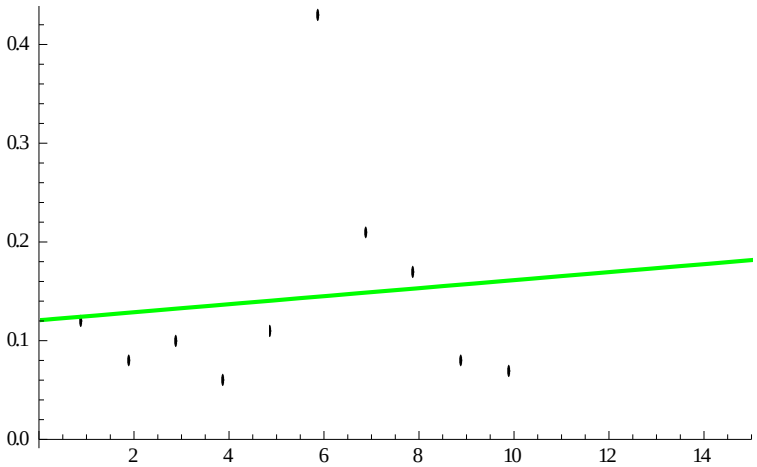
Graphs 133-176 provide an analysis visualization of all the financial ratios for the *Health Care* industry and of the linear models and their constituents:

Graph 133: Plot of the time series – Cash Ratio (Health Care)



No explicit trend is evident for all years.

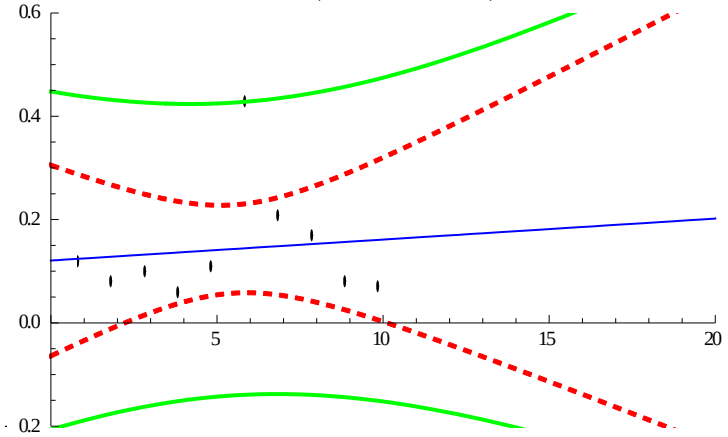
Graph 134: Scatter plot with the trend line – Cash Ratio (Health Care)



The model has a positive trend. The equation of the line is:

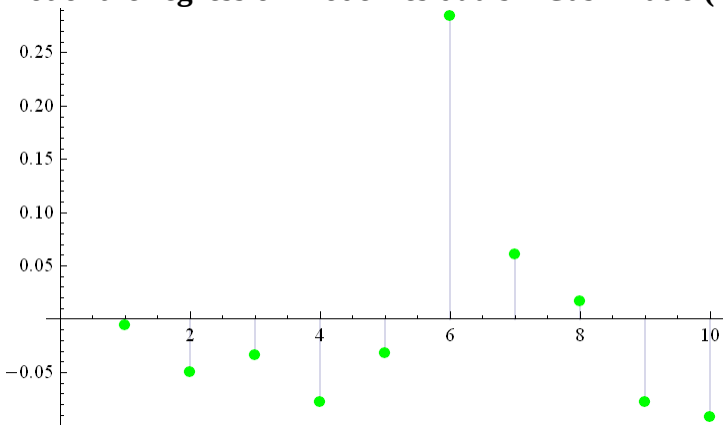
$$0.120667 + 0.00406061x$$

Graph 135: Plot of the time series, trend line, mean and single prediction bands – Cash Ratio (Health Care)



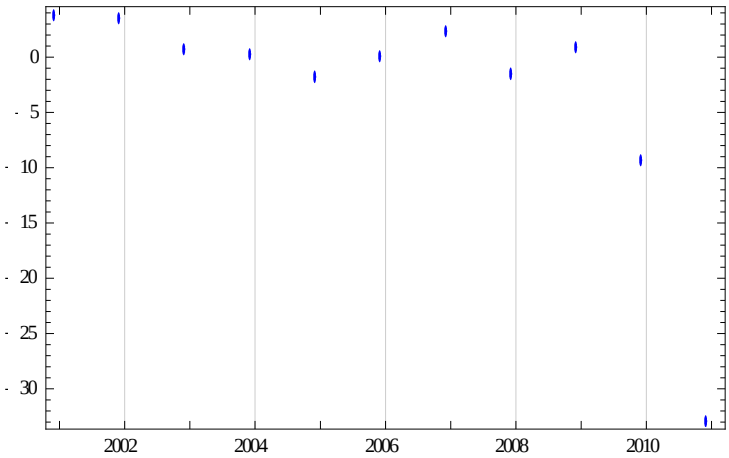
With a coefficient of determination of 1%, we can observe that all but one of the data points of the raw data fall within the confidence bands.

Graph 136: Plot of the regression model residuals – Cash Ratio (Health Care)



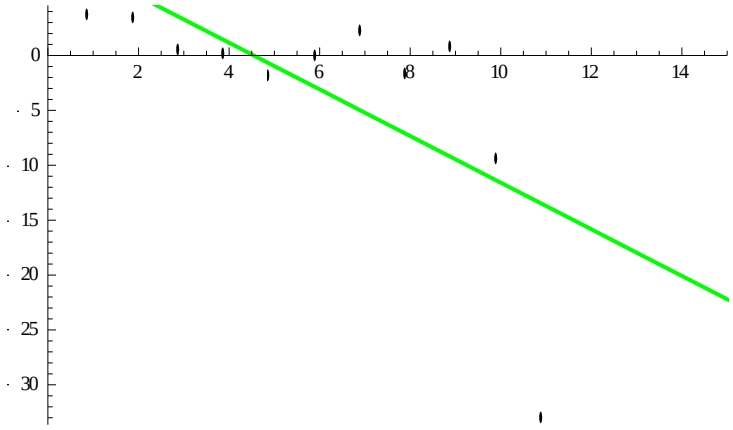
Most of the values for the residuals are lower than 0.10.

Graph 137: Plot of the time series – ROA (Health Care)



We can observe a negative trend with periodic cyclic variations.

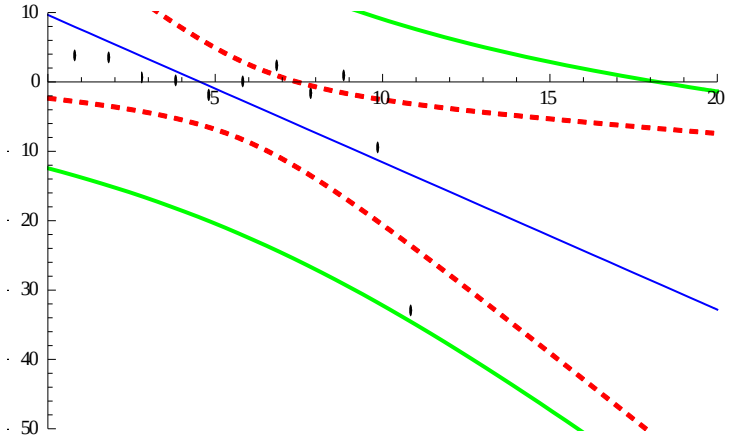
Graph 138: Scatter plot with the trend line – ROA (Health Care)



The model is affected by the marker of the final year. The line equation is:

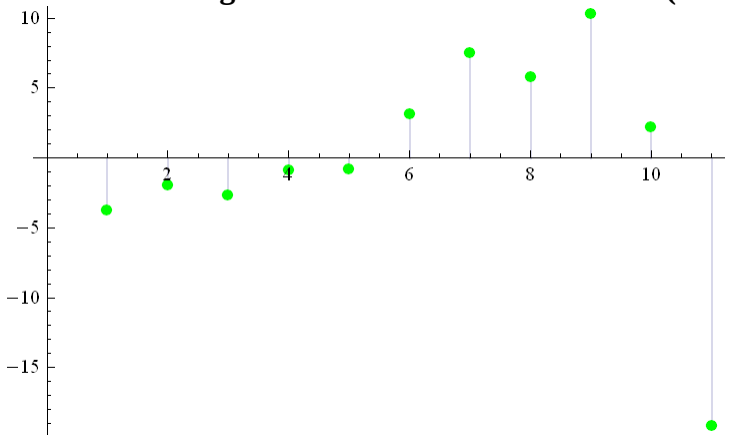
$$9.65273 - 2.12364\,x$$

Graph 139: Plot of the time series, trend line, mean and single prediction bands – ROA (Health Care)



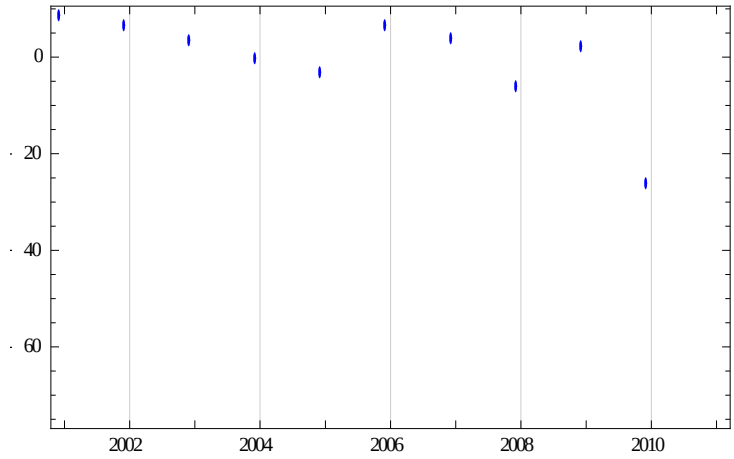
With a coefficient of determination of 45%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 140: Plot of the regression model residuals – ROA (Health Care)



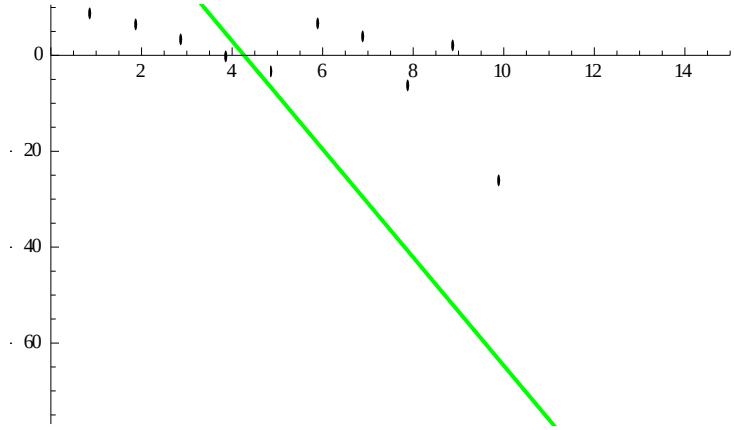
We can observe no evident residuals clustering, although most of the values are low.

Graph 141: Plot of the time series – ROE (Health Care)



We can observe negative long-term trend. Please note that the final marker is off the chart.

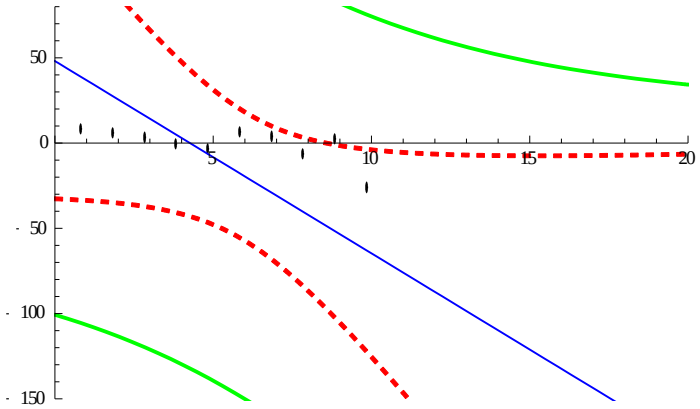
Graph 142: Scatter plot with the trend line – ROE (Health Care)



The trend line has an acute negative trend. The line equation is:

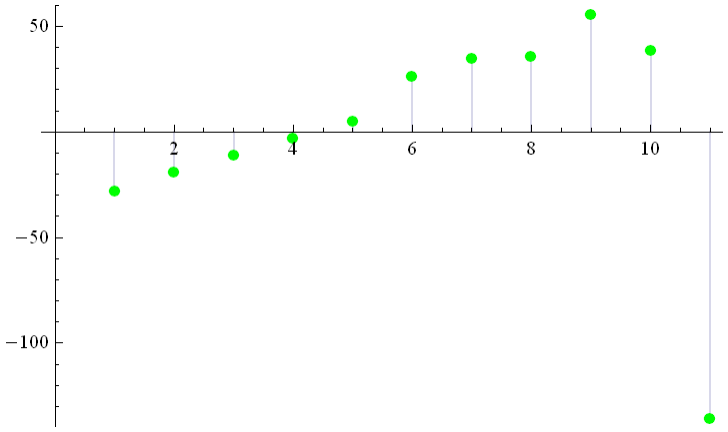
$$48.1387 - 11.2819x$$

Graph 143: Plot of the time series, trend line, mean and single prediction bands – ROE (Health Care)



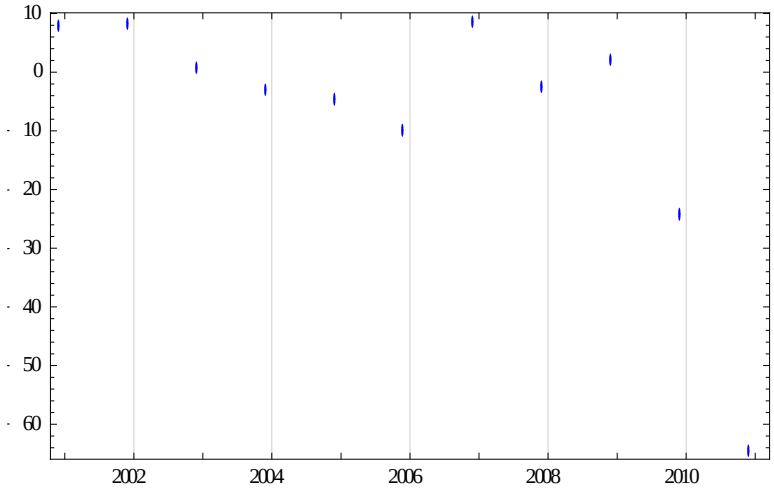
We can observe the widening of the bands due to the extremely divergent value for the final year.

Graph 144: Plot of the regression model residuals – ROE (Health Care)



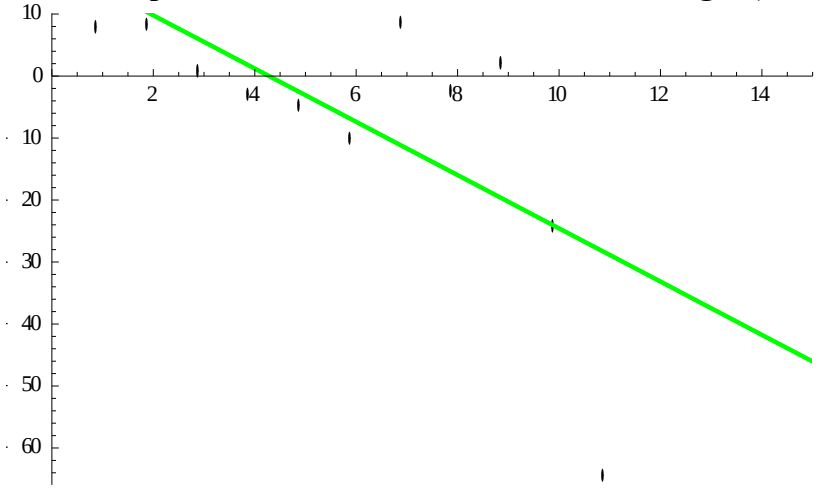
We can observe no evident clustering of the residuals.

Graph 145: Plot of the time series – Net Profit Margin (Health Care)



We can observe a negative trend with periodic cyclic variations.

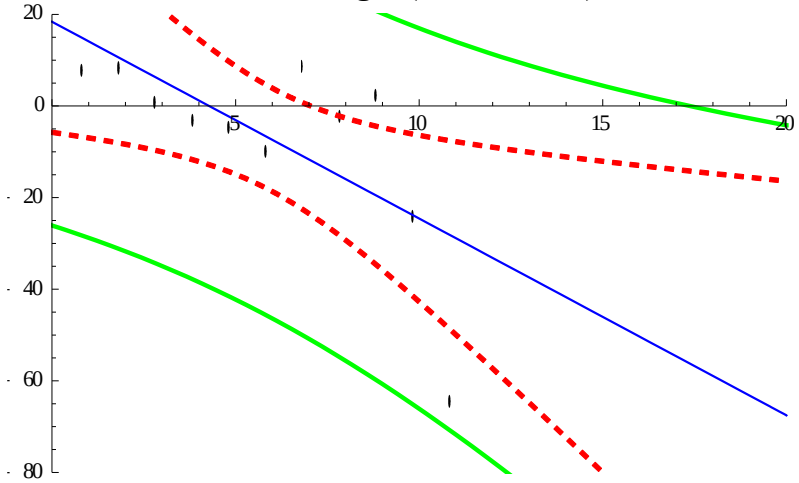
Graph 146: Scatter plot with the trend line – Net Profit Margin (Health Care)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

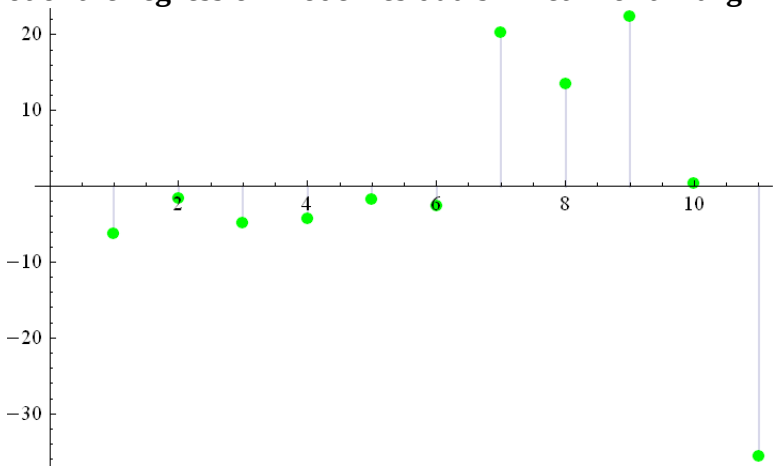
$$18.396 - 4.296\,x$$

Graph 147: Plot of the time series, trend line, mean and single prediction bands – Net Profit Margin (Health Care)



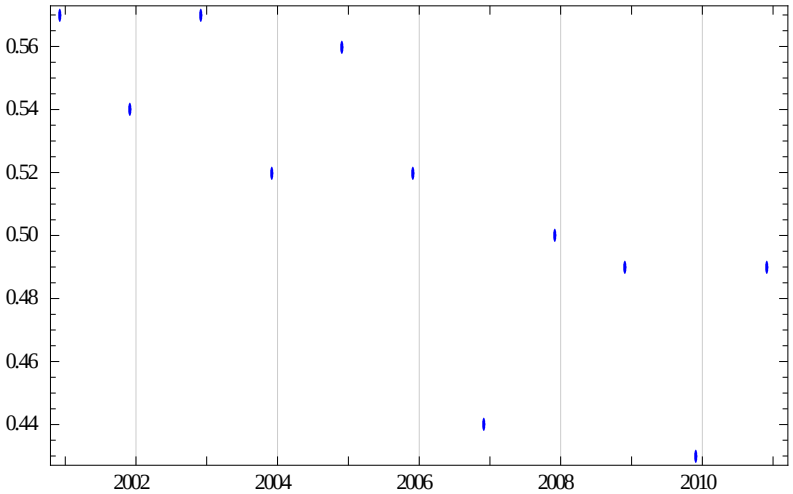
With a coefficient of determination of 45%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 148: Plot of the regression model residuals – Net Profit Margin (Health Care)



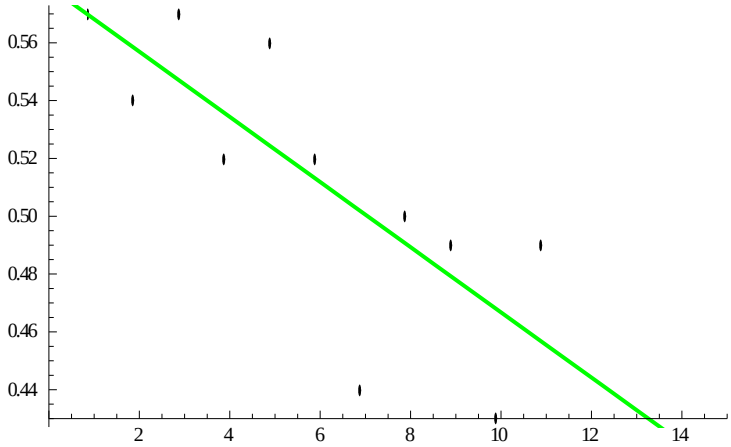
We can observe that many residuals cluster around zero.

Graph 149: Plot of the time series – Sales/TA (Health Care)



We can observe a negative trend with periodic cyclic variations.

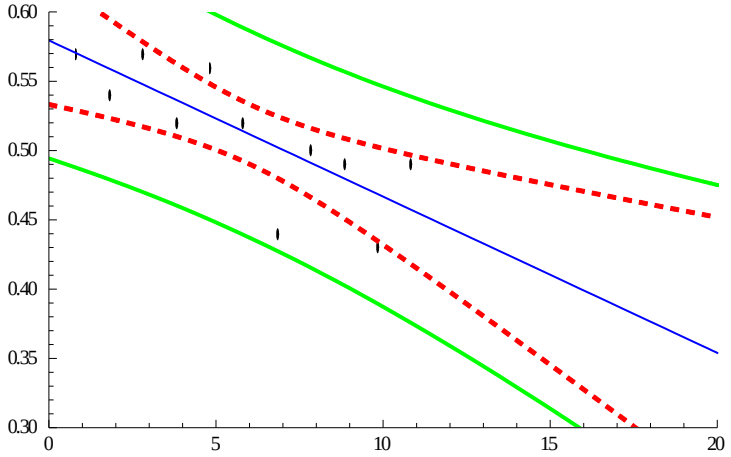
Graph 150: Scatter plot with the trend line – Sales/TA (Health Care)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

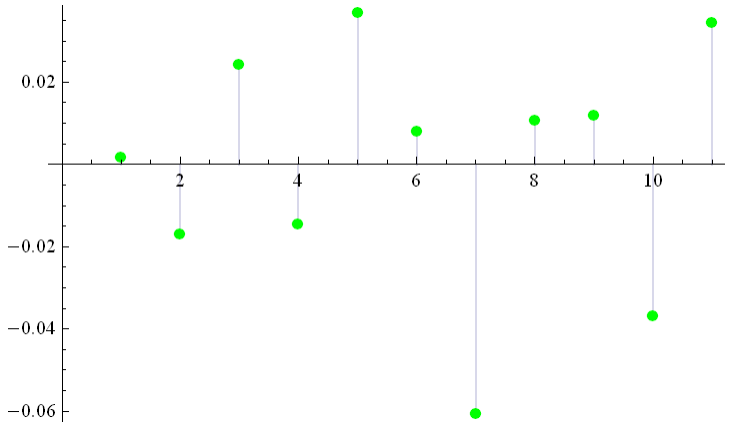
$$0.579455 - 0.0112727\,x$$

Graph 151: Plot of the time series, trend line, mean and single prediction bands – Sales/TA (Health Care)



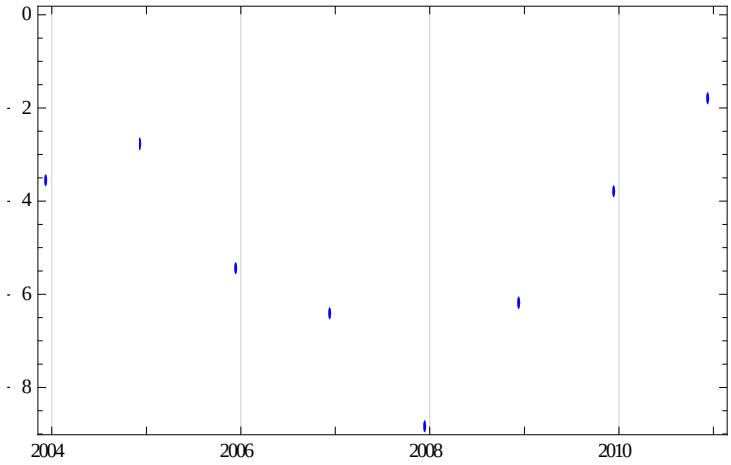
With a coefficient of determination of 61%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 152: Plot of the regression model residuals – Sales/TA (Health Care)



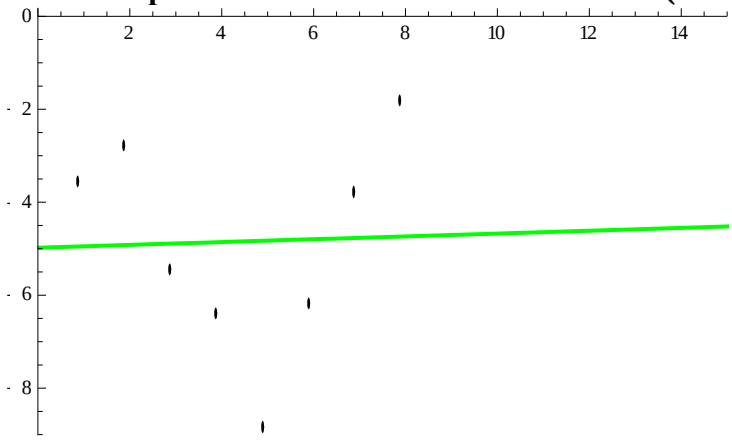
We can observe no evident clustering of the residuals.

Graph 153: Plot of the time series – CAPEX/TA (Health Care)



No explicit trend is evident for all years.

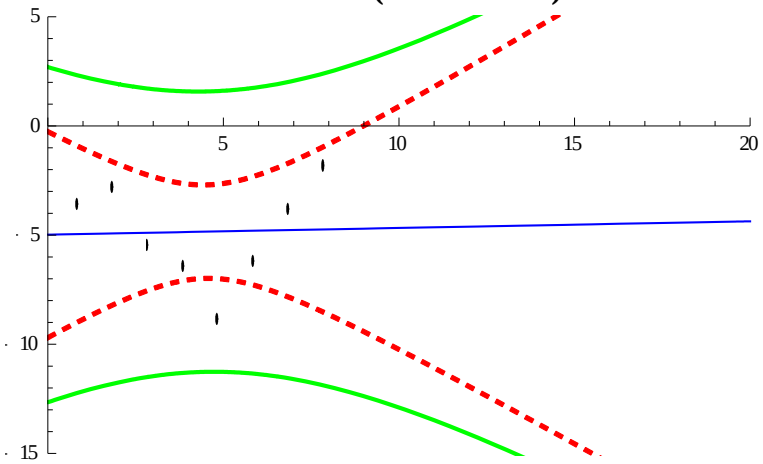
Graph 154: Scatter plot with the trend line – CAPEX/TA (Health Care)



The linear model has a positive trend. The line equation is:

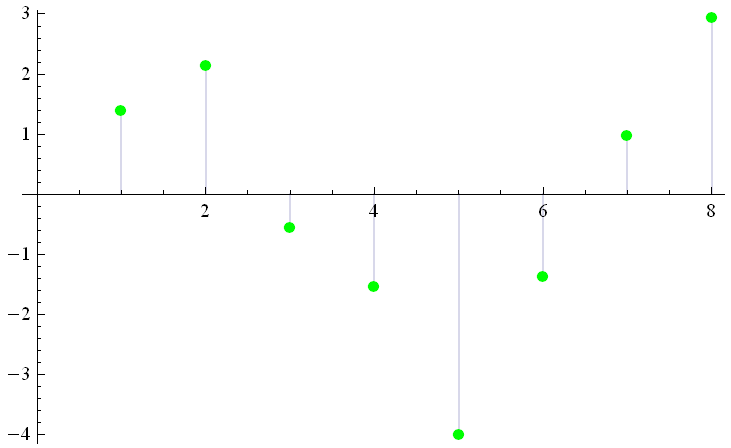
$$4.97893 - 0.0305952x$$

Graph 155: Plot of the time series, trend line, mean and single prediction bands – CAPEX/TA (Health Care)



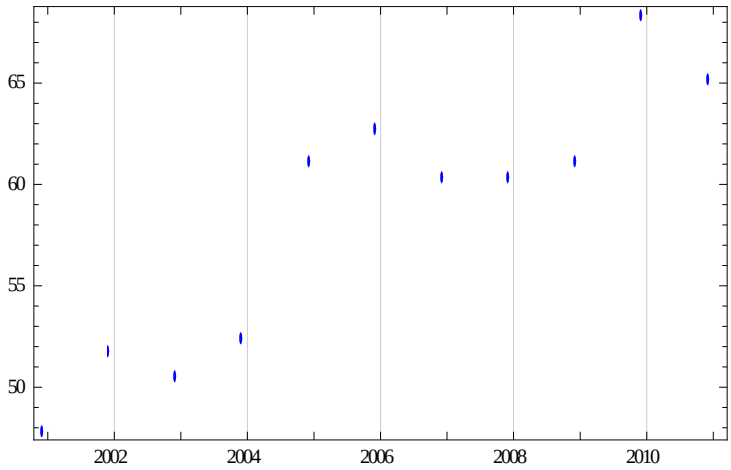
With a coefficient of determination of 0%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 156: Plot of the regression model residuals – CAPEX/TA (Health Care)



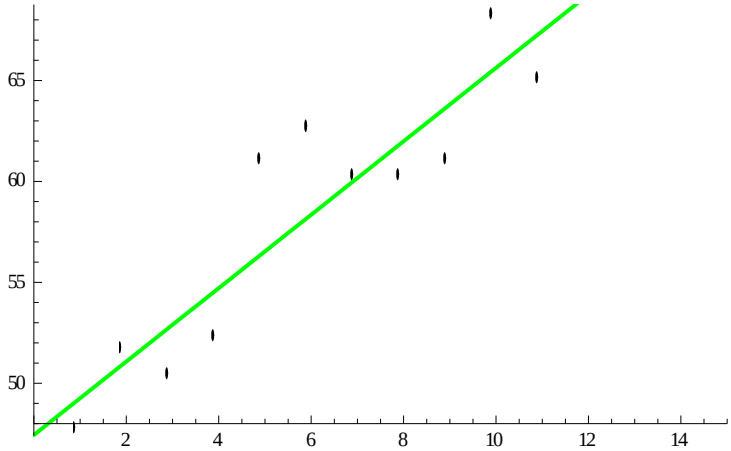
We can observe no evident clustering of the residuals.

Graph 157: Plot of the time series – PPE/TA (Health Care)



We can observe a positive trend with periodic cyclic variations.

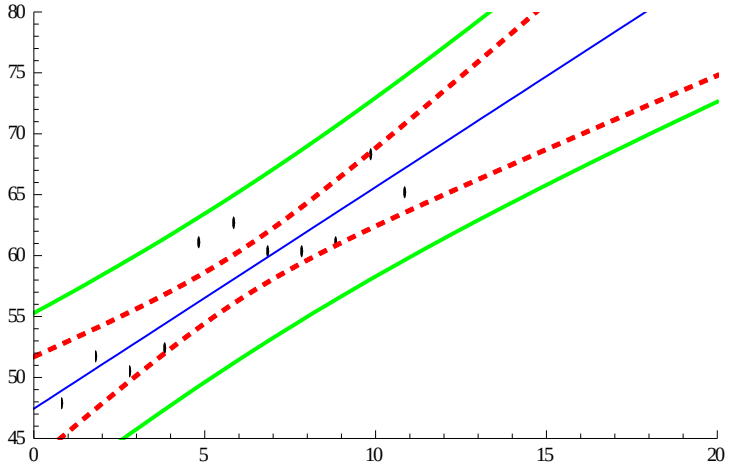
Graph 158: Scatter plot with the trend line – PPE/TA (Health Care)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

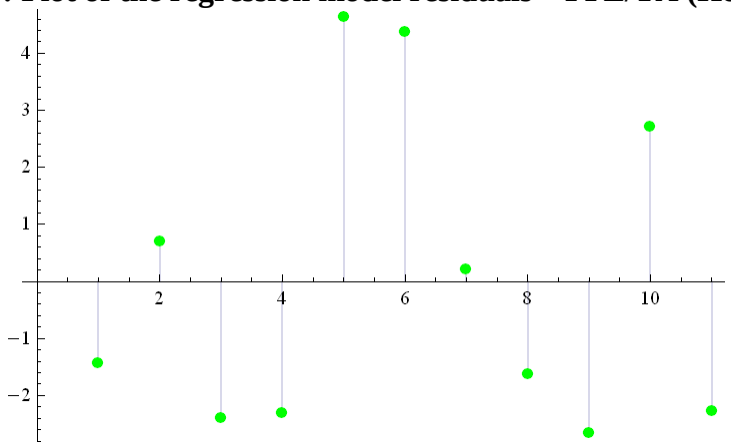
$$47.4396 + 1.81855\,x$$

Graph 159: Plot of the time series, trend line, mean and single prediction bands – PPE/TA (Health Care)



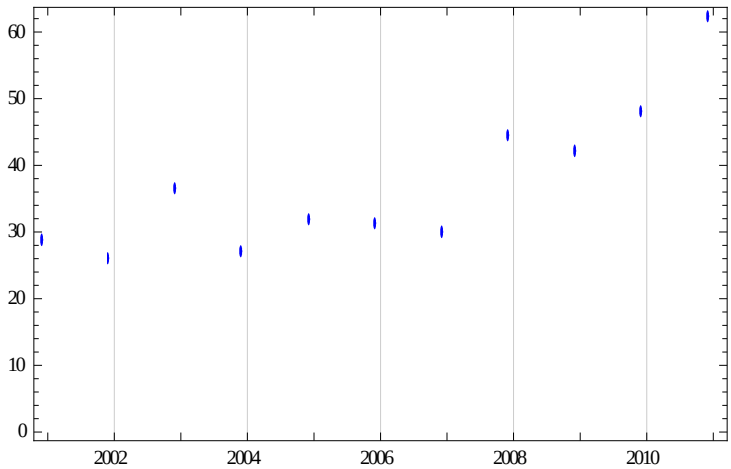
With a coefficient of determination of 83%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 160: Plot of the regression model residuals – PPE/TA (Health Care)



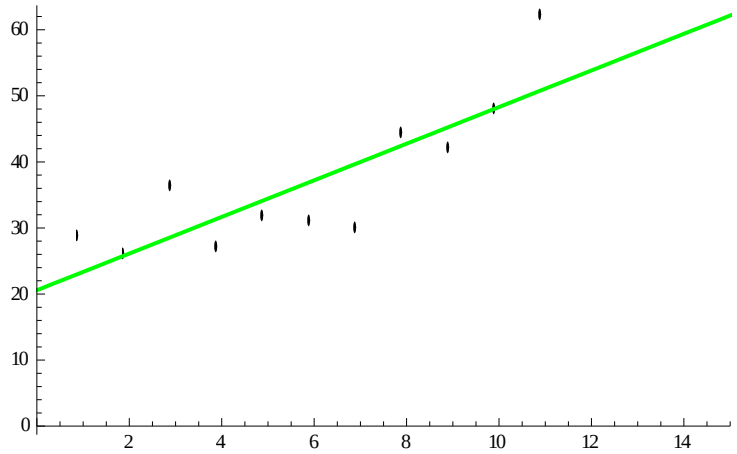
We can observe no evident clustering of the residuals.

Graph 161: Plot of the time series – Leverage (Health Care)



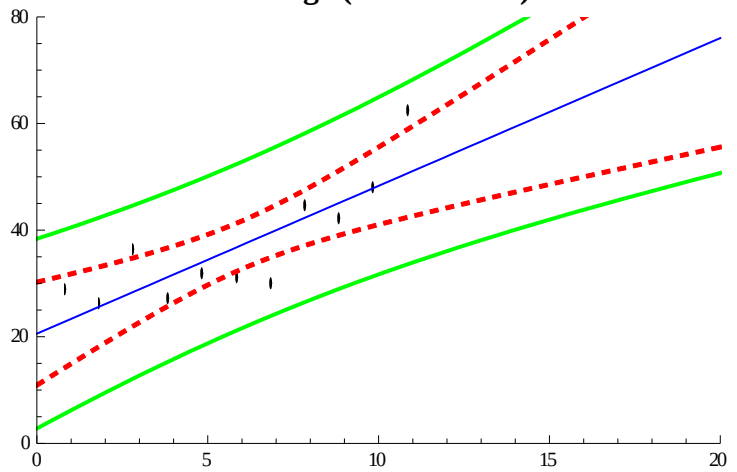
We can observe a positive trend with periodic cyclic variations.

Graph 162: Scatter plot with the trend line – Leverage (Health Care)



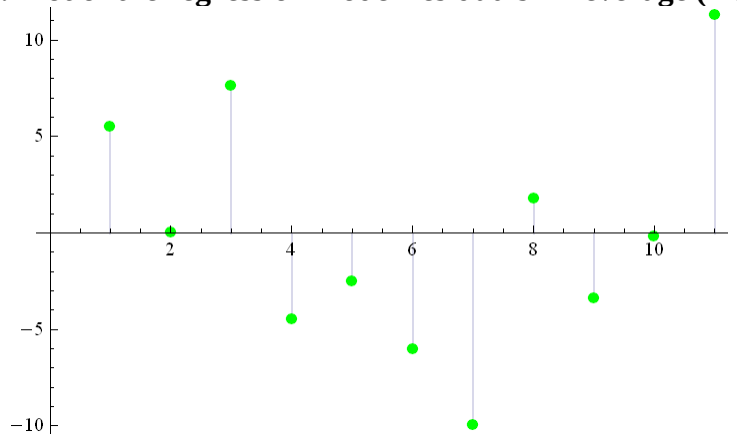
The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is: $20.5811 + 2.77209x$

Graph 163: Plot of the time series, trend line, mean and single prediction bands – Leverage (Health Care)



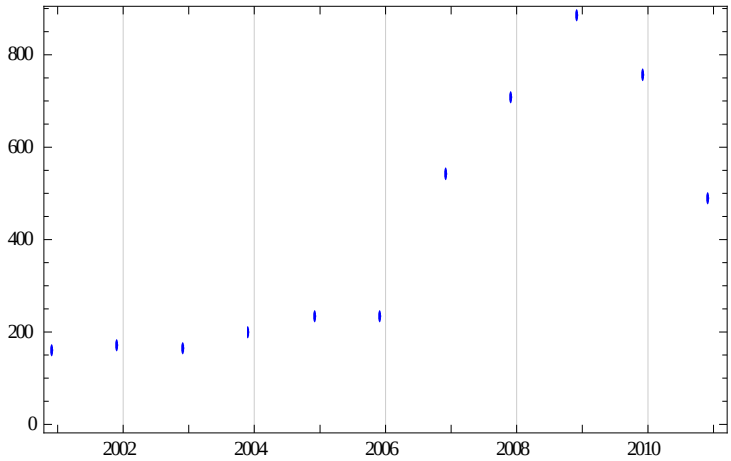
With a coefficient of determination of 68%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 164: Plot of the regression model residuals – Leverage (Health Care)



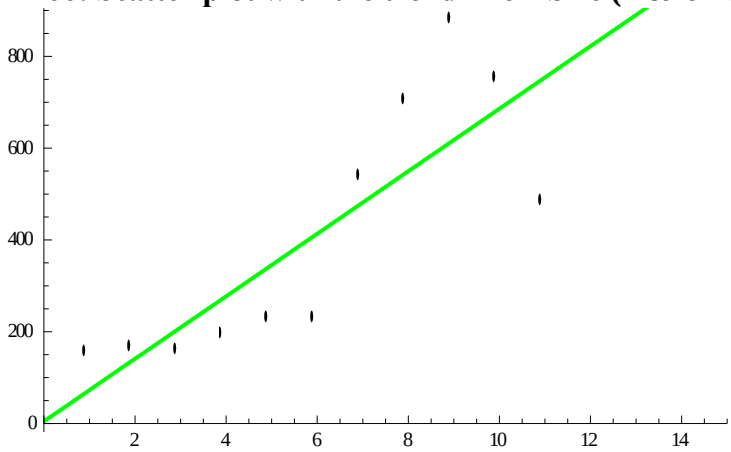
We can observe no evident clustering of the residuals.

Graph 165: Plot of the time series – Size (Health Care)



We can observe a positive trend with periodic cyclic variations.

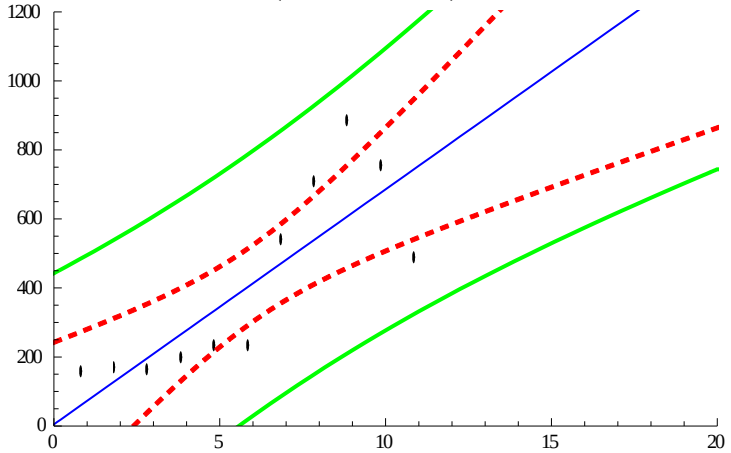
Graph 166: Scatter plot with the trend line – Size (Health Care)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

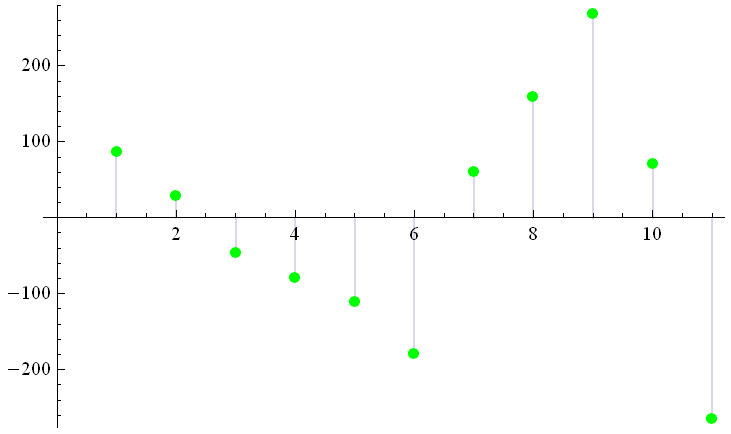
$$4.73055 + 68.1154x$$

Graph 167: Plot of the time series, trend line, mean and single prediction bands – Size (Health Care)



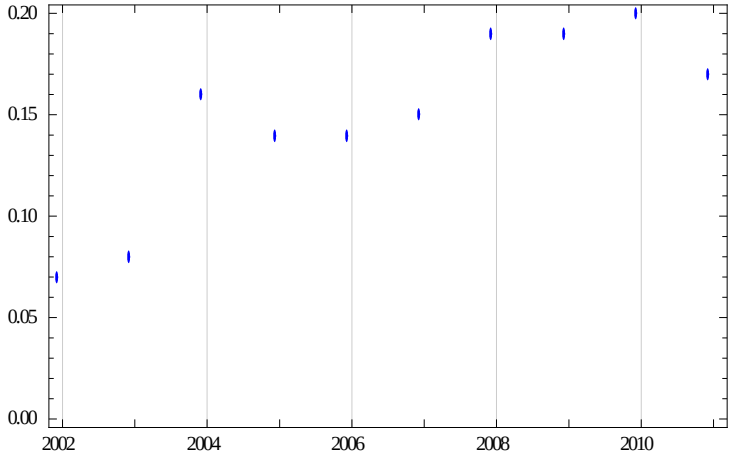
With a coefficient of determination of 68%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 168: Plot of the regression model residuals – Size (Health Care)



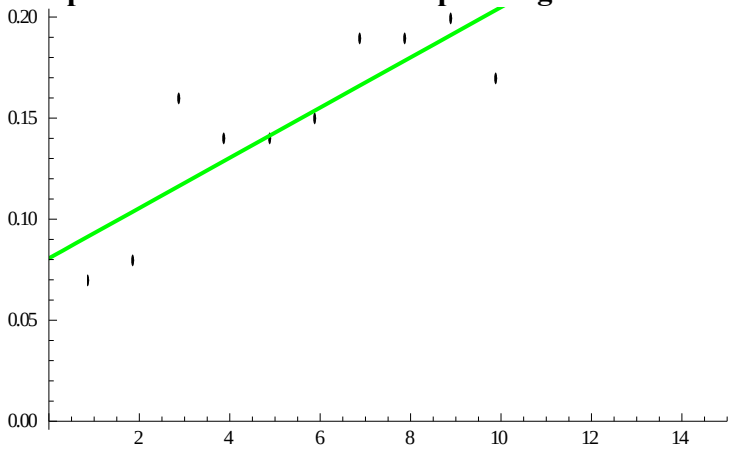
We can observe no evident clustering of the residuals.

Graph 169: Plot of the time series – Operating Performance (Health Care)



We can observe a positive trend with periodic cyclic variations.

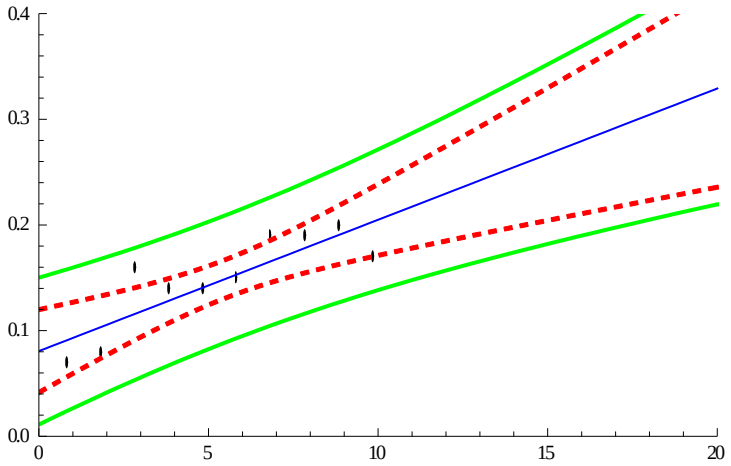
Graph 170: Scatter plot with the trend line – Operating Performance (Health Care)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

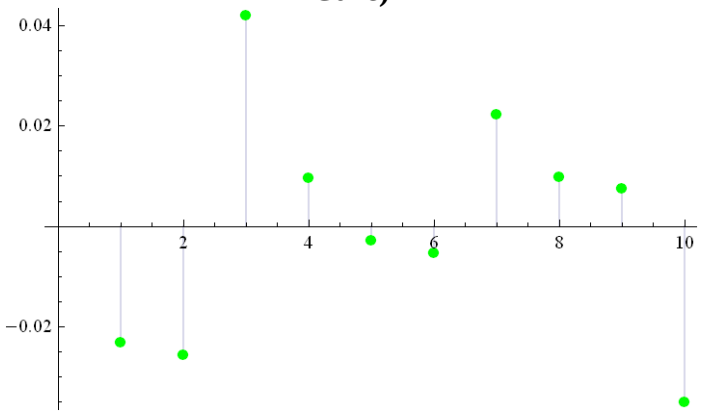
$$0.0806667 + 0.0124242\,x$$

Graph 171: Plot of the time series, trend line, mean and single prediction bands – Operating Performance (Health Care)



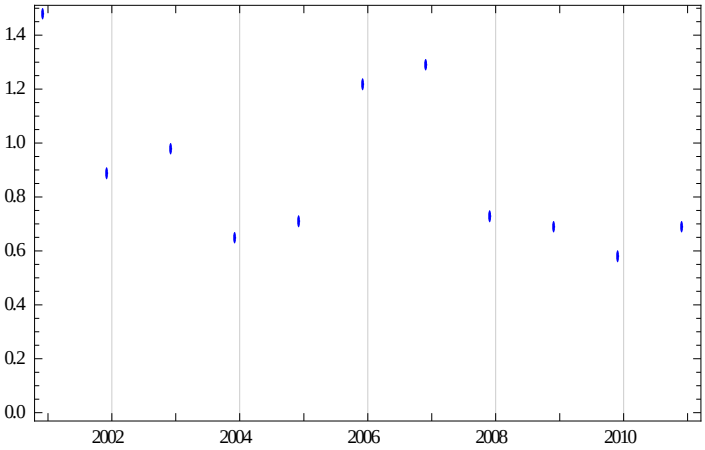
With a coefficient of determination of 72%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph172: Plot of the regression model residuals – Operating Performance (Health Care)



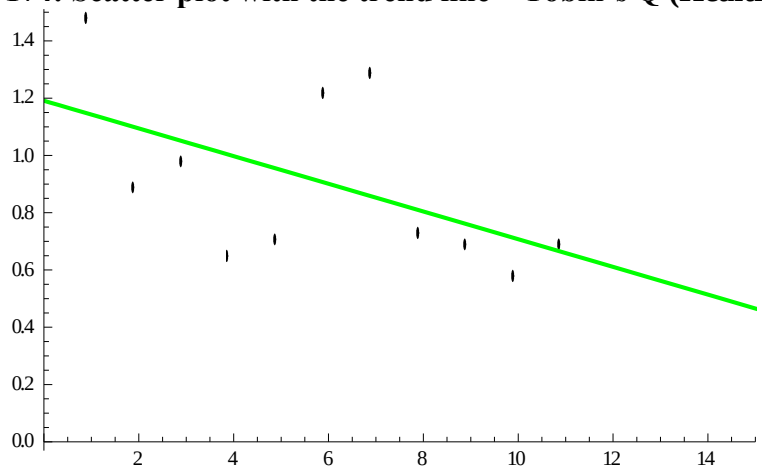
We can observe no evident clustering of the residuals.

Graph 173: Plot of the time series – Tobin's Q (Health Care)



We can observe negative long-term trend.

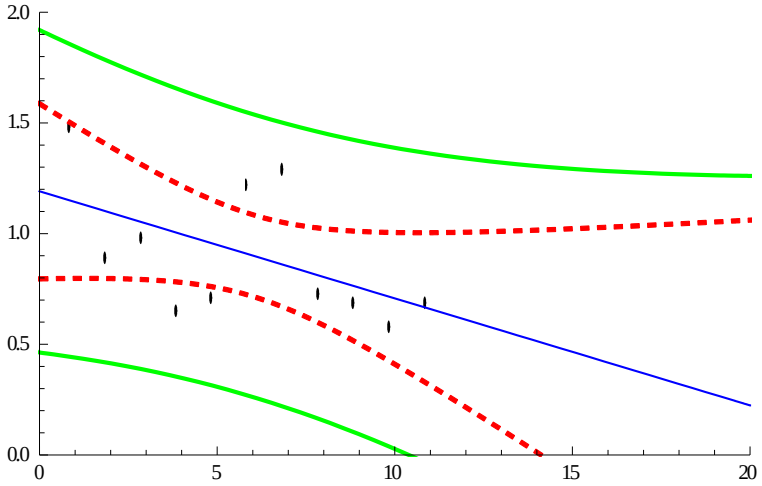
Graph 174: Scatter plot with the trend line – Tobin's Q (Health Care)



The equation of the regression line is:

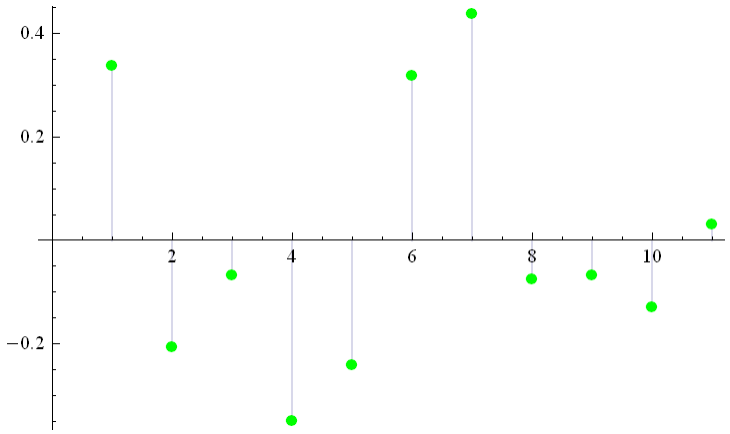
$$1.19109 - 0.0483636\,x$$

Graph 175: Plot of the time series, trend line, mean and single prediction bands – Tobin's Q (Health Care)



With a coefficient of determination of 28%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 176: Plot of the regression model residuals – Tobin's Q (Health Care)



We can observe no evident clustering of the residuals.

4.5 Industrials Industry

Table 9: Positive Analysis for the Industry of Industrials

Industrials (N=59)											
Year	Cash Ratio	ROA	ROE	EAT/Sales	Sales/TA	CAPEX/TA	PPE/TA	Leverage	Size	Sales/Empl	Tobin's Q
2001	0.40	4.40%	8.71%	5.85%	0.77	-4.53%	39.62%	17.28%	160.40	0.10	1.37
2002	0.59	4.55%	9.27%	5.37%	0.77	-10.19%	42.18%	20.30%	181.65	0.06	0.91
2003	0.38	3.35%	6.23%	5.00%	0.70	no data	41.53%	21.40%	194.35	0.33	0.98
2004	0.53	5.01%	9.45%	6.91%	0.71	-1.44%	42.75%	17.06%	217.63	0.16	0.71
2005	0.32	2.05%	3.86%	3.37%	0.65	-3.90%	51.48%	24.83%	268.17	0.21	0.79
2006	0.25	2.82%	5.42%	3.83%	0.69	-5.09%	48.30%	26.75%	290.23	0.45	0.92
2007	0.29	2.50%	5.30%	3.57%	0.66	-4.49%	47.22%	28.47%	344.85	0.22	0.95
2008	0.28	-1.71%	-7.94%	-4.93%	0.70	-4.09%	48.12%	29.64%	394.52	0.67	0.58
2009	0.36	-0.39%	-8.29%	5.37%	0.59	-3.54%	49.55%	29.91%	385.47	0.25	0.66
2010	0.31	-1.19%	-3.87%	-10.73%	0.55	-2.99%	50.37%	30.38%	414.77	0.26	0.59
2011	0.32	-5.25%	-16.40%	-72.83%	0.51	-2.10%	52.67%	33.11%	411.22	0.24	0.56

The cash ratio portrays fluctuating variances whereas *Activity* seems to be diminishing at a nearly steady rate and this may be an indication of diminishing demand, industry decline, or simply that the denominator of the ratio is growing disproportionately with respect to the numerator. *Productivity* has doubled during the time span and *Valuation* is steadily diminishing.

Profitability ratios are falling quite abruptly from 2008 and on, with especially low figures in the *Net Profit Margin* ratio in the last year. CAPEX is erratic whereas *BS structure* has gained in PPE by approximately 10%, in (trending but not analogous) accordance with *Size*, which has more than doubled in the time span.

Leverage has grown steadily by more than 10% overall. It would not be irrational to question how an industry with diminishing profits, diminishing activity and smoothly growing financial leverage can more than double in size in little over ten years.

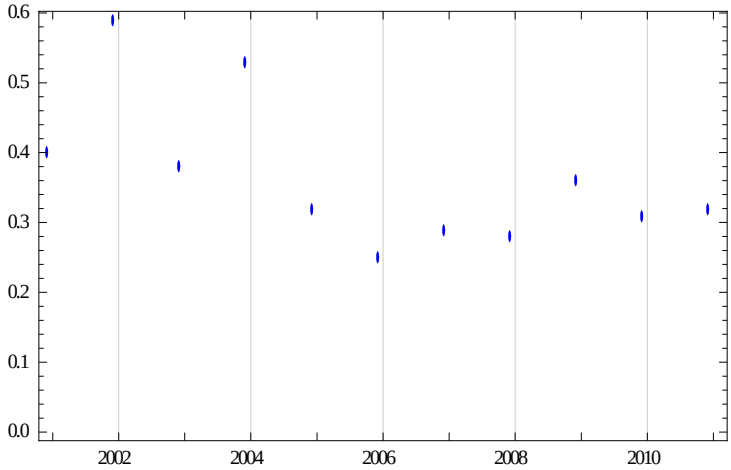
Table 10: Forecasting for the Industry of Industrials

Industrials							
Ratio	Domain	Formula	Linear Correlation	a	b	R^2	p-value
Cash Ratio	Liquidity	Cash / CL	Inverse	0.4815	-0.0192	**36%**	**0.051040**
ROA	Profitability	EAT / TA	Inverse	6.6720	-0.8675	**80%**	**0.000192**
ROE	Profitability	EAT / Equity	Inverse	14.9769	-2.3183	**77%**	**0.000368**
Net Profit Margin	Profitability	EAT / Revenue	Inverse	21.7165	-4.3652	**39%**	**0.041239**
Asset Turnover	Activity	Revenue / TA	Inverse	0.8011	-0.0229	**82%**	**0.000119**
CAPEX Ratio	Growth	CAPEX / TA	Uncorrelated	-3.8996	0.0593	**1%**	**0.779397**
Fixed Assets Leverage	BS Structure	PPE / TA	Direct	39.6964	1.1686	**76%**	**0.000474**
Financial Leverage	Leverage	TD / TA	Direct	15.8955	1.5800	**88%**	**0.000019**
Size	Size	Total Assets	Direct	122.6380	29.0036	**96%**	**1.1*10^-7**
Operating Performance	Productivity	Revenue / Empl.	Uncorrelated	0.1433	0.0208	**17%**	**0.214786**
Tobin's Q	Valuation	TA (MV) / Repl. Value	Inverse	1.1686	-0.0581	**64%**	**0.003101**

The linear model seems effective for seven ratios of this industry. The coefficient of determination is low for four ratios. Consequently, as with previous industries, the linear model could prove highly effective for forecasting many financial ratios in this industry.

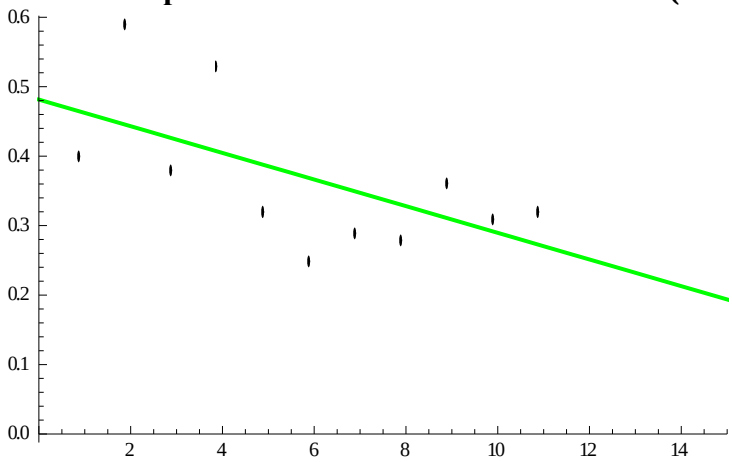
Graphs 177-220 provide an analysis visualization of all the financial ratios for the *Industrials* industry and of the linear models and their constituents:

Graph 177: Plot of the time series – Cash Ratio (Industrials)



We can observe negative long-term trend.

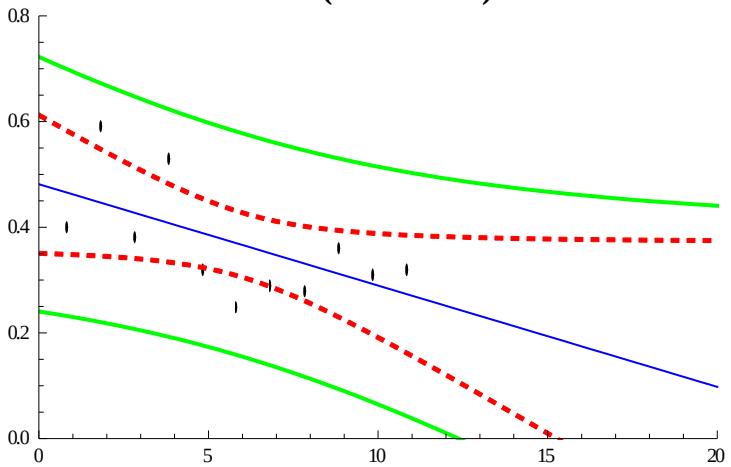
Graph 178: Scatter plot with the trend line – Cash Ratio (Industrials)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

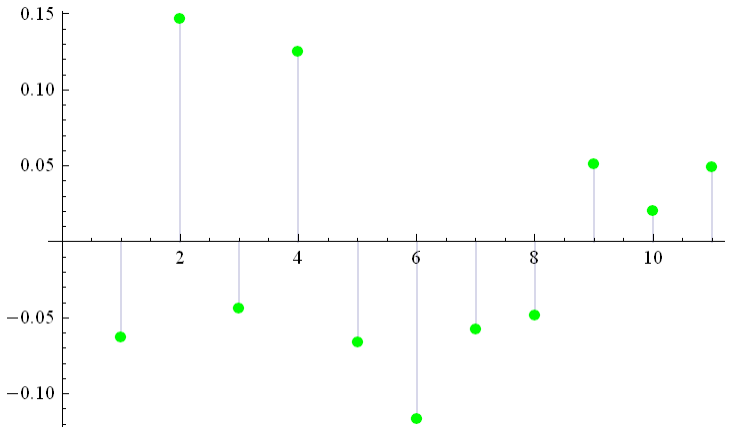
$$0.481455 \cdot 0.0191818\,x$$

Graph 179: Plot of the time series, trend line, mean and single prediction bands – Cash Ratio (Industrials)



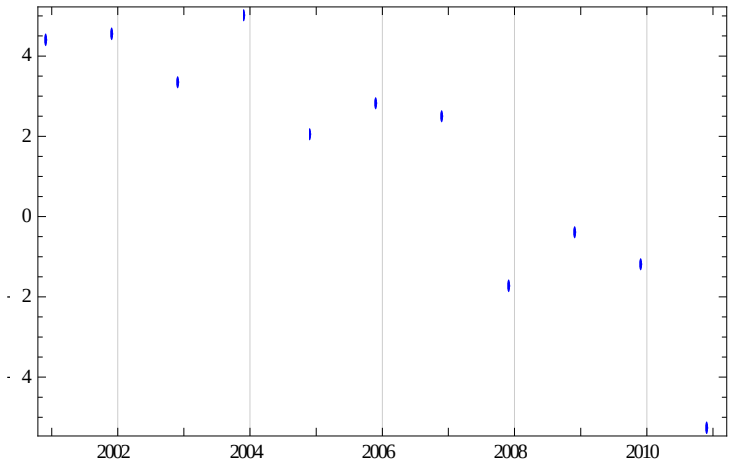
With a coefficient of determination of 36%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 180: Plot of the regression model residuals – Cash Ratio (Industrials)



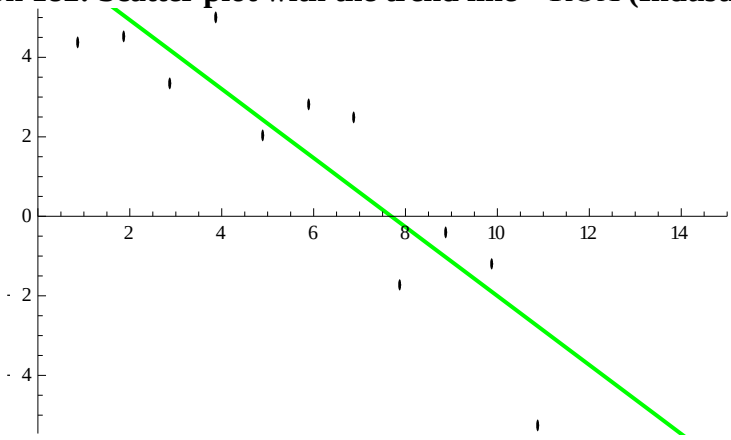
We can observe no evident clustering of the residuals.

Graph 181: Plot of the time series – ROA (Industrials)



We can observe a negative trend with periodic cyclic variations.

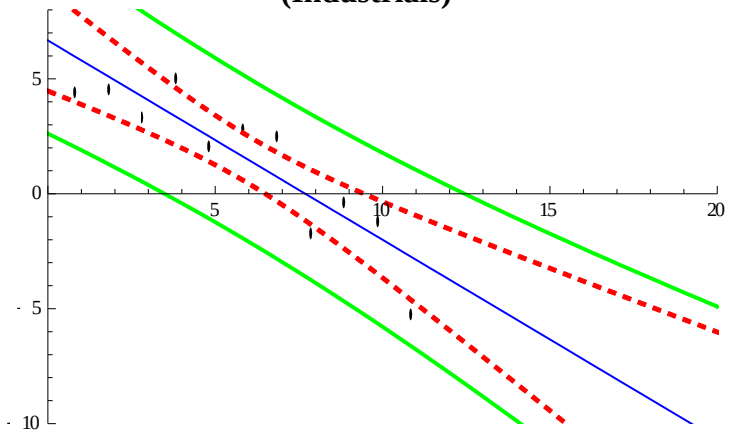
Graph 182: Scatter plot with the trend line – ROA (Industrials)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

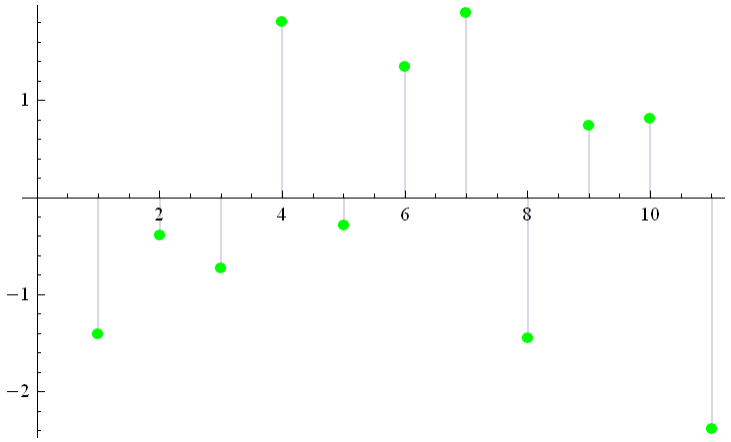
$$6.672 - 0.867455x$$

Graph 183: Plot of the time series, trend line, mean and single prediction bands – ROA (Industrials)



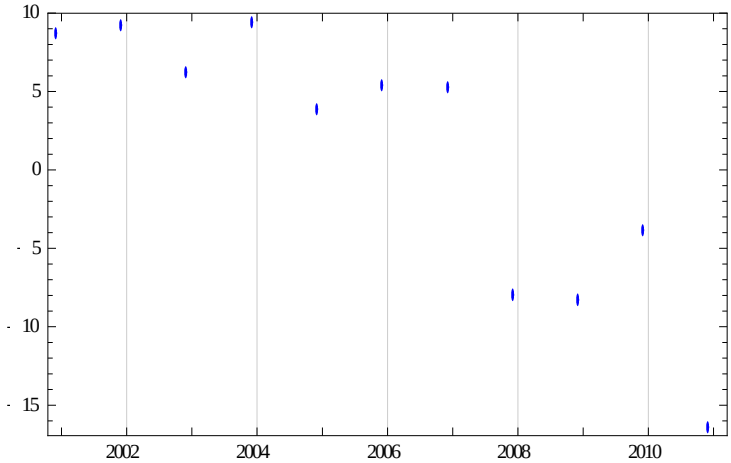
With a coefficient of determination of 80%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 184: Plot of the regression model residuals – ROA (Industrials)



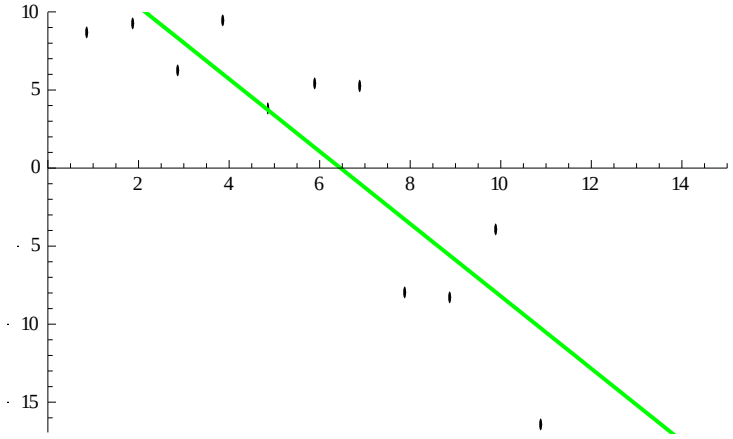
We can observe no evident clustering of the residuals.

Graph 185: Plot of the time series – ROE (Industrials)



We can observe a negative trend with periodic cyclic variations.

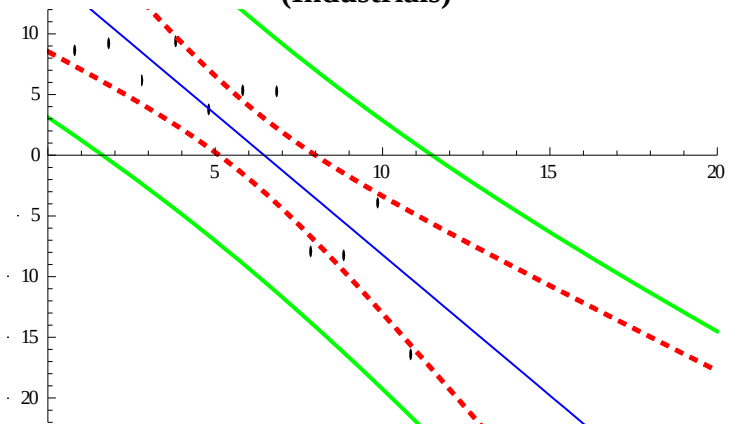
Graph 186: Scatter plot with the trend line – ROE (Industrials)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

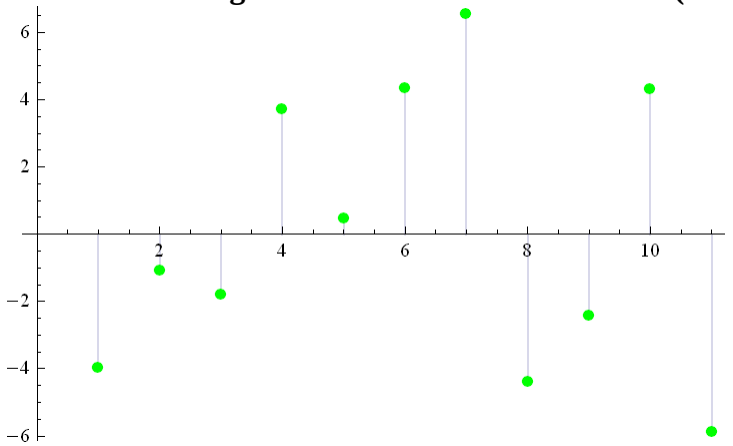
$$14.9769 - 2.31827\,x$$

Graph 187: Plot of the time series, trend line, mean and single prediction bands – ROE (Industrials)



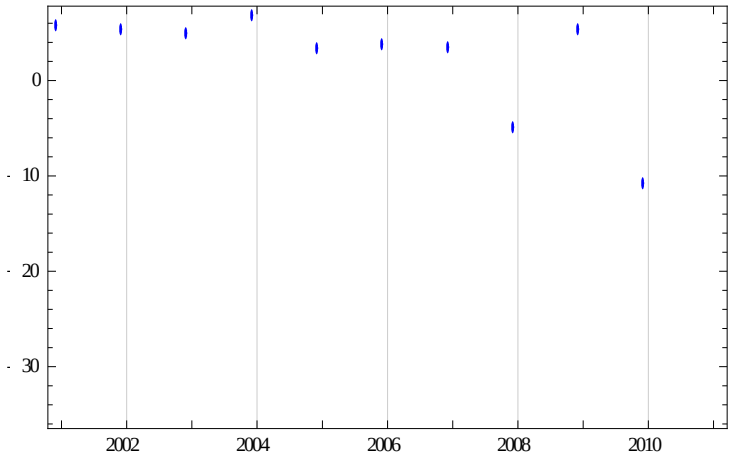
With a coefficient of determination of 77%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 188: Plot of the regression model residuals – ROE (Industrials)



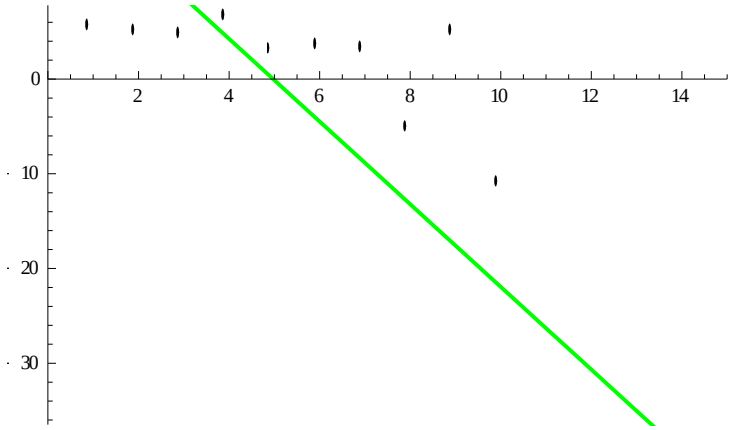
We can observe no evident clustering of the residuals.

Graph 189: Plot of the time series – Net Profit Margin (Industrials)



We can observe negative long-term trend. Please note that the last value is off the chart.

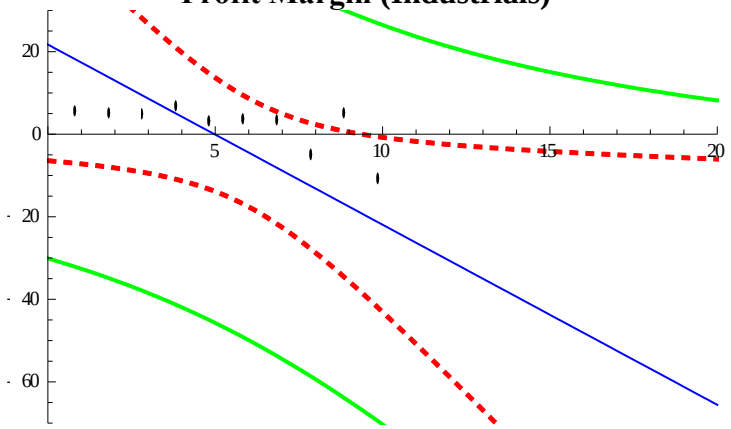
Graph 190: Scatter plot with the trend line – Net Profit Margin (Industrials)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

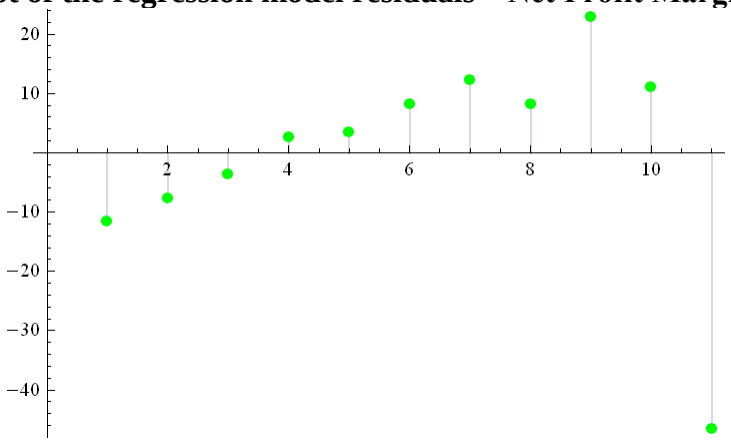
$$21.7165 - 4.36518x$$

Graph 191: Plot of the time series, trend line, mean and single prediction bands – Net Profit Margin (Industrials)



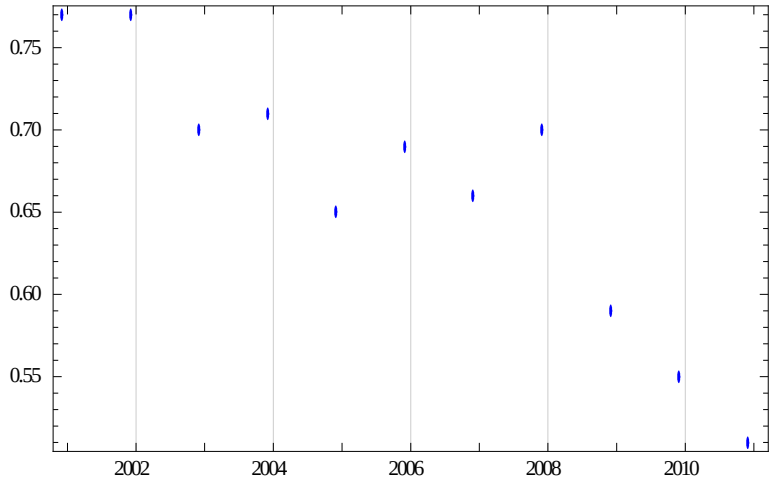
With a coefficient of determination of 39%, we can observe that bands are exceptionally wide, due to the extremely divergent marker of the final year.

Graph 192: Plot of the regression model residuals – Net Profit Margin (Industrials)



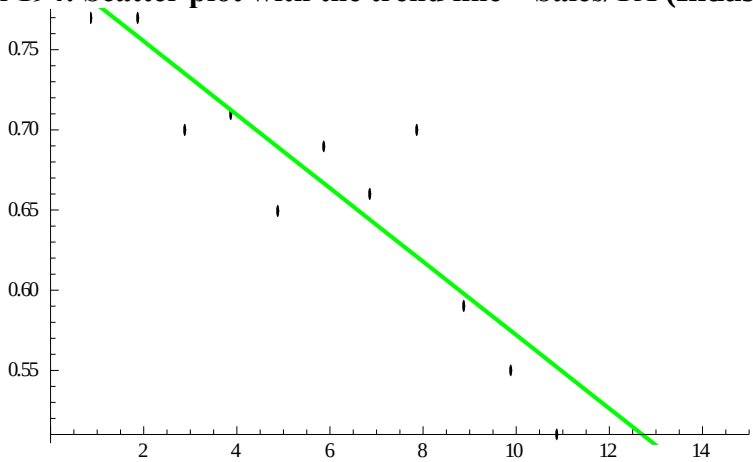
We can observe no evident clustering of the residuals.

Graph 193: Plot of the time series – Sales/TA (Industrials)



We can observe a negative trend with periodic cyclic variations.

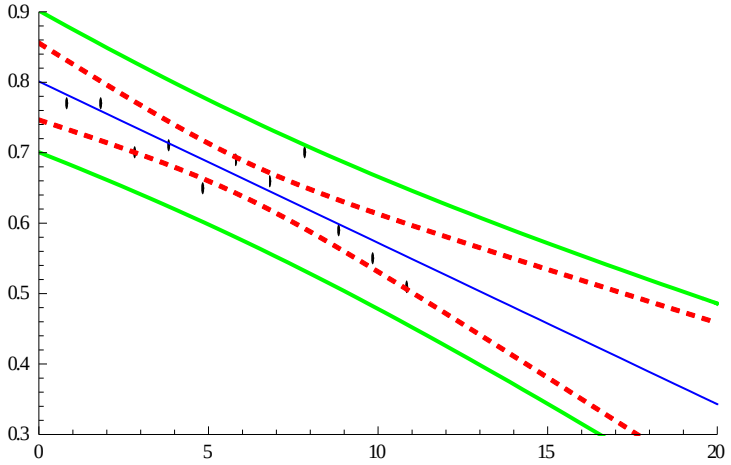
Graph 194: Scatter plot with the trend line – Sales/TA (Industrials)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

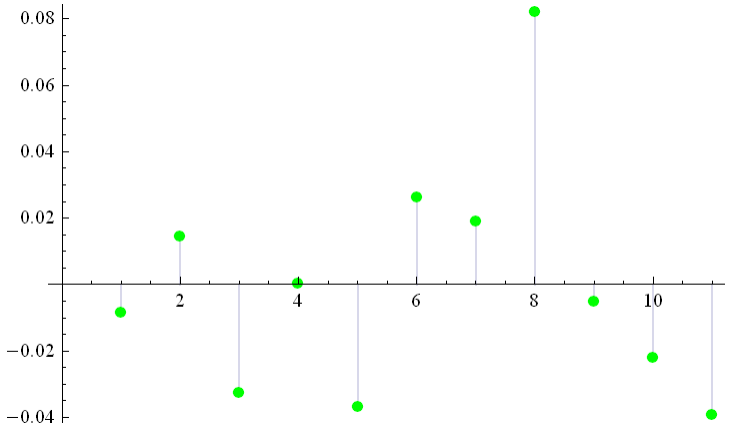
$$0.801091 \cdot 0.0229091\,x$$

Graph 195: Plot of the time series, trend line, mean and single prediction bands – Sales/TA (Industrials)



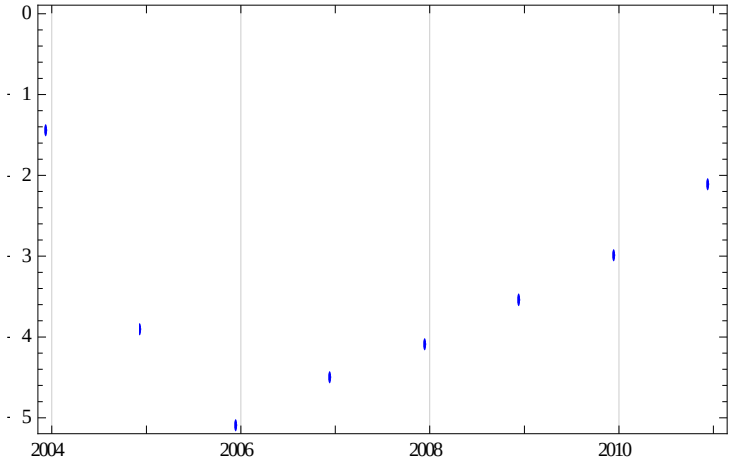
With a coefficient of determination of 82%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 196: Plot of the regression model residuals – Sales/TA (Industrials)



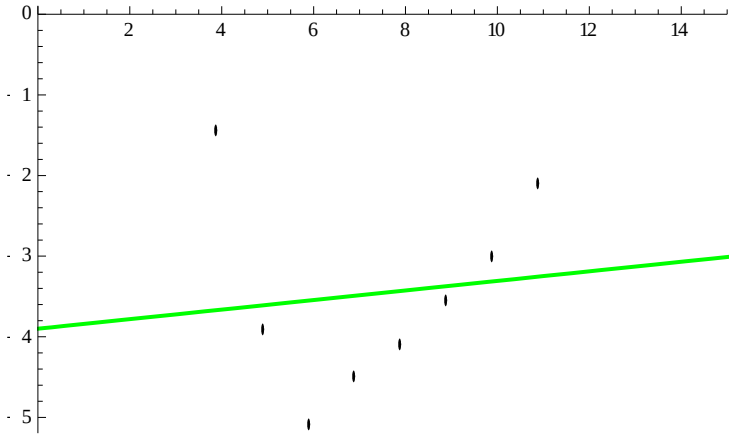
We can observe no evident clustering of the residuals.

Graph 197: Plot of the time series – CAPEX/TA (Industrials)



No explicit trend is evident for all years although there is a positive trend from 2006 and on.

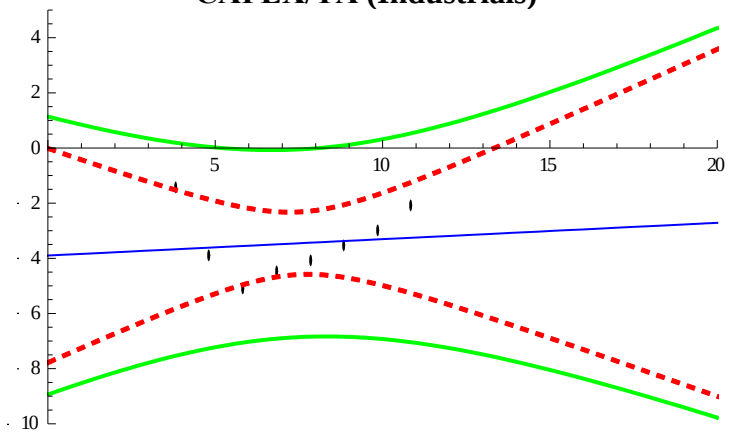
Graph 198: Scatter plot with the trend line – CAPEX/TA (Industrials)



The regression line has a positive trend. The line equation is:

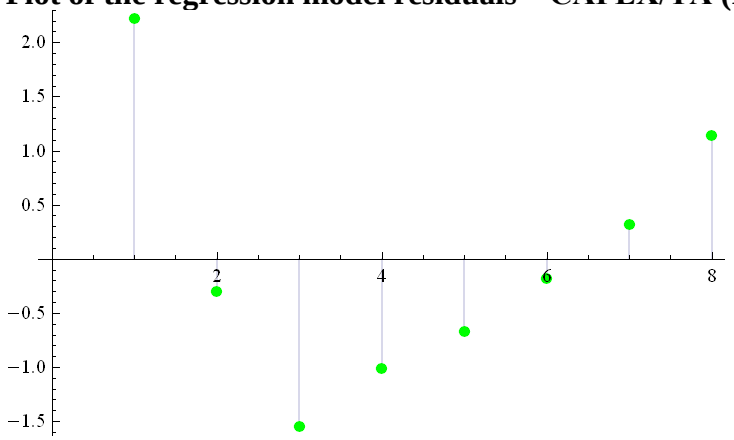
$$3.89964 + 0.0592857\,x$$

Graph 199: Plot of the time series, trend line, mean and single prediction bands – CAPEX/TA (Industrials)



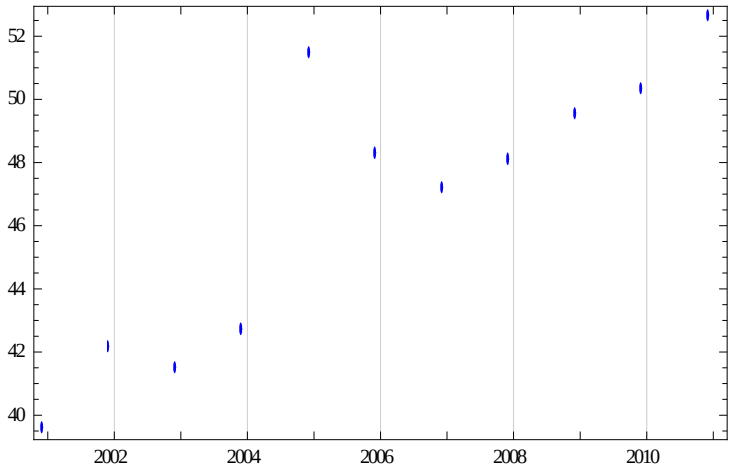
With a coefficient of determination of 1%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 200: Plot of the regression model residuals – CAPEX/TA (Industrials)



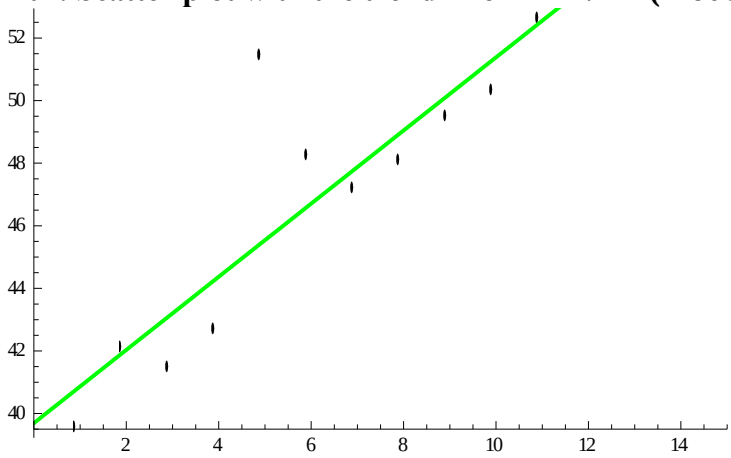
We can observe no evident clustering of the residuals.

Graph 201: Plot of the time series – PPE/TA (Industrials)



We can observe a positive trend with periodic cyclic variations.

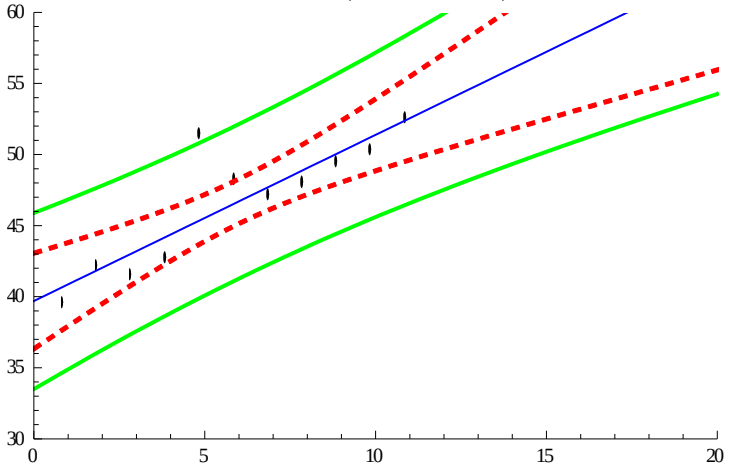
Graph 202: Scatter plot with the trend line – PPE/TA (Industrials)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

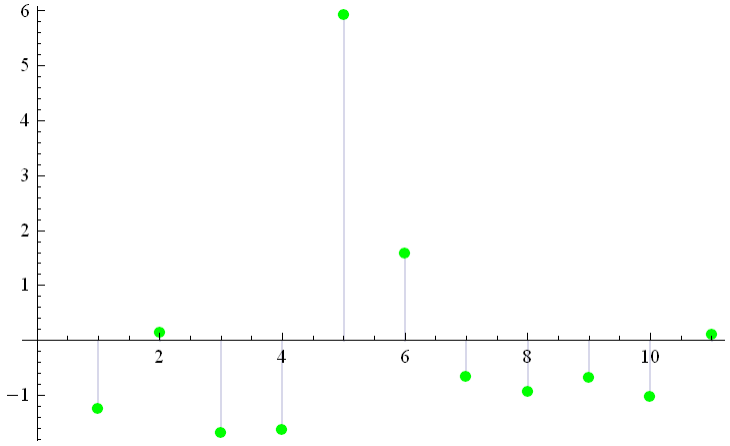
$$39.6964 + 1.16864x$$

Graph 203: Plot of the time series, trend line, mean and single prediction bands – PPE/TA (Industrials)



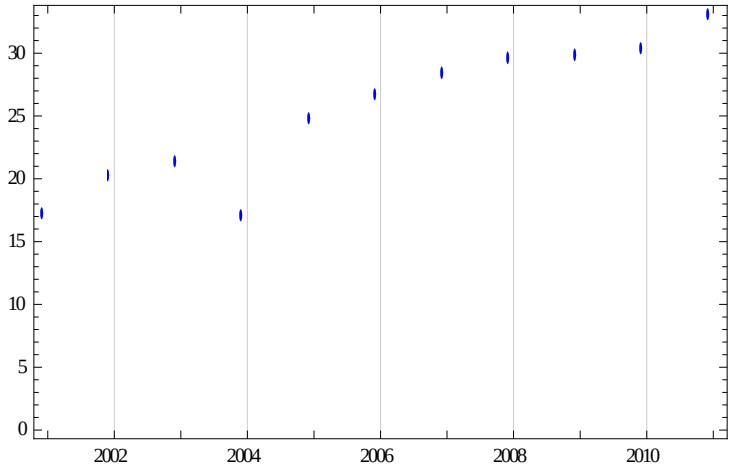
With a coefficient of determination of 76%, we can observe that most markers of the raw data fall within the confidence bands and that all but one are within the prediction bands.

Graph 204: Plot of the regression model residuals – PPE/TA (Industrials)



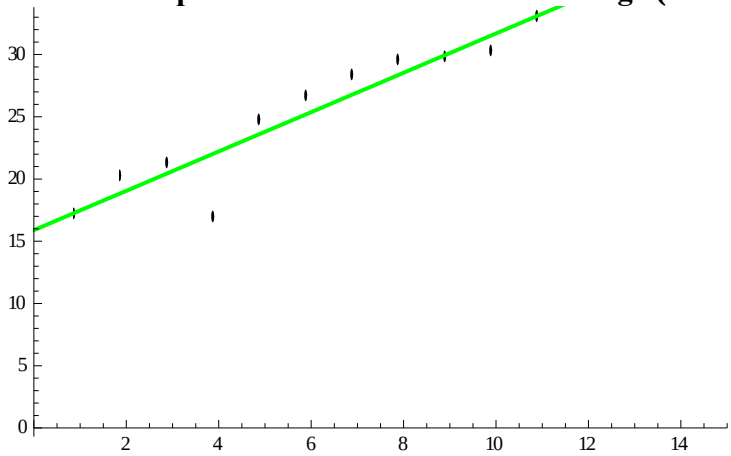
We can observe no evident clustering of the residuals.

Graph 205: Plot of the time series – Leverage (Industrials)



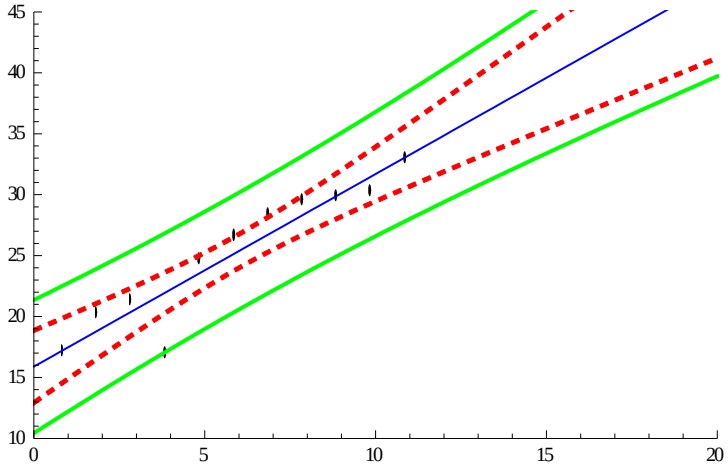
We can observe a positive trend with periodic cyclic variations.

Graph 206: Scatter plot with the trend line – Leverage (Industrials)



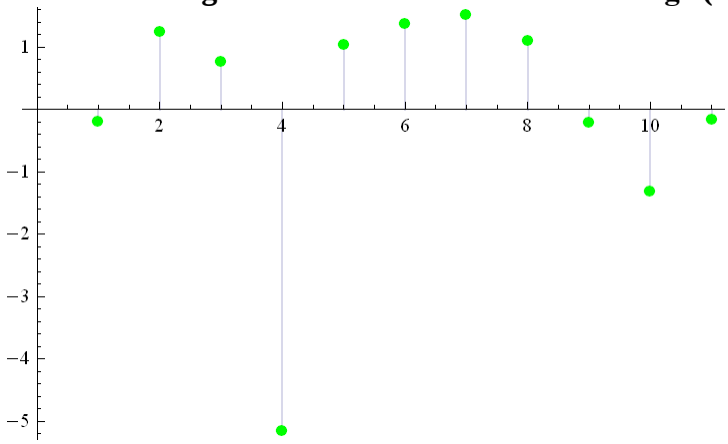
The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is: $15.8955 + 1.58x$

Graph 207: Plot of the time series, trend line, mean and single prediction bands – Leverage (Industrials)



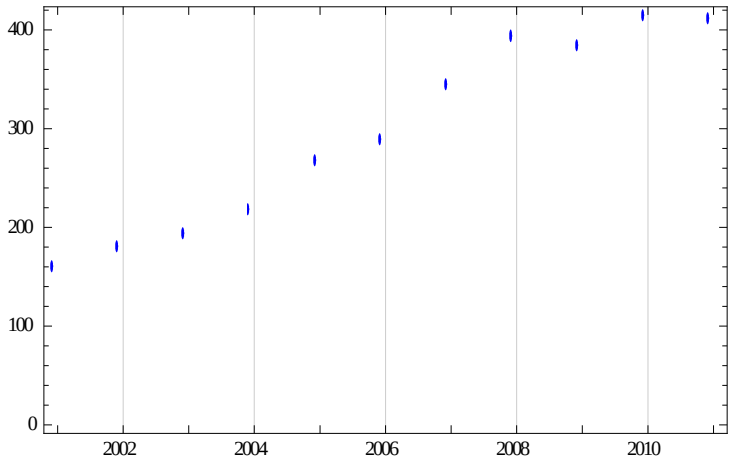
With a coefficient of determination of 88%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands, with one exception.

Graph 208: Plot of the regression model residuals – Leverage (Industrials)



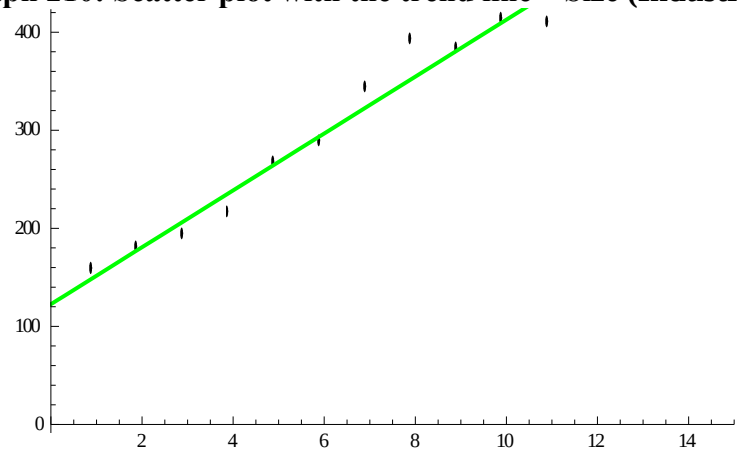
We can observe no evident clustering of the residuals.

Graph 209: Plot of the time series – Size (Industrials)



We can observe a positive trend with periodic cyclic variations.

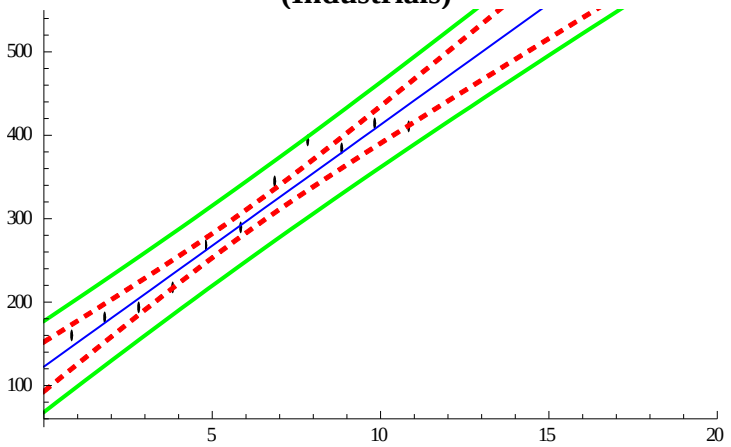
Graph 210: Scatter plot with the trend line – Size (Industrials)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

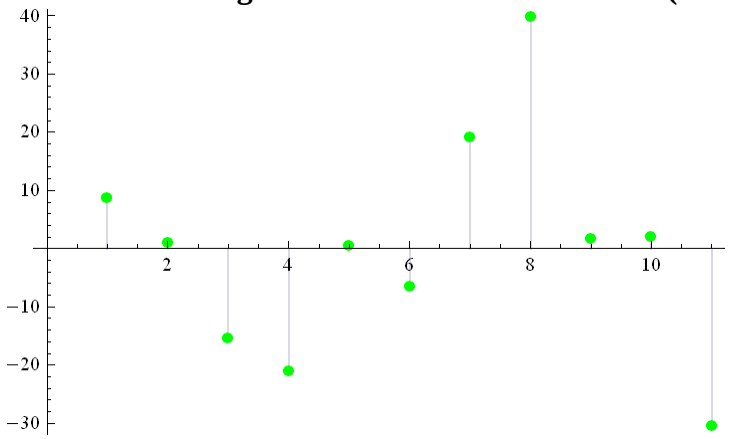
$$122.638 + 29.0036\,x$$

Graph 211: Plot of the time series, trend line, mean and single prediction bands – Size (Industrials)



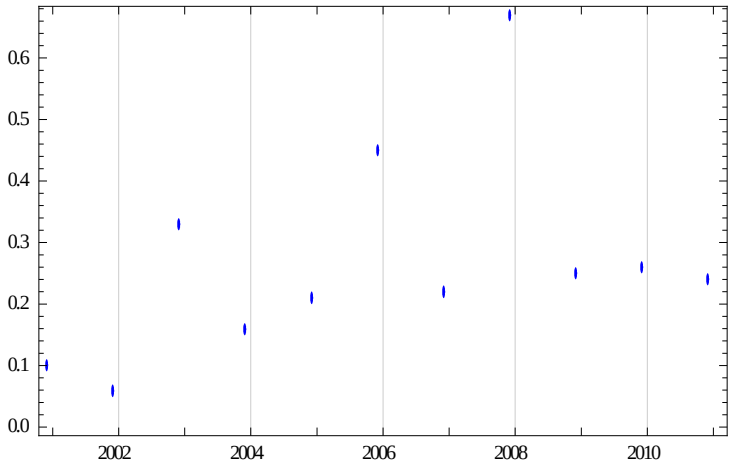
With a coefficient of determination of 96%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 212: Plot of the regression model residuals – Size (Industrials)



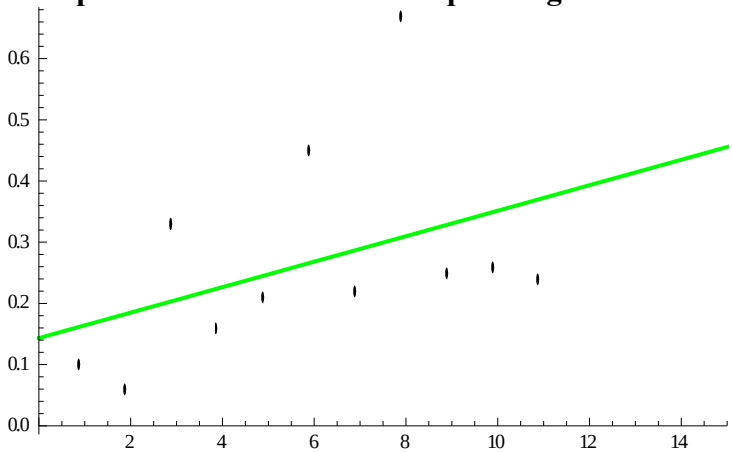
We can observe no evident clustering of the residuals.

Graph 213: Plot of the time series – Operating Performance (Industrials)



We can observe long-term trend.

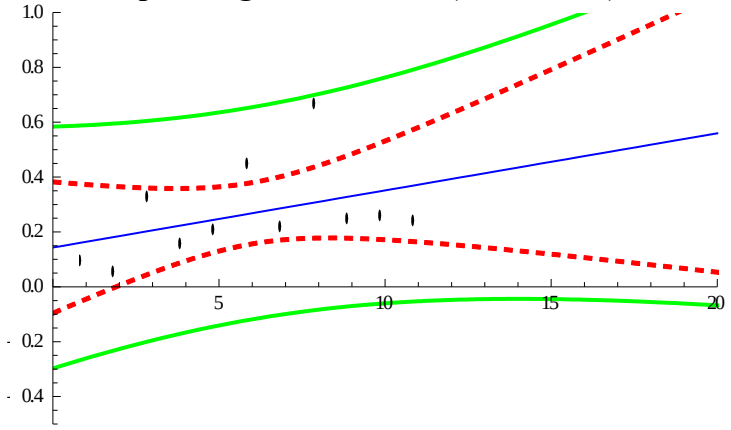
Graph 214: Scatter plot with the trend line – Operating Performance (Industrials)



The equation of the trend line is:

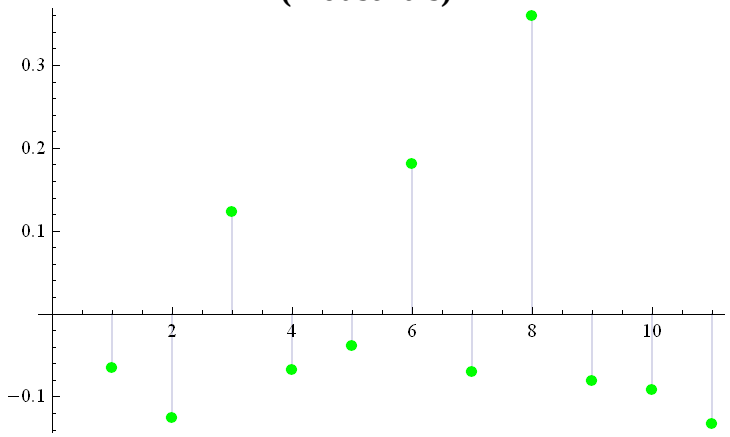
$$0.143273 + 0.0208182\,x$$

Graph 215: Plot of the time series, trend line, mean and single prediction bands – Operating Performance (Industrials)



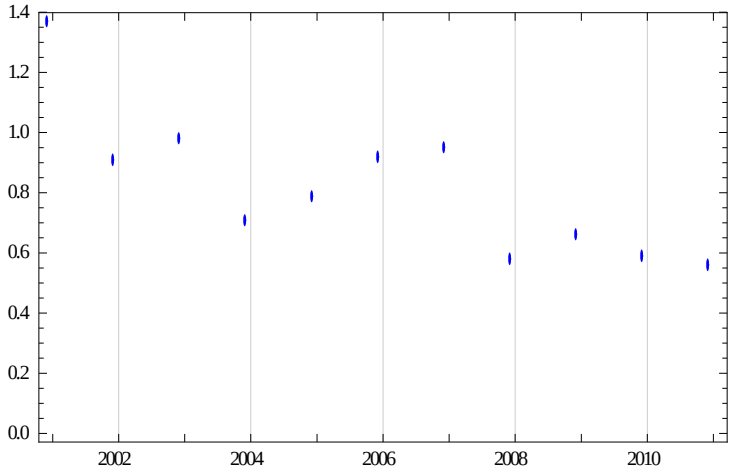
With a coefficient of determination of 17%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 216: Plot of the regression model residuals – Operating Performance (Industrials)



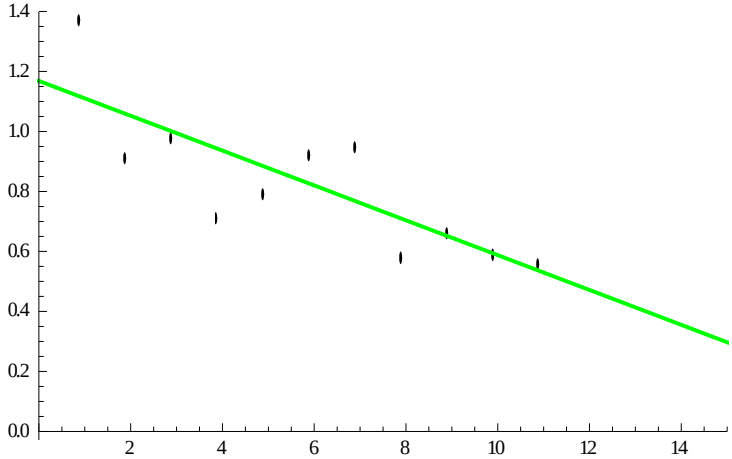
We can observe no evident clustering of the residuals.

Graph 217: Plot of the time series – Tobin's Q (Industrials)



We can observe a negative trend with periodic cyclic variations.

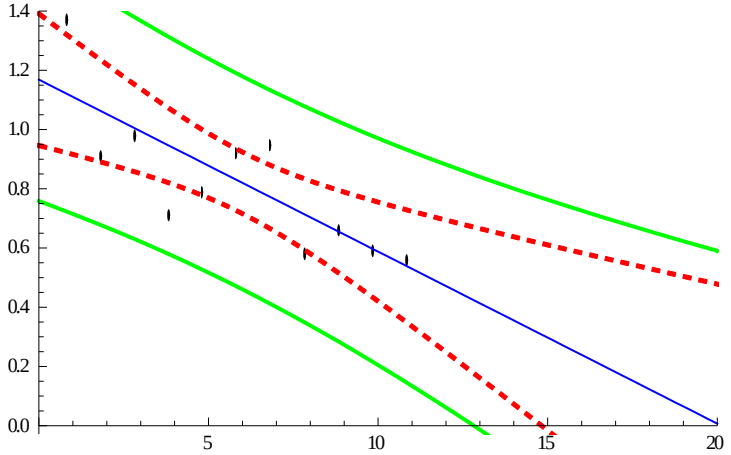
Graph 218: Scatter plot with the trend line – Tobin's Q (Industrials)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

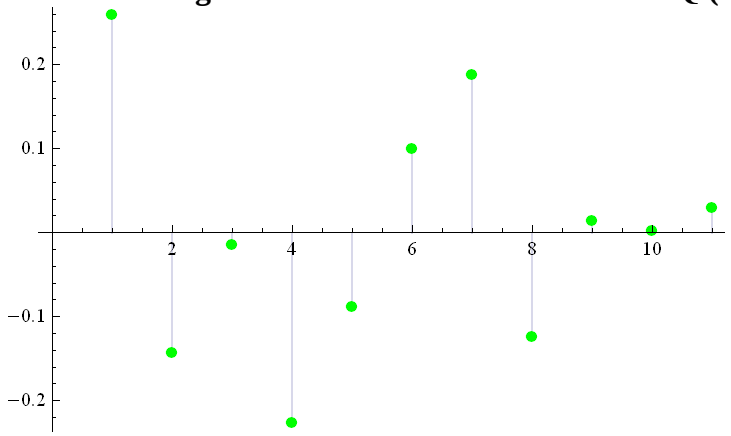
$$1.16855 \cdot 0.0580909\,x$$

Graph 219: Plot of the time series, trend line, mean and single prediction bands – Tobin's Q (Industrials)



With a coefficient of determination of 64%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 220: Plot of the regression model residuals – Tobin's Q (Industrials)



We can observe that four residuals cluster around zero.

4.6 Oil & Gas Industry

Table 11: Positive Analysis for the Oil & Gas Industry

Oil & Gas (N=2)											
Year	Cash Ratio	ROA	ROE	EAT/Sales	Sales/TA	CAPEX/TA	PPE/TA	Leverage	Size	Sales/Empl	Tobin's Q
2001	no data	6.11%	47.76%	2.33%	2.25	no data	48.20%	27.01%	1493.28	1.29	1.39
2002	no data	5.73%	21.34%	2.74%	1.93	no data	45.06%	29.69%	1622.42	1.16	1.17
2003	0.11	8.08%	20.24%	4.12%	2.03	no data	43.19%	29.77%	1914.08	0.82	1.17
2004	0.15	7.21%	25.54%	3.65%	1.87	-9.05%	46.62%	23.47%	2136.11	0.86	1.17
2005	0.09	8.70%	32.28%	4.54%	1.95	-8.09%	34.00%	34.93%	2794.10	2.36	1.57
2006	0.07	7.93%	27.02%	3.21%	2.47	-3.39%	52.34%	42.61%	2826.16	2.56	1.63
2007	0.07	8.38%	24.12%	3.90%	2.18	-3.61%	36.09%	35.39%	3292.87	2.61	1.27
2008	0.23	3.13%	27.40%	0.83%	3.02	-6.25%	54.22%	39.98%	3248.13	3.31	0.87
2009	0.12	4.92%	13.14%	2.66%	1.83	-11.60%	50.68%	38.29%	3672.93	2.20	0.96
2010	0.12	4.69%	18.80%	2.39%	1.89	-7.70%	35.41%	36.25%	4648.80	2.83	0.66
2011	0.20	3.58%	21.41%	1.43%	2.35	-6.08%	51.28%	44.07%	4877.46	3.79	0.70

The industry of *Oil & Gas* seems to be one of the healthiest and most resilient of the Hellenic industries. Cash and equivalents are steadily rising in accordance with almost stable profitability. *Activity* hints to a very strong asset turnover, *Capital Expenditures* exhibit small per annum fluctuations and so does *BS Structure*. *Leverage* has risen over 10% overall. *Size* has augmented substantially for the industry has more than tripled in the time span. *Productivity* is rising although *Valuation* is diminishing.

If these results are offset with economic inefficiency of the sovereign-economy, this industry seems even more promising.

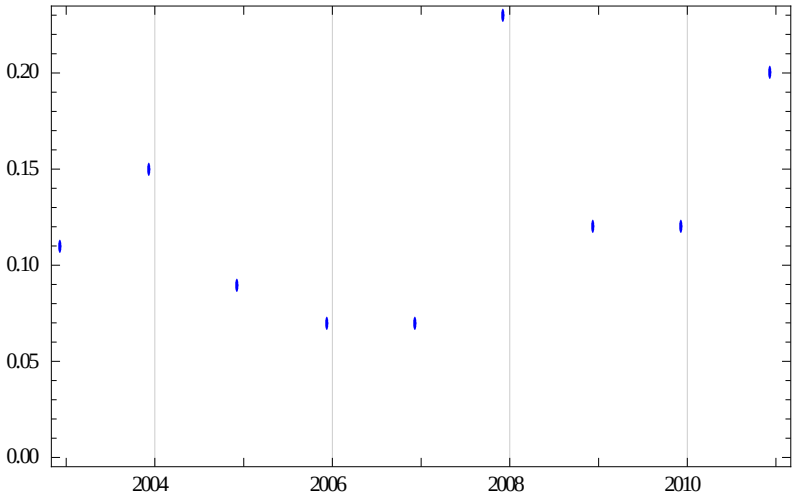
Table 12: Forecasting for the Oil & Gas Industry

Oil & Gas							
Ratio	**Domain**	**Formula**	**Linear Correlation**	**a**	**b**	**R^2**	**p-value**
Cash Ratio	Liquidity	Cash / CL	Uncorrelated	0.0881	0.0082	**16%**	**0.282695**
ROA	Profitability	EAT / TA	Long Term Trend	8.1202	-0.3161	**28%**	**0.092825**
ROE	Profitability	EAT / Equity	Long Term Trend	34.5127	-1.5241	**32%**	**0.071846**
Net Profit Margin	Profitability	EAT / Revenue	Long Term Trend	3.7942	-0.1505	**19%**	**0.177005**
Asset Turnover	Activity	Revenue / TA	Uncorrelated	2.0371	0.0206	**4%**	**0.570033**
CAPEX Ratio	Growth	CAPEX / TA	Uncorrelated	-6.7286	-0.0539	**0%**	**0.910097**
Fixed Assets Leverage	BS Structure	PPE / TA	Uncorrelated	44.2867	0.1505	**0%**	**0.839491**
Financial Leverage	Leverage	TD / TA	Direct	25.3738	1.5507	**62%**	**0.004167**
Size	Size	Total Assets	Direct	937.3520	336.5980	**96%**	**1.4*10^-7**
Operating Performance	Productivity	Revenue / Empl.	Direct	0.6098	0.2588	**73%**	**0.000791**
Tobin's Q	Valuation	TA (MV) / Repl. Value	Inverse	1.5247	-0.0638	**43%**	**0.027910**

The linear model seems effective for four ratios of this industry, whereas the coefficient of determination is extremely low for five and null for two ratios. Consequently, the linear model could prove effective for forecasting some ratios in this industry.

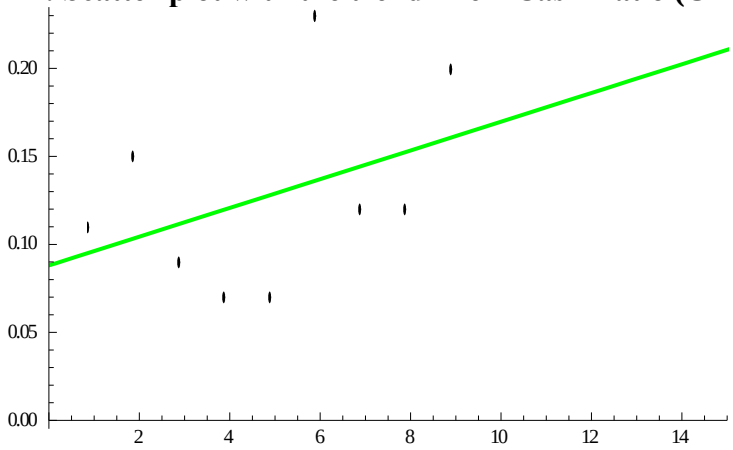
Graphs 221-264 provide an analysis visualization of all the financial ratios for the *Oil & Gas* industry and of the linear models and their constituents:

Graph 221: Plot of the time series – Cash Ratio (Oil & Gas)



No explicit trend is evident for all years.

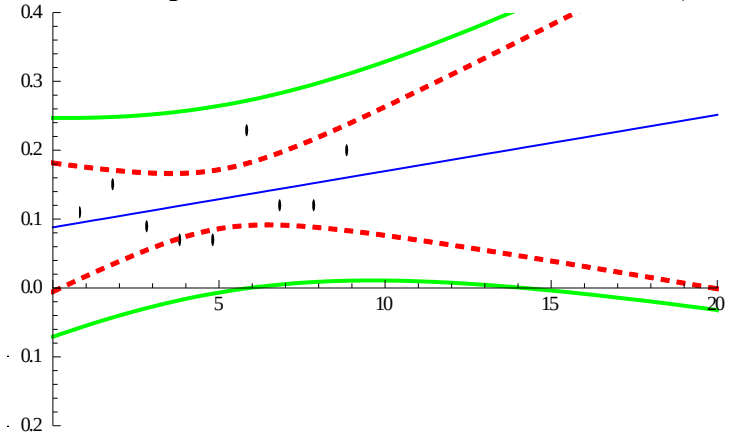
Graph 222: Scatter plot with the trend line – Cash Ratio (Oil & Gas)



The equation of the trend line is:

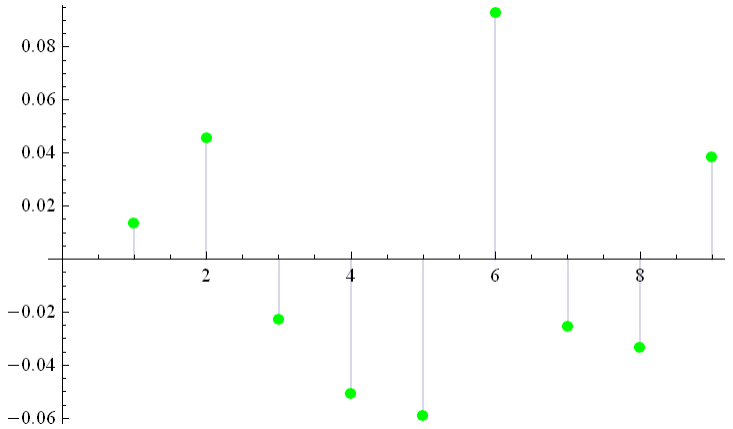
$$0.0880556 \cdot 0.00816667\,x$$

Graph 223: Scatter plot with the trend line – Cash Ratio (Oil & Gas)



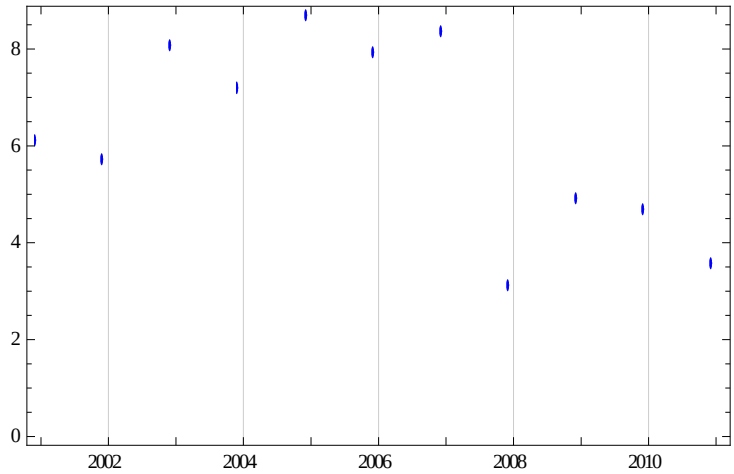
With a coefficient of determination of 16%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 224: Plot of the regression model residuals – Cash Ratio (Oil & Gas)



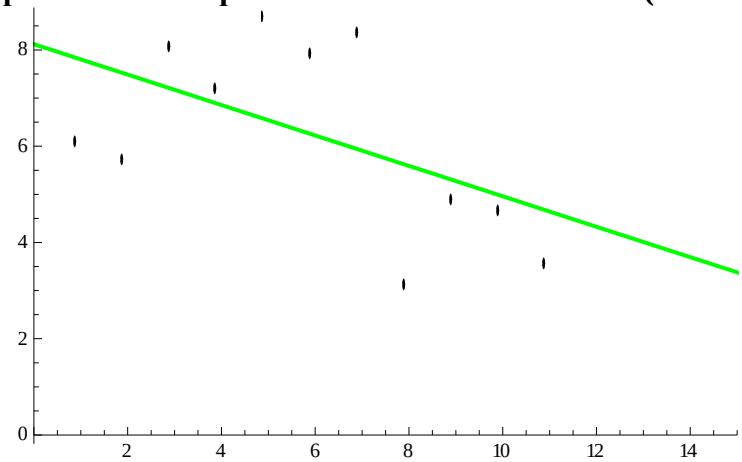
We can observe no evident clustering of the residuals.

Graph 225: Plot of the time series – ROA (Oil & Gas)



We can observe negative long-term trend.

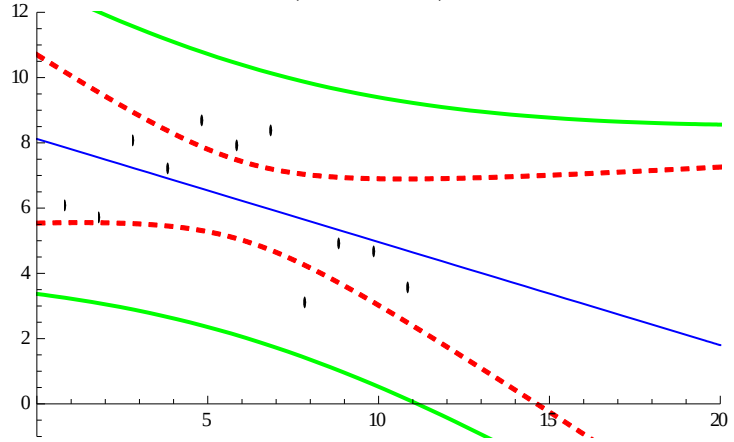
Graph 226: Scatter plot with the trend line – ROA (Oil & Gas)



The regression line has a downward trend. The equation of the trend line is:

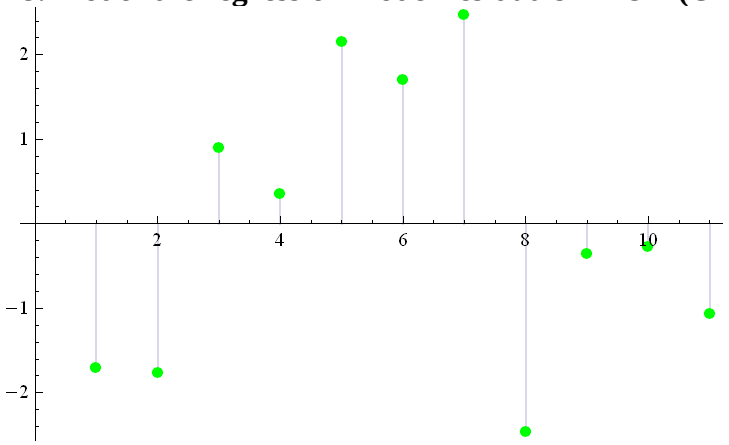
$$8.12018 - 0.316091\,x$$

Graph 227: Plot of the time series, trend line, mean and single prediction bands – ROA (Oil & Gas)



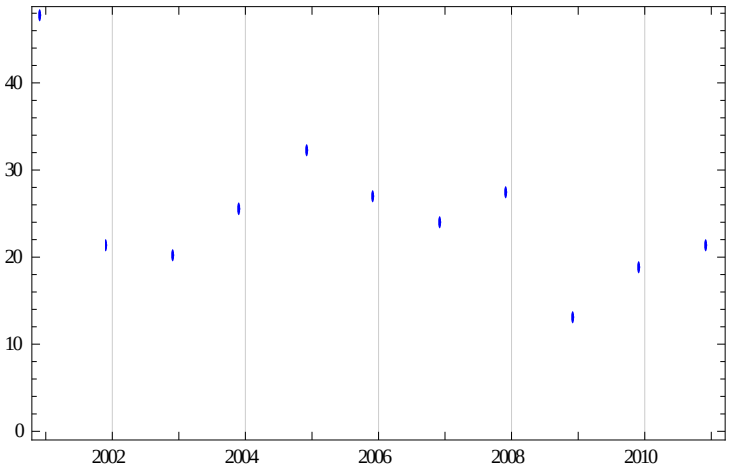
With a coefficient of determination of 28%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 228: Plot of the regression model residuals – ROA (Oil & Gas)



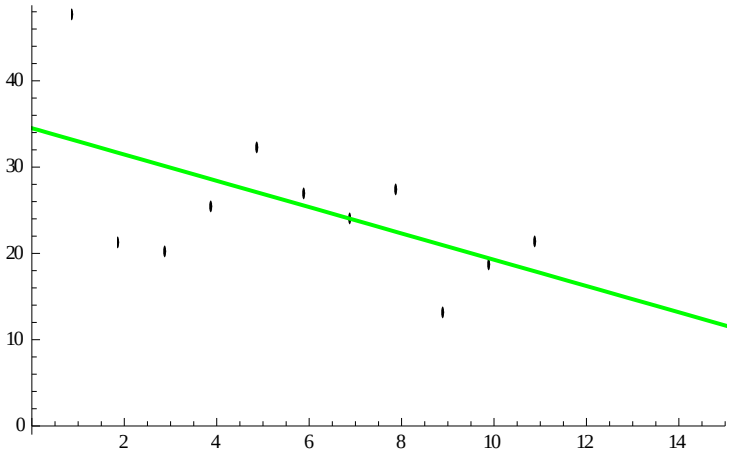
We can observe no evident clustering of the residuals.

Graph 229: Plot of the time series – ROE (Oil & Gas)



We can observe negative long-term trend.

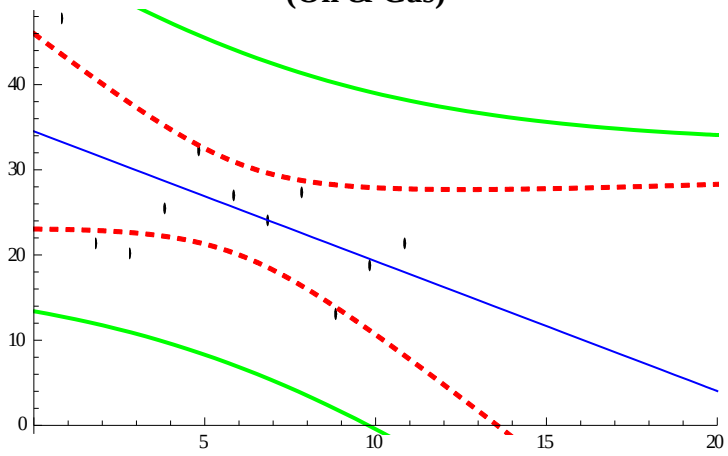
Graph 230: Scatter plot with the trend line – ROE (Oil & Gas)



The regression line has a downward trend. The equation of the trend line is:

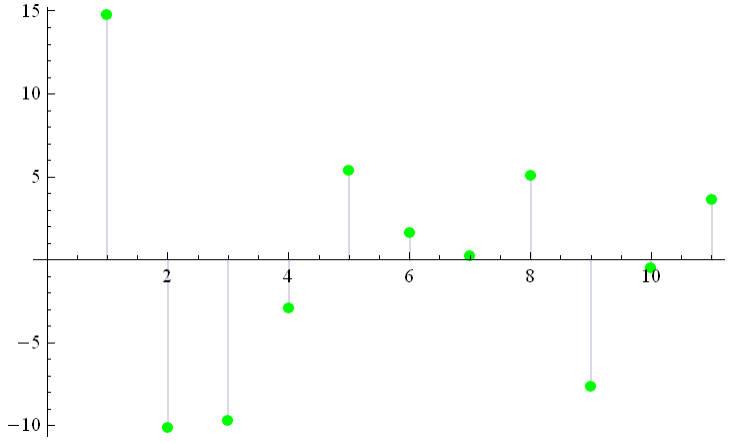
$$34.5127 - 1.52409x$$

Graph 231: Plot of the time series, trend line, mean and single prediction bands – ROE (Oil & Gas)



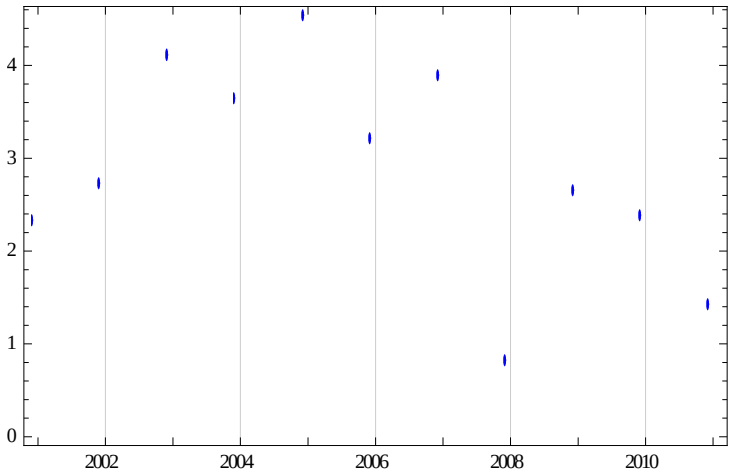
With a coefficient of determination of 32%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 232: Plot of the regression model residuals – ROE (Oil & Gas)



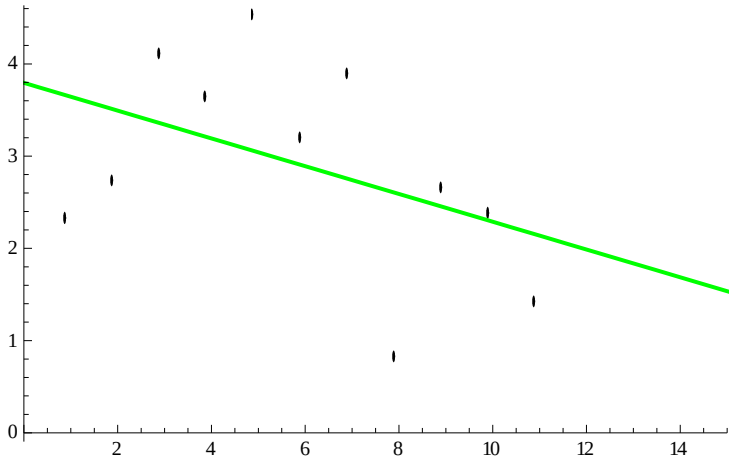
We can observe no evident clustering of the residuals.

Graph 233: Plot of the time series – Net Profit Margin (Oil & Gas)



We can observe negative long-term trend.

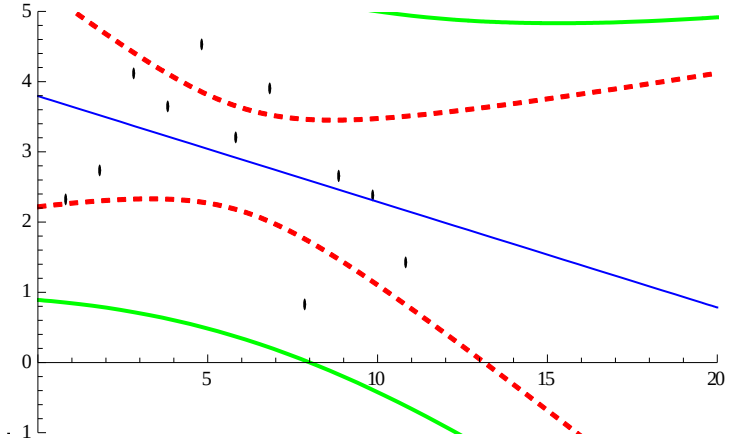
Graph 234: Scatter plot with the trend line – Net Profit Margin (Oil & Gas)



The equation of the trend line is:

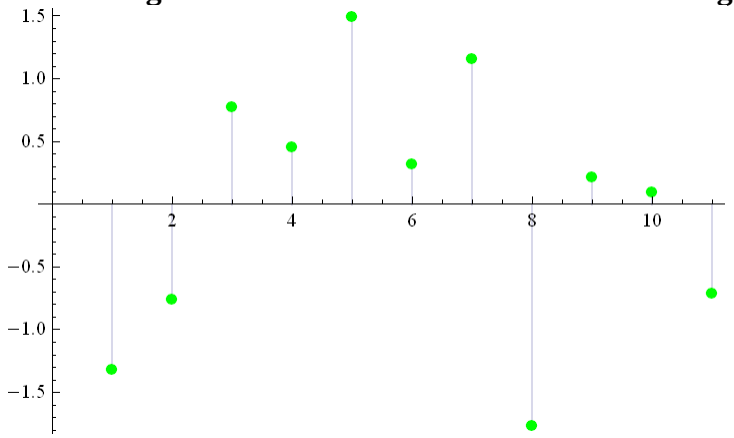
$$3.79418 - 0.150545\,x$$

Graph 235: Plot of the time series, trend line, mean and single prediction bands – Net Profit Margin (Oil & Gas)



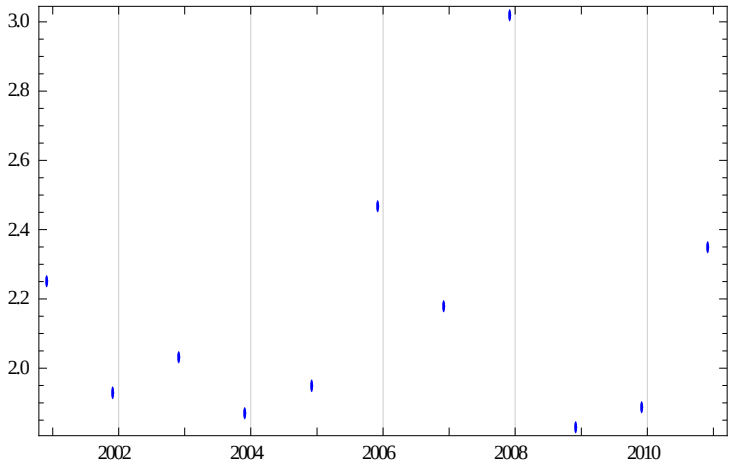
With a coefficient of determination of 19%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 236: Plot of the regression model residuals – Net Profit Margin (Oil & Gas)



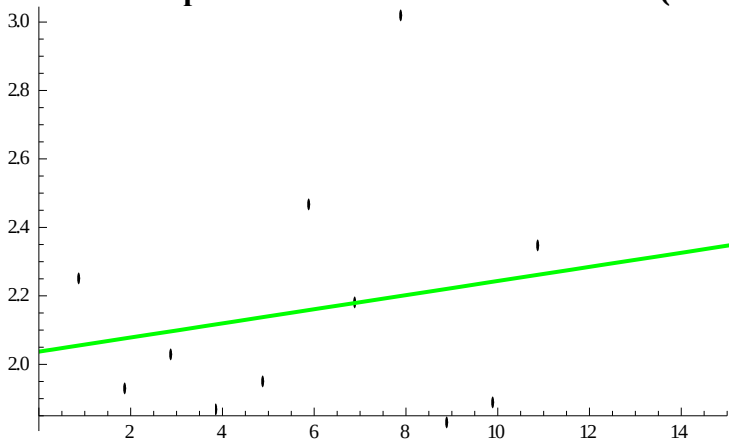
We can observe no evident clustering of the residuals.

Graph 237: Plot of the time series – Sales/TA (Oil & Gas)



No explicit trend is evident for all years.

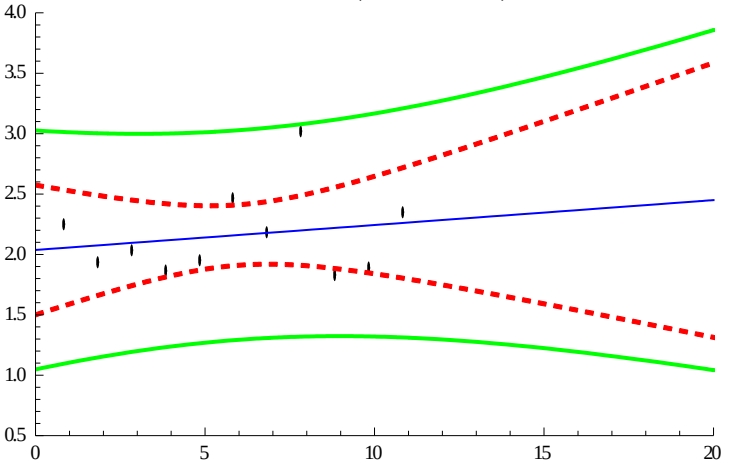
Graph 238: Scatter plot with the trend line – Sales/TA (Oil & Gas)



The linear model has a positive trend. The equation of the trend line is:

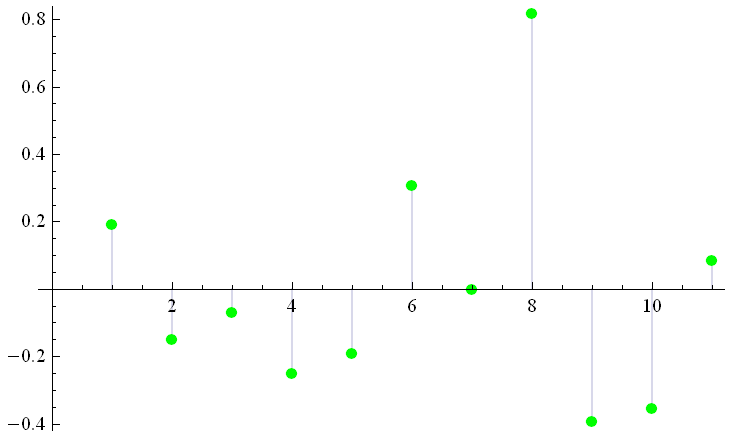
$$2.03709 + 0.0206364x$$

Graph 239: Plot of the time series, trend line, mean and single prediction bands – Sales/TA (Oil & Gas)



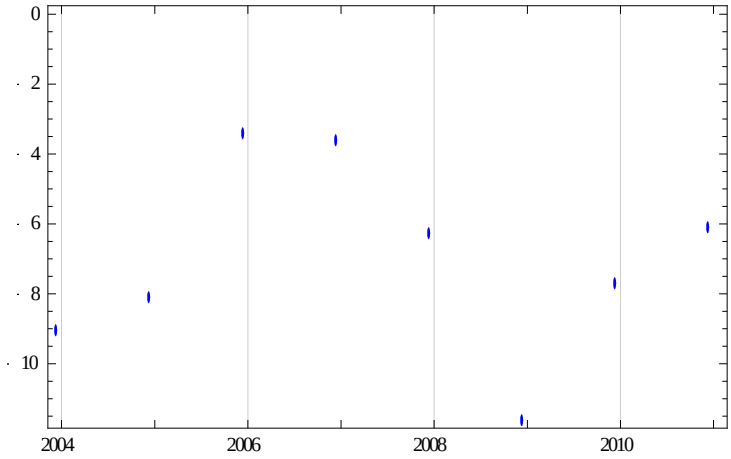
With a coefficient of determination of 4%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 240: Plot of the regression model residuals – Sales/TA (Oil & Gas)



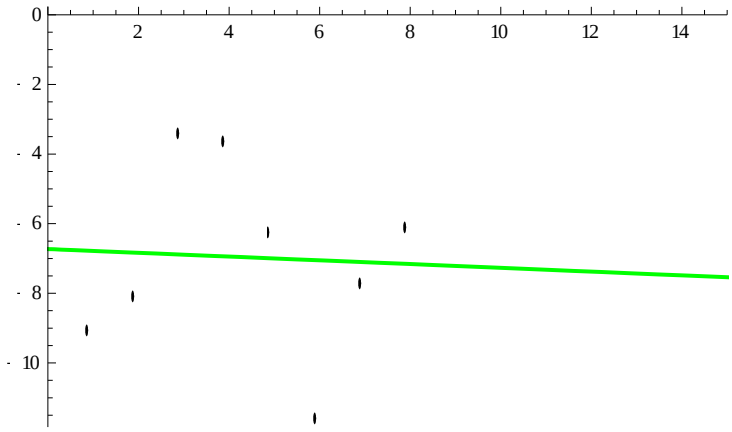
We can observe no evident clustering of the residuals.

Graph 241: Plot of the time series – CAPEX/TA (Oil & Gas)



No explicit trend is evident for all years.

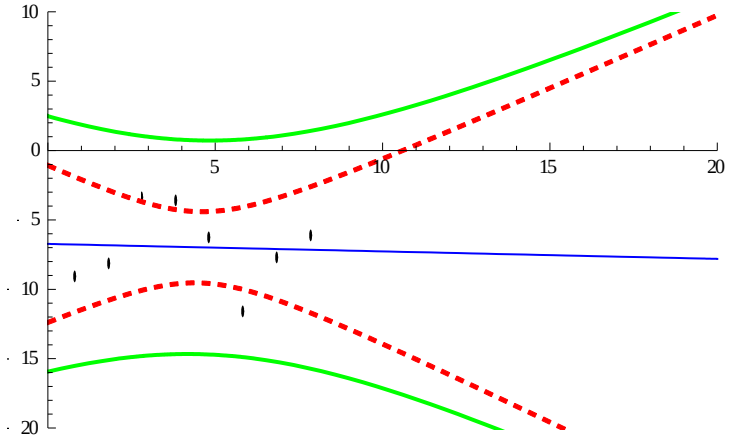
Graph 242: Scatter plot with the trend line – CAPEX/TA (Oil & Gas)



The equation of the trend line is:

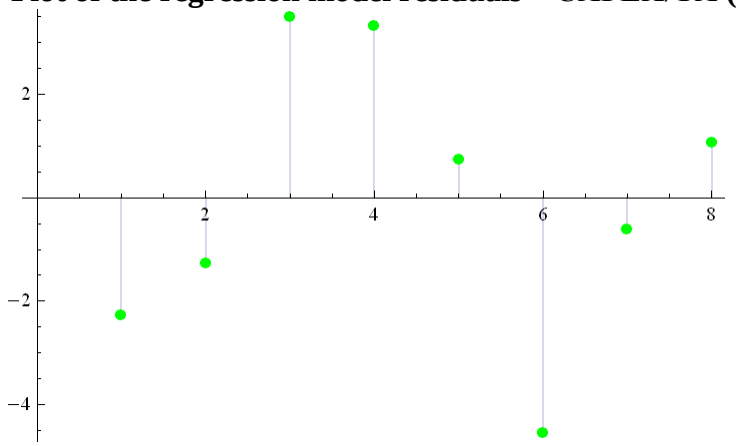
$$6.72857 - 0.0539286\,x$$

Graph 243: Plot of the time series, trend line, mean and single prediction bands – CAPEX/TA (Oil & Gas)



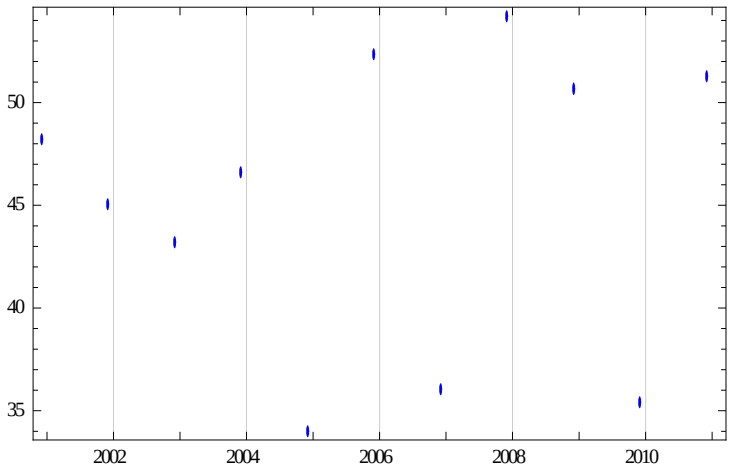
Even with a coefficient of determination of 0%, we can observe that the prediction bands are significantly wide.

Graph 244: Plot of the regression model residuals – CAPEX/TA (Oil & Gas)



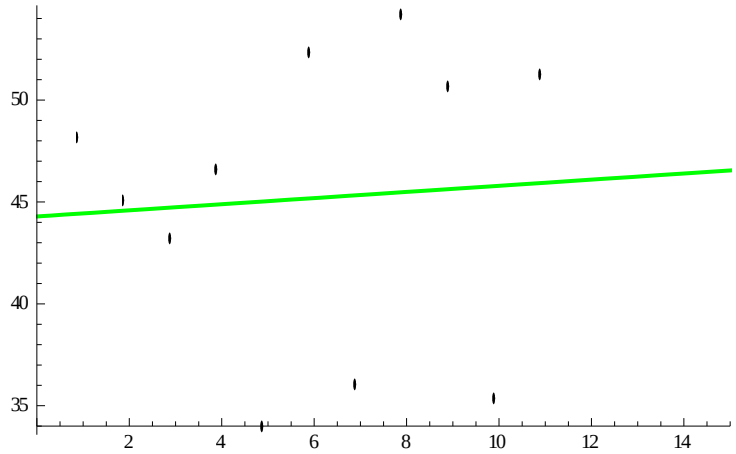
We can observe no evident clustering of the residuals.

Graph 245: Plot of the time series – PPE/TA (Oil & Gas)



No explicit trend is evident for all years.

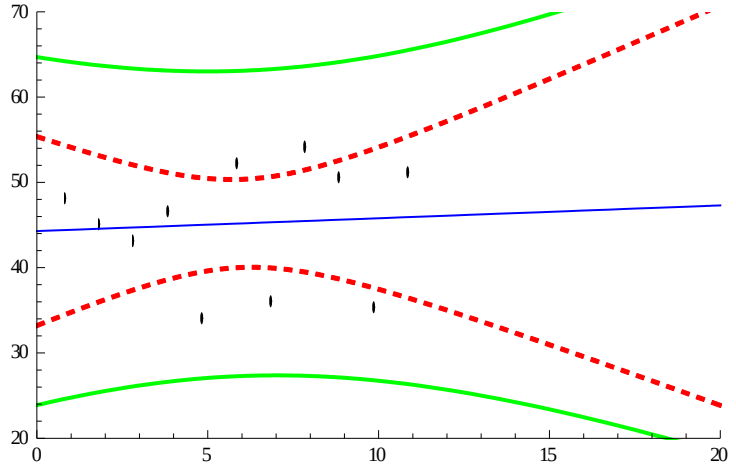
Graph 246: Scatter plot with the trend line – PPE/TA (Oil & Gas)



The linear model has a positive trend. The equation of the trend line is:

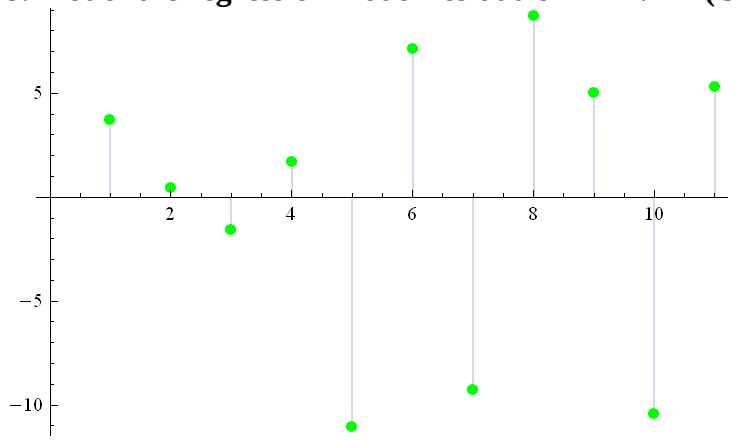
$$44.2867 + 0.150545\,x$$

Graph 247: Plot of the time series, trend line, mean and single prediction bands – PPE/TA (Oil & Gas)



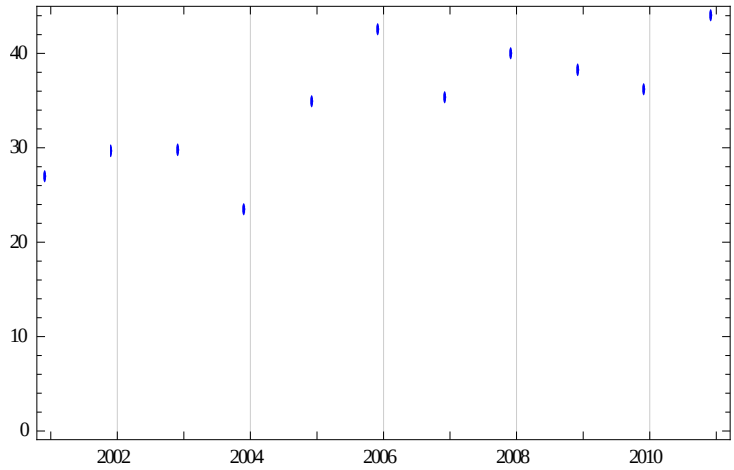
With a coefficient of determination of 0%, we can observe that the prediction bands are extremely wide.

Graph 248: Plot of the regression model residuals – PPE/TA (Oil & Gas)



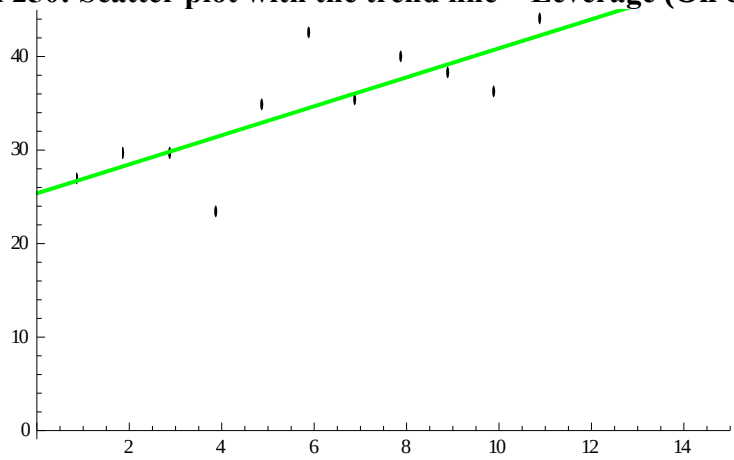
We can observe no evident clustering of the residuals.

Graph 249: Plot of the time series – Leverage (Oil & Gas)



We can observe a positive trend with periodic cyclic variations.

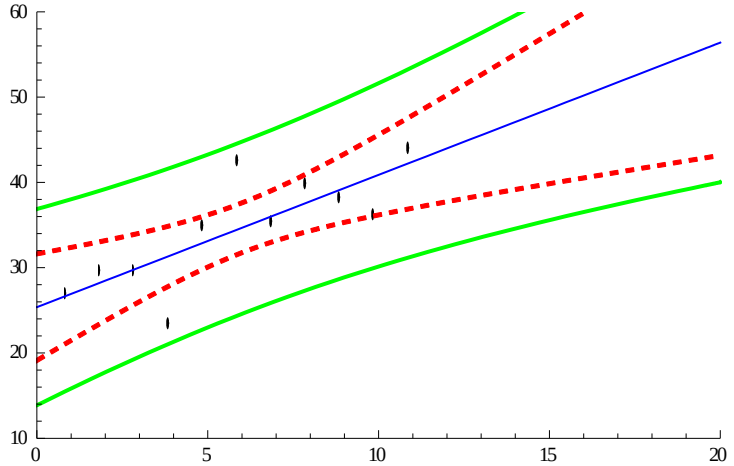
Graph 250: Scatter plot with the trend line – Leverage (Oil & Gas)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

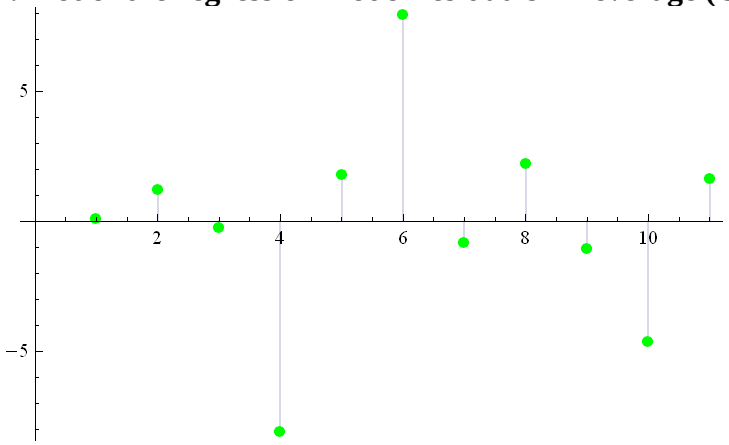
$$25.3738 + 1.55073x$$

Graph 251: Plot of the time series, trend line, mean and single prediction bands – Leverage (Oil & Gas)



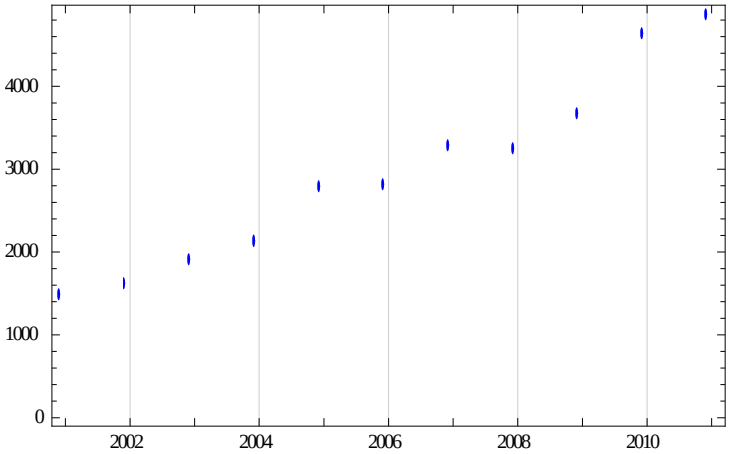
With a coefficient of determination of 62%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 252: Plot of the regression model residuals – Leverage (Oil & Gas)



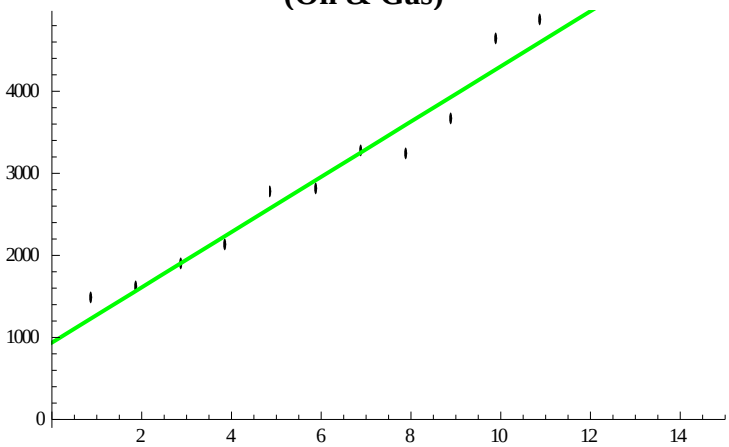
We can observe low residuals for the most part.

Graph 253: Plot of the time series – Size (Oil & Gas)



We can observe a positive trend with periodic cyclic variations.

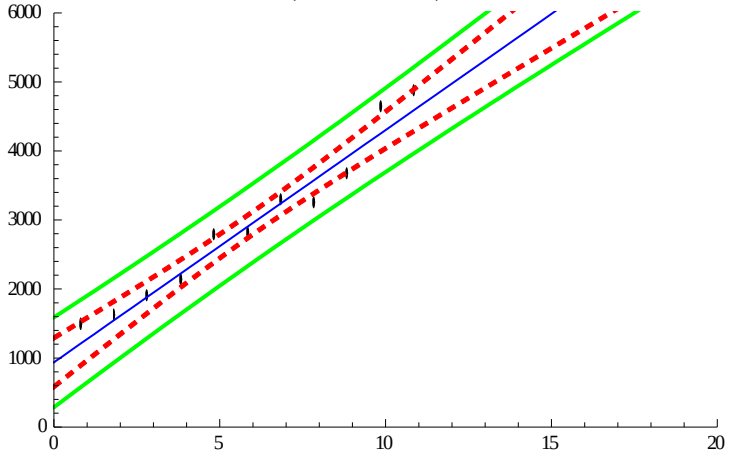
Graph 254: Plot of the time series, trend line, mean and single prediction bands – Size (Oil & Gas)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

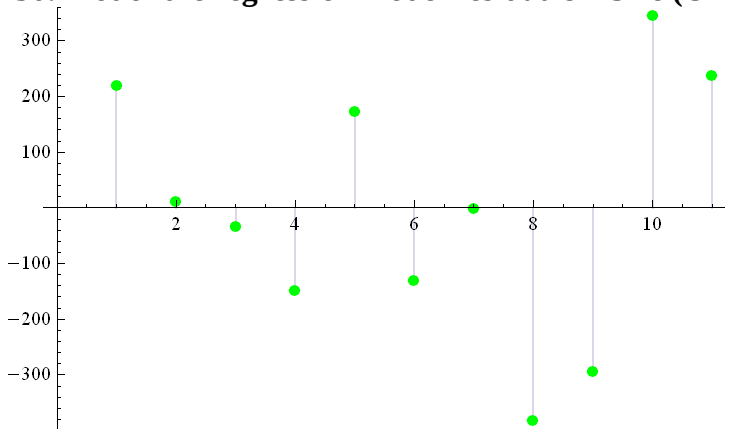
$$937.352 + 336.598x$$

Graph 255: Plot of the time series, trend line, mean and single prediction bands – Size (Oil & Gas)



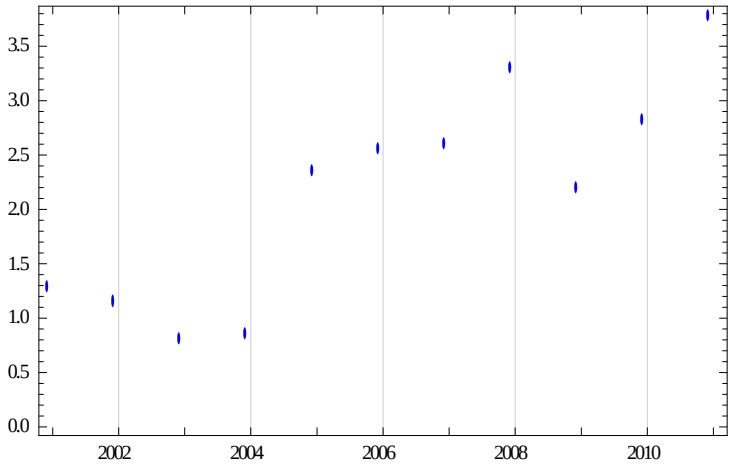
With a coefficient of determination of 96%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands. In addition, the prediction bands are significantly narrow, due to the *goodness of fit*.

Graph 256: Plot of the regression model residuals – Size (Oil & Gas)



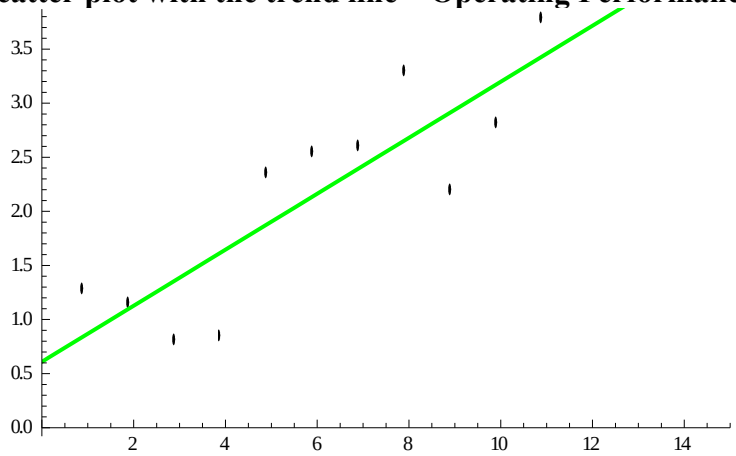
We can observe no evident clustering of the residuals.

Graph 257: Plot of the time series – Operating Performance (Oil & Gas)



We can observe a positive trend with periodic cyclic variations.

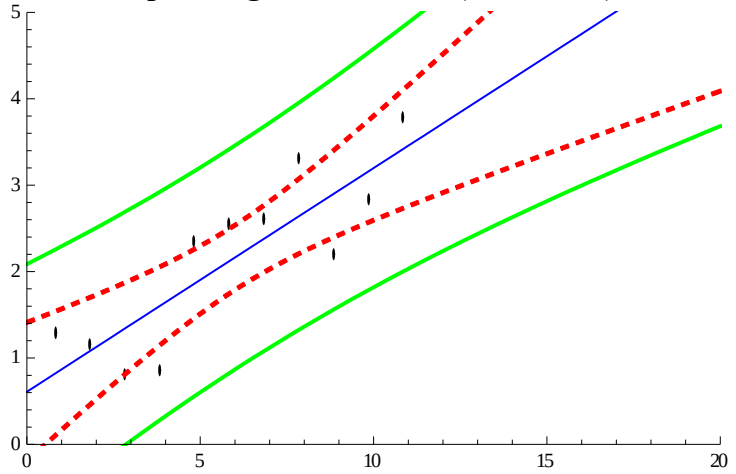
Graph 258: Scatter plot with the trend line – Operating Performance (Oil & Gas)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

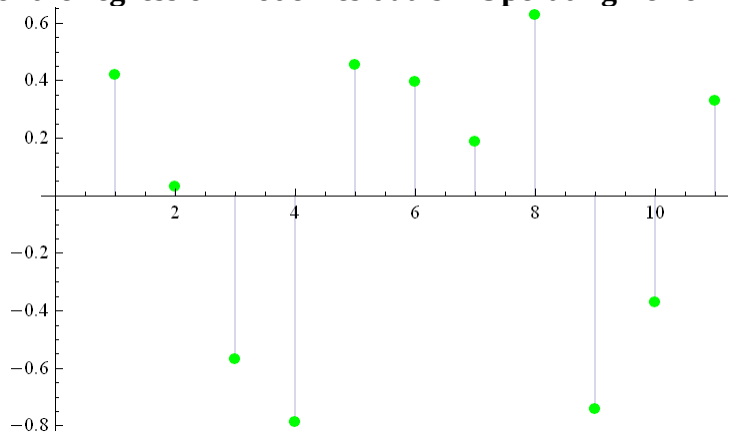
$$0.609818 + 0.258818\,x$$

Graph 259: Plot of the time series, trend line, mean and single prediction bands – Operating Performance (Oil & Gas)



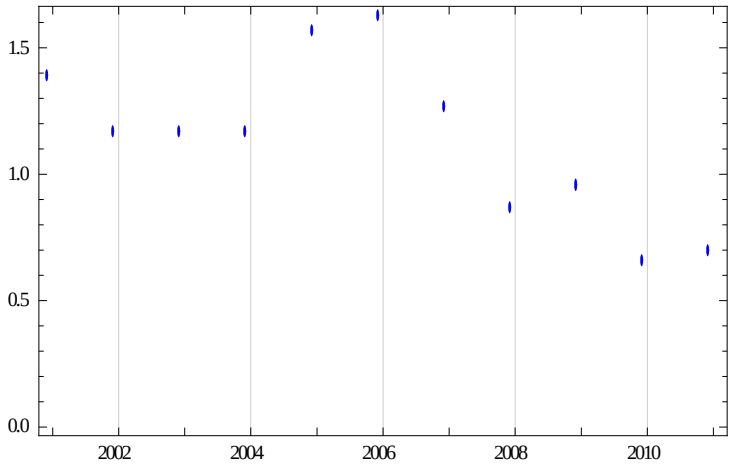
With a coefficient of determination of 73%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 260: Plot of the regression model residuals – Operating Performance (Oil & Gas)



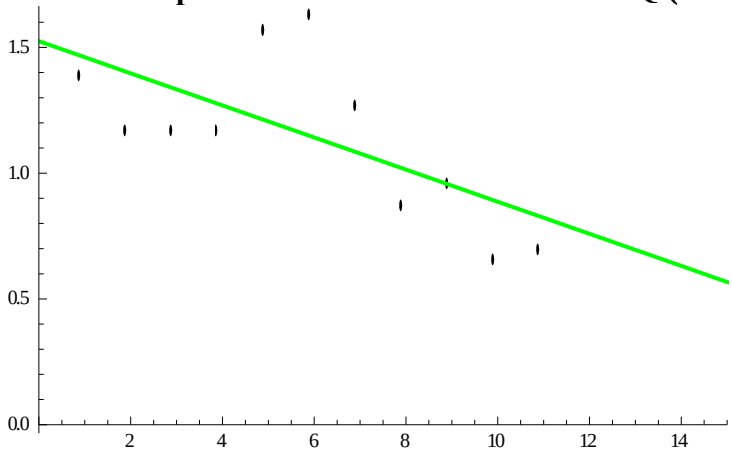
We can observe no evident clustering of the residuals.

Graph 261: Plot of the time series – Tobin's Q (Oil & Gas)



We can observe negative long-term trend.

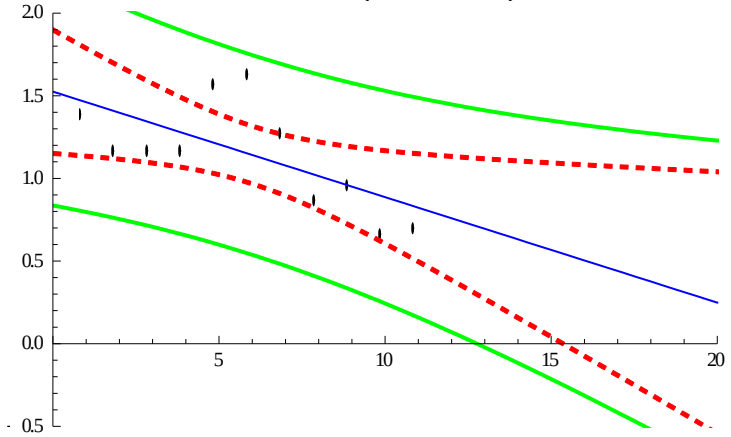
Graph 262: Scatter plot with the trend line – Tobin's Q (Oil & Gas)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

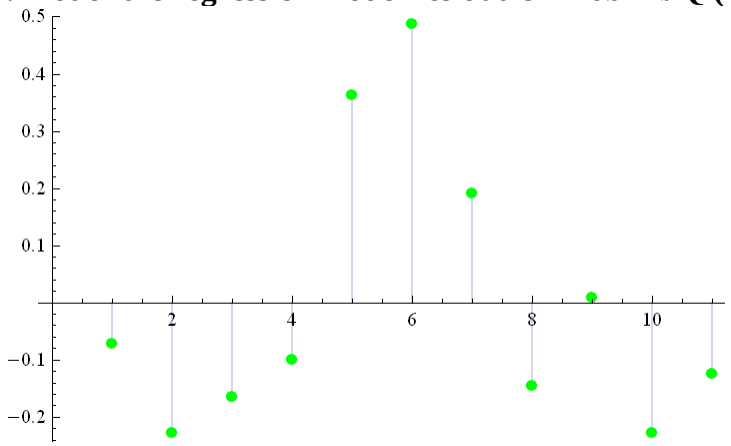
$$1.52473 \cdot 0.0638182\,x$$

Graph 263: Plot of the time series, trend line, mean and single prediction bands – Tobin's Q (Oil & Gas)



With a coefficient of determination of 43%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 264: Plot of the regression model residuals – Tobin's Q (Oil & Gas)



We can observe no evident clustering of the residuals.

4.7 Technology Industry

Table 13: Positive Analysis for the Technology Industry

Technology (N=22)											
Year	Cash Ratio	ROA	ROE	EAT/Sales	Sales/TA	CAPEX/TA	PPE/TA	Leverage	Size	Sales/Empl	Tobin's Q
2001	0.10	5.40%	9.33%	5.10%	0.95	-2.17%	30.56%	26.70%	73.73	0.08	2.23
2002	0.19	3.65%	0.46%	5.51%	0.90	no data	33.88%	17.22%	146.88	0.12	1.62
2003	0.23	-0.22%	2.58%	1.47%	0.89	no data	32.91%	20.16%	137.96	0.21	1.28
2004	0.40	2.72%	5.86%	4.61%	0.94	-11.50%	34.41%	13.65%	128.04	0.18	0.83
2005	0.38	0.44%	-9.99%	-0.13%	0.88	-6.74%	35.70%	30.64%	124.89	0.16	1.10
2006	0.36	4.55%	-1.38%	2.73%	0.93	-4.45%	30.80%	19.74%	104.37	0.18	1.06
2007	0.20	1.04%	-7.21%	-1.38%	0.91	-7.82%	35.89%	24.82%	126.12	0.34	1.15
2008	0.22	-0.98%	3.61%	-4.06%	0.87	-8.01%	38.25%	29.23%	152.91	0.20	0.77
2009	0.25	-1.29%	-14.21%	-6.57%	0.79	-6.03%	38.36%	30.37%	156.11	0.18	0.80
2010	0.31	-4.57%	-8.85%	-12.26%	0.71	-5.32%	37.46%	29.47%	146.04	0.17	0.74
2011	0.19	-5.64%	-24.37%	-15.99%	0.69	-5.25%	40.68%	33.35%	144.68	0.18	0.61

The cash ratio shows fluctuating variances with no evident longitudinal trend. We would expect to see this situation in an industry with fluctuating needs in assets, current liabilities and/or erratic activity, but *Activity* seems to be diminishing in a steady rate whereas the structure of the balance sheet shows the same behavior as cash, so the conjecture that variations in assets may be directly linked to these specific variances in cash and equivalents should be investigated further in this industry. *Productivity* has more than doubled during the time span and *Valuation* overall is diminishing.

Profitability ratios are diminishing, with especially low figures in the ROE and *Net Profit Margin* ratios in the final years. CAPEX show somewhat erratic behavior whereas *BS structure* has gained in PPE by approximately 10%, in (trending but not analogous) accordance with *Size*, which has more than doubled in the time span. *Leverage* has grown steadily by almost 10% overall.

As with many of the previous industries, it would not be irrational to question how an industry with diminishing profits, diminishing *Activity* and smoothly growing financial leverage can more than double in size in little over ten years.

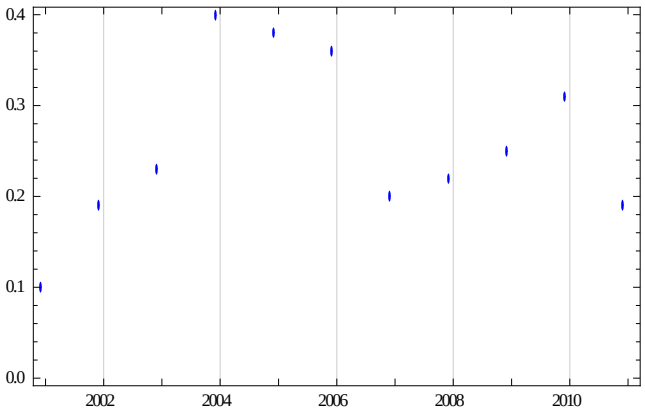
Table 14: Forecasting for the Technology Industry

Technology							
Ratio	**Domain**	**Formula**	**Linear Correlation**	**a**	**b**	**R^2**	**p-value**
Cash Ratio	Liquidity	Cash / CL	Uncorrelated	0.2327	0.0041	**2%**	**0.671381**
ROA	Profitability	EAT / TA	Inverse	5.8140	-0.8917	**70%**	**0.001312**
ROE	Profitability	EAT / Equity	Inverse	10.0480	-2.3439	**61%**	**0.004577**
Net Profit Margin	Profitability	EAT / Revenue	Inverse	10.0522	-1.9931	**85%**	**0.000056**
Asset Turnover	Activity	Revenue / TA	Inverse	0.9947	-0.0225	**68%**	**0.001711**
CAPEX Ratio	Growth	CAPEX / TA	Uncorrelated	-5.9983	-0.0542	**0%**	**0.867751**
Fixed Assets Leverage	BS Structure	PPE / TA	Direct	30.4680	0.8175	**70%**	**0.001228**
Financial Leverage	Leverage	TD / TA	Direct	17.4925	1.2566	**42%**	**0.030527**
Size	Size	Total Assets	Uncorrelated	106.1490	4.1528	**32%**	**0.068415**
Operating Performance	Productivity	Revenue / Empl.	Uncorrelated	0.1365	0.0075	**15%**	**0.234415**
Tobin's Q	Valuation	TA (MV) / Repl. Value	Inverse	1.8244	-0.1194	**70%**	**0.001233**

The linear model seems effective for seven ratios of this industry. The coefficient of determination is low for three ratios and null for one ratio. Consequently, as with previous industries, the linear model could prove successful for forecasting many financial ratios in this industry.

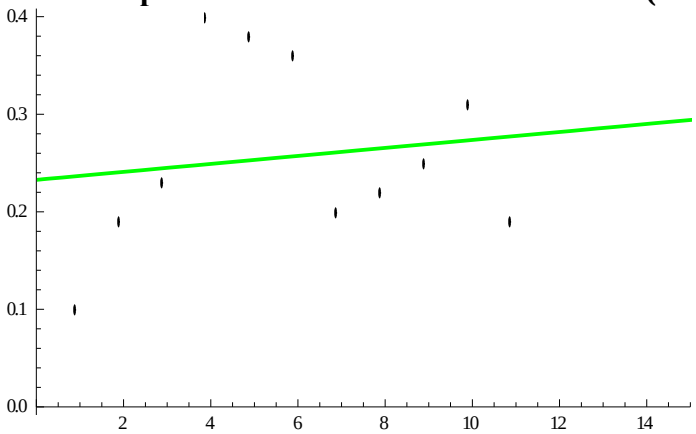
Graphs 265-308 provide an analysis visualization of all the financial ratios for the *Technology* industry and of the linear models and their constituents:

Graph 265: Plot of the time series – Cash Ratio (Technology)



No explicit trend is evident for all years.

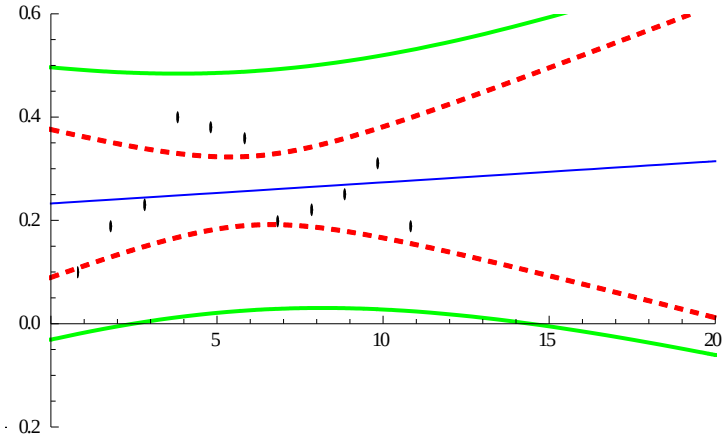
Graph 266: Scatter plot with the trend line – Cash Ratio (Technology)



The regression model has a positive trend. The line equation is:

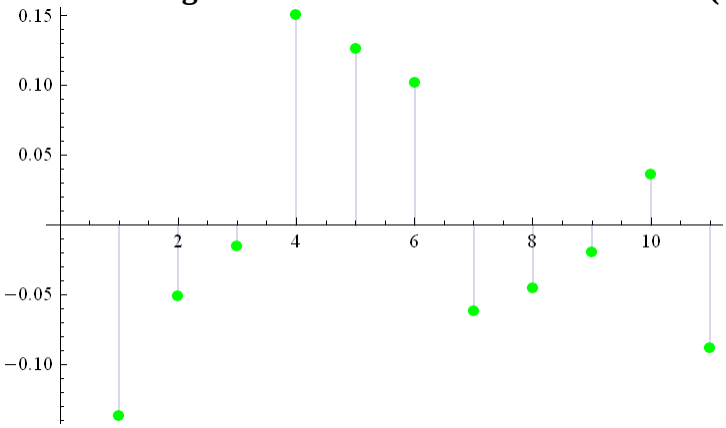
$$0.232727 + 0.00409091x$$

Graph 267: Plot of the time series, trend line, mean and single prediction bands – Cash Ratio (Technology)



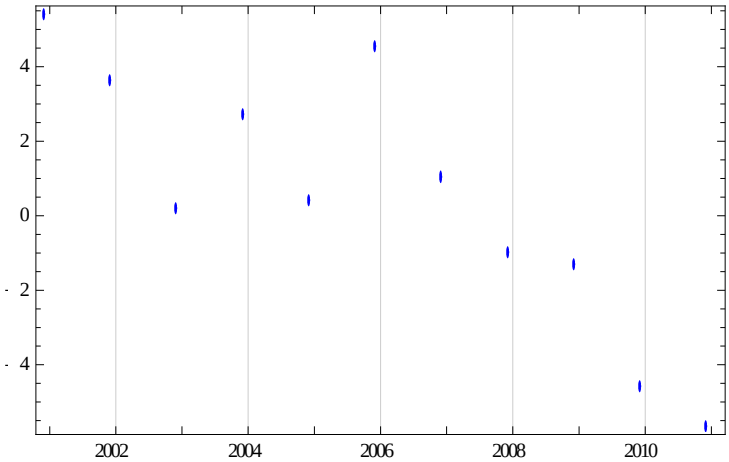
With a coefficient of determination of 2%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 268: Plot of the regression model residuals – Cash Ratio (Technology)



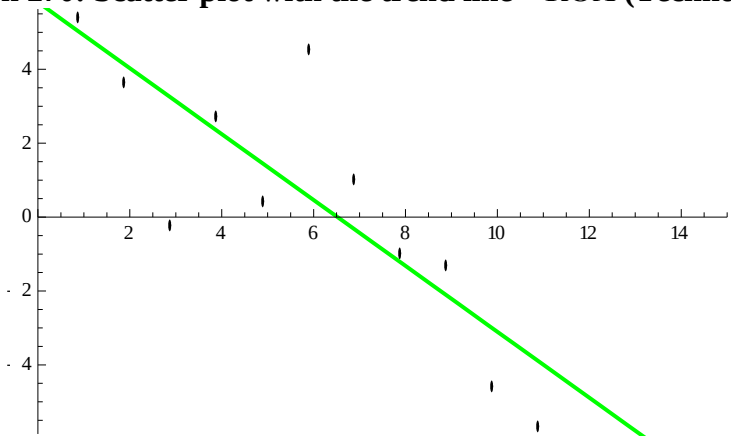
We can observe no evident clustering of the residuals.

Graph 269: Plot of the time series – ROA (Technology)



We can observe a negative trend with periodic cyclic variations.

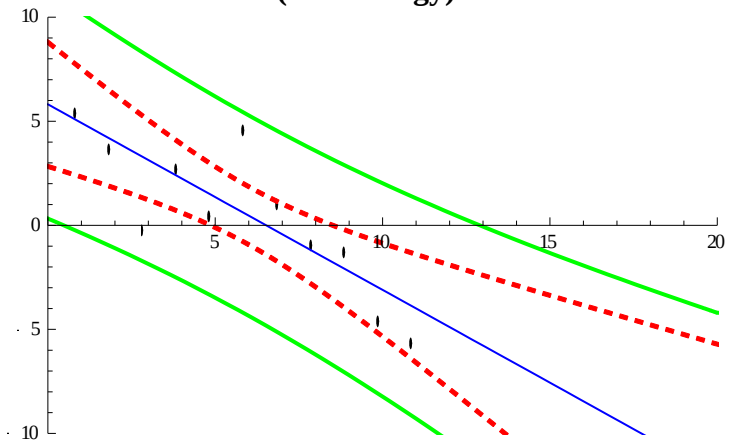
Graph 270: Scatter plot with the trend line – ROA (Technology)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

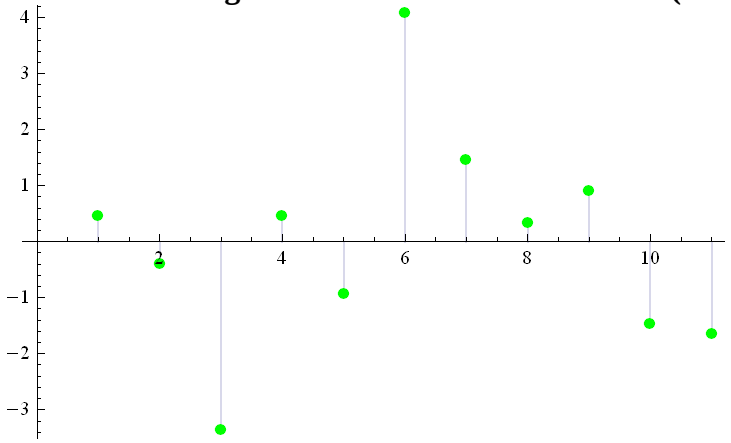
$$5.814 - 0.891727x$$

Graph 271: Plot of the time series, trend line, mean and single prediction bands – ROA (Technology)



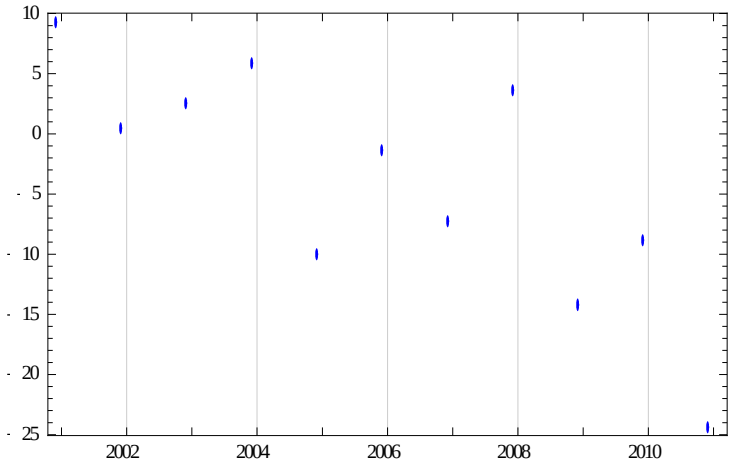
With a coefficient of determination of 70%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 272: Plot of the regression model residuals – ROA (Technology)



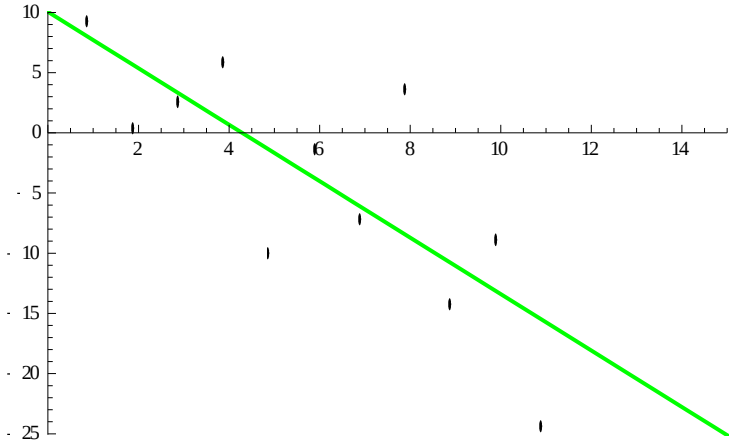
We can observe no evident clustering of the residuals.

Graph 273: Plot of the time series – ROE (Technology)



We can observe a negative trend with periodic cyclic variations.

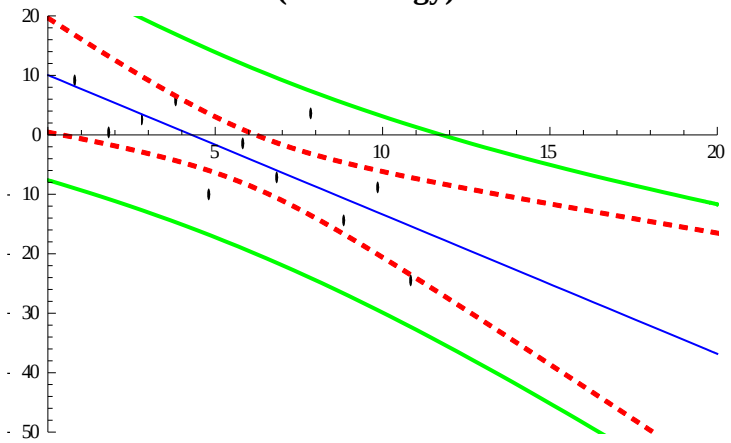
Graph 274: Scatter plot with the trend line – ROE (Technology)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

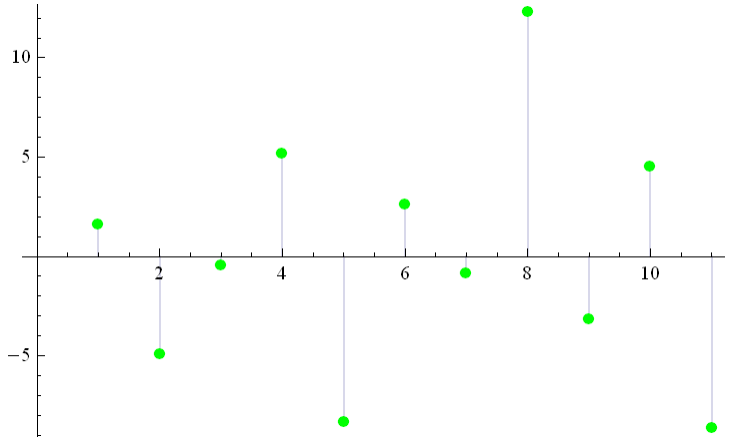
$$10.048 - 2.34391x$$

Graph 275: Plot of the time series, trend line, mean and single prediction bands – ROE (Technology)



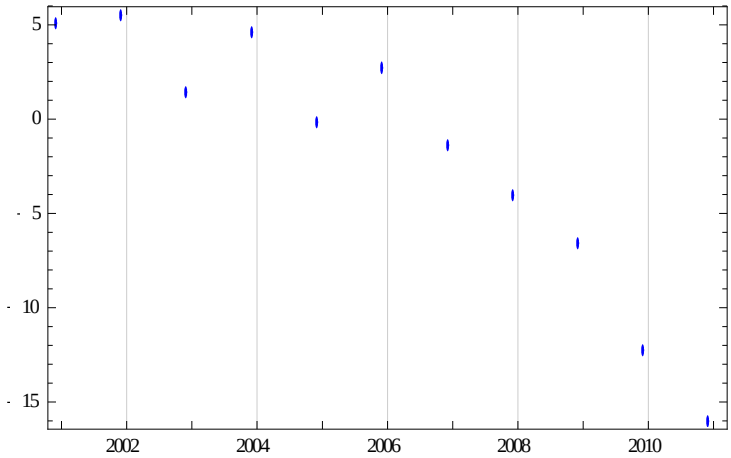
With a coefficient of determination of 61%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 276: Plot of the regression model residuals – ROE (Technology)



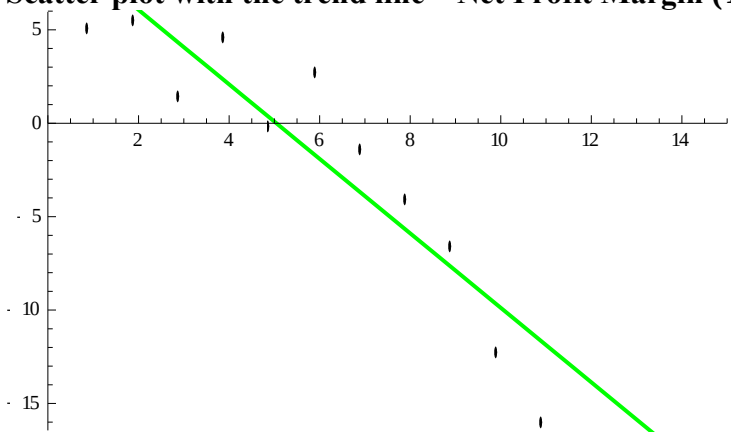
We can observe no evident clustering of the residuals.

Graph 277: Plot of the time series – Net Profit Margin (Technology)



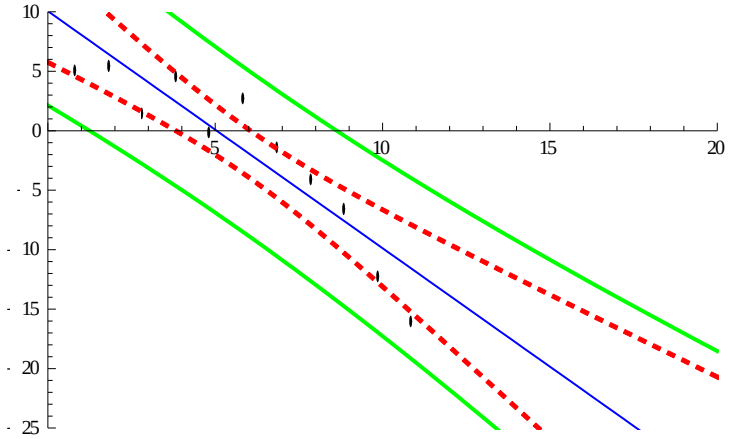
We can observe a negative trend with periodic cyclic variations.

Graph 278: Scatter plot with the trend line – Net Profit Margin (Technology)



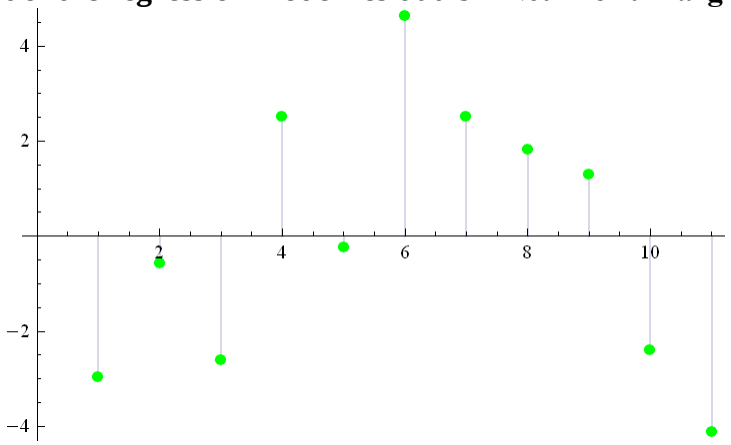
The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is: $10.0522 - 1.99309x$

Graph 279: Plot of the time series, trend line, mean and single prediction bands – Net Profit Margin (Technology)



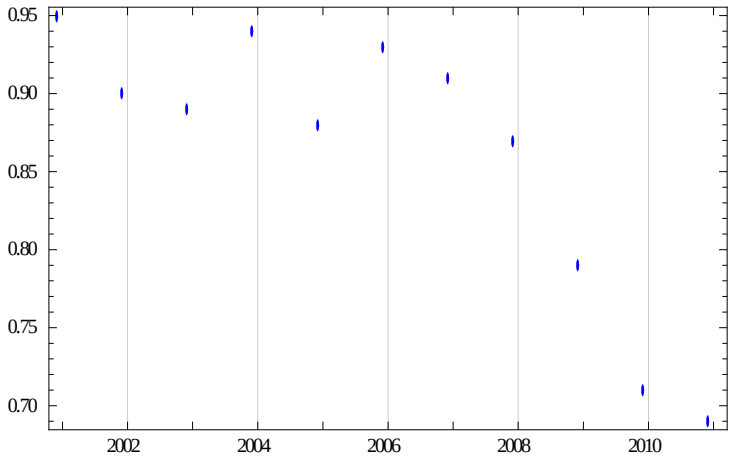
With a coefficient of determination of 85%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 280: Plot of the regression model residuals – Net Profit Margin (Technology)



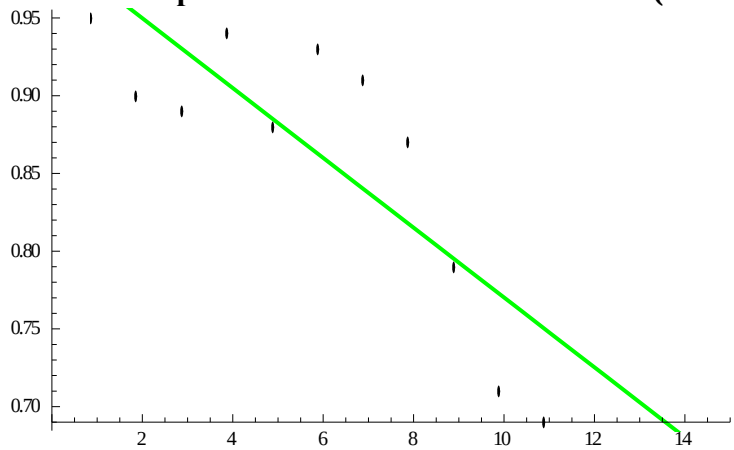
We can observe no evident clustering of the residuals.

Graph 281: Plot of the time series – Sales/TA (Technology)



We can observe a negative trend with periodic cyclic variations.

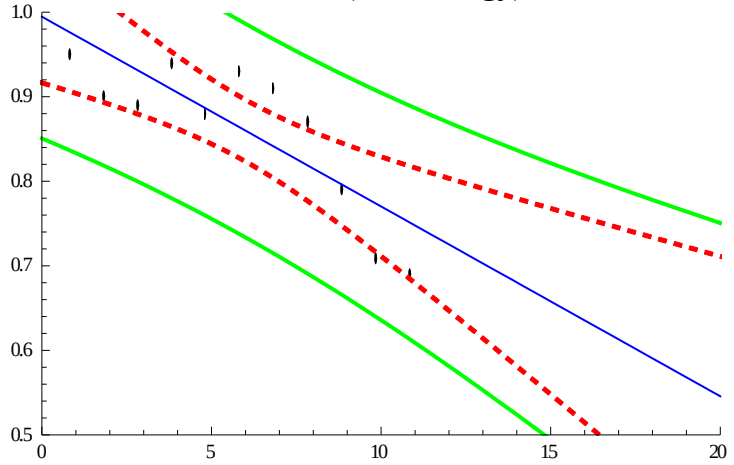
Graph 282: Scatter plot with the trend line – Sales/TA (Technology)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

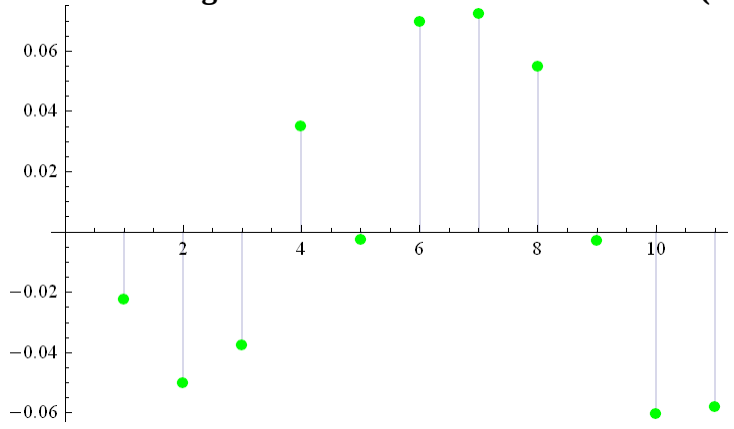
$$0.994727 - 0.0224545\,x$$

Graph 283: Plot of the time series, trend line, mean and single prediction bands – Sales/TA (Technology)



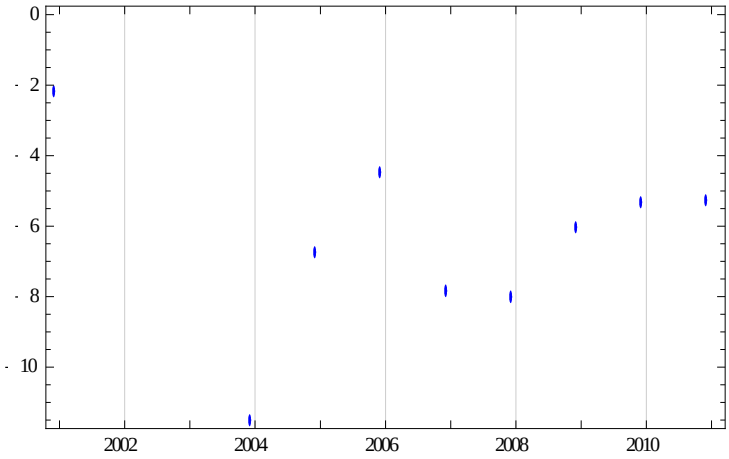
With a coefficient of determination of 68%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 284: Plot of the regression model residuals – Sales/TA (Technology)



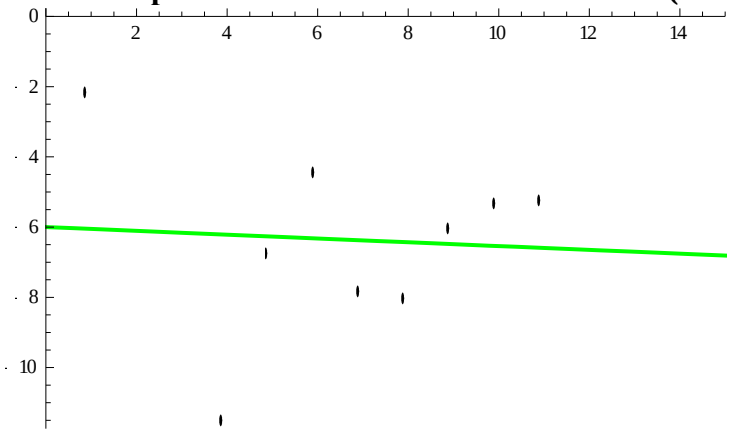
We can observe no evident clustering of the residuals.

Graph 285: Plot of the time series – CAPEX/TA (Technology)



No explicit trend is evident for all years.

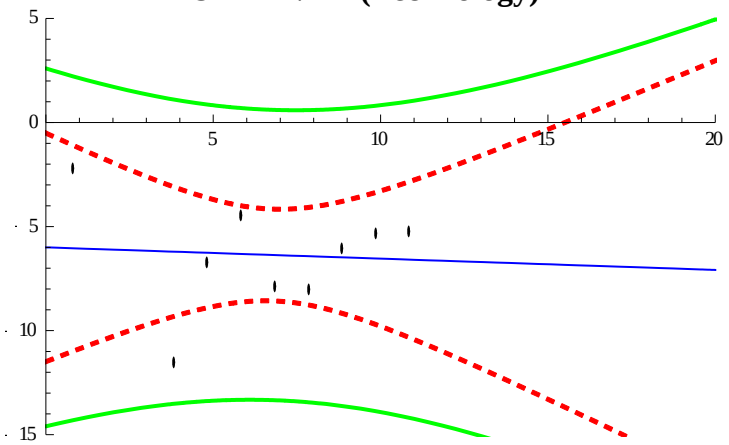
Graph 286: Scatter plot with the trend line – CAPEX/TA (Technology)



The regression line equation is:

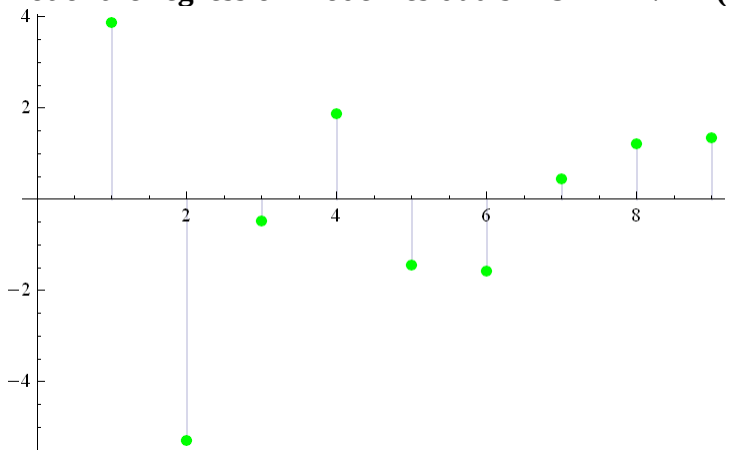
$$5.99827 - 0.0541899\,x$$

Graph 287: Plot of the time series, trend line, mean and single prediction bands – CAPEX/TA (Technology)



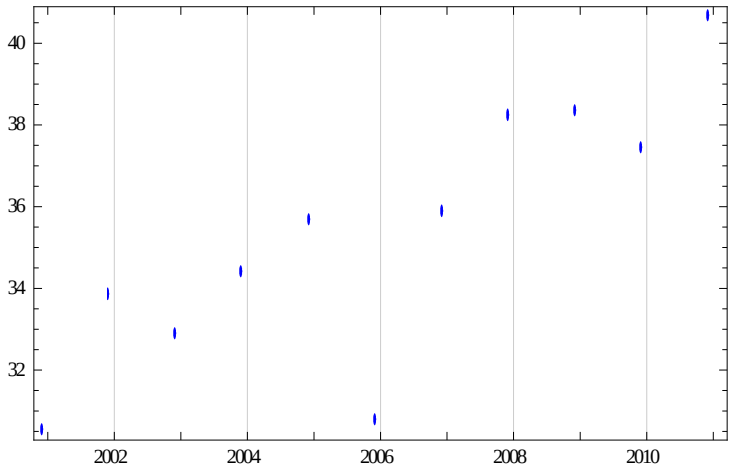
With a coefficient of determination of 0%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 288: Plot of the regression model residuals – CAPEX/TA (Technology)



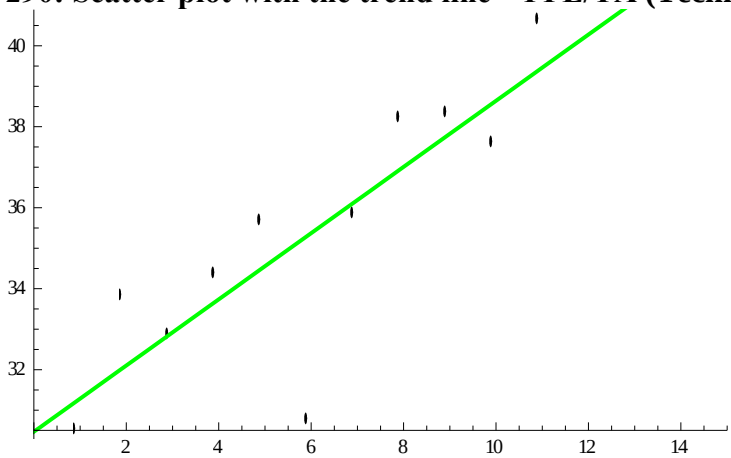
We can observe no evident clustering of the residuals.

Graph 289: Plot of the time series – PPE/TA (Technology)



We can observe a positive trend with periodic cyclic variations.

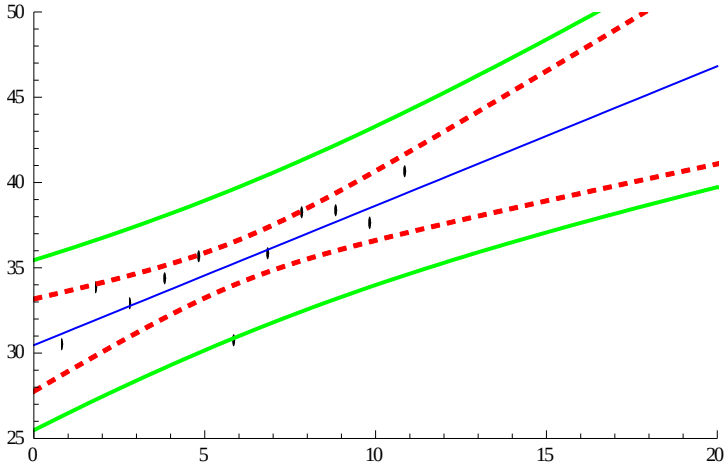
Graph 290: Scatter plot with the trend line – PPE/TA (Technology)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

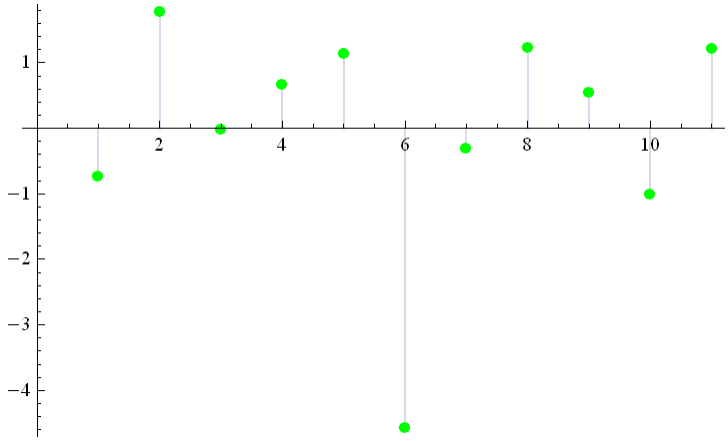
$$30.468 + 0.817455\,x$$

Graph 291: Plot of the time series, trend line, mean and single prediction bands – PPE/TA (Technology)



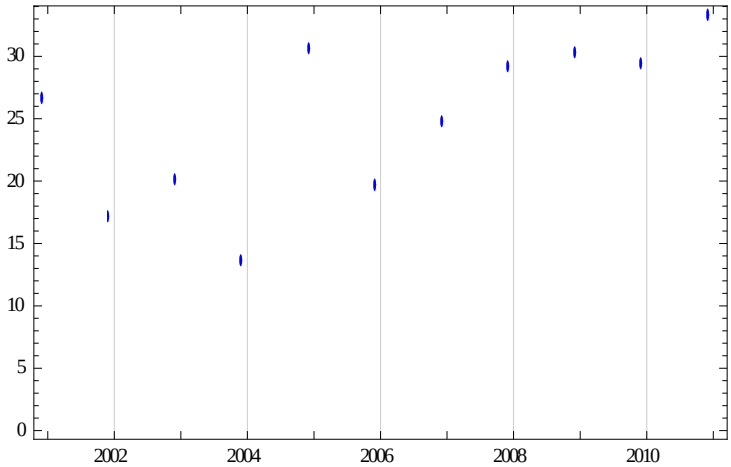
With a coefficient of determination of 70%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands, with one exception.

Graph 292: Plot of the regression model residuals – PPE/TA (Technology)



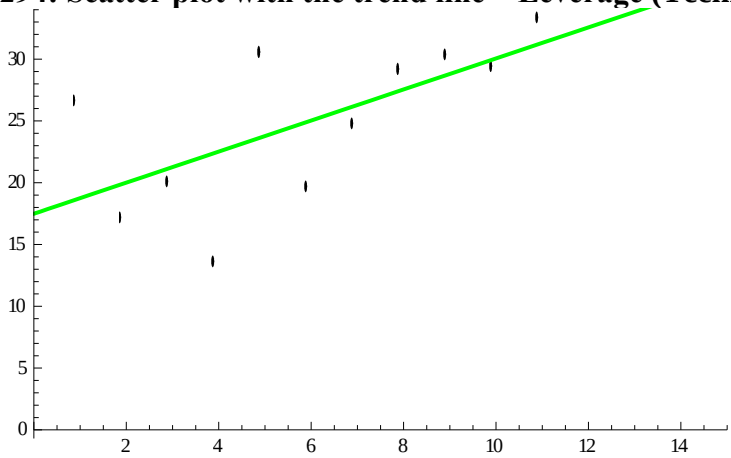
We can observe no evident clustering of the residuals.

Graph 293: Plot of the time series – Leverage (Technology)



We can observe long-term trend.

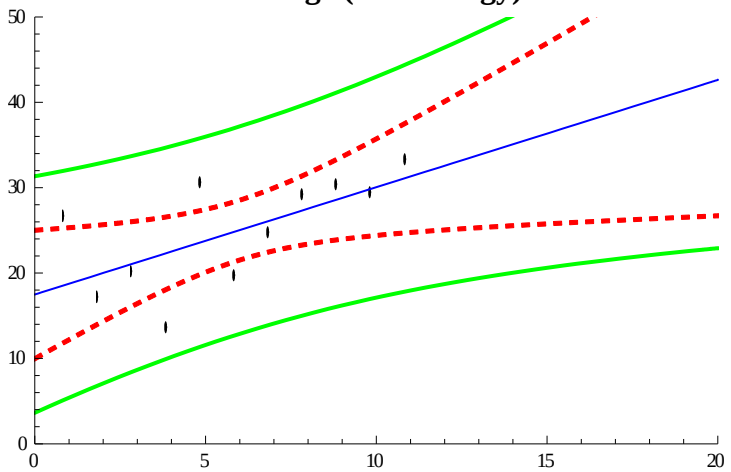
Graph 294: Scatter plot with the trend line – Leverage (Technology)



The direct correlation of the raw data and the trend line is evident. The equation of the trend line is:

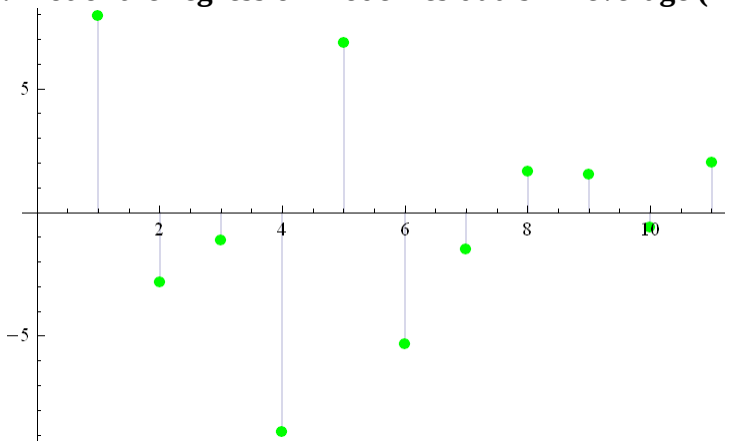
$$17.4925 + 1.25655\,x$$

Graph 295: Plot of the time series, trend line, mean and single prediction bands – Leverage (Technology)



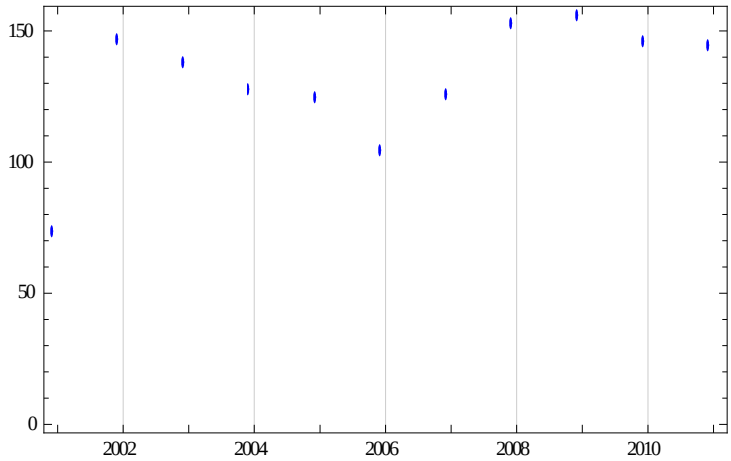
With a coefficient of determination of 42%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 296: Plot of the regression model residuals – Leverage (Technology)



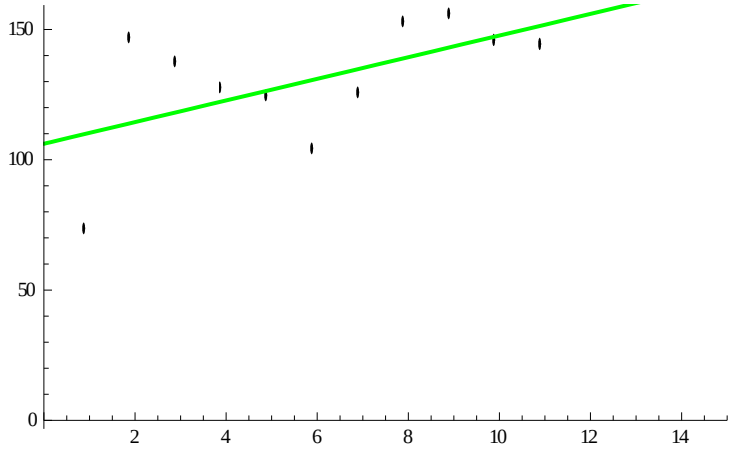
We can observe no evident clustering of the residuals.

Graph 297: Plot of the time series – Size (Technology)



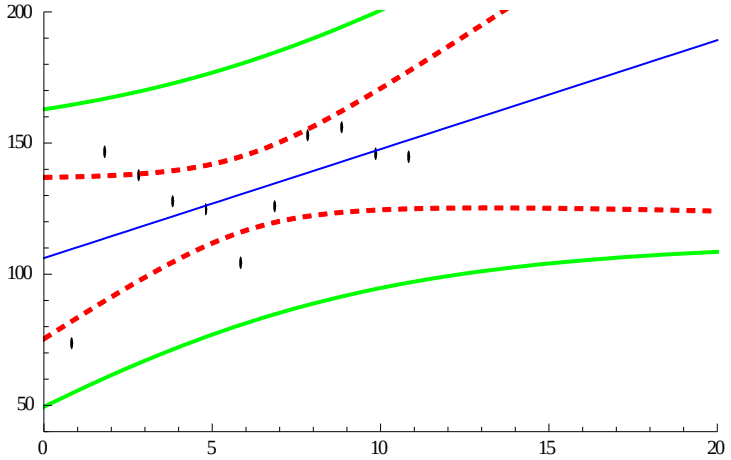
No explicit trend is evident for all years.

Graph 298: Scatter plot with the trend line – Size (Technology)



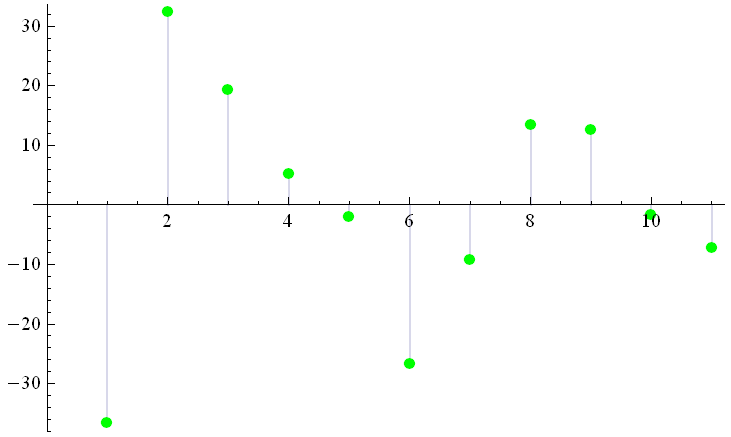
The linear model has a positive trend. The line equation is: $106.149 + 4.15282x$

Graph 299: Plot of the time series, trend line, mean and single prediction bands – Size (Technology)



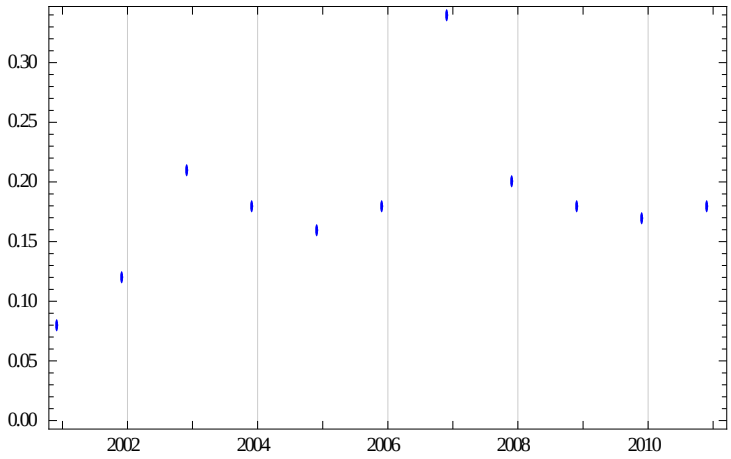
With a coefficient of determination of 32%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 300: Plot of the regression model residuals – Size (Technology)



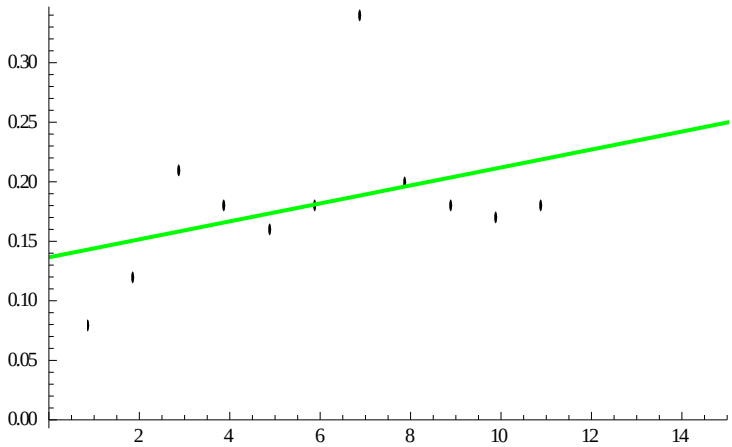
We can observe no evident clustering of the residuals.

Graph 301: Plot of the time series – Operating Performance (Technology)



We can observe long-term trend.

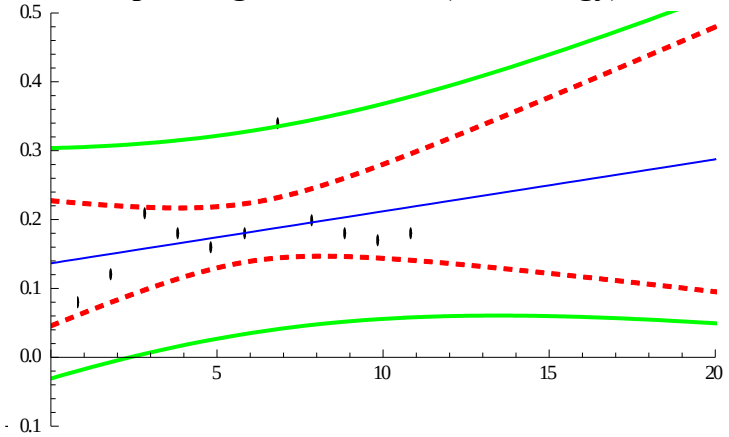
Graph 302: Scatter plot with the trend line – Operating Performance (Technology)



The linear model has a positive trend. The line equation is:

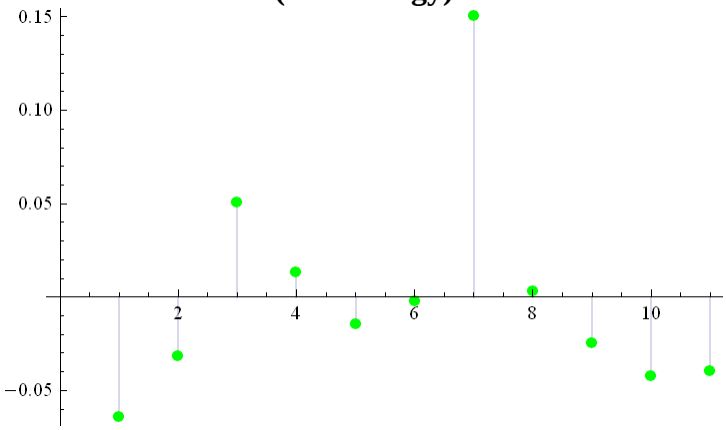
$$0.136545 + 0.00754545\,x$$

Graph 303: Plot of the time series, trend line, mean and single prediction bands – Operating Performance (Technology)



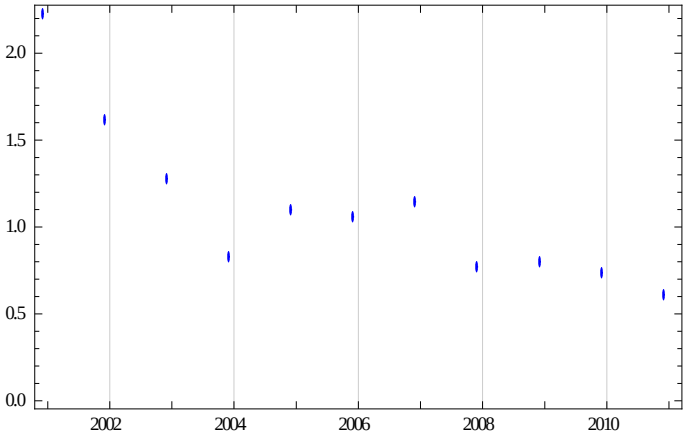
With a coefficient of determination of 15%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands, with one exception.

Graph 304: Plot of the regression model residuals – Operating Performance (Technology)



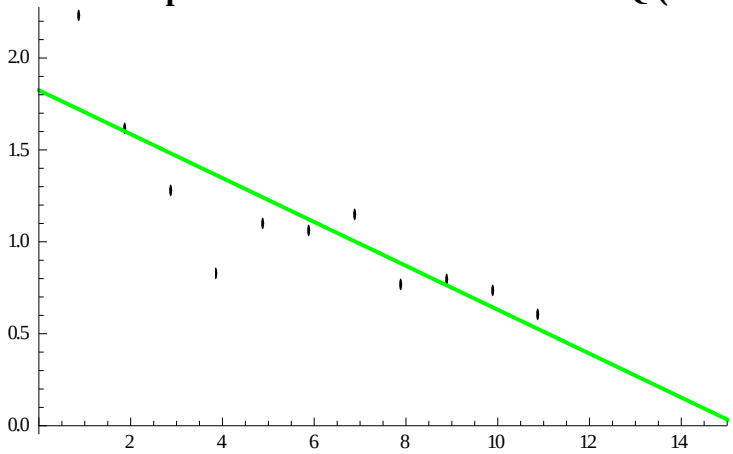
We can observe no evident clustering of the residuals.

Graph 305: Plot of the time series – Tobin's Q (Technology)



We can observe a negative trend with periodic cyclic variations.

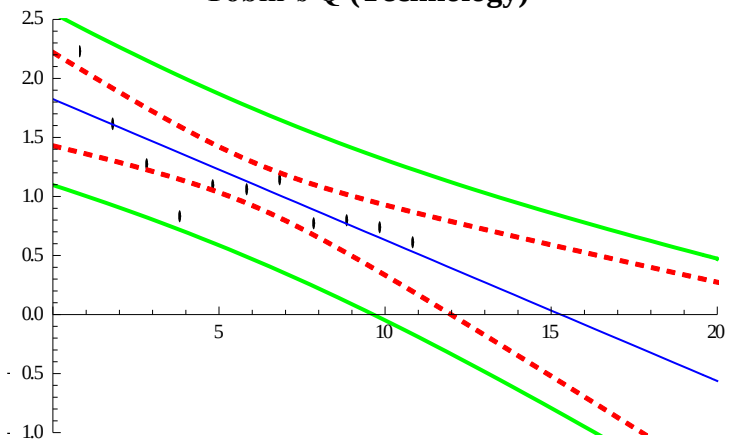
Graph 306: Scatter plot with the trend line – Tobin's Q (Technology)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

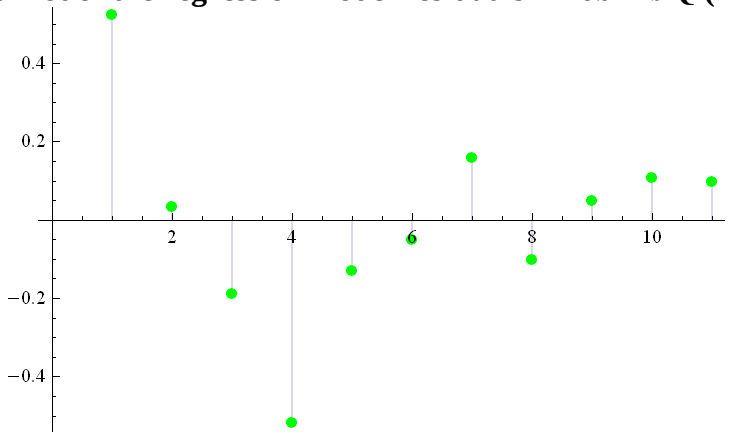
$$1.82436 - 0.119364x$$

Graph 307: Plot of the time series, trend line, mean and single prediction bands – Tobin's Q (Technology)



With a coefficient of determination of 70%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 308: Plot of the regression model residuals – Tobin's Q (Technology)



We can observe no evident clustering of the residuals.

4.8 Telecommunications Industry

Table 15: Positive Analysis for the Telecommunications Industry

Telecommunications (N=2)											
Year	Cash Ratio	ROA	ROE	EAT/Sales	Sales/TA	CAPEX/TA	PPE/TA	Leverage	Size	Sales/Empl	Tobin's Q
2001	0.18	6.92%	10.39%	11.30%	0.60	no data	66.32%	14.65%	4198.18	no data	2.92
2002	0.25	-1.00%	-1.75%	-1.63%	0.50	no data	66.97%	35.65%	4520.22	no data	1.15
2003	no data	2.43%	5.43%	4.88%	0.57	-9.33%	60.21%	24.18%	5256.87	0.21	1.36
2004	no data	-6.07%	-16.98%	-6.76%	0.68	-8.81%	63.94%	31.33%	5058.12	0.87	0.87
2005	0.54	-5.61%	-12.29%	-7.96%	0.64	-4.21%	59.79%	35.28%	5560.34	0.22	1.29
2006	0.41	-1.43%	-2.86%	-5.30%	0.42	-4.25%	66.94%	27.62%	6357.61	0.12	1.00
2007	0.21	-7.32%	-19.15%	-19.74%	0.47	-5.19%	69.71%	34.81%	5927.69	0.17	1.07
2008	0.48	5.27%	27.69%	9.39%	0.56	-8.44%	70.44%	52.93%	11425.20	0.19	1.04
2009	0.42	3.98%	21.81%	6.90%	0.58	-8.63%	75.37%	52.53%	10321.50	0.18	1.01
2010	0.26	0.42%	2.40%	0.72%	0.57	-7.87%	74.65%	55.57%	9537.80	0.18	0.87
2011	0.27	1.32%	6.81%	2.38%	0.55	-7.88%	70.48%	53.92%	9090.90	0.18	0.69

The cash ratio although stronger in many years, shows fluctuating variances with no evident longitudinal trend. As with the *Technology* industry, we would expect to witness this situation in an industry with fluctuating current liabilities, needs in assets and/or erratic *Activity*, but we cannot observe analogous change in *Activity* and cash; *Activity* seems to be fairly stable with minor variations.

Profitability lows are in 2007 and from this year and on it is rising, thus posing an exception in this industry, especially for the final years. *Productivity* has dropped during the time span and *Valuation* overall is diminishing. *Capital Expenditures* show somewhat erratic behavior whereas *BS structure* seems fairly stable. *Leverage* has grown significantly while the *Size* of this industry has more than doubled in the time span.

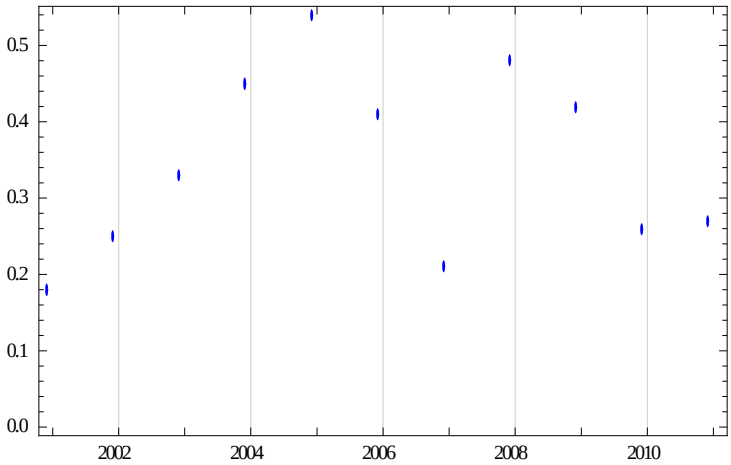
Table 16: Forecasting for the Telecommunications Industry

Telecommunications							
Ratio	Domain	Formula	Linear Correlation	a	b	R^2	p-value
Cash Ratio	Liquidity	Cash / CL	Uncorrelated	0.3187	0.0045	**2%**	**0.719002**
ROA	Profitability	EAT / TA	Uncorrelated	-0.2791	0.0300	**0%**	**0.951097**
ROE	Profitability	EAT / Equity	Uncorrelated	-5.1538	1.1847	**7%**	**0.431924**
Net Profit Margin	Profitability	EAT / Revenue	Uncorrelated	-0.0589	-0.0784	**0%**	**0.933236**
Asset Turnover	Activity	Revenue / TA	Uncorrelated	0.5773	-0.0032	**2%**	**0.674616**
CAPEX Ratio	Growth	CAPEX / TA	Uncorrelated	-6.8114	-0.0735	**1%**	**0.800639**
Fixed Assets Leverage	BS Structure	PPE / TA	Direct	61.1698	1.0902	**50%**	**0.015168**
Financial Leverage	Leverage	TD / TA	Direct	16.0167	3.6710	**78%**	**0.000334**
Size	Size	Total Assets	Direct	3050.5900	662.0850	**73%**	**0.000782**
Operating Performance	Productivity	Revenue / Empl.	Uncorrelated	0.3973	-0.0257	**13%**	**0.311693**
Tobin's Q	Valuation	TA (MV) / Repl. Value	Inverse	1.9264	-0.1200	**44%**	**0.025816**

The linear model seems effective for only four ratios of this industry. The coefficient of determination is low for five ratios and null for two ratios. The *Telecommunications* industry shows the least effectiveness with respect to the regression models.

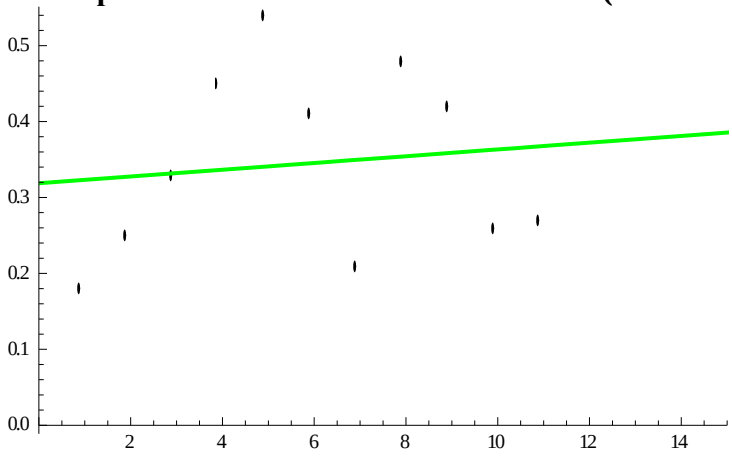
Graphs 309-352 provide an analysis visualization of all the financial ratios for the *Telecommunications* industry and of the linear models and their constituents:

Graph 309: Plot of the time series – Cash Ratio (Telecommunications)



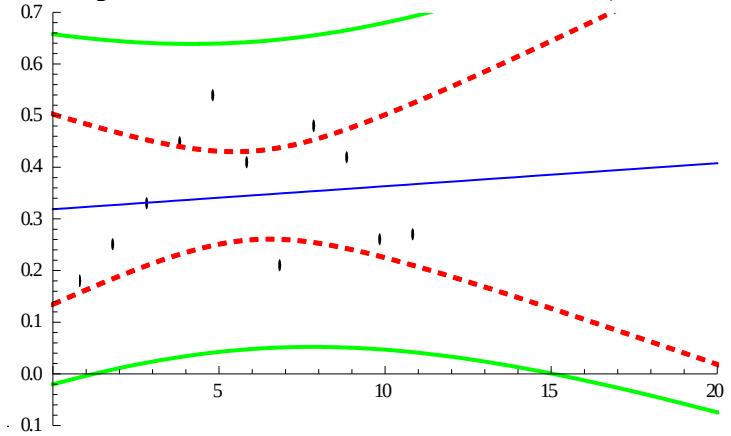
No explicit trend is evident for all years.

Graph 310: Scatter plot with the trend line – Cash Ratio (Telecommunications)



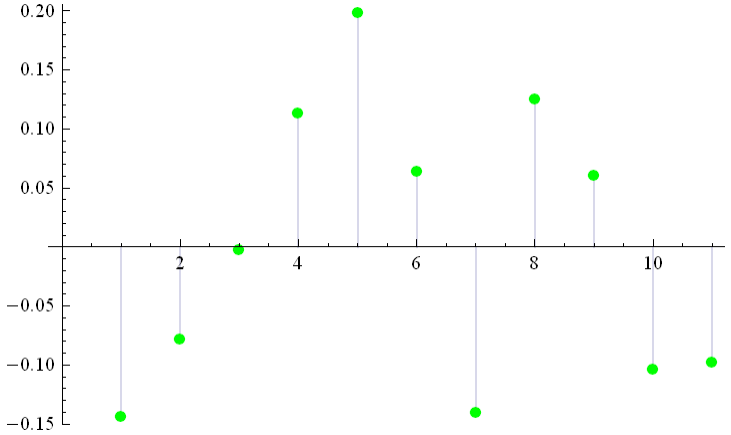
The linear model has a positive trend. The line equation is: $0.318727 + 0.00445455x$

Graph 311: Scatter plot with the trend line – Cash Ratio (Telecommunications)



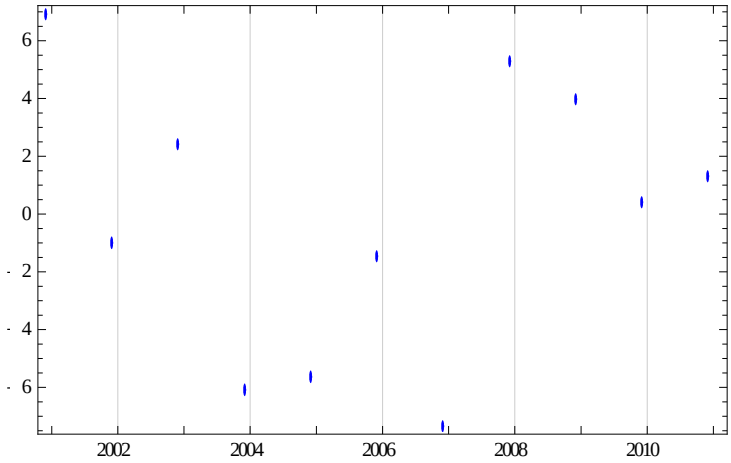
With a coefficient of determination of 2%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 312: Plot of the regression model residuals – Cash Ratio (Telecommunications)



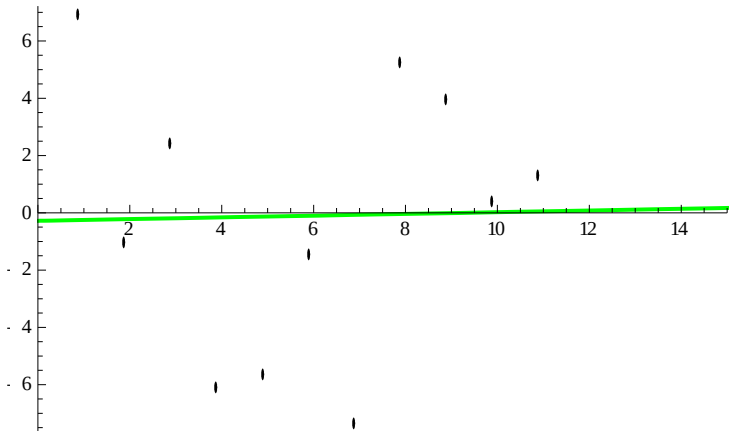
We can observe no evident clustering of the residuals.

Graph 313: Plot of the time series – ROA (Telecommunications)



No explicit trend is evident for all years.

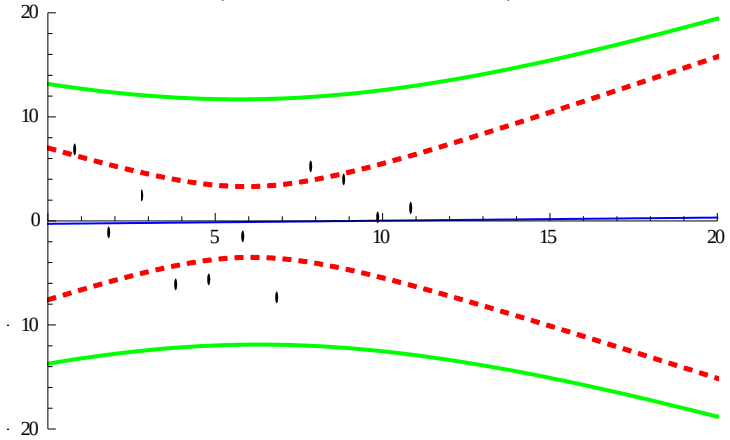
Graph 314: Scatter plot with the trend line – ROA (Telecommunications)



The linear model has a positive trend. The line equation is:

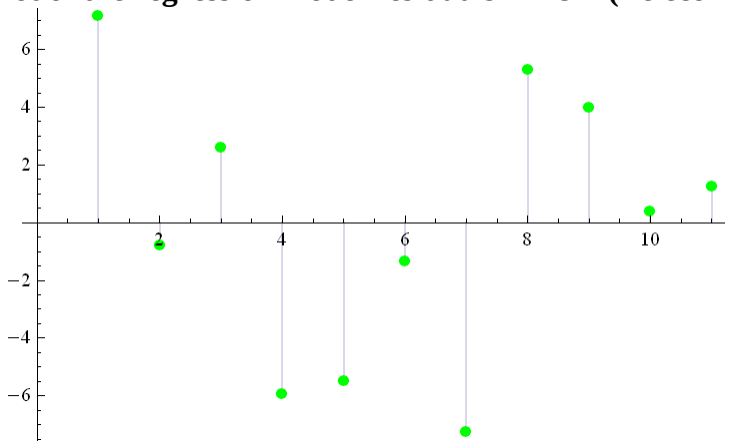
$$0.279091 + 0.03x$$

Graph 315: Plot of the time series, trend line, mean and single prediction bands – ROA (Telecommunications)



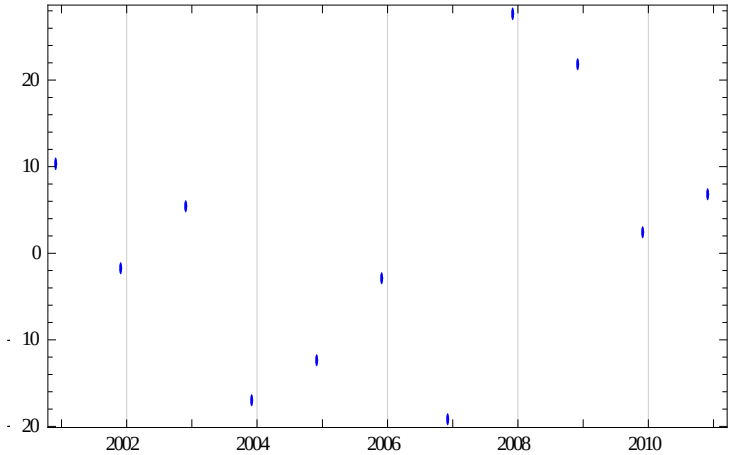
With a coefficient of determination of 0%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 316: Plot of the regression model residuals – ROA (Telecommunications)



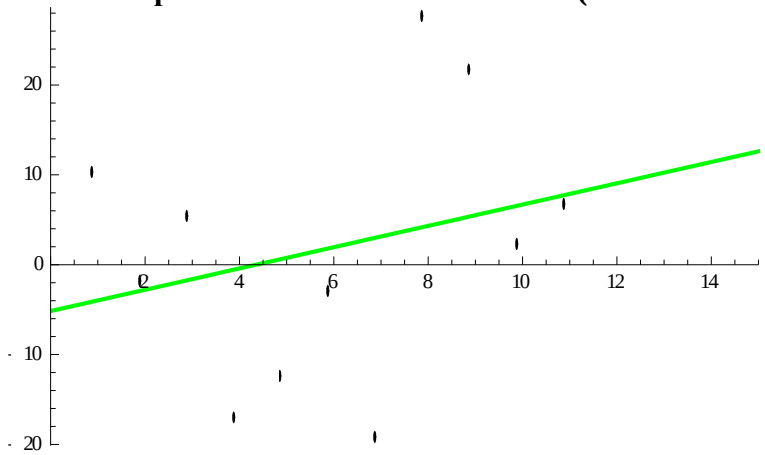
We can observe no evident clustering of the residuals.

Graph 317: Plot of the time series – ROE (Telecommunications)



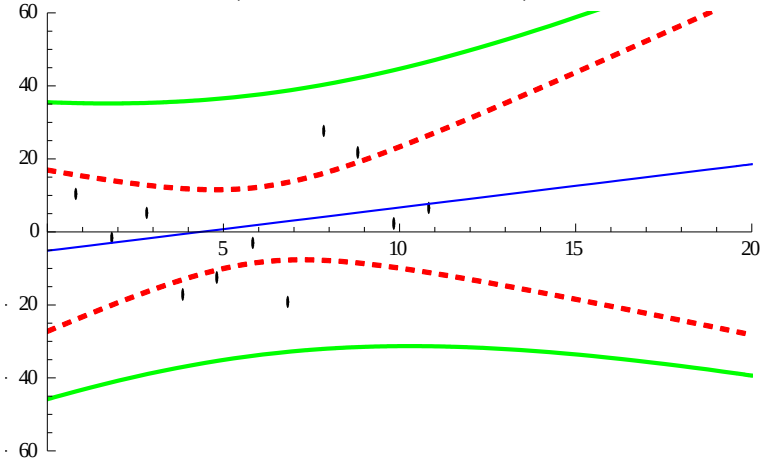
No explicit trend is evident for all years.

Graph 318: Scatter plot with the trend line – ROE (Telecommunications)



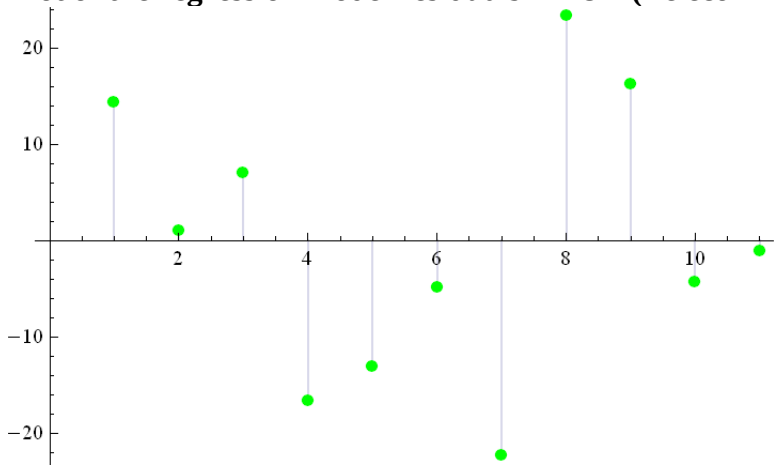
The linear model has a positive trend. The line equation is: $5.15382 + 1.18473x$

Graph 319: Plot of the time series, trend line, mean and single prediction bands – ROE (Telecommunications)



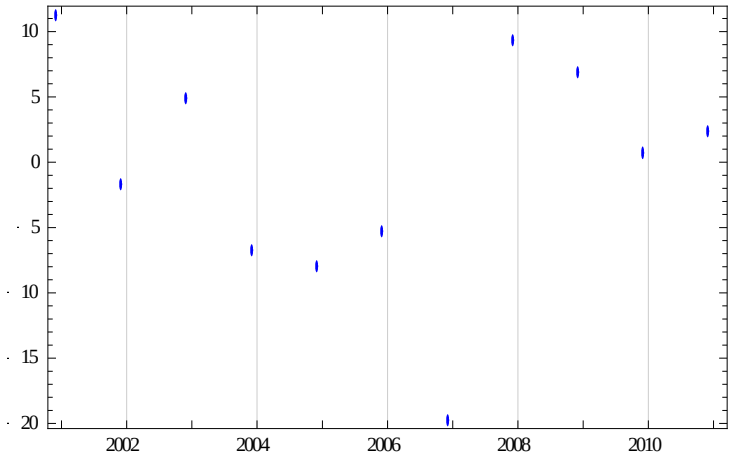
With a coefficient of determination of 7%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 320: Plot of the regression model residuals – ROE (Telecommunications)



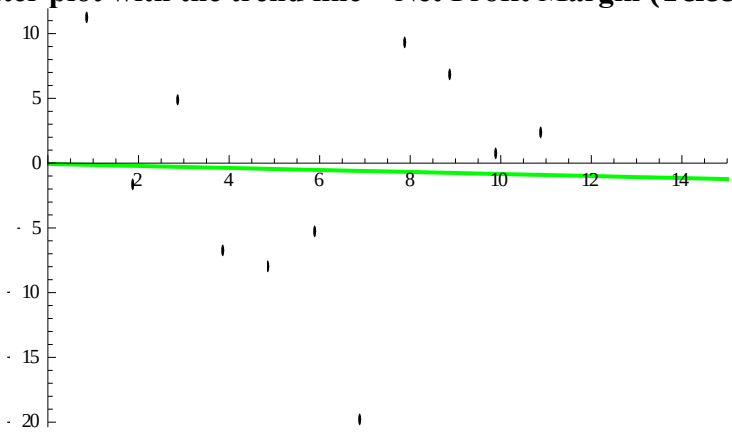
We can observe no evident clustering of the residuals.

Graph 321: Plot of the time series – Net Profit Margin (Telecommunications)



No explicit trend is evident for all years.

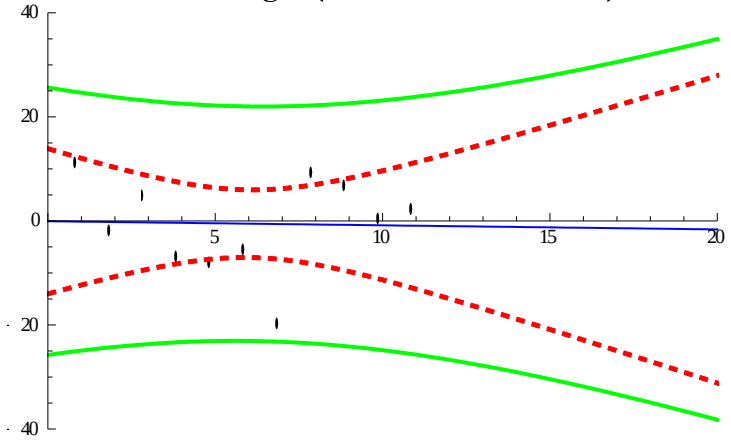
Graph 322: Scatter plot with the trend line – Net Profit Margin (Telecommunications)



The linear model has a negative trend. The line equation is:

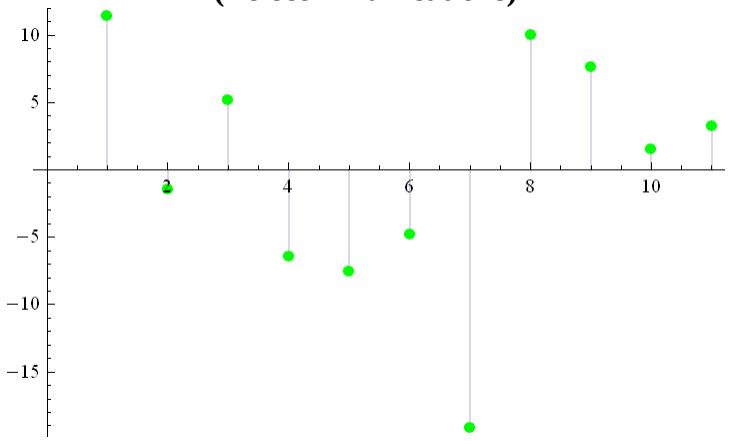
$$0.0589091 - 0.0783636x$$

Graph 323: Plot of the time series, trend line, mean and single prediction bands – Net Profit Margin (Telecommunications)



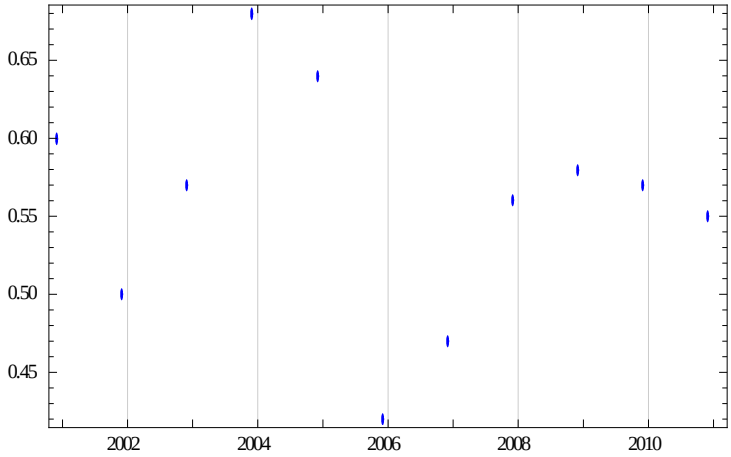
With a coefficient of determination of 0%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 324: Plot of the regression model residuals – Net Profit Margin (Telecommunications)



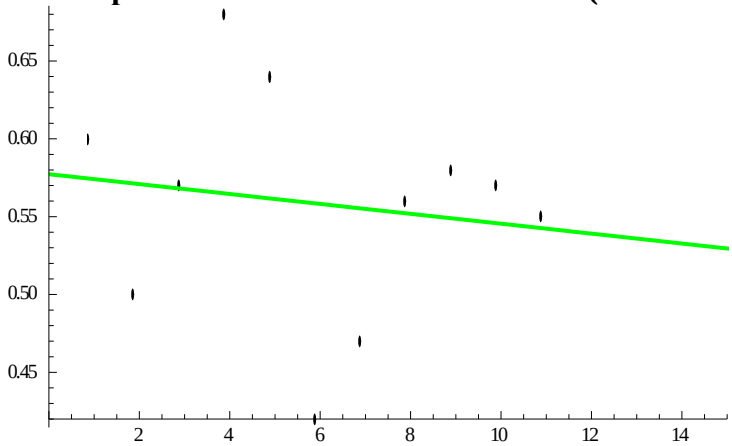
We can observe no evident clustering of the residuals.

Graph 325: Plot of the time series – Sales/TA (Telecommunications)



No explicit trend is evident for all years.

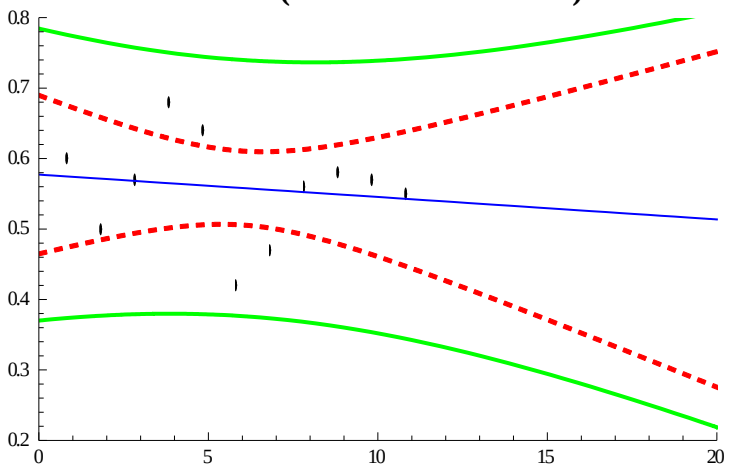
Graph 326: Scatter plot with the trend line – Sales/TA (Telecommunications)



The linear model has a negative trend. The line equation is:

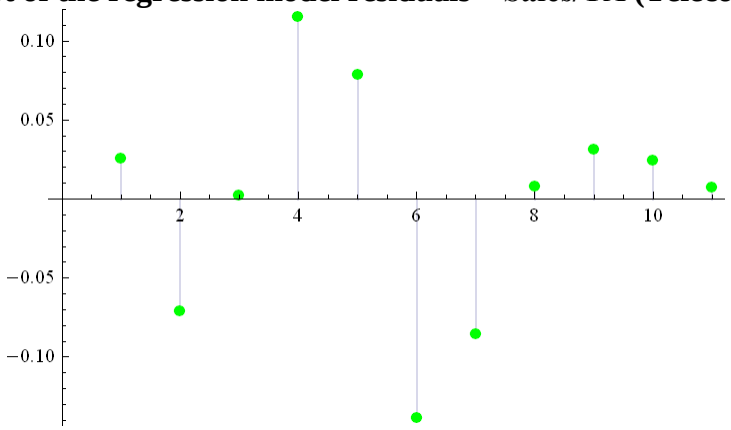
$$0.577273 - 0.00318182x$$

Graph 327: Plot of the time series, trend line, mean and single prediction bands – Sales/TA (Telecommunications)



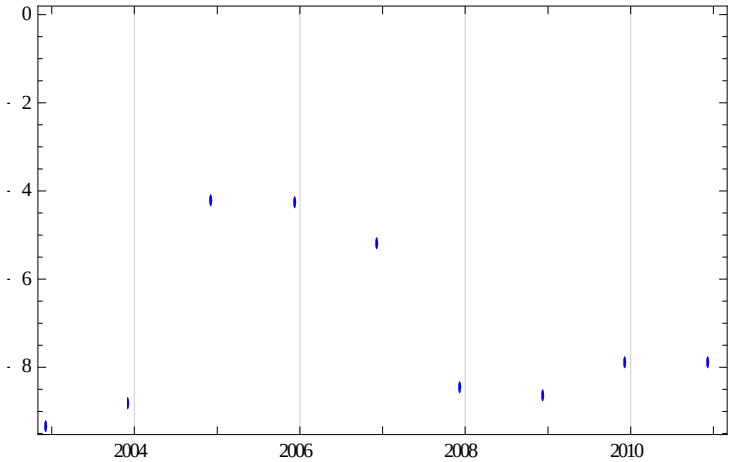
With a coefficient of determination of 2%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 328: Plot of the regression model residuals – Sales/TA (Telecommunications)



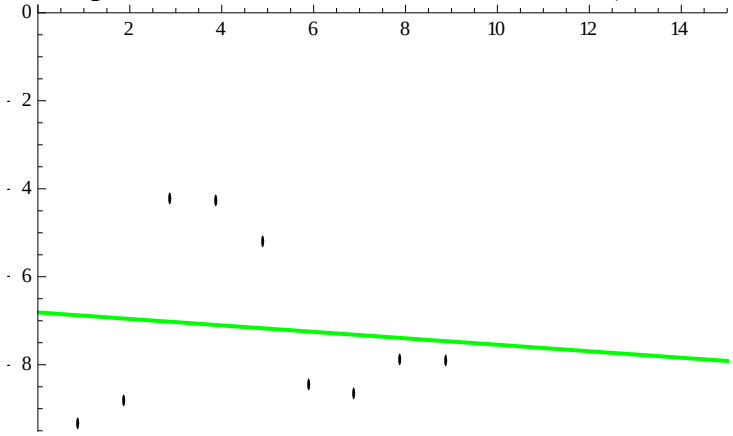
We can observe no evident clustering of the residuals.

Graph 329: Plot of the time series – CAPEX/TA (Telecommunications)



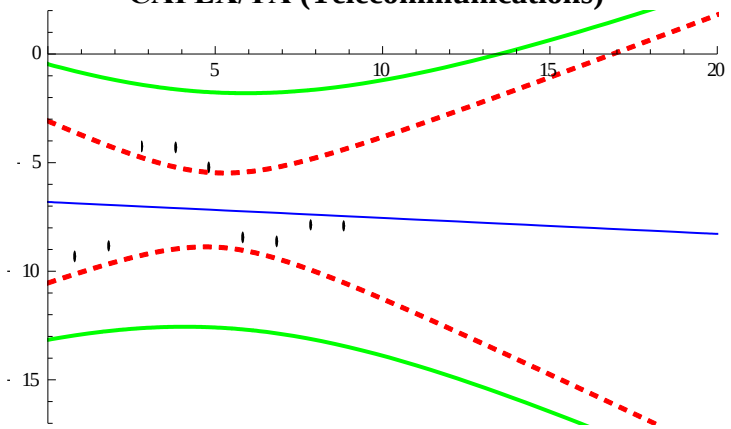
No explicit trend is evident for all years.

Graph 330: Scatter plot with the trend line – CAPEX/TA (Telecommunications)



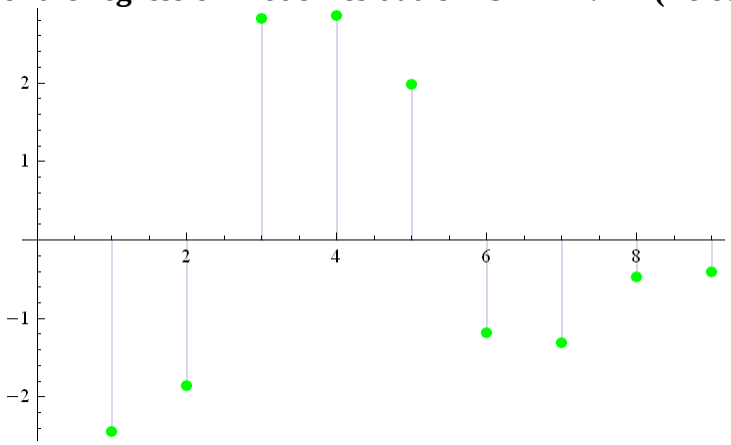
The linear model has a negative trend. The line equation is: $6.81139 - 0.0735x$

Graph 331: Plot of the time series, trend line, mean and single prediction bands – CAPEX/TA (Telecommunications)



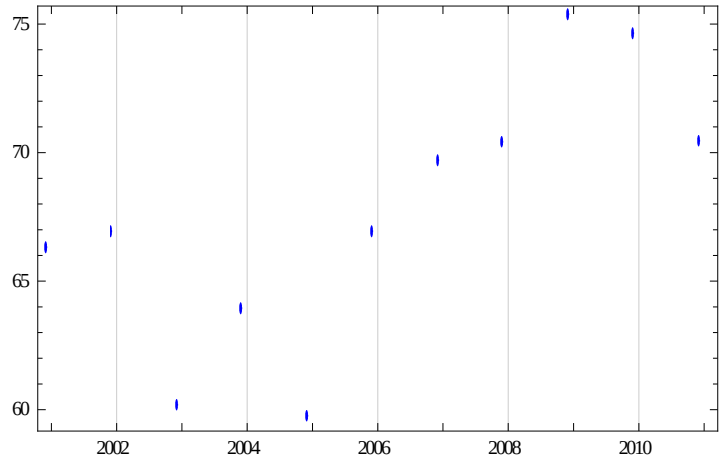
With a coefficient of determination of 1%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 332: Plot of the regression model residuals – CAPEX/TA (Telecommunications)



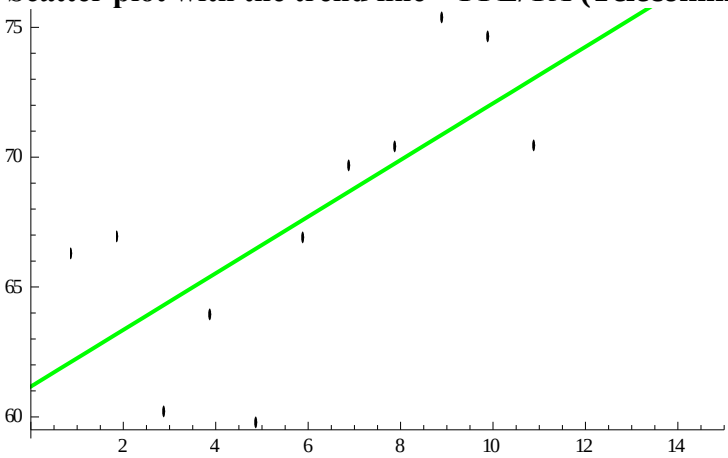
We can observe no evident clustering of the residuals.

Graph 333: Plot of the time series – PPE/TA (Telecommunications)



We can observe a positive trend with periodic cyclic variations.

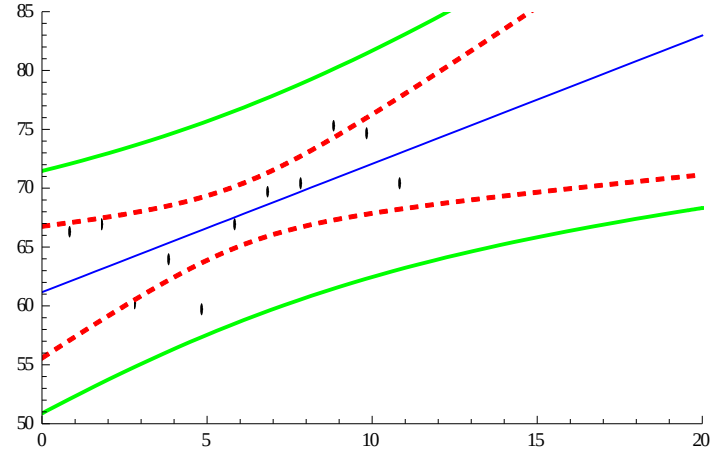
Graph 334: Scatter plot with the trend line – PPE/TA (Telecommunications)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

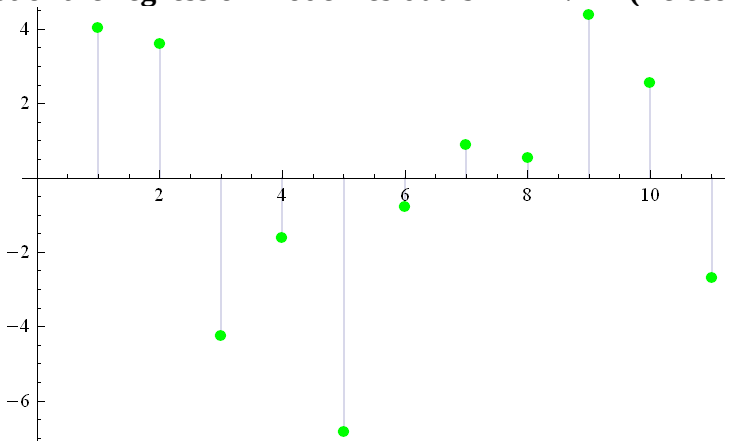
$$61.1698 + 1.09018x$$

Graph 335: Plot of the time series, trend line, mean and single prediction bands – PPE/TA (Telecommunications)



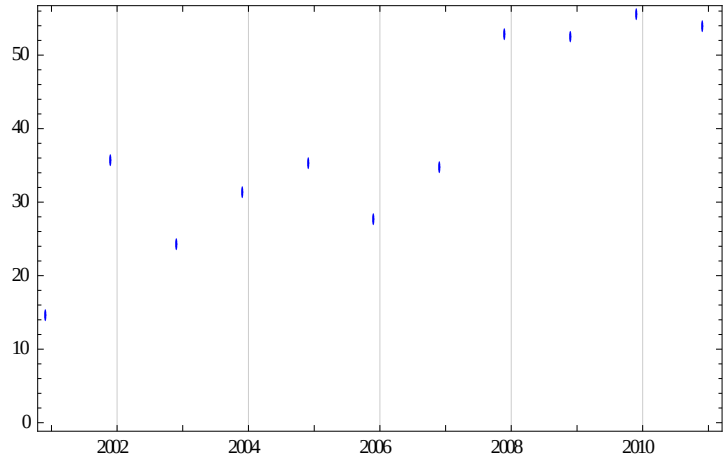
With a coefficient of determination of 50%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 336: Plot of the regression model residuals – PPE/TA (Telecommunications)



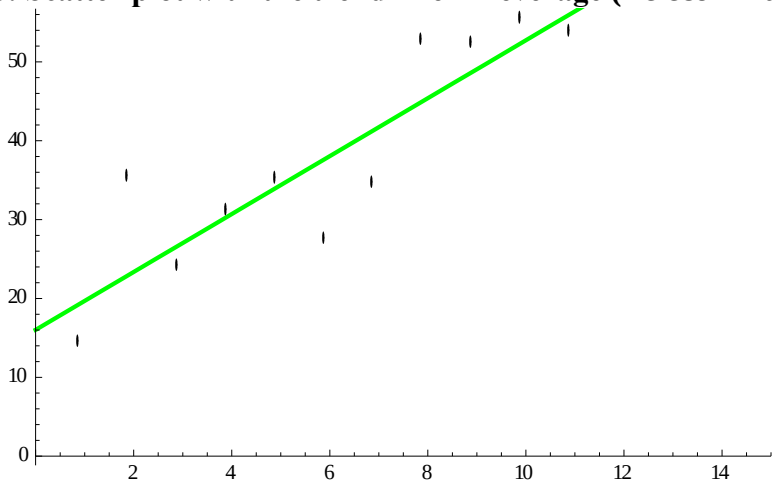
We can observe no evident clustering of the residuals.

Graph 337: Plot of the time series – Leverage (Telecommunications)



We can observe a positive trend with periodic cyclic variations.

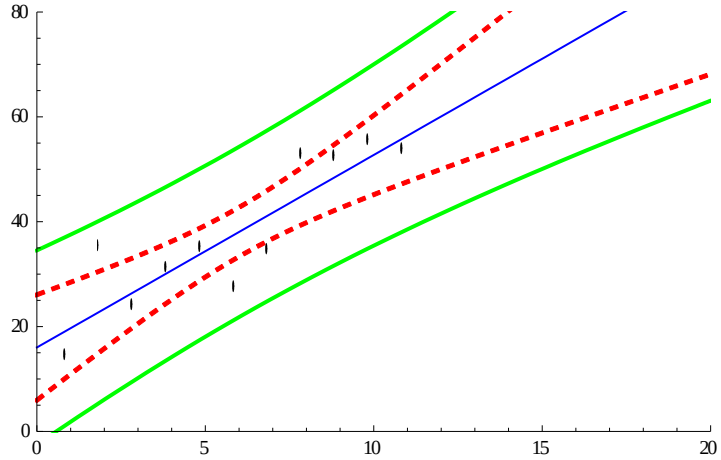
Graph 338: Scatter plot with the trend line – Leverage (Telecommunications)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

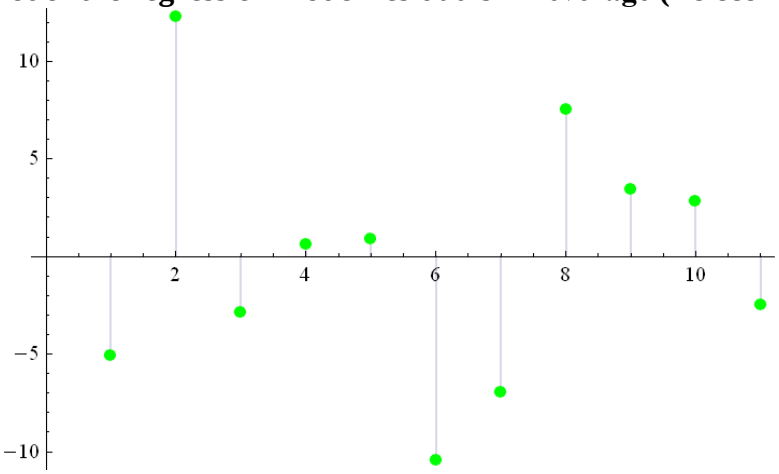
$$16.0167 + 3.671\,x$$

Graph 339: Plot of the time series, trend line, mean and single prediction bands – Leverage (Telecommunications)



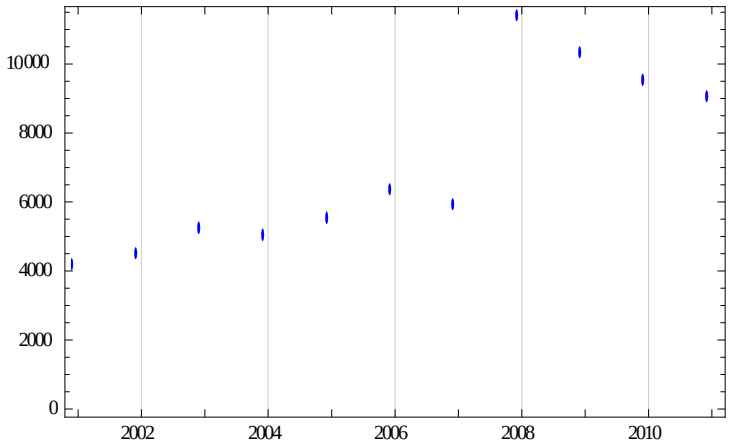
With a coefficient of determination of 78%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 340: Plot of the regression model residuals – Leverage (Telecommunications)



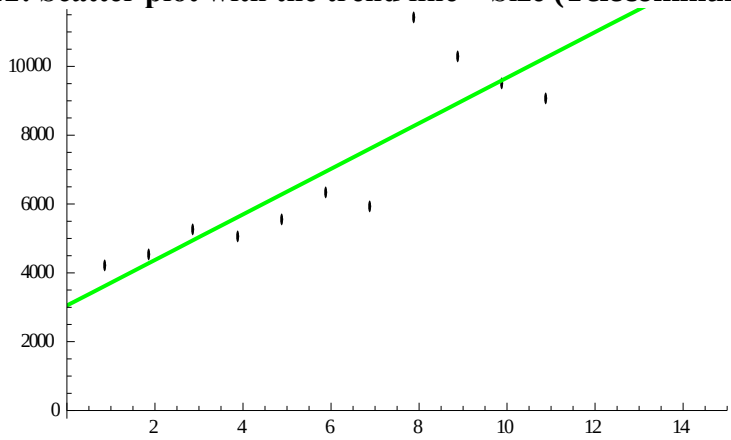
We can observe no evident clustering of the residuals.

Graph 341: Plot of the time series – Size (Telecommunications)



We can observe a positive trend with periodic cyclic variations.

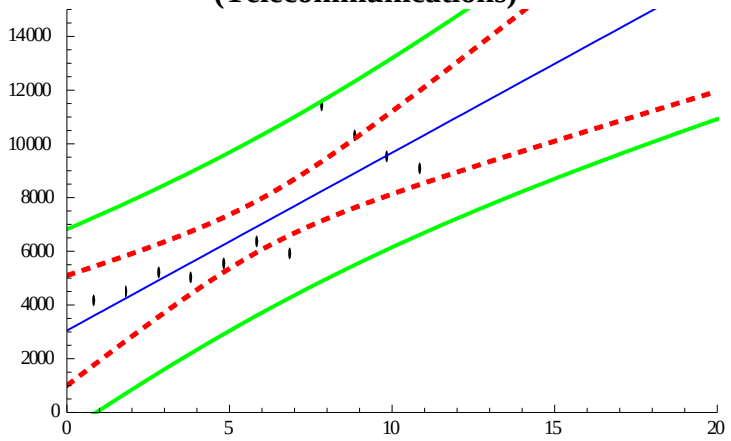
Graph 342: Scatter plot with the trend line – Size (Telecommunications)



The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

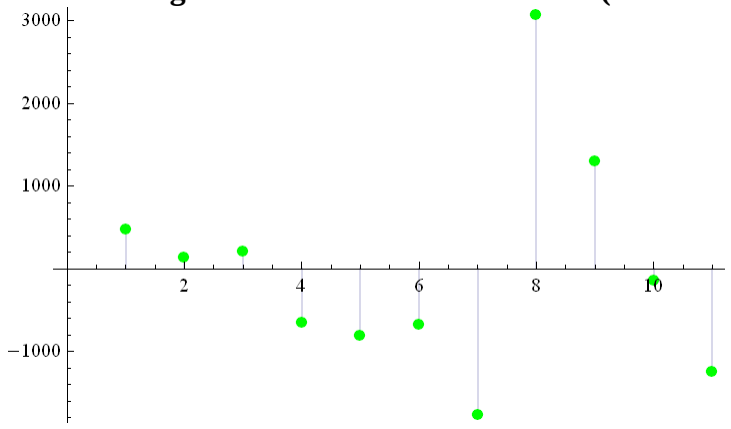
$$3050.59 + 662.085\,x$$

Graph 343: Plot of the time series, trend line, mean and single prediction bands – Size (Telecommunications)



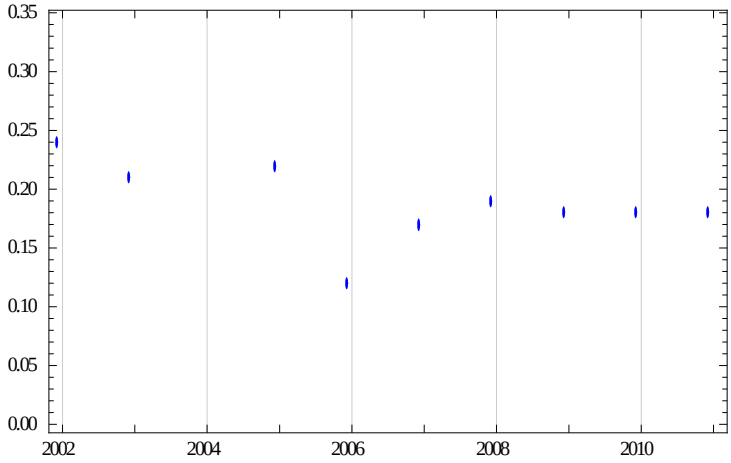
With a coefficient of determination of 73%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 344: Plot of the regression model residuals – Size (Telecommunications)



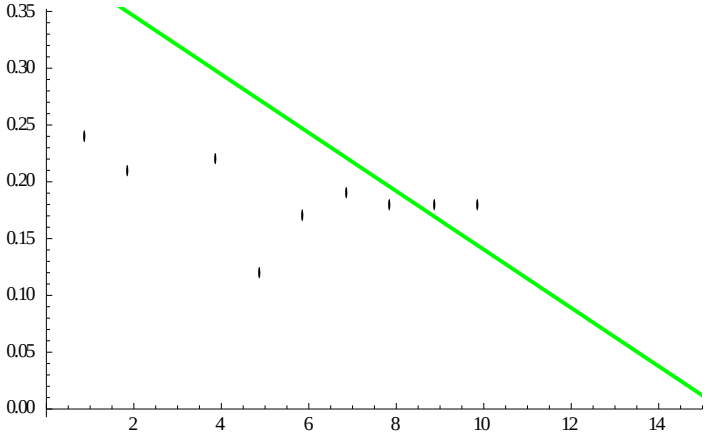
We can observe no evident clustering of the residuals.

Graph 345: Plot of the time series – Operating Performance (Telecommunications)



We can observe long-term trend. Please note that the value for 2004 is off the chart.

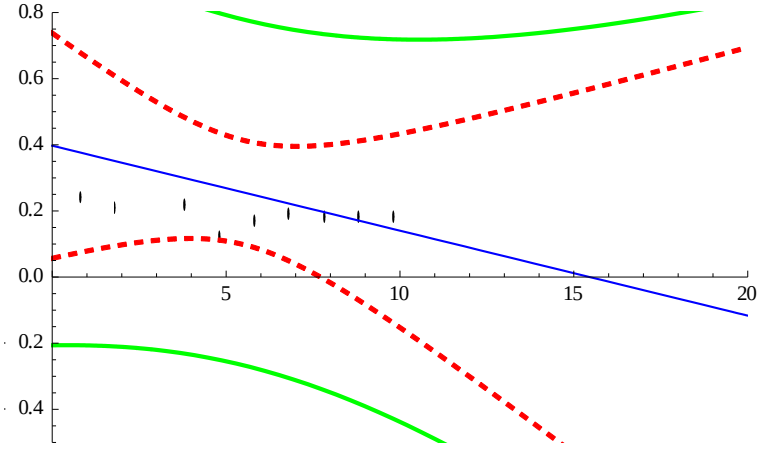
Graph 346: Scatter plot with the trend line – Operating Performance (Telecommunications)



The linear model has a negative trend. The line equation is:

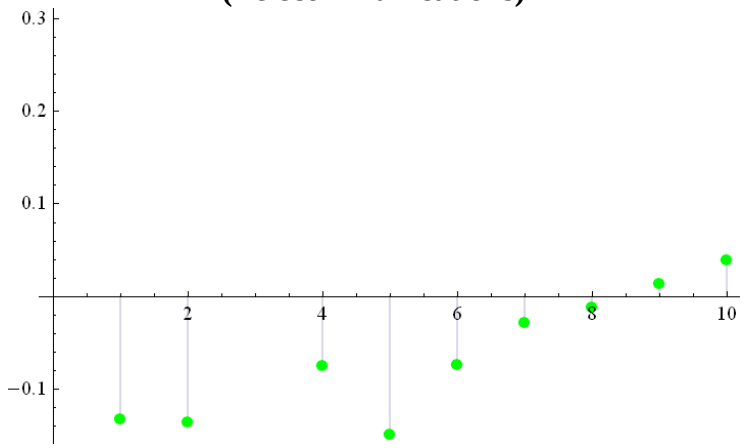
$$0.397333 - 0.025697x$$

Graph 347: Plot of the time series, trend line, mean and single prediction bands – Operating Performance (Telecommunications)



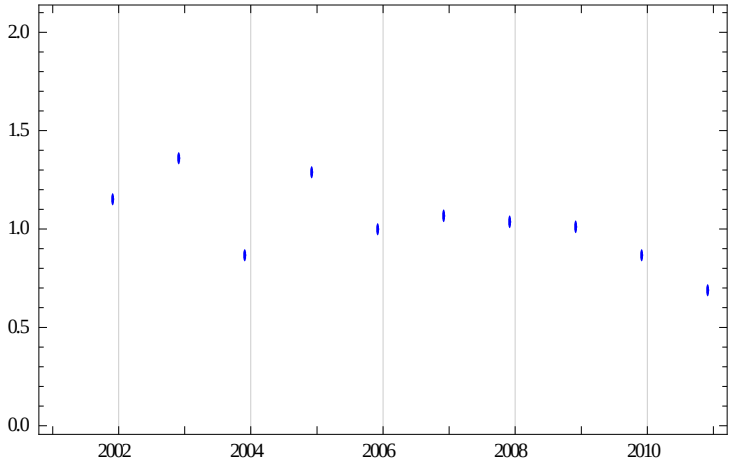
With a coefficient of determination of 13%, we can observe that the prediction bands are significantly wide, due to the extremely divergent 2004 marker.

Graph 348: Plot of the regression model residuals – Operating Performance (Telecommunications)



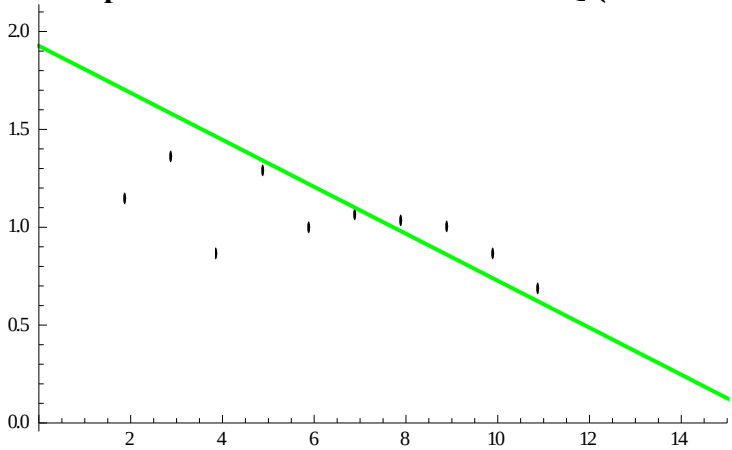
We can observe no evident clustering of the residuals.

Graph 349: Plot of the time series – Tobin's Q (Telecommunications)



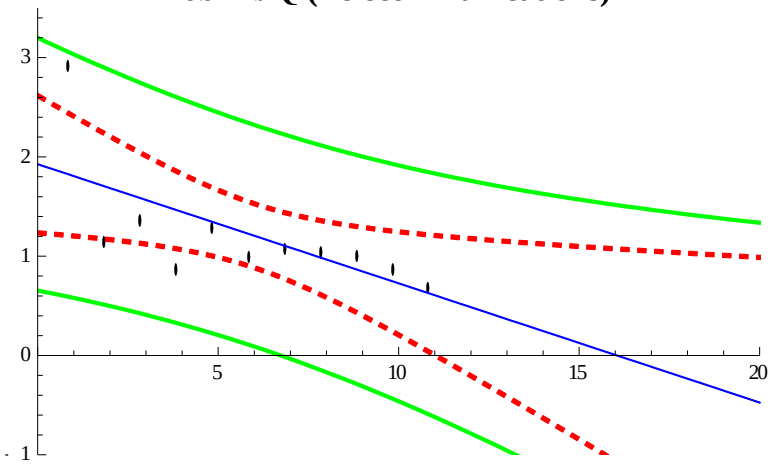
We can observe long-term trend.

Graph 350: Scatter plot with the trend line – Tobin's Q (Telecommunications)



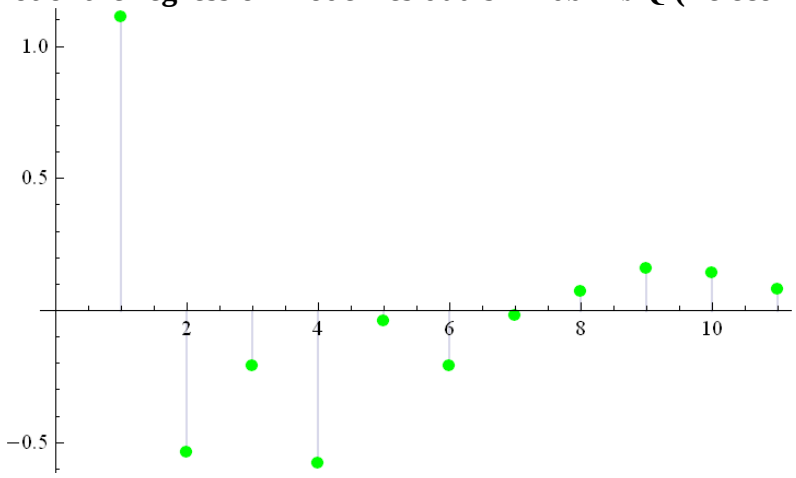
The linear model has a negative trend. The line equation is: $1.92636 - 0.12x$

Graph 351: Plot of the time series, trend line, mean and single prediction bands – Tobin's Q (Telecommunications)



With a coefficient of determination of 44%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 352: Plot of the regression model residuals – Tobin's Q (Telecommunications)



We can observe no evident clustering of the residuals.

4.9 Utilities Industry

Table 17: Positive Analysis for the Utilities Industry

Utilities (N=4)											
Year	Cash Ratio	ROA	ROE	EAT/Sales	Sales/TA	CAPEX/TA	PPE/TA	Leverage	Size	Sales/Empl	Tobin's Q
2001	0.05	5.83%	14.00%	16.66%	0.37	no data	70.26%	25.34%	3014.04	0.10	0.91
2002	no data	8.39%	16.11%	20.26%	0.37	no data	75.40%	17.86%	3918.53	no data	0.67
2003	0.11	6.46%	10.59%	16.56%	0.38	no data	79.20%	20.09%	3935.50	no data	0.83
2004	0.49	6.28%	12.07%	15.44%	0.37	-31.14%	76.17%	22.54%	3229.29	no data	0.66
2005	0.05	3.01%	6.10%	8.80%	0.32	-7.81%	77.53%	22.63%	3565.99	0.10	0.71
2006	0.31	3.75%	8.68%	10.52%	0.36	-4.86%	77.84%	20.83%	3637.32	0.13	0.77
2007	1.16	4.20%	7.29%	14.34%	0.32	-6.71%	66.61%	15.49%	3885.04	0.19	1.40
2008	0.72	3.54%	5.19%	13.74%	0.33	-7.61%	66.89%	18.13%	4050.64	0.26	0.76
2009	0.61	4.09%	7.50%	13.30%	0.31	-8.30%	68.09%	18.06%	4534.59	0.26	0.87
2010	0.46	3.24%	5.92%	11.56%	0.28	-5.55%	69.50%	18.26%	4668.12	0.25	0.64
2011	0.43	3.40%	5.31%	12.70%	0.25	-8.24%	68.77%	19.19%	4853.32	0.25	0.45

The cash ratio for the *Utilities* industry stands out as a very strong marker rendering the industry in an everything but negligible cash position, where in the final years almost half of the Current Liabilities can be provided for by cash and its equivalents. This industry's cash position is the highest of all the industries. *Activity* is slowly diminishing and this industry possesses the lowest *Turnover* of all the industries. Profitability variations do not seem to pose any sign for concern, especially if we contrast them to the profitability of other industries. Along with the *Oil & Gas* industry, the *Utilities* industry does not change sign from positive to negative in profitability anywhere in the time span.

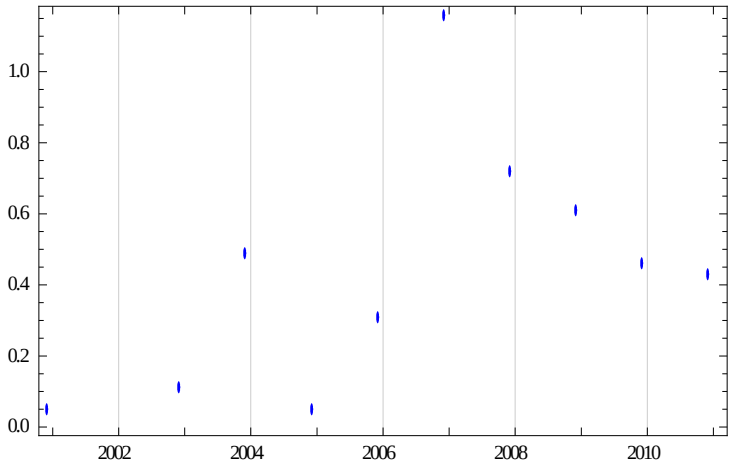
Productivity is rising during the time span and *Valuation* overall is diminishing. CAPEX show somewhat erratic behavior whereas *BS structure* seems fairly stable, a little less than 70% in PPE in the final years. *Leverage* has dropped and this is an exception in all industries, whereas *Size* is growing. Overall the *Utilities* industry seems very healthy and it is the only industry that is growing with diminishing *Leverage* and almost steady profits.

Table 18: Forecasting for the Utilities Industry

Utilities							
Ratio	**Domain**	**Formula**	**Linear Correlation**	**a**	**b**	**R^2**	**p-value**
Cash Ratio	Liquidity	Cash / CL	Uncorrelated	0.0889	0.0547	**26%**	**0.131191**
ROA	Profitability	EAT / TA	Inverse	7.1527	-0.4014	**59%**	**0.005731**
ROE	Profitability	EAT / Equity	Inverse	14.7627	-0.9641	**74%**	**0.000722**
Net Profit Margin	Profitability	EAT / Revenue	Inverse	17.3840	-0.5658	**34%**	**0.057856**
Asset Turnover	Activity	Revenue / TA	Inverse	0.4009	-0.0114	**81%**	**0.000175**
CAPEX Ratio	Growth	CAPEX / TA	Uncorrelated	-18.6193	1.9093	**29%**	**0.164870**
Fixed Assets Leverage	BS Structure	PPE / TA	Uncorrelated	77.5069	-0.8533	**34%**	**0.058671**
Financial Leverage	Leverage	TD / TA	Uncorrelated	22.6491	-0.4655	**30%**	**0.078317**
Size	Size	Total Assets	Direct	3065.4600	145.0340	**70%**	**0.001421**
Operating Performance	Productivity	Revenue / Empl.	Direct	0.0510	0.0199	**76%**	**0.004740**
Tobin's Q	Valuation	TA (MV) / Repl. Value	Uncorrelated	0.8651	-0.0128	**3%**	**0.600904**

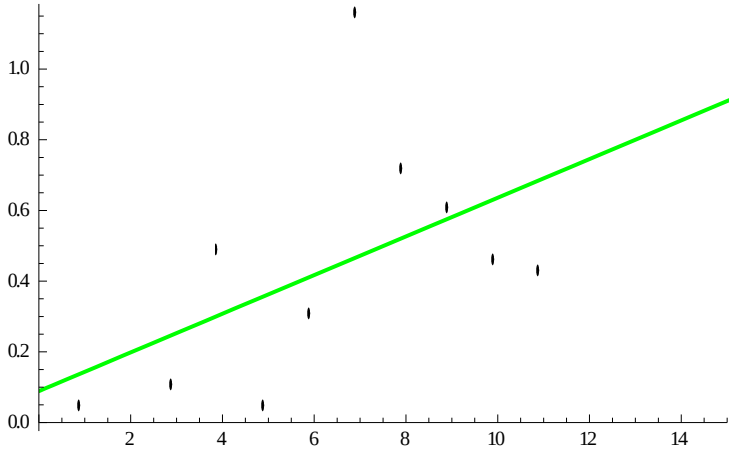
The linear model seems effective for five ratios of this industry. The coefficient of determination is low for five ratios and under 10% for one ratio. Graphs 353-396 provide an analysis visualization of all the financial ratios for the *Utilities* industry and of the linear models and their constituents:

Graph 353: Plot of the time series – Cash Ratio (Utilities)



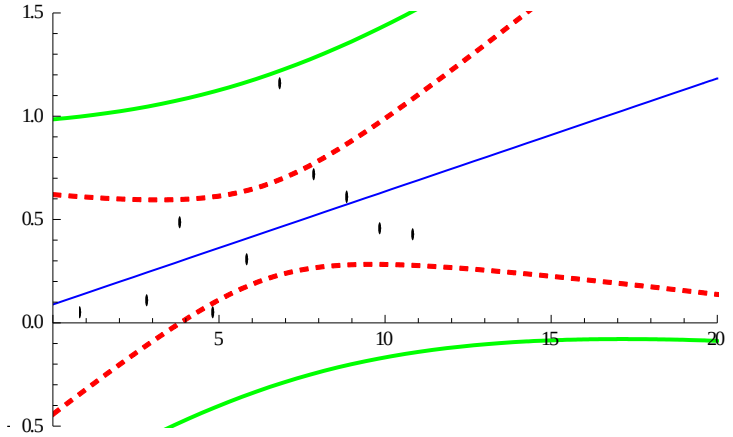
No explicit trend is evident for all years.

Graph 354: Scatter plot with the trend line – Cash Ratio (Utilities)



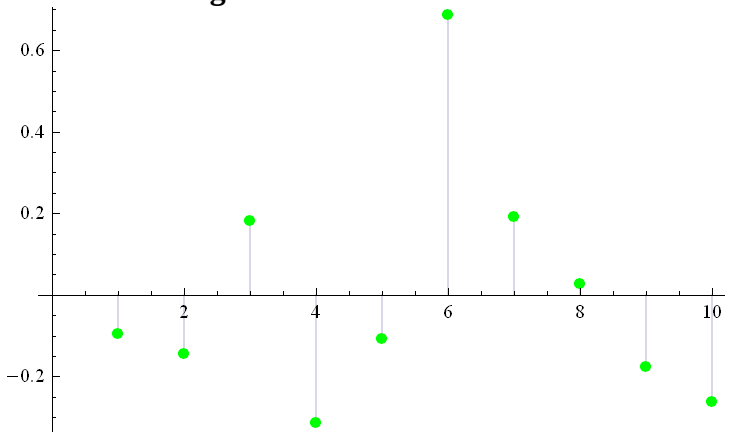
The linear model has a positive trend. The line equation is: $0.0889394 + 0.054697\,x$

Graph 355: Plot of the time series, trend line, mean and single prediction bands – Cash Ratio (Utilities)



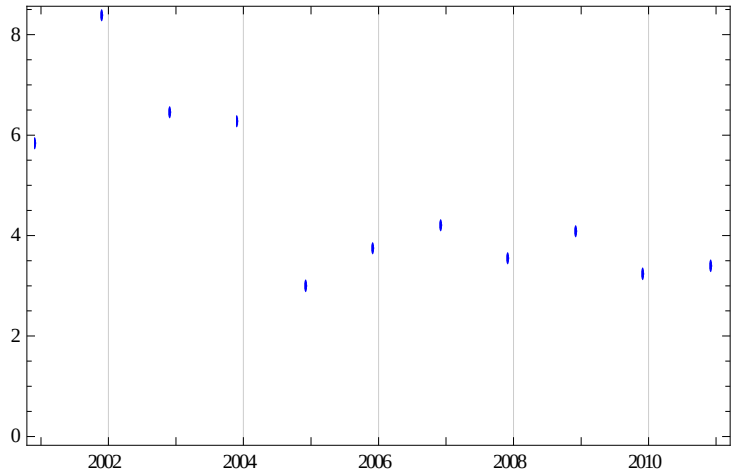
With a coefficient of determination of 26%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 356: Plot of the regression model residuals – Cash Ratio (Utilities)



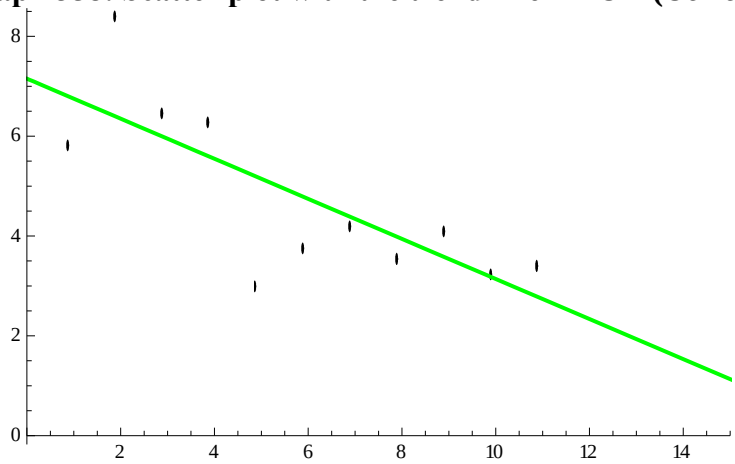
We can observe no evident clustering of the residuals.

Graph 357: Plot of the time series – ROA (Utilities)



We can observe a negative trend with periodic cyclic variations.

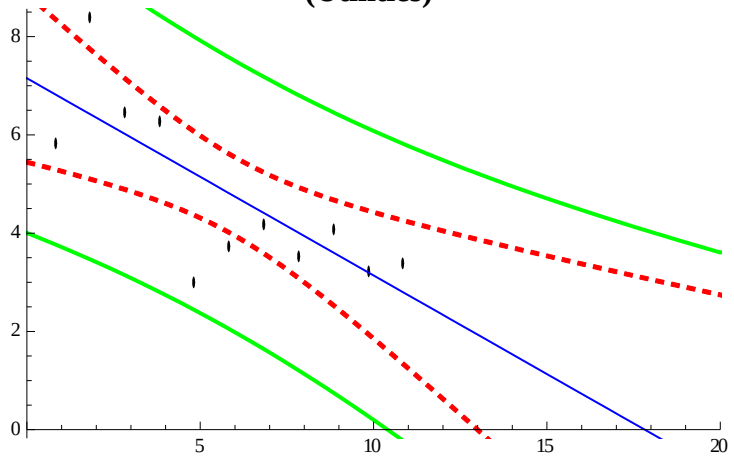
Graph 358: Scatter plot with the trend line – ROA (Utilities)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

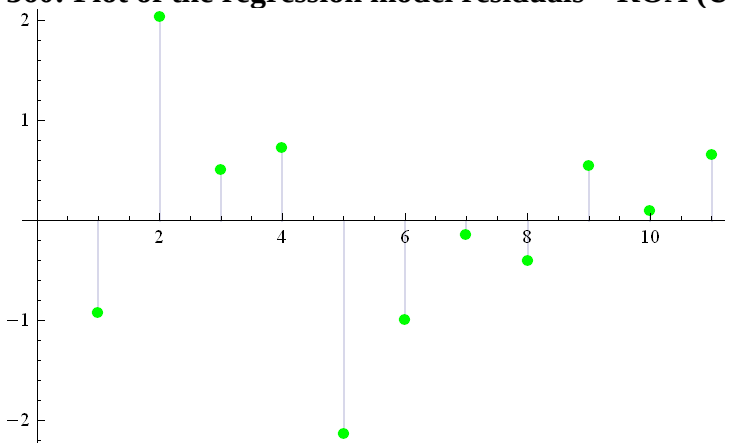
$$7.15273 - 0.401364\,x$$

Graph 359: Plot of the time series, trend line, mean and single prediction bands – ROA (Utilities)



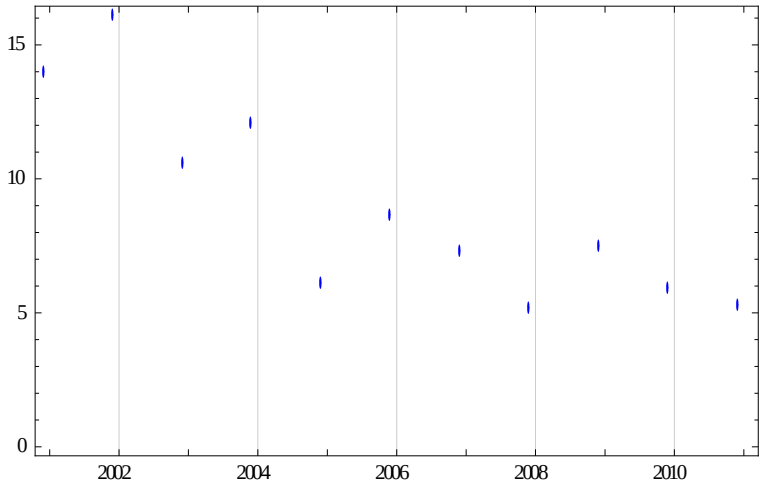
With a coefficient of determination of 59%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 360: Plot of the regression model residuals – ROA (Utilities)



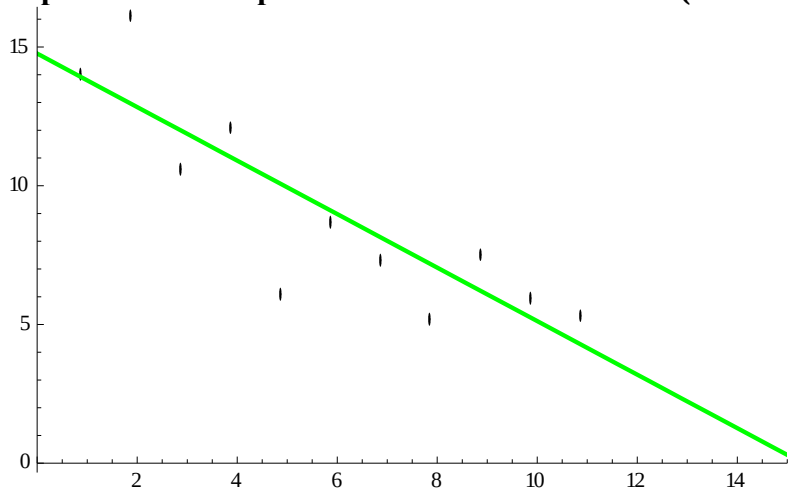
We can observe no evident residuals clustering, although most register low values.

Graph 361: Plot of the time series – ROE (Utilities)



We can observe a negative trend with periodic cyclic variations.

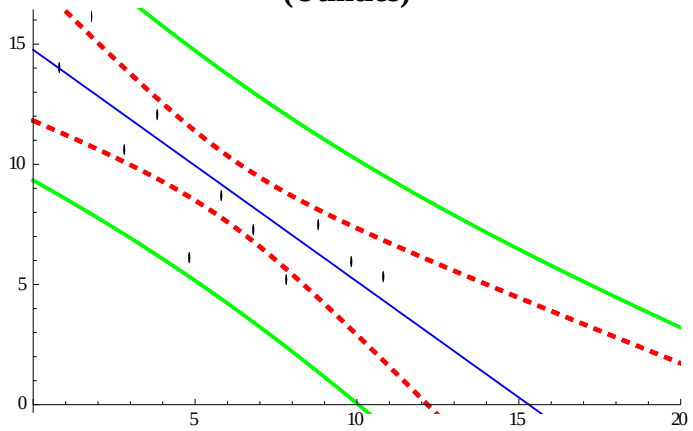
Graph 362: Scatter plot with the trend line – ROE (Utilities)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

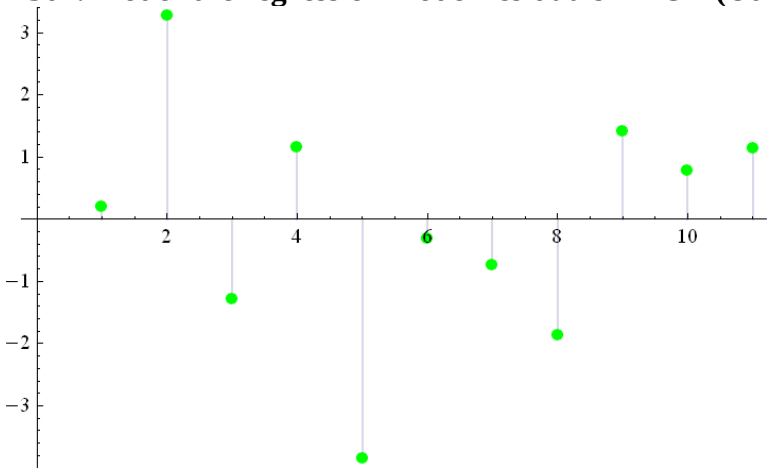
$$14.7627 \cdot 0.964091\,x$$

Graph 363: Plot of the time series, trend line, mean and single prediction bands – ROE (Utilities)



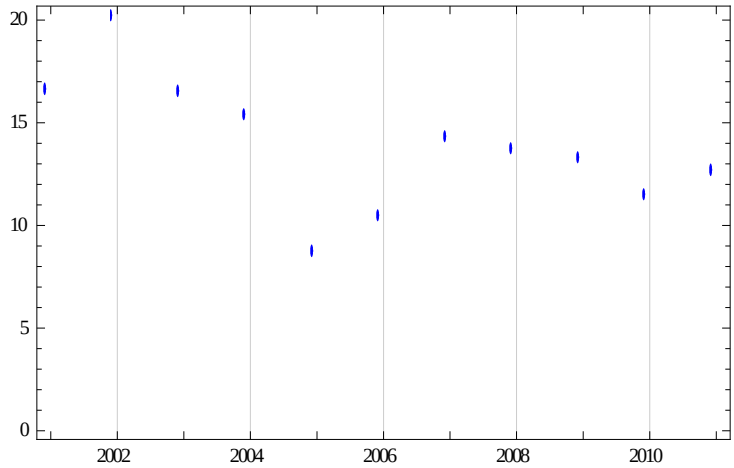
With a coefficient of determination of 74%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 364: Plot of the regression model residuals – ROE (Utilities)



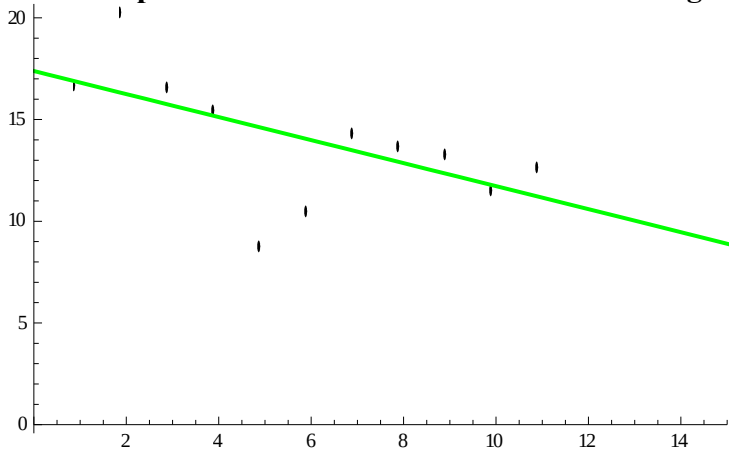
We can observe no evident clustering of the residuals.

Graph 365: Plot of the time series – Net Profit Margin (Utilities)



We can observe a negative trend with periodic cyclic variations.

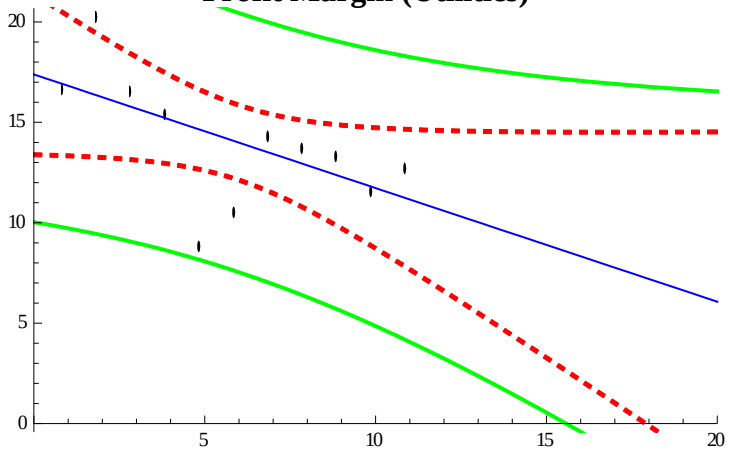
Graph 366: Scatter plot with the trend line – Net Profit Margin (Utilities)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

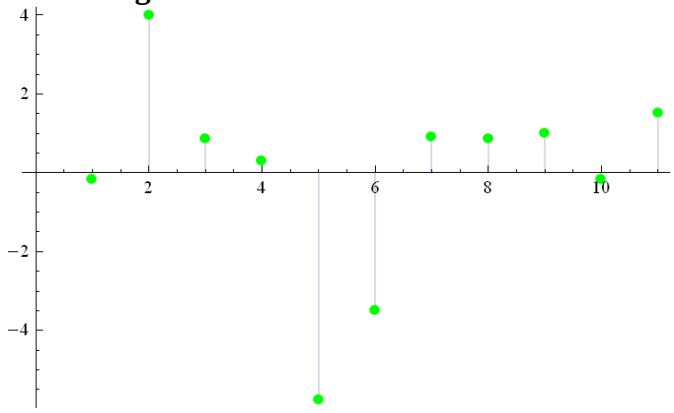
$$17.384 - 0.565818\,x$$

Graph 367: Plot of the time series, trend line, mean and single prediction bands – Net Profit Margin (Utilities)



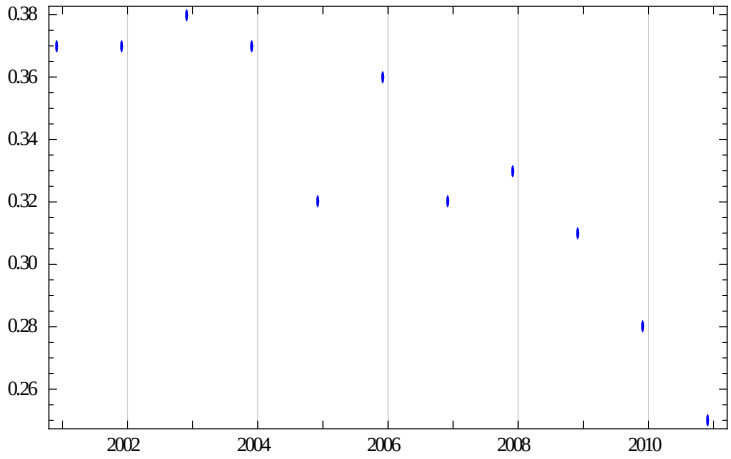
With a coefficient of determination of 34%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 368: Plot of the regression model residuals – Net Profit Margin (Utilities)



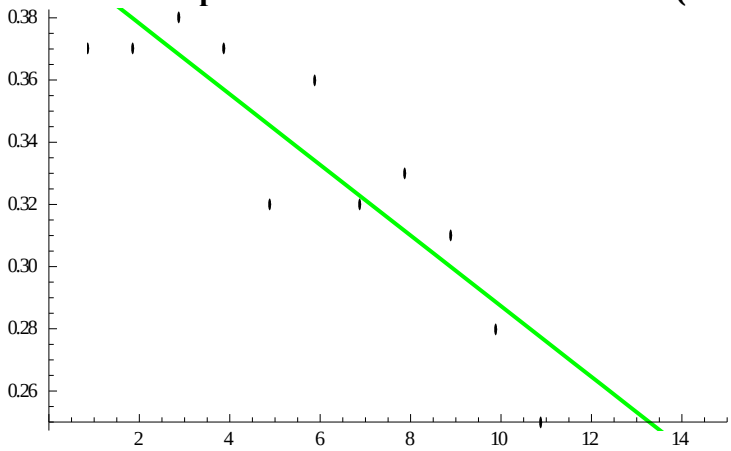
We can observe no evident clustering of the residuals.

Graph 369: Plot of the time series – Sales/TA (Utilities)



We can observe a negative trend with periodic cyclic variations.

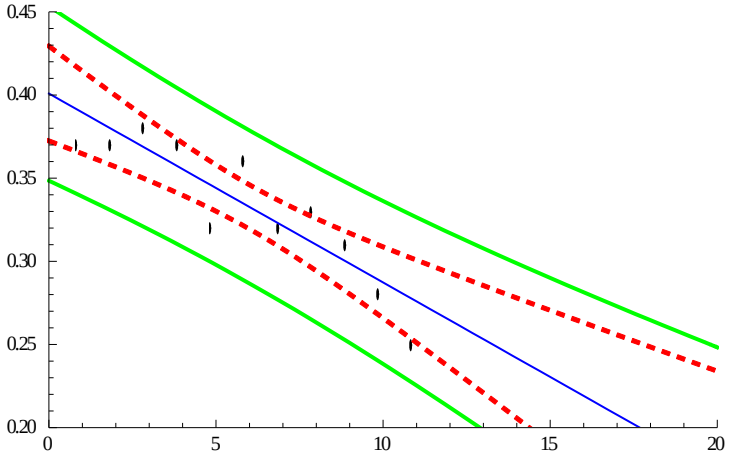
Graph 370: Scatter plot with the trend line – Sales/TA (Utilities)



The inverse linear correlation of the raw data and the trend line is evident. The equation of the trend line is:

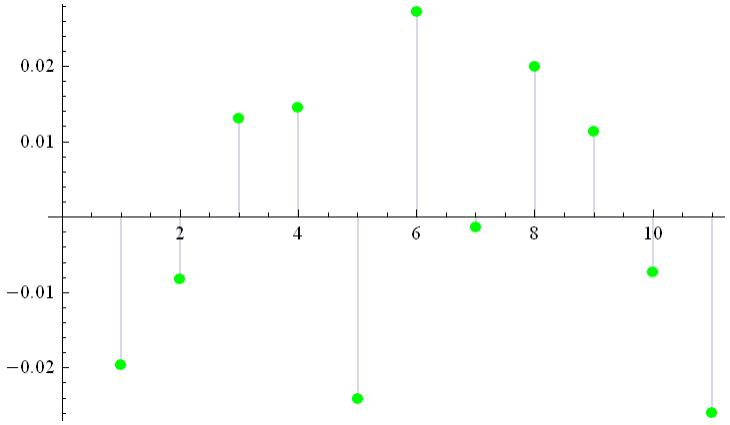
$$0.400909 - 0.0113636x$$

Graph 371: Plot of the time series, trend line, mean and single prediction bands – Sales/TA (Utilities)



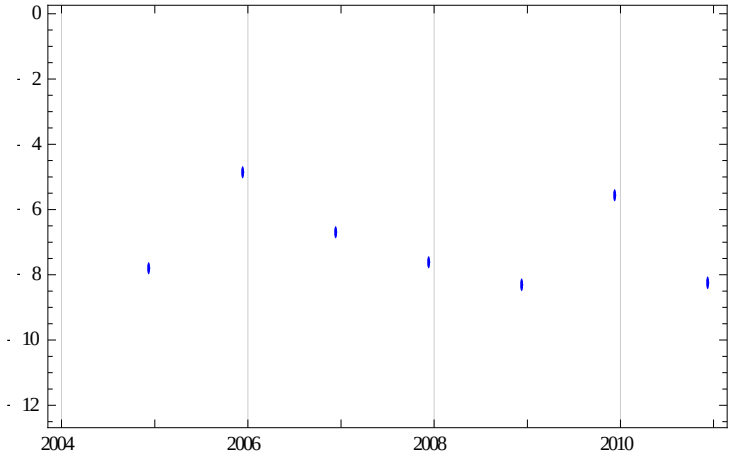
With a coefficient of determination of 81%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 372: Plot of the regression model residuals – Sales/TA (Utilities)



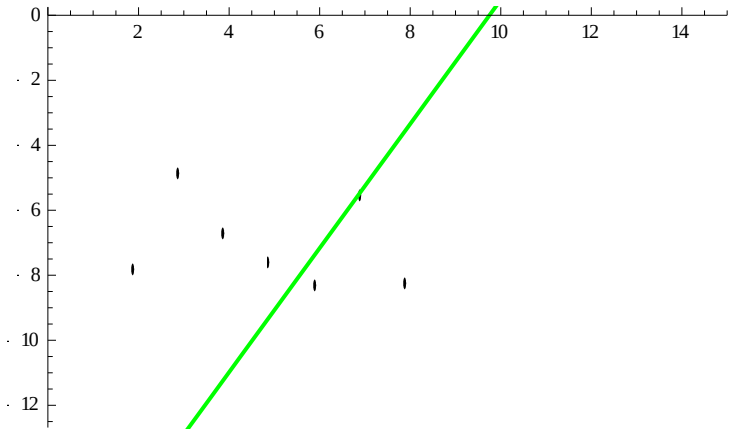
We can observe no evident clustering of the residuals.

Graph 373: Plot of the time series – CAPEX/TA (Utilities)



No explicit trend is evident for all years. Please note that the marker for 2004 is off the chart.

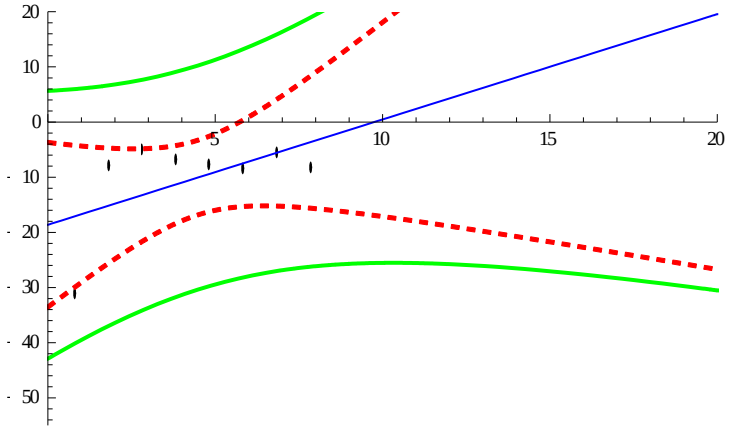
Graph 374: Scatter plot with the trend line – CAPEX/TA (Utilities)



The linear model has a positive trend. The line equation is:

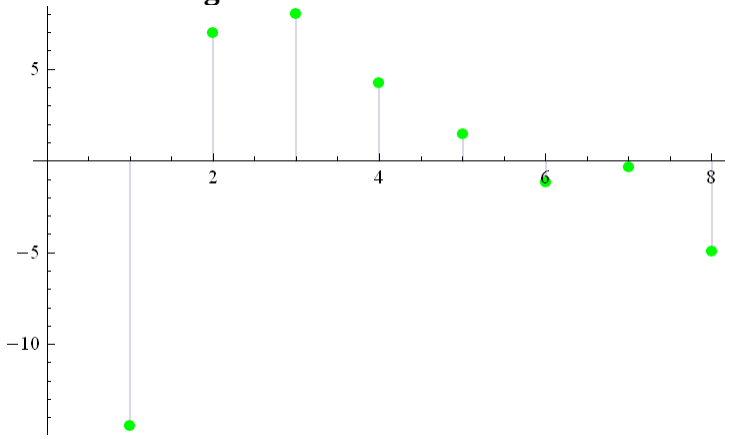
$$18.6193 - 1.90929x$$

Graph 375: Plot of the time series, trend line, mean and single prediction bands – CAPEX/TA (Utilities)



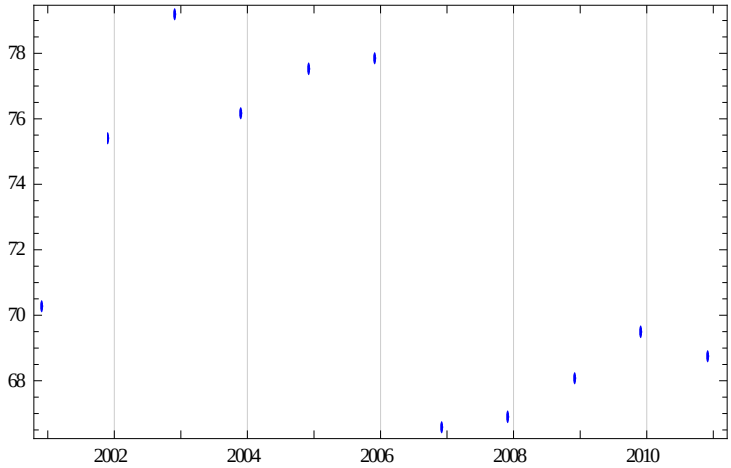
With a coefficient of determination of 29%, we can observe that most markers of the raw data fall within the confidence bands and that all but one are within the prediction bands.

Graph 376: Plot of the regression model residuals – CAPEX/TA (Utilities)



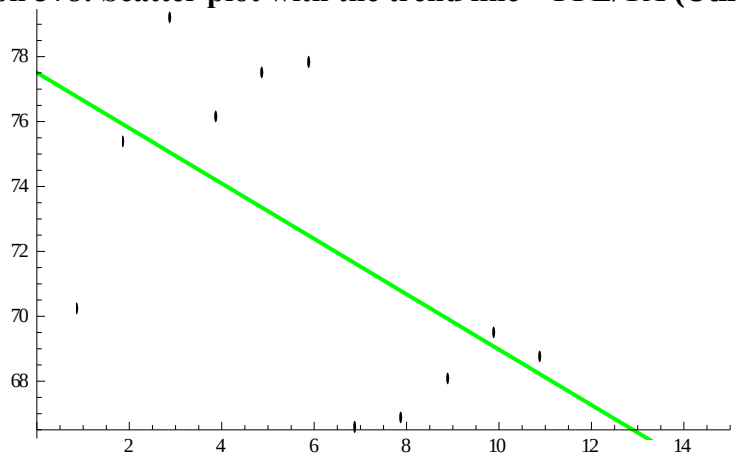
We can observe no evident clustering of the residuals.

Graph 377: Plot of the time series – PPE/TA (Utilities)



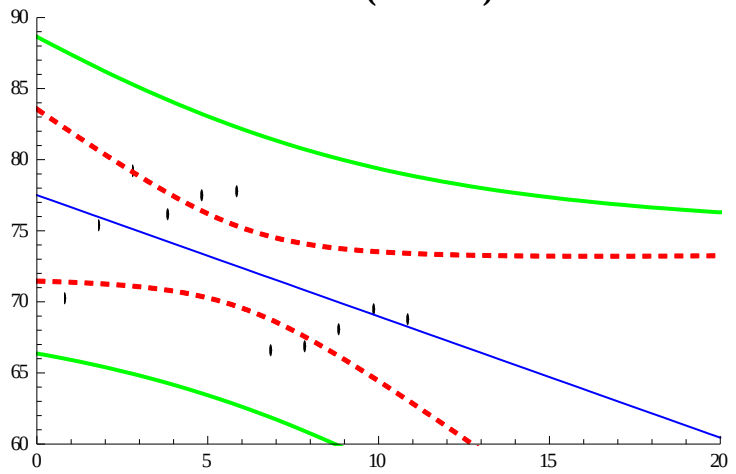
No explicit trend is evident for all years.

Graph 378: Scatter plot with the trend line – PPE/TA (Utilities)



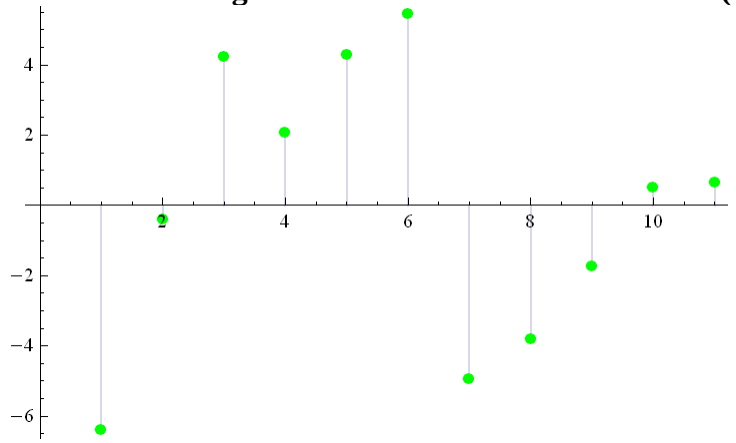
The linear model has a negative trend. The line equation is: $77.5069 - 0.853273\,x$

Graph 379: Plot of the time series, trend line, mean and single prediction bands – PPE/TA (Utilities)



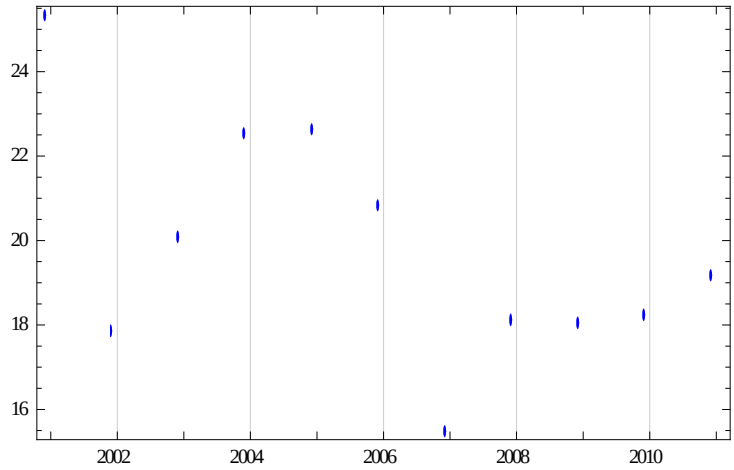
With a coefficient of determination of 34%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 380: Plot of the regression model residuals – PPE/TA (Utilities)



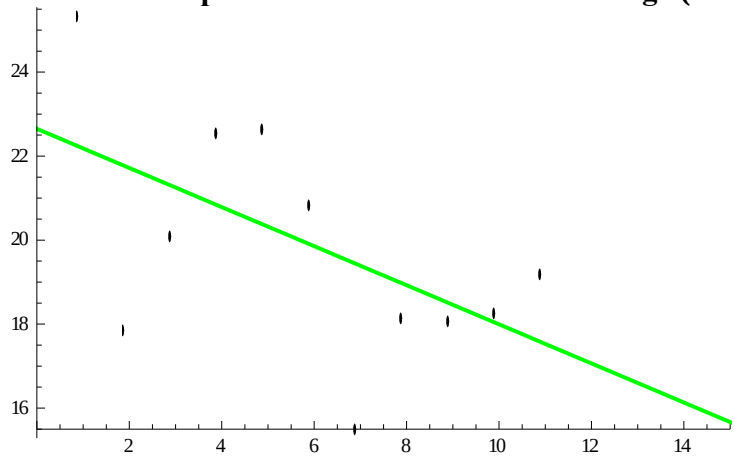
We can observe no evident clustering of the residuals.

Graph 381: Plot of the time series – Leverage (Utilities)



No explicit trend is evident for all years.

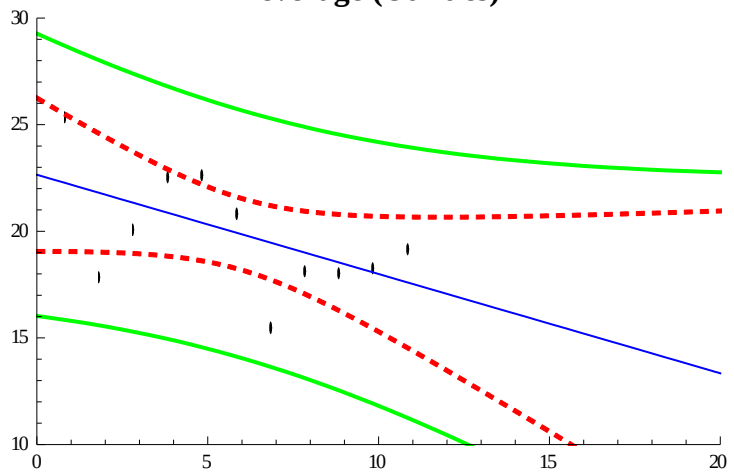
Graph 382: Scatter plot with the trend line – Leverage (Utilities)



The linear model has a negative trend. The line equation is:

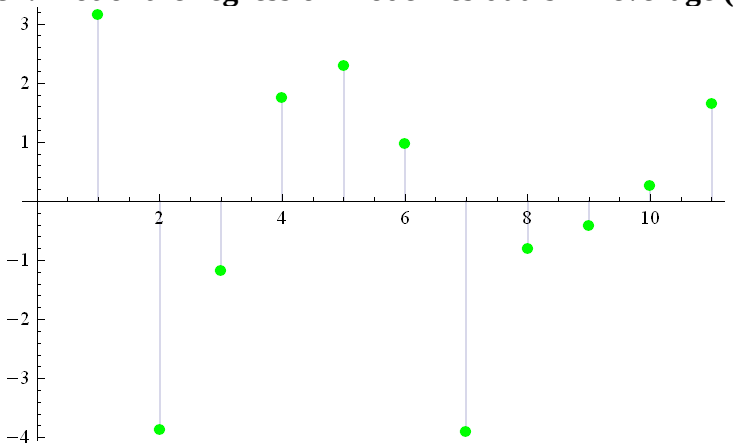
$$22.6491 - 0.465455x$$

Graph 383: Plot of the time series, trend line, mean and single prediction bands – Leverage (Utilities)



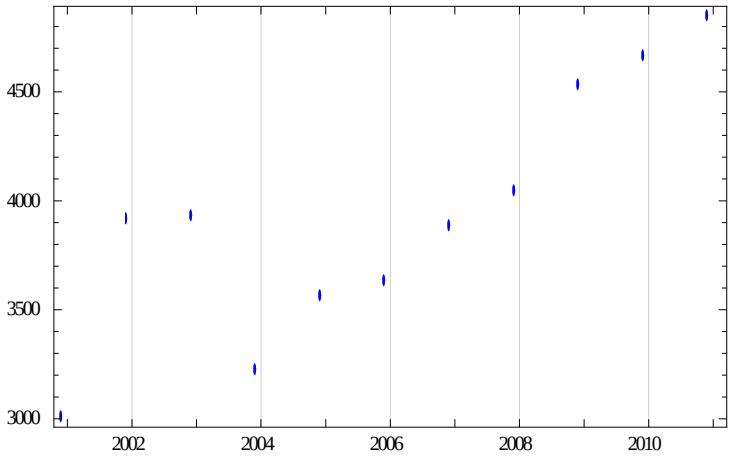
With a coefficient of determination of 30%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 384: Plot of the regression model residuals – Leverage (Utilities)



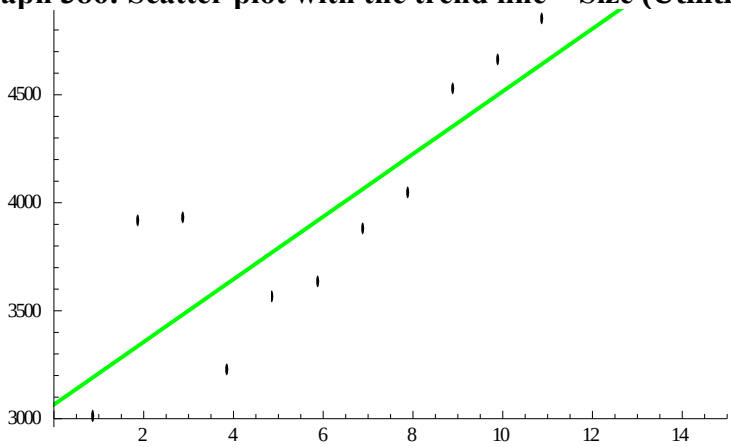
We can observe no evident clustering of the residuals.

Graph 385: Plot of the time series – Size (Utilities)



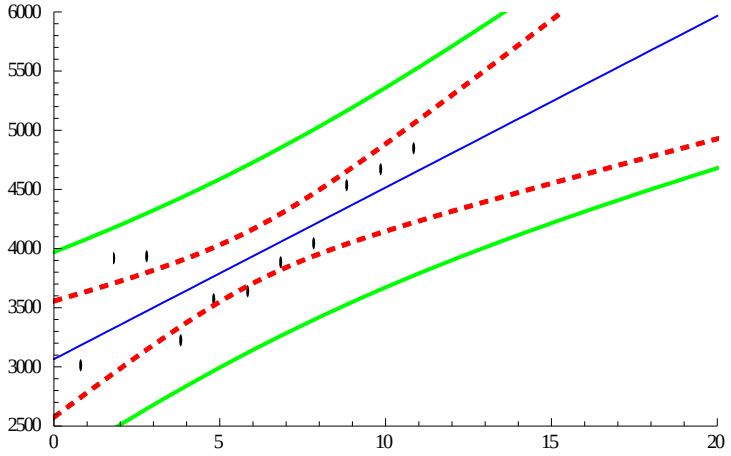
We can observe a positive trend with periodic cyclic variations.

Graph 386: Scatter plot with the trend line – Size (Utilities)



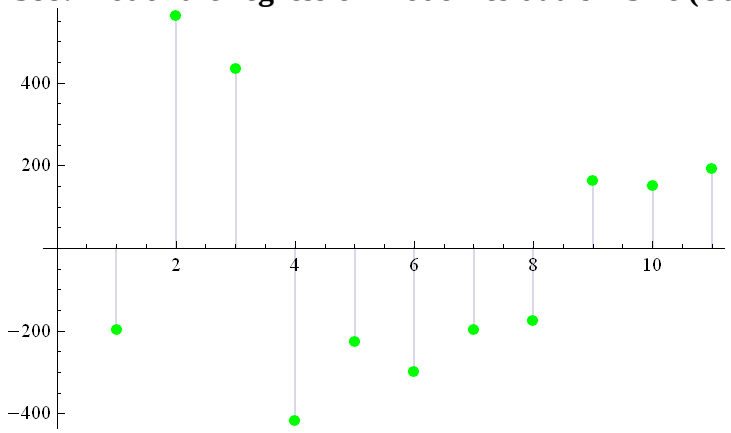
The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is: $3065.46 + 145.034x$

Graph 387: Plot of the time series, trend line, mean and single prediction bands – Size (Utilities)



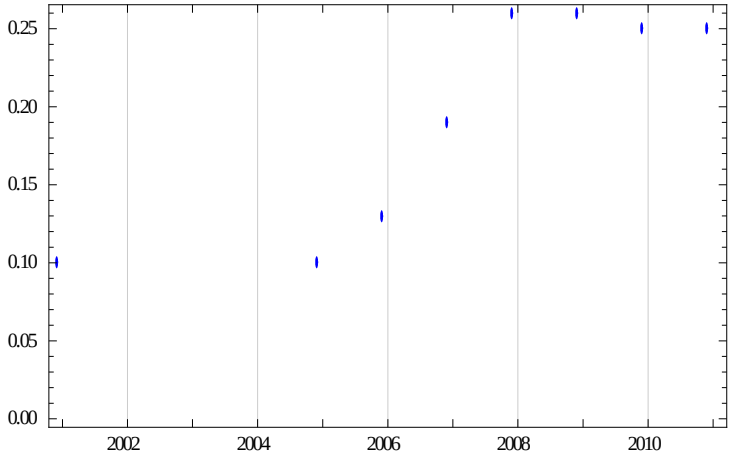
With a coefficient of determination of 70%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 388: Plot of the regression model residuals – Size (Utilities)



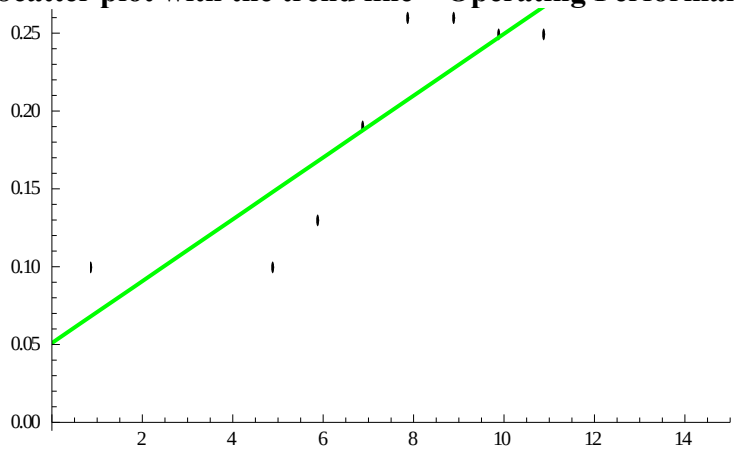
We can observe no evident clustering of the residuals.

Graph 389: Plot of the time series – Operating Performance (Utilities)



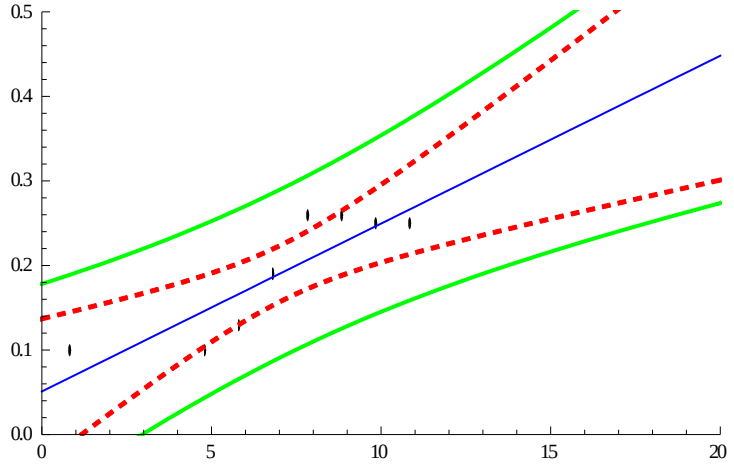
We can observe a positive trend with periodic cyclic variations.

Graph 390: Scatter plot with the trend line – Operating Performance (Utilities)



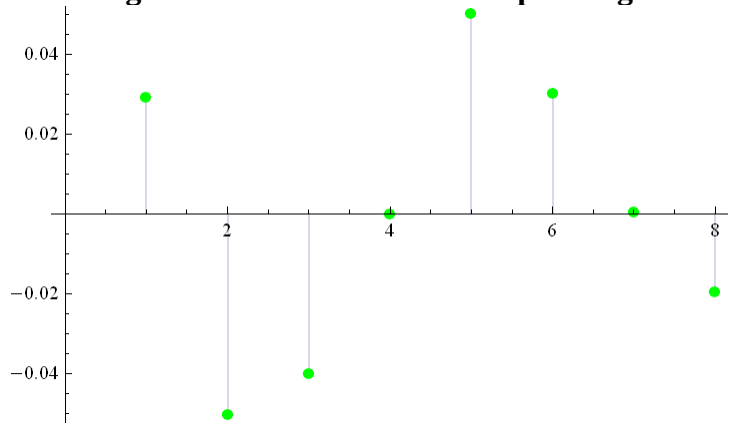
The direct linear correlation of the raw data and the trend line is evident. The equation of the trend line is: $0.0510053 + 0.0198589x$

Graph 391: Plot of the time series, trend line, mean and single prediction bands – Operating Performance (Utilities)



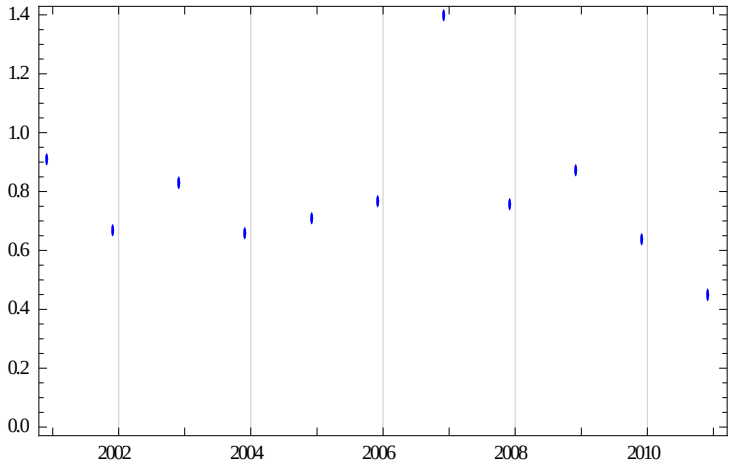
With a coefficient of determination of 76%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands.

Graph 392: Plot of the regression model residuals – Operating Performance (Utilities)



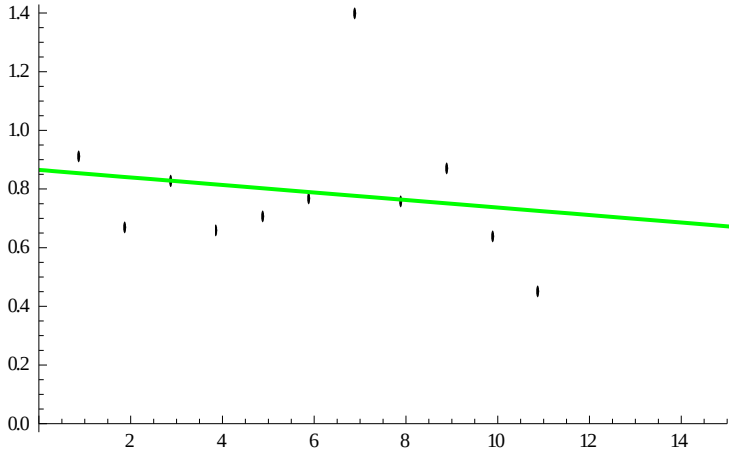
We can observe no evident clustering of the residuals.

Graph 393: Plot of the time series – Tobin's Q (Utilities)



We can observe negative long-term trend.

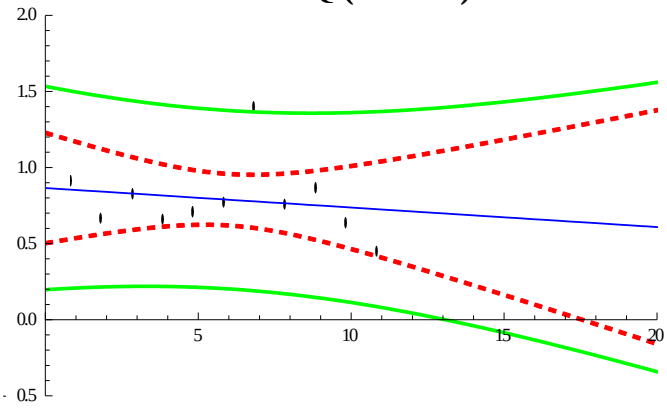
Graph 394: Scatter plot with the trend line – Tobin's Q (Utilities)



The linear model has a negative trend. The line equation is:

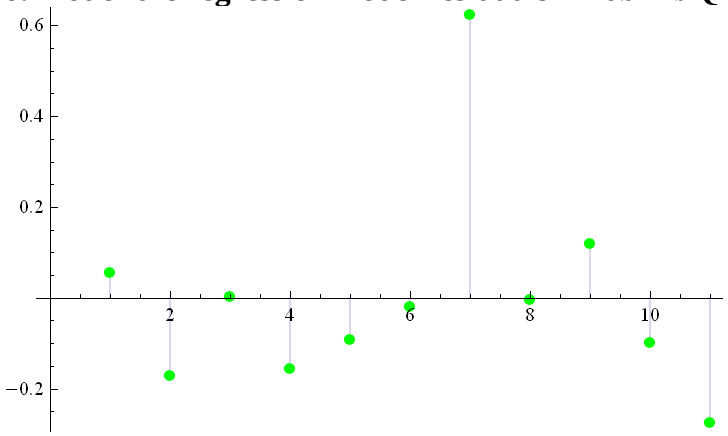
$$0.865091 - 0.0128182\,x$$

Graph 395: Plot of the time series, trend line, mean and single prediction bands – Tobin's Q (Utilities)



With a coefficient of determination of 3%, we can observe that most markers of the raw data fall within the confidence bands and that all are within the prediction bands, with one exception.

Graph 396: Plot of the regression model residuals – Tobin's Q (Utilities)



We can observe no evident residuals clustering, although most are under 0.2 points.

5. Conclusions

In order to facilitate analysis and conclusion extraction from the results, the ratios are consolidated in tabular form; the average (of all industries) of the per annum ratios is calculated and presented along with the highest and lowest values for each year. All tables are color coded and dark color corresponds to maximum values whereas light color to minimum values (except for p-values where color coding is reversed). In addition, the variance of the ratios is calculated both for each year and for each specific industry. The average along with each minimum and maximum (regardless of the particular industry they originate) are then presented in a graph. Although it may be of little value to calculate the averages of all industries as we are uniting dissimilar entities, it may pose as a pseudo-benchmark in order to compare each industry with said average, instead of comparing industries to each other.

5.1 Cash Ratio

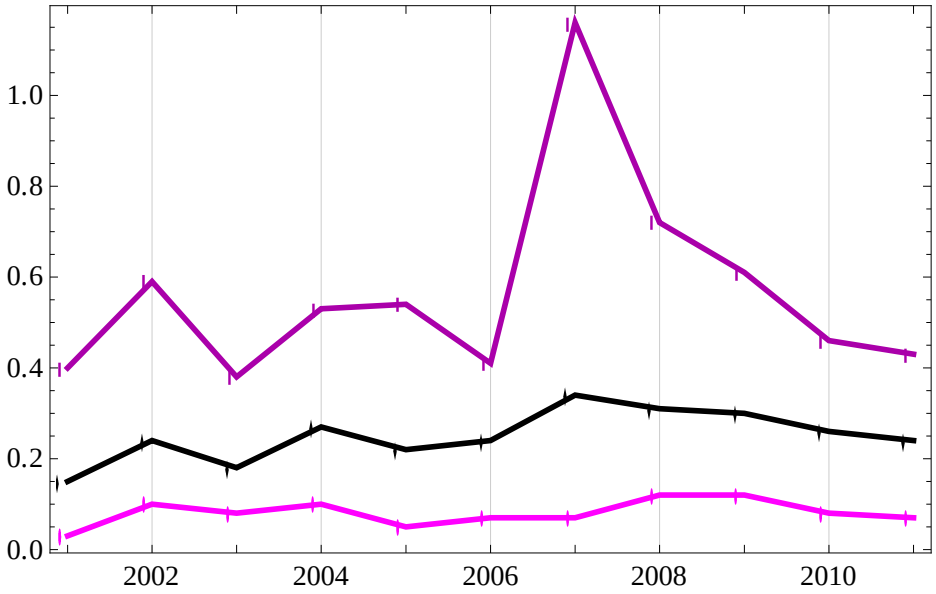
Table 19: Industry consolidation with the averages and extremums for Cash Ratio

Cash Ratio													
Year	**Materials**	**Goods**	**Services**	**Health**	**Industrials**	**Oil & Gas**	**Tech**	**Telecom**	**Utilities**	**Average**	**Min**	**Max**	**Variance**
2001	0.03	0.12	0.14	no data	0.40	no data	0.10	0.18	0.05	**0.15**	0.03	0.40	**1.30%**
2002	0.10	0.13	0.33	0.12	0.59	no data	0.19	0.25	no data	**0.24**	0.10	0.59	**2.64%**
2003	0.10	0.19	0.23	0.08	0.38	0.11	0.23	no data	0.11	**0.18**	0.08	0.38	**0.89%**
2004	0.10	0.12	0.25	0.10	0.53	0.15	0.40	no data	0.49	**0.27**	0.10	0.53	**2.84%**
2005	0.09	0.11	0.37	0.06	0.32	0.09	0.38	0.54	0.05	**0.22**	0.05	0.54	**2.87%**
2006	0.13	0.13	0.37	0.11	0.25	0.07	0.36	0.41	0.31	**0.24**	0.07	0.41	**1.55%**
2007	0.11	0.15	0.42	0.43	0.29	0.07	0.20	0.21	1.16	**0.34**	0.07	1.16	**9.94%**
2008	0.12	0.17	0.33	0.21	0.28	0.23	0.22	0.48	0.72	**0.31**	0.12	0.72	**3.11%**
2009	0.24	0.24	0.28	0.17	0.36	0.12	0.25	0.42	0.61	**0.30**	0.12	0.61	**1.92%**
2010	0.18	0.27	0.36	0.08	0.31	0.12	0.31	0.26	0.46	**0.26**	0.08	0.46	**1.25%**
2011	0.16	0.20	0.35	0.07	0.32	0.20	0.19	0.27	0.43	**0.24**	0.07	0.43	**1.09%**
Average	**0.12**	**0.17**	**0.31**	**0.14**	**0.37**	**0.13**	**0.26**	**0.33**	**0.44**	**0.25**	**0.08**	**0.57**	**2.67%**
Min	0.03	0.11	0.14	0.06	0.25	0.07	0.10	0.18	0.05	0.15	0.03	0.38	0.89%
Max	0.24	0.27	0.42	0.43	0.59	0.23	0.40	0.54	1.16	0.34	0.12	1.16	9.94%
Variance	**0.26%**	**0.25%**	**0.58%**	**1.15%**	**1.02%**	**0.28%**	**0.79%**	**1.46%**	**10.72%**	**0.28%**	**0.06%**	**4.56%**	

Minimum values are scattered and reveal a close to null cash position, whereas maximum values are divided in three industries in the time span, beginning from *Industrials*, continuing with *Telecommunications* and ending with the *Utilities* industry. The greatest variance is observed in the *Utilities* industry, which from a close to null cash position in the first years shows the strongest cash position in the final ones; the lowest variance is observed in the *Consumer Goods* industry, whereas overall variance is low (with the exception of *Utilities*).

Temporally the highest variance of almost 10% is observed in 2007, whereas for the rest of the years it fluctuates from 1% to 3% approximately; this can be traced to the *Utilities* cash position for 2007. The cash ratio shows diversity over the years and is largely dependent on the specific industry it originates from; we cannot forget that a cash ratio of a firm may not be enough to extract any sound conclusion on liquidity, since the latter is greatly reliant on the ability of short-term loaning. Nevertheless, in a sovereign-debt crisis it may not erroneous to assume as a given that said ability diminishes, since market efficiency overall is diminishing, including that of financial institutions, intermediaries and markets.

Graph 397: Plot of the Average and Extremums for Cash Ratio



We can observe that the maximum values are disproportionate to the minimums, with regard to the position of the average. The 2007 maximum is due to the *Utilities* cash position rapid augmentation, from 0.31 (2006) to 1.16 (2007).

5.2 Profitability Ratios

For this study, the three discrete profitability ratios are able to provide insight in one of the most important financial domains, that of value formulation and profit generation. As we would easily guess in regard to the profitability ratios of many firms within an economy undergoing a crisis and with a stable high-yield credit rating from 2010, they are not tantalizing.

What we would expect on the other hand is a somewhat steady or rising profitability in flexible accordance with the GDP until the crisis. The surprising find is that the profitability profile hints towards a long-term negative trend *and* a sudden shock due to market crisis; not only the latter.

It may be of importance to note once again that the turning point for the Hellenic GDP is in 2009 whence before that year it was rising. The profits of most of the industries before this year are not as expected in reference to a growing economy, especially if we take under consideration the fact that at the same time all industries are growing rapidly.

The fact that not even the record breaking high profitability ratios do not show signs of substantial growth before the crisis initiation (or even the world economy recession of 2008) is worthy of further investigation. If combined with industry size growth ratios then maybe the instigators behind this particular situation can be traced in transparency, overall economy efficiency and rudimentary managerial decisions long before the sovereign-debt crisis made its appearance.

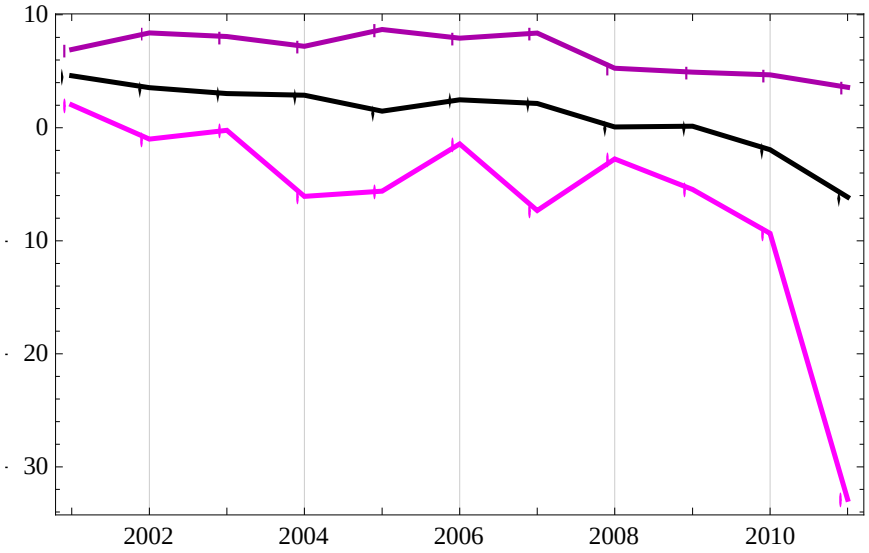
5.2.1 ROA

Table 20: Industry consolidation with the averages and extremums for ROA

ROA													
Year	**Materials**	**Goods**	**Services**	**Health**	**Industrials**	**Oil & Gas**	**Tech**	**Telecom**	**Utilities**	**Average**	**Min**	**Max**	**Variance**
2001	2.99%	2.02%	4.00%	3.80%	4.40%	6.11%	5.40%	6.92%	5.83%	**4.61%**	2.02%	6.92%	**0.02%**
2002	2.41%	1.28%	3.47%	3.51%	4.55%	5.73%	3.65%	-1.00%	8.39%	**3.55%**	-1.00%	8.39%	**0.06%**
2003	1.28%	1.82%	3.42%	0.65%	3.35%	8.08%	-0.22%	2.43%	6.46%	**3.03%**	-0.22%	8.08%	**0.07%**
2004	3.43%	1.67%	5.36%	0.27%	5.01%	7.21%	2.72%	-6.07%	6.28%	**2.88%**	-6.07%	7.21%	**0.14%**
2005	2.20%	0.90%	3.32%	-1.77%	2.05%	8.70%	0.44%	-5.61%	3.01%	**1.47%**	-5.61%	8.70%	**0.13%**
2006	2.25%	0.53%	1.83%	0.10%	2.82%	7.93%	4.55%	-1.43%	3.75%	**2.48%**	-1.43%	7.93%	**0.07%**
2007	2.25%	1.57%	4.42%	2.33%	2.50%	8.38%	1.04%	-7.32%	4.20%	**2.15%**	-7.32%	8.38%	**0.16%**
2008	-2.76%	-2.02%	-2.34%	-1.52%	-1.71%	3.13%	-0.98%	5.27%	3.54%	**0.07%**	-2.76%	5.27%	**0.08%**
2009	-1.83%	-3.67%	-5.46%	0.86%	-0.39%	4.92%	-1.29%	3.98%	4.09%	**0.14%**	-5.46%	4.92%	**0.12%**
2010	-0.99%	-3.66%	-6.07%	-9.34%	-1.19%	4.69%	-4.57%	0.42%	3.24%	**-1.94%**	-9.34%	4.69%	**0.18%**
2011	-2.83%	-8.16%	-8.69%	-32.87%	-5.25%	3.58%	-5.64%	1.32%	3.40%	**-6.13%**	-32.87%	3.58%	**1.09%**
Average	**0.76%**	**-0.70%**	**0.30%**	**-3.09%**	**1.47%**	**6.22%**	**0.46%**	**-0.10%**	**4.74%**	**1.12%**	**-6.37%**	**6.73%**	**0.19%**
Min	-2.83%	-8.16%	-8.69%	-32.87%	-5.25%	3.13%	-5.64%	-7.32%	3.01%	-6.13%	-32.87%	3.58%	0.02%
Max	3.43%	2.02%	5.36%	3.80%	5.01%	8.70%	5.40%	6.92%	8.39%	4.61%	2.02%	8.70%	1.09%
Variance	**0.05%**	**0.10%**	**0.23%**	**1.00%**	**0.09%**	**0.04%**	**0.11%**	**0.20%**	**0.03%**	**0.08%**	**0.81%**	**0.03%**	

Minimum values for the profitability ratio of Return on Assets are scattered (although five of the eleven are almost in sequential years in the *Telecommunications* industry) and reveal losses. Maximum values are divided in three industries in the time span, with the lion's share belonging to the *Oil & Gas* industry, which along with the *Utilities* industry are the only ones that the ratio does not change sign in the time span (for all profitability ratios), as has been previously indicated. The greatest variance is observed in the *Health Care* industry, which from a shy ratio turns to a negative double digit in the final year; the lowest variance is observed in the *Utilities* industry. Temporally the highest variance is observed in the final year, whereas the lowest in the first year; one could conjecture on the causes of the erratic temporal behavior of the ratio in these eleven years.

Graph 398: Plot of the Average and Extremums for ROA



We can observe that the maximum values are not disproportionate to the minimums, except in the final year. It possibly would be of interest to point out that the average reveals a negative long-term trend and not an acute diminution.

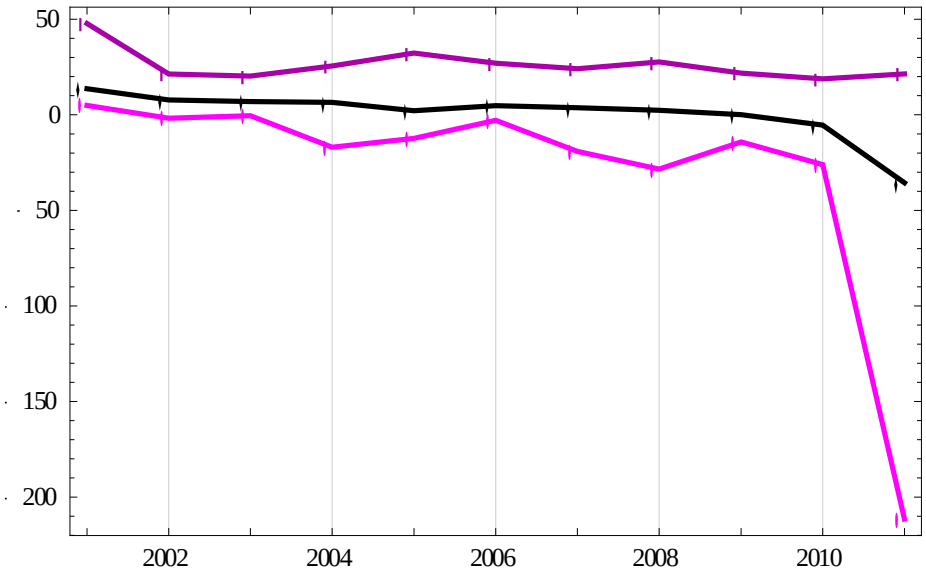
5.2.2 ROE

Table 21: Industry consolidation with the averages and extremums for ROE

ROE													
Year	**Materials**	**Goods**	**Services**	**Health**	**Industrials**	**Oil & Gas**	**Tech**	**Telecom**	**Utilities**	**Average**	**Min**	**Max**	**Variance**
2001	5.38%	4.93%	13.46%	8.82%	8.71%	47.76%	9.33%	10.39%	14.00%	**13.64%**	4.93%	47.76%	**1.54%**
2002	1.52%	3.30%	13.01%	6.61%	9.27%	21.34%	0.46%	-1.75%	16.11%	**7.77%**	-1.75%	21.34%	**0.54%**
2003	-0.44%	5.94%	8.40%	3.50%	6.23%	20.24%	2.58%	5.43%	10.59%	**6.94%**	-0.44%	20.24%	**0.31%**
2004	6.42%	5.09%	11.54%	-0.08%	9.45%	25.54%	5.86%	-16.98%	12.07%	**6.55%**	-16.98%	25.54%	**1.14%**
2005	4.20%	-4.27%	2.38%	-3.17%	3.86%	32.28%	-9.99%	-12.29%	6.10%	**2.12%**	-12.29%	32.28%	**1.51%**
2006	-1.89%	-1.99%	3.37%	6.71%	5.42%	27.02%	-1.38%	-2.86%	8.68%	**4.79%**	-2.86%	27.02%	**0.78%**
2007	11.61%	-3.71%	11.31%	3.95%	5.30%	24.12%	-7.21%	-19.15%	7.29%	**3.72%**	-19.15%	24.12%	**1.39%**
2008	-28.39%	-8.59%	8.38%	-6.11%	-7.94%	27.40%	3.61%	27.69%	5.19%	**2.36%**	-28.39%	27.69%	**2.84%**
2009	-3.65%	-12.18%	-5.63%	2.26%	-8.29%	13.14%	-14.21%	21.81%	7.50%	**0.08%**	-14.21%	21.81%	**1.30%**
2010	0.70%	-15.04%	-22.72%	-26.04%	-3.87%	18.80%	-8.85%	2.40%	5.92%	**-5.41%**	-26.04%	18.80%	**1.83%**
2011	-10.45%	-36.96%	-53.88%	-211.53%	-16.40%	21.41%	-24.37%	6.81%	5.31%	**-35.56%**	-211.53%	21.41%	**43.49%**
Average	**-1.36%**	**-5.77%**	**-0.95%**	**-19.55%**	**1.07%**	**25.37%**	**-4.02%**	**1.95%**	**8.98%**	**0.64%**	**-29.88%**	**26.18%**	**5.15%**
Min	-28.39%	-36.96%	-53.88%	-211.53%	-16.40%	13.14%	-24.37%	-19.15%	5.19%	-35.56%	-211.53%	18.80%	0.31%
Max	11.61%	5.94%	13.46%	8.82%	9.45%	47.76%	9.33%	27.69%	16.11%	13.64%	4.93%	47.76%	43.49%
Variance	**1.03%**	**1.44%**	**3.83%**	**37.70%**	**0.70%**	**0.74%**	**0.90%**	**2.01%**	**0.13%**	**1.52%**	**34.05%**	**0.61%**	

Minimum values for the profitability ratio of Return on Equity are scattered (although as with ROA five of the eleven are almost in sequential years in the *Telecommunications* industry) and reveal losses. Maximum values are within two industries in the time span, with the lion's share again delivered to the *Oil & Gas* industry. The *Utilities* industry does not hold an extremun for this ratio but remains profitable. The greatest variance is observed in the *Health Care* industry, which from a profitable position in the beginning of the time span returns a negative triple digit for ROE in the final year (and the only negative triple digit in profitability in this study; the industry lost more than double its Owners' Funds in 2011); whereas the lowest variance is observed again in the *Utilities* industry. Temporally the highest variance is observed in the final year, whereas the lowest in 2003.

Graph 399: Plot of the Average and Extremums for ROE



As with ROA, We can observe that the maximum values are not disproportionate to the minimums, except in the final year.

5.2.3 Net Profit Margin

Table 22: Industry consolidation with the averages and extremums for Net Profit Margin

Net Profit Margin													
Year	**Materials**	**Goods**	**Services**	**Health**	**Industrials**	**Oil & Gas**	**Tech**	**Telecom**	**Utilities**	**Average**	**Min**	**Max**	**Variance**
2001	4.04%	1.98%	5.18%	7.86%	5.85%	2.33%	5.10%	11.30%	16.66%	**6.70%**	1.98%	16.66%	**0.20%**
2002	3.30%	1.79%	3.25%	8.23%	5.37%	2.74%	5.51%	-1.63%	20.26%	**5.42%**	-1.63%	20.26%	**0.34%**
2003	1.06%	2.42%	1.63%	0.76%	5.00%	4.12%	1.47%	4.88%	16.56%	**4.21%**	0.76%	16.56%	**0.21%**
2004	4.24%	1.93%	6.08%	-3.02%	6.91%	3.65%	4.61%	-6.76%	15.44%	**3.68%**	-6.76%	15.44%	**0.35%**
2005	3.11%	0.23%	0.54%	-4.70%	3.37%	4.54%	-0.13%	-7.96%	8.80%	**0.87%**	-7.96%	8.80%	**0.22%**
2006	-0.99%	-1.06%	1.51%	-9.98%	3.83%	3.21%	2.73%	-5.30%	10.52%	**0.50%**	-9.98%	10.52%	**0.30%**
2007	1.91%	-0.74%	3.63%	8.60%	3.57%	3.90%	-1.38%	-19.74%	14.34%	**1.57%**	-19.74%	14.34%	**0.77%**
2008	-9.98%	-6.28%	-3.39%	-2.45%	-4.93%	0.83%	-4.06%	9.39%	13.74%	**-0.79%**	-9.98%	13.74%	**0.52%**
2009	-4.15%	-11.46%	-4.00%	2.14%	5.37%	2.66%	-6.57%	6.90%	13.30%	**0.47%**	-11.46%	13.30%	**0.52%**
2010	-2.56%	-18.82%	-13.13%	-24.18%	-10.73%	2.39%	-12.26%	0.72%	11.56%	**-7.45%**	-24.18%	11.56%	**1.14%**
2011	-6.89%	-33.45%	-13.54%	-64.44%	-72.83%	1.43%	-15.99%	2.38%	12.70%	**-21.18%**	-72.83%	12.70%	**7.99%**
Average	**-0.63%**	**-5.77%**	**-1.11%**	**-7.38%**	**-4.48%**	**2.89%**	**-1.91%**	**-0.53%**	**13.99%**	-0.55%	**-14.71%**	**13.99%**	**1.14%**
Min	-9.98%	-33.45%	-13.54%	-64.44%	-72.83%	0.83%	-15.99%	-19.74%	8.80%	-21.18%	-72.83%	8.80%	0.20%
Max	4.24%	2.42%	6.08%	8.60%	6.91%	4.54%	5.51%	11.30%	20.26%	6.70%	1.98%	20.26%	7.99%
Variance	**0.21%**	**1.18%**	**0.42%**	**4.08%**	**4.93%**	**0.01%**	**0.47%**	**0.75%**	**0.09%**	**0.56%**	**3.95%**	**0.09%**	

Minimum values for the profitability ratio of the *Net Profit Margin* are scattered (although as with ROE and ROA many are almost in sequential years in the *Telecommunications* industry) and reveal losses. Maximum values for this ratio all are delivered by the *Utilities* industry, which reveals diminishing but resilient profitability. The greatest variance is observed in the *Industrials* industry and this because for the last year it has the minimum figure of all years in the time span. The lowest variance is observed now in the *Oil & Gas* industry, which does not hold a maximum for this ratio, but has a more than negligible *Net Profit Margin* profile. Temporally the highest variance is observed in the final year, whereas the lowest in 2001.

Graph 400: Plot of the Average and Extremums for Net Profit Margin

As with ROE and ROA, We can observe that the maximum values are not extremely disproportionate to the minimums, except in the final year.

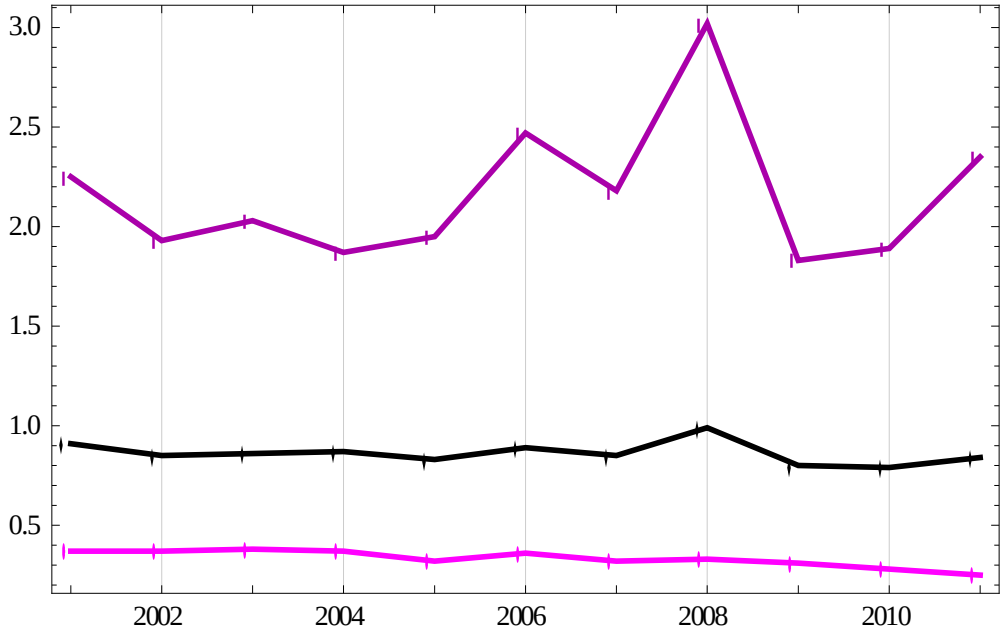
5.3 Activity

Table 23: Industry consolidation with the averages and extremums for Activity

Activity													
Year	**Materials**	**Goods**	**Services**	**Health**	**Industrials**	**Oil & Gas**	**Tech**	**Telecom**	**Utilities**	**Average**	**Min**	**Max**	**Variance**
2001	0.81	0.71	1.13	0.57	0.77	2.25	0.95	0.60	0.37	**0.91**	0.37	2.25	**26.72%**
2002	0.81	0.7	1.09	0.54	0.77	1.93	0.90	0.50	0.37	**0.85**	0.37	1.93	**18.94%**
2003	0.85	0.72	1.09	0.57	0.70	2.03	0.89	0.57	0.38	**0.86**	0.38	2.03	**20.64%**
2004	0.81	0.72	1.21	0.52	0.71	1.87	0.94	0.68	0.37	**0.87**	0.37	1.87	**17.48%**
2005	0.78	0.62	1.10	0.56	0.65	1.95	0.88	0.64	0.32	**0.83**	0.32	1.95	**19.83%**
2006	0.86	0.63	1.16	0.52	0.69	2.47	0.93	0.42	0.36	**0.89**	0.36	2.47	**37.08%**
2007	0.88	0.68	1.13	0.44	0.66	2.18	0.91	0.47	0.32	**0.85**	0.32	2.18	**27.72%**
2008	0.92	0.8	1.19	0.50	0.70	3.02	0.87	0.56	0.33	**0.99**	0.33	3.02	**57.43%**
2009	0.77	0.77	1.08	0.49	0.59	1.83	0.79	0.58	0.31	**0.80**	0.31	1.83	**17.51%**
2010	0.86	0.68	1.11	0.43	0.55	1.89	0.71	0.57	0.28	**0.79**	0.28	1.89	**20.32%**
2011	0.87	0.72	1.15	0.49	0.51	2.35	0.69	0.55	0.25	**0.84**	0.25	2.35	**34.17%**
Average	**0.84**	**0.70**	**1.13**	**0.51**	**0.66**	**2.16**	**0.86**	**0.56**	**0.33**	**0.86**	**0.33**	**2.16**	**0.27**
Min	0.77	0.62	1.08	0.43	0.51	1.83	0.69	0.42	0.25	0.79	0.25	1.83	0.17
Max	0.92	0.80	1.21	0.57	0.77	3.02	0.95	0.68	0.38	0.99	0.38	3.02	0.57
Variance	**0.18%**	**0.26%**	**0.16%**	**0.22%**	**0.64%**	**11.53%**	**0.72%**	**0.48%**	**0.16%**	**0.27%**	**0.16%**	**11.53%**	

Turnover seems smooth in fluctuations and in this respect it can be considered a stable ratio with low per industry variance. The *Oil & Gas* industry stands out with highest turnover for all years and the *Utilities* industry with the lowest turnover for all years. This particular ratio reveals a crucial difference in the two most profitable Hellenic industries; this antithesis none the less may point out to either ad hoc "stronger" industries or sounder managerial practice exhibited by two very different industries that nonetheless share profitability highs. The greatest variance is observed in the *Oil & Gas* industry and the lowest variance is shared by the *Utilities* and *Consumer Services* industries. Temporally the highest variance is observed in 2008, whereas the lowest in 2004.

Graph 401: Plot of the Average and Extremums for Activity



We can observe the gradual temporal variations in the low and average markers which follow an almost linear trend, whereas the maximum markers reveal fluctuations.

5.4 CAPEX/TA

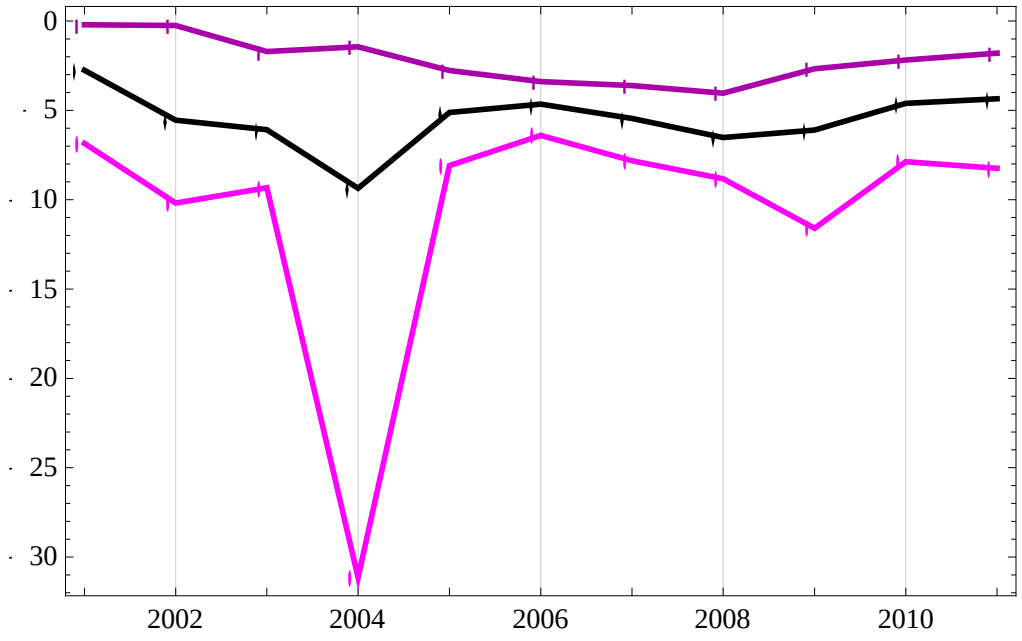
Table 24: Industry consolidation with the averages and extremums for CAPEX/TA

CAPEX/TA													
Year	Materials	Goods	Services	Health	Industrials	Oil & Gas	Tech	Telecom	Utilities	Average	Min	Max	Variance
2001	no data	-6.85%	-0.21%	no data	-4.53%	no data	-2.17%	no data	no data	**-2.75%**	-6.85%	-0.21%	**0.06%**
2002	no data	-6.22%	-0.25%	no data	-10.19%	no data	no data	no data	no data	**-5.55%**	-10.19%	-0.25%	**0.17%**
2003	no data	-7.21%	-1.71%	no data	no data	no data	no data	-9.33%	no data	**-6.08%**	-9.33%	-1.71%	**0.10%**
2004	-3.28%	-4.32%	-11.11%	-3.55%	-1.44%	-9.05%	-11.50%	-8.81%	-31.14%	**-9.36%**	-31.14%	-1.44%	**0.71%**
2005	-3.43%	-3.26%	-5.85%	-2.77%	-3.90%	-8.09%	-6.74%	-4.21%	-7.81%	**-5.12%**	-8.09%	-2.77%	**0.04%**
2006	-3.92%	-4.06%	-6.40%	-5.44%	-5.09%	-3.39%	-4.45%	-4.25%	-4.86%	**-4.65%**	-6.40%	-3.39%	**0.01%**
2007	-4.88%	-4.30%	-5.70%	-6.39%	-4.49%	-3.61%	-7.82%	-5.19%	-6.71%	**-5.45%**	-7.82%	-3.61%	**0.02%**
2008	-5.60%	-4.04%	-5.79%	-8.83%	-4.09%	-6.25%	-8.01%	-8.44%	-7.61%	**-6.52%**	-8.83%	-4.04%	**0.03%**
2009	-3.80%	-2.67%	-4.14%	-6.17%	-3.54%	-11.60%	-6.03%	-8.63%	-8.30%	**-6.10%**	-11.60%	-2.67%	**0.08%**
2010	-2.74%	-2.18%	-3.36%	-3.78%	-2.99%	-7.70%	-5.32%	-7.87%	-5.55%	**-4.61%**	-7.87%	-2.18%	**0.04%**
2011	-2.73%	-2.13%	-2.91%	-1.80%	-2.10%	-6.08%	-5.25%	-7.88%	-8.24%	**-4.35%**	-8.24%	-1.80%	**0.06%**
Average	**-3.80%**	**-4.29%**	**-4.31%**	**-4.84%**	**-4.24%**	**-6.97%**	**-6.37%**	**-7.18%**	**-10.03%**	**-5.50%**	**-10.58%**	**-2.19%**	**0.12%**
Min	-5.60%	-7.21%	-11.11%	-8.83%	-10.19%	-11.60%	-11.50%	-9.33%	-31.14%	-9.36%	-31.14%	-4.04%	0.01%
Max	-2.73%	-2.13%	-0.21%	-1.80%	-1.44%	-3.39%	-2.17%	-4.21%	-4.86%	-2.75%	-6.40%	-0.21%	0.71%
Variance	**0.01%**	**0.03%**	**0.09%**	**0.05%**	**0.05%**	**0.07%**	**0.06%**	**0.04%**	**0.65%**	**0.02%**	**0.44%**	**0.01%**	

The CAPEX ratio serves as an indicator of growth and investment on fixed assets; note that in this case the maximum value of the table serves as the minimum capital expenditure, since CAPEX is an outlay and it is designated as a negative value, rendering the minimum arithmetic value as the maximum capital expenditure.

We can observe that extremums are scattered and there is no obvious clustering of expenditures, except for 3 consecutive years first in *Consumer Services* and then in *Consumer Goods*. Variance within the industries (as well as temporally) is low, with *Basic Materials* possessing lowest variance and *Utilities* the highest. In the time span, highest variance is observed in 2004 and lowest in 2006.

Graph 402: Plot of the Average and Extremums for CAPEX/TA



We can observe the gradual augmentation of expenditures, with 2004 standing out from the *Utilities* industry ratio maximum.

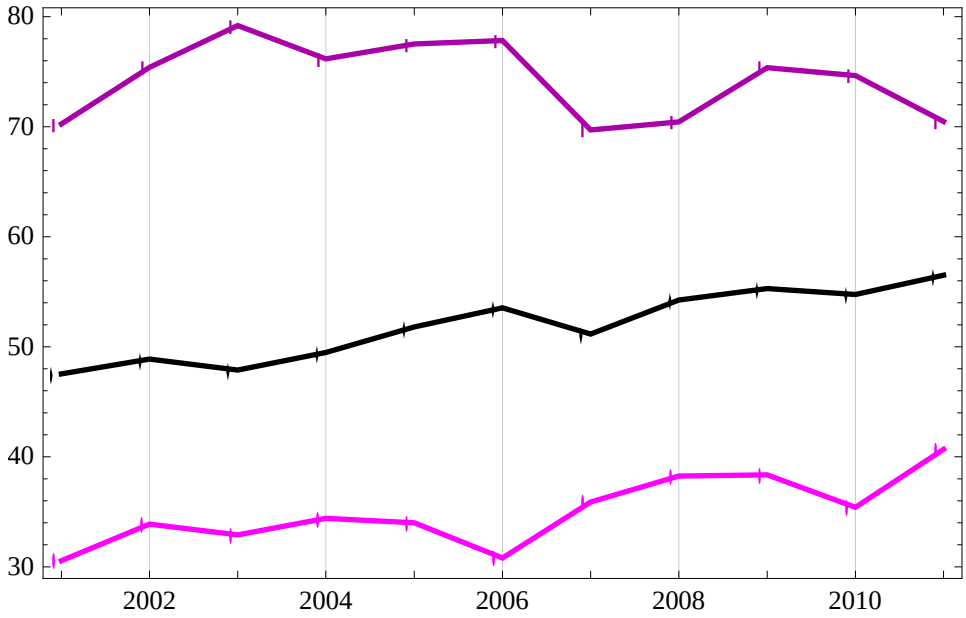
5.5 PPE/TA

Table 25: Industry consolidation with the averages and extremums for PPE/TA

PPE/TA													
Year	**Materials**	**Goods**	**Services**	**Health**	**Industrials**	**Oil & Gas**	**Tech**	**Telecom**	**Utilities**	**Average**	**Min**	**Max**	**Variance**
2001	38.07%	39.04%	48.00%	47.83%	39.62%	48.20%	30.56%	66.32%	70.26%	**47.54%**	30.56%	70.26%	**1.54%**
2002	38.54%	37.82%	48.31%	51.78%	42.18%	45.06%	33.88%	66.97%	75.40%	**48.88%**	33.88%	75.40%	**1.73%**
2003	37.31%	37.25%	48.84%	50.51%	41.53%	43.19%	32.91%	60.21%	79.20%	**47.88%**	32.91%	79.20%	**1.84%**
2004	40.54%	37.81%	50.71%	52.41%	42.75%	46.62%	34.41%	63.94%	76.17%	**49.48%**	34.41%	76.17%	**1.59%**
2005	46.01%	46.09%	54.46%	61.17%	51.48%	34.00%	35.70%	59.79%	77.53%	**51.80%**	34.00%	77.53%	**1.63%**
2006	42.67%	46.67%	53.52%	62.74%	48.30%	52.34%	30.80%	66.94%	77.84%	**53.54%**	30.80%	77.84%	**1.74%**
2007	43.83%	47.80%	52.94%	60.38%	47.22%	36.09%	35.89%	69.71%	66.61%	**51.16%**	35.89%	69.71%	**1.35%**
2008	46.36%	49.86%	53.70%	60.37%	48.12%	54.22%	38.25%	70.44%	66.89%	**54.25%**	38.25%	70.44%	**0.93%**
2009	50.15%	50.53%	53.73%	61.15%	49.55%	50.68%	38.36%	75.37%	68.09%	**55.29%**	38.36%	75.37%	**1.10%**
2010	47.23%	52.12%	57.71%	68.34%	50.37%	35.41%	37.46%	74.65%	69.50%	**54.75%**	35.41%	74.65%	**1.74%**
2011	47.83%	50.41%	61.19%	65.18%	52.67%	51.28%	40.68%	70.48%	68.77%	**56.50%**	40.68%	70.48%	**0.94%**
Average	**43.50%**	**45.04%**	**53.01%**	**58.35%**	**46.71%**	**45.19%**	**35.35%**	**67.71%**	**72.39%**	**51.92%**	**35.01%**	**74.28%**	**1.46%**
Min	37.31%	37.25%	48.00%	47.83%	39.62%	34.00%	30.56%	59.79%	66.61%	47.54%	30.56%	69.71%	0.93%
Max	50.15%	52.12%	61.19%	68.34%	52.67%	54.22%	40.68%	75.37%	79.20%	56.50%	40.68%	79.20%	1.84%
Variance	**0.18%**	**0.31%**	**0.15%**	**0.40%**	**0.18%**	**0.47%**	**0.09%**	**0.24%**	**0.21%**	**0.09%**	**0.09%**	**0.11%**	

The PPE ratio serves as an indicator of balance sheet structure, providing the net fixed assets leverage of the balance sheet, or the fixed assets leverage in cases where intangibles and long-term investments are absent from the statement of financial position, which is the case for many Hellenic firms. We can observe that extremums are clustered with most minimums in the *Technology* industry and maximums shared by the *Utilities* and *Telecommunication*s industries. Variance within the industries (as well as temporally) is low, with the *Technology* industry possessing lowest variance and the *Oil & Gas* industry the highest. Temporally the highest variance among the industries is observed in 2003 and the lowest in 2008.

Graph 403: Plot of the Average and Extremums for PPE/TA



We can observe a positive trend in all markers that continues even in the years of diminishing profitability. If we corroborate the fact that during the same time span the denominator of the ratio is also rising very sharply, we may conclude that there is substantial investment in PPE.

5.6 Leverage

Table 26: Industry consolidation with the averages and extremums for Leverage

Leverage													
Year	**Materials**	**Goods**	**Services**	**Health**	**Industrials**	**Oil & Gas**	**Tech**	**Telecom**	**Utilities**	**Average**	**Min**	**Max**	**Variance**
2001	32.04%	31.57%	24.50%	28.91%	17.28%	27.01%	26.70%	14.65%	25.34%	**25.33%**	14.65%	32.04%	**0.31%**
2002	32.44%	29.07%	27.79%	26.19%	20.30%	29.69%	17.22%	35.65%	17.86%	**26.25%**	17.22%	35.65%	**0.37%**
2003	34.74%	27.60%	25.46%	36.54%	21.40%	29.77%	20.16%	24.18%	20.09%	**26.66%**	20.09%	36.54%	**0.33%**
2004	25.85%	22.66%	26.70%	27.23%	17.06%	23.47%	13.65%	31.33%	22.54%	**23.39%**	13.65%	31.33%	**0.26%**
2005	33.47%	29.57%	25.91%	31.94%	24.83%	34.93%	30.64%	35.28%	22.63%	**29.91%**	22.63%	35.28%	**0.18%**
2006	34.04%	32.18%	28.92%	31.22%	26.75%	42.61%	19.74%	27.62%	20.83%	**29.32%**	19.74%	42.61%	**0.43%**
2007	35.40%	33.92%	26.71%	30.04%	28.47%	35.39%	24.82%	34.81%	15.49%	**29.45%**	15.49%	35.40%	**0.38%**
2008	38.21%	37.71%	30.51%	44.56%	29.64%	39.98%	29.23%	52.93%	18.13%	**35.66%**	18.13%	52.93%	**0.91%**
2009	39.05%	38.35%	30.19%	42.17%	29.91%	38.29%	30.37%	52.53%	18.06%	**35.44%**	18.06%	52.53%	**0.84%**
2010	38.40%	39.48%	33.91%	48.16%	30.38%	36.25%	29.47%	55.57%	18.26%	**36.65%**	18.26%	55.57%	**1.04%**
2011	39.37%	42.83%	37.76%	62.39%	33.11%	44.07%	33.35%	53.92%	19.19%	**40.67%**	19.19%	62.39%	**1.38%**
Average	**34.82%**	**33.18%**	**28.94%**	**37.21%**	**25.38%**	**34.68%**	**25.03%**	**38.04%**	**19.86%**	**30.79%**	**17.92%**	**42.93%**	**0.59%**
Min	25.85%	22.66%	24.50%	26.19%	17.06%	23.47%	13.65%	14.65%	15.49%	23.39%	13.65%	31.33%	0.18%
Max	39.37%	42.83%	37.76%	62.39%	33.11%	44.07%	33.35%	55.57%	25.34%	40.67%	22.63%	62.39%	1.38%
Variance	**0.15%**	**0.32%**	**0.14%**	**1.13%**	**0.28%**	**0.39%**	**0.37%**	**1.73%**	**0.07%**	**0.28%**	**0.06%**	**1.08%**	

As one of the most substantial markers for financial analysis and financial management, *Leverage* provides the medium for balancing profitability and financial risk. Within an economy undergoing a crisis where risk is an eminent factor of operations (and with major profitability losses) *Leverage* may be expected to rise acutely since profits may not be sufficient to sustain growth (or even stability) which is not the case for any of the industries, since financial leverage may be rising, but far from abruptly (with the exception of the maximum markers) and not in analogous accordance with the accentuation of growth or the fall of profitability.

We can only conjecture if the steady growth of *Leverage* is either a managerial decision or the inability of the sovereign-economy to provide financial assets. The *Utilities* industry shows minimum leverage whereas most maximum markers belong to the *Telecommunications* industry. Overall variance is low, with its highest manifestation in the *Telecommunications* industry and lowest in the *Utilities* industry. We may as well observe that variance among industries almost follows the pattern of the extremums for this ratio. Temporally the last year shows the greatest variance whereas 2005 the lowest.

Increasing financial leverage would be considered as a logical component for driving growth and boosting profitability within a flourishing economy. But where growth cannot be driven from internal operations, i.e. from profits (first flag is raised, for the point that we take growth as a given in this argument) the financial institutions could maybe provide the vessel for said growth (second flag is raised, in respect to the risk of financing an entity with diminishing profits) and we would expect that since debt will offer what income (or absence of it at that) is not able to, that we would observe accordance of diminishing profits, growth and leverage. But we do not: acute variation in financial leverage is only observed in the *Telecommunications* and *Health Care* industries, whereas average *Leverage* shows gradual fluctuations.

Since it is accepted that risk rises with accentuation of debt and profitability enters the equation as the balancing factor to alleviate said risk, then we could assume that when profitability is absent that leverage would kick in to support operations, but all this within a steady framework and a stable (in terms of growth) system. Here a discrepancy is introduced as far as the profitability, growth and leverage parameters are concerned.

Graph 404: Plot of the Average and Extremums for Leverage

We must reference that leverage may be a misleading indicator by itself, since the above profile would be more than acceptable and expected in an efficient economy, hinting to substantial stockholder returns, which as we are aware from the profitability markers is not the case here. Average *Leverage* has risen by 15% in the time span and per annum variations are not erratic. In addition, cyclical variations can be witnessed, hinting to diminishing average *Leverage* for some periods.

Note that we would expect the same profile from an economy where profitability is rising and growth and activity is stable; that is to say that a stable rise in *Leverage* may explain rise in profitability when change in *Activity* and growth is negligible. Continuing the argument posed above, financial leverage would be enough to account for no growth but raise in profits and it may also be enough to account for a raise in profits and simultaneous growth. But a marker of 15% growth in financial leverage (in a time span such as this) may seem dubious whence a dramatic decrease in profits and a dramatic increase in growth are witnessed at the same time.

The question of growth probably remains unanswered, since this *Leverage* profile may not be acceptable to account fully for diminishing profitability, accentuated growth and a sovereign-economy in crisis simultaneously.

We would expect stability or retrenchment whence profits are absent. But if we hypothesize that while profits are diminishing growth can be achieved (as is the case), then we would probably expect that this growth is financed through debt, whereas the latter will be analogous to risk. It remains to be analyzed if this financial leverage profile is enough to sustain the losses in profitability and accentuation of growth, although it seems unlikely. If we are to explain these results under scrutiny, then we probably would gather that debt alone does not pose a sufficient driver for the accentuation of growth with the particular drops in profitability.

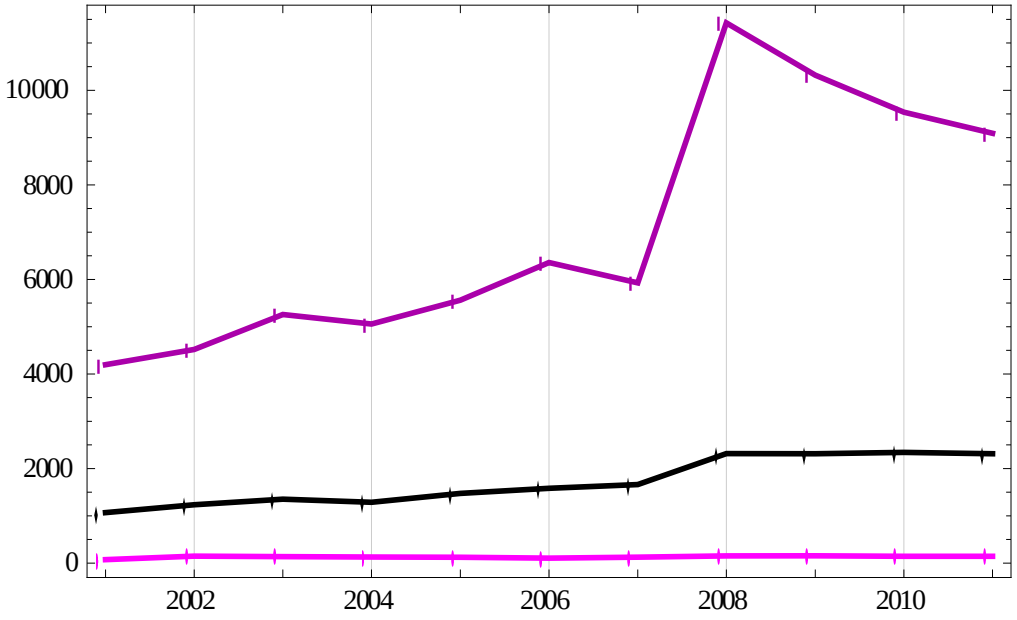
5.7 Size

Table 27: Industry consolidation with the averages and extremums for Size

Size												
Year	Materials	Goods	Services	Health	Industrials	Oil & Gas	Tech	Telecom	Utilities	Average	Min	Max
2001	157.43	165.41	191.89	160.04	160.40	1493.28	73.73	4198.18	3014.04	**1068.27**	73.73	4198.18
2002	171.62	185.00	200.69	170.31	181.65	1622.42	146.88	4520.22	3918.53	**1235.26**	146.88	4520.22
2003	184.39	187.34	204.67	164.01	194.35	1914.08	137.96	5256.87	3935.50	**1353.24**	137.96	5256.87
2004	233.03	185.42	209.98	198.65	217.63	2136.11	128.04	5058.12	3229.29	**1288.48**	128.04	5058.12
2005	304.57	211.11	214.32	234.64	268.17	2794.10	124.89	5560.34	3565.99	**1475.35**	124.89	5560.34
2006	334.64	228.92	233.49	234.18	290.23	2826.16	104.37	6357.61	3637.32	**1582.99**	104.37	6357.61
2007	351.15	231.55	257.04	543.05	344.85	3292.87	126.12	5927.69	3885.04	**1662.15**	126.12	5927.69
2008	358.21	232.95	282.65	709.48	394.52	3248.13	152.91	11425.20	4050.64	**2317.19**	152.91	11425.20
2009	346.98	219.18	302.14	886.37	385.47	3672.93	156.11	10321.50	4534.59	**2313.92**	156.11	10321.50
2010	404.48	233.74	284.70	757.62	414.77	4648.80	146.04	9537.80	4668.12	**2344.01**	146.04	9537.80
2011	396.75	244.11	315.08	489.30	411.22	4877.46	144.68	9090.90	4853.32	**2313.65**	144.68	9090.90
Average	**294.84**	**211.34**	**245.15**	**413.42**	**296.66**	**2956.94**	**131.07**	**7023.13**	**3935.67**	**1723.14**	**131.07**	**7023.13**
Min	157.43	165.41	191.89	160.04	160.40	1493.28	73.73	4198.18	3014.04	1068.27	73.73	4198.18
Max	404.48	244.11	315.08	886.37	414.77	4877.46	156.11	11425.20	4853.32	2344.01	156.11	11425.20

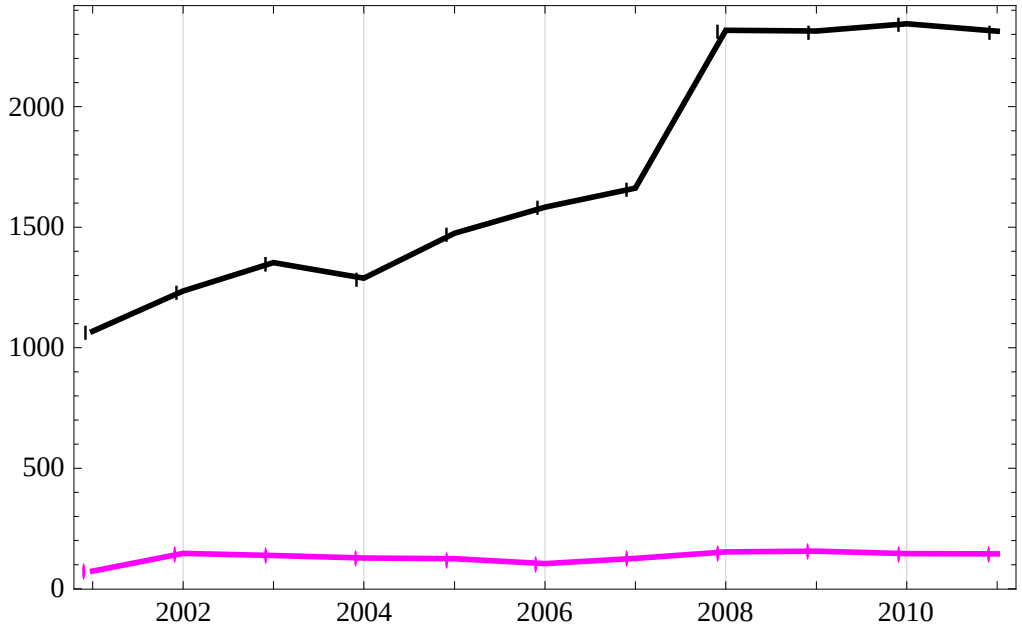
Within the time span all industries have grown substantially. The *Basic Materials*, *Industrials*, *Technology* and *Telecommunications* industries have more than doubled whereas *Health Care* and *Oil & Gas* have more than tripled in size. Maximum values belong to the *Telecommunications* industry and minimum values to the *Technology* industry.

Graph 405: Plot of the Average and Extremums for Size



We are able to observe differences in industries via their size, where significant variations are witnessed. Although the *Technology* industry has doubled, we can see that temporally the change is negligible if compared to the *Telecommunications* industry. In order to better portray the changes in *Size*, graph 406 offers the same profile omitting the maximums.

Graph 406: Plot of the Average and Minimums for Size



Changes in average *Size* are more apparent since the range of the graph is magnified.

5.8 Productivity

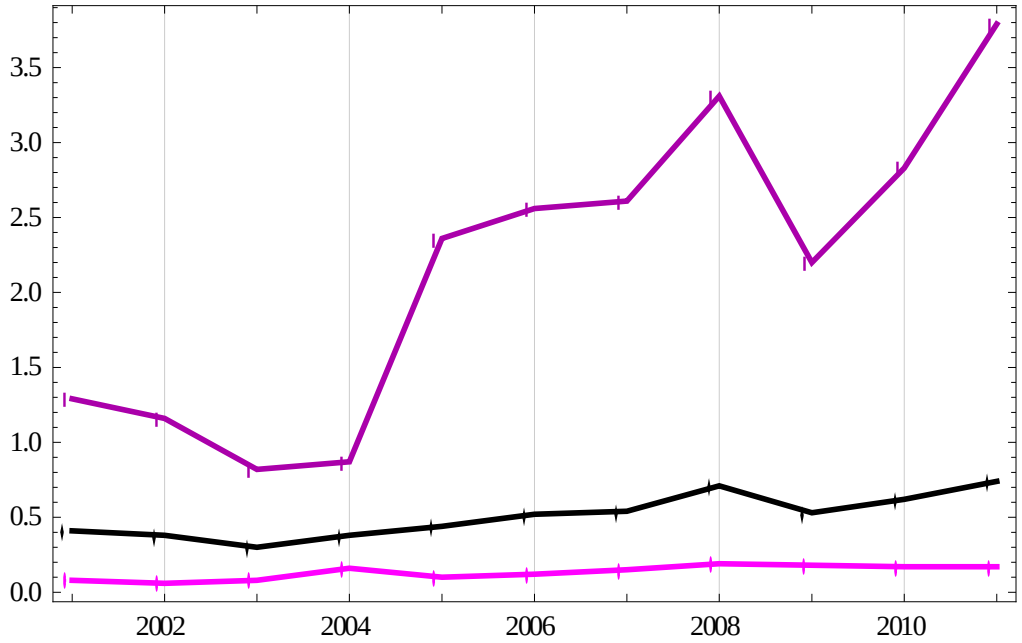
Table 28: Industry consolidation with the averages and extremums for Productivity

Productivity													
Year	**Materials**	**Goods**	**Services**	**Health**	**Industrials**	**Oil & Gas**	**Tech**	**Telecom**	**Utilities**	**Average**	**Min**	**Max**	**Variance**
2001	0.20	0.18	0.94	no data	0.10	1.29	0.08	no data	0.10	**0.41**	0.08	1.29	**20.77%**
2002	0.16	0.20	0.90	0.07	0.06	1.16	0.12	no data	no data	**0.38**	0.06	1.16	**17.59%**
2003	0.28	0.30	0.20	0.08	0.33	0.82	0.21	0.21	no data	**0.30**	0.08	0.82	**4.32%**
2004	0.24	0.17	0.39	0.16	0.16	0.86	0.18	0.87	no data	**0.38**	0.16	0.87	**8.38%**
2005	0.27	0.19	0.31	0.14	0.21	2.36	0.16	0.22	0.10	**0.44**	0.10	2.36	**46.66%**
2006	0.34	0.20	0.54	0.14	0.45	2.56	0.18	0.12	0.13	**0.52**	0.12	2.56	**54.00%**
2007	0.35	0.30	0.55	0.15	0.22	2.61	0.34	0.17	0.19	**0.54**	0.15	2.61	**54.91%**
2008	0.38	0.55	0.64	0.19	0.67	3.31	0.20	0.19	0.26	**0.71**	0.19	3.31	**87.64%**
2009	0.28	0.60	0.58	0.19	0.25	2.20	0.18	0.18	0.26	**0.53**	0.18	2.20	**37.57%**
2010	0.33	0.76	0.61	0.20	0.26	2.83	0.17	0.18	0.25	**0.62**	0.17	2.83	**64.75%**
2011	0.38	0.71	0.77	0.17	0.24	3.79	0.18	0.18	0.25	**0.74**	0.17	3.79	**120.87%**
Average	**0.29**	**0.38**	**0.58**	**0.15**	**0.27**	**2.16**	**0.18**	**0.26**	**0.19**	**0.51**	**0.13**	**2.16**	**47.04%**
Min	0.16	0.17	0.20	0.07	0.06	0.82	0.08	0.12	0.10	0.30	0.06	0.82	4.32%
Max	0.38	0.76	0.94	0.20	0.67	3.79	0.34	0.87	0.26	0.74	0.19	3.79	120.87%
Variance	**0.48%**	**4.75%**	**4.78%**	**0.18%**	**2.65%**	**91.38%**	**0.37%**	**4.72%**	**0.46%**	**1.79%**	**0.20%**	**91.25%**	

Productivity overall is rising with minimum values scattered among the industries but with the *Health Care* industry holding minimums for 5 years, whereas the *Oil & Gas* industry holds *Productivity* maximums for all but one year. Minimum variance belongs to the *Health Care* industry and maximum variance to the *Oil & Gas* industry.

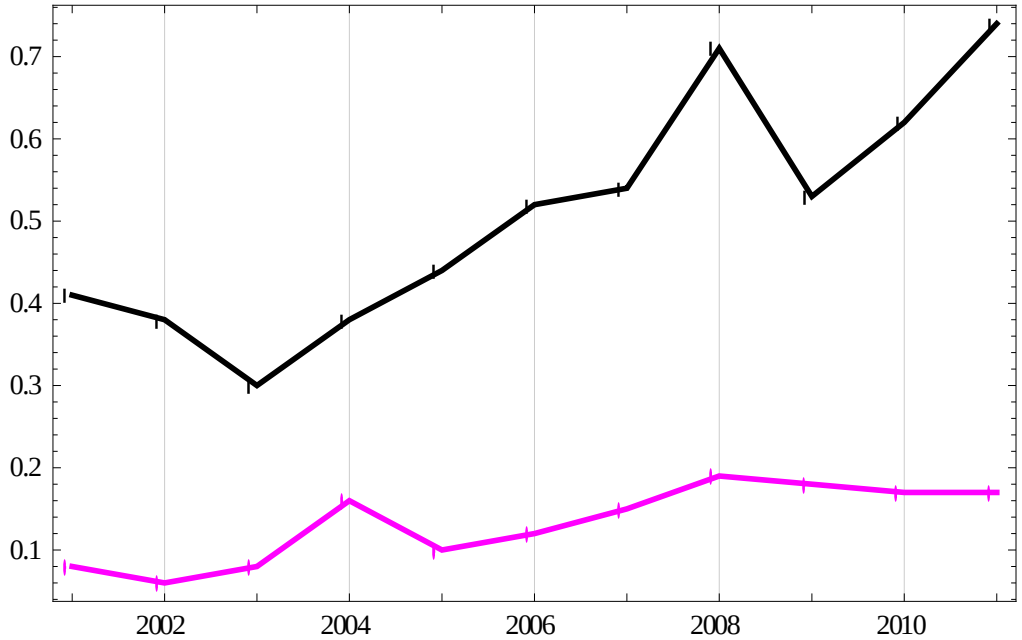
As with *Leverage*, we may as well observe that variance almost follows the pattern of the extremums for this ratio. Temporally the last year shows the greatest variance whereas 2003 the lowest.

Graph 407: Plot of the Average and Extremums for Productivity



This ratio may serve as a facilitator with respect to the question of growth, profitability and financial leverage. Whence *Productivity* is rising, then maybe it is possible for growth to be sustained with diminishing profits and smoothly rising *Leverage*. Graph 408 provides insight to the temporal change of average *Productivity*.

Graph 408: Plot of the Average and Minimums for Productivity



Average productivity has almost doubled in the time span. Further analysis will establish if this change is derived from rise in the numerator or fall in the denominator (or both) of the ratio.

5.9 Valuation

Table 29: Industry consolidation with the averages and extremums for Tobin's Q

Tobin's Q													
Year	**Materials**	**Goods**	**Services**	**Health**	**Industrials**	**Oil & Gas**	**Tech**	**Telecom**	**Utilities**	**Average**	**Min**	**Max**	**Variance**
2001	1.25	1.38	1.36	1.48	1.37	1.39	2.23	2.92	0.91	**1.59**	0.91	2.92	**32.90%**
2002	0.83	0.96	1.09	0.89	0.91	1.17	1.62	1.15	0.67	**1.03**	0.67	1.62	**6.62%**
2003	0.97	1.00	1.34	0.98	0.98	1.17	1.28	1.36	0.83	**1.10**	0.83	1.36	**3.23%**
2004	0.69	0.70	1.16	0.65	0.71	1.17	0.83	0.87	0.66	**0.83**	0.65	1.17	**3.75%**
2005	0.75	0.75	1.31	0.71	0.79	1.57	1.10	1.29	0.71	**1.00**	0.71	1.57	**9.45%**
2006	0.87	0.90	1.41	1.22	0.92	1.63	1.06	1.00	0.77	**1.09**	0.77	1.63	**7.03%**
2007	0.97	1.01	1.34	1.29	0.95	1.27	1.15	1.07	1.40	**1.16**	0.95	1.40	**2.56%**
2008	0.61	0.65	0.90	0.73	0.58	0.87	0.77	1.04	0.76	**0.77**	0.58	1.04	**1.94%**
2009	0.65	0.71	0.86	0.69	0.66	0.96	0.80	1.01	0.87	**0.80**	0.65	1.01	**1.58%**
2010	0.56	0.65	0.82	0.58	0.59	0.66	0.74	0.87	0.64	**0.68**	0.56	0.87	**1.04%**
2011	0.58	0.63	0.74	0.69	0.56	0.70	0.61	0.69	0.45	**0.63**	0.45	0.74	**0.73%**
Average	**0.79**	**0.85**	**1.12**	**0.90**	**0.82**	**1.14**	**1.11**	**1.21**	**0.79**	**0.97**	**0.70**	**1.39**	**6.44%**
Min	0.56	0.63	0.74	0.58	0.56	0.66	0.61	0.69	0.45	0.63	0.45	0.74	0.73%
Max	1.25	1.38	1.41	1.48	1.37	1.63	2.23	2.92	1.40	1.59	0.95	2.92	32.90%
Variance	**4.05%**	**4.75%**	**5.63%**	**8.29%**	**5.19%**	**9.31%**	**20.20%**	**32.70%**	**5.17%**	**6.75%**	**2.08%**	**31.75%**	

Valuation overall is diminishing, revealing a steady accumulating negative trend in market distrust; especially in the final years all the industries are valued even lower than their replacement value. Minimums and maximums are scattered and maximum variance belongs to the *Telecommunications* industry whereas minimum variance to the *Basic Materials* industry. The variance of this ratio could be regarded as an adjoining marker of volatility, since the latter is defined as a standard deviation.

Graph 409: Plot of the Average and Extremums for Tobin's Q

We can observe the acute drop of *Valuation* in the first years and its cyclic variations, as well as its negative trend. Lowest markers are all below 1 and of the average values six of the eleven are over 1.

5.10 Linear Model Effectiveness

Table 30: Consolidation of the coefficients of determination and p-values

Coefficients of Determination											
Ratio	**Materials**	**Goods**	**Services**	**Health**	**Industrials**	**Oil & Gas**	**Tech**	**Telecom**	**Utilities**	**Min**	**Max**
Cash Ratio	**64%**	50%	33%	**1%**	36%	16%	2%	2%	26%	**1%**	**64%**
ROA	66%	74%	74%	45%	**80%**	28%	70%	**0%**	59%	**0%**	**80%**
ROE	19%	76%	58%	34%	**77%**	32%	61%	**7%**	74%	**7%**	**77%**
Net Profit Margin	61%	71%	72%	45%	39%	19%	**85%**	**0%**	34%	**0%**	**85%**
Asset Turnover	15%	4%	**1%**	61%	**82%**	4%	68%	2%	81%	**1%**	**82%**
CAPEX/TA	4%	**80%**	5%	**0%**	1%	**0%**	**0%**	1%	29%	**0%**	**80%**
PPE/TA	81%	**85%**	84%	83%	76%	**0%**	70%	50%	34%	**0%**	**85%**
Leverage	57%	69%	74%	68%	**88%**	62%	42%	78%	**30%**	**30%**	**88%**
Size	92%	85%	93%	68%	**96%**	**96%**	**32%**	73%	70%	**32%**	**96%**
Productivity	66%	**76%**	**0%**	72%	17%	73%	15%	13%	**76%**	**0%**	**76%**
Tobin's Q	58%	56%	54%	28%	64%	43%	**70%**	44%	**3%**	**3%**	**70%**
p-values											
Ratio	**Materials**	**Goods**	**Services**	**Health**	**Industrials**	**Oil & Gas**	**Tech**	**Telecom**	**Utilities**	**Min**	**Max**
Cash Ratio	**0.003101**	0.014563	0.063211	**0.761005**	0.051040	0.282695	0.671381	0.719002	0.131191	**0.003101**	**0.761005**
ROA	0.002229	0.000624	0.000659	0.023785	**0.000192**	0.092825	0.001312	**0.951097**	0.005731	**0.000192**	**0.951097**
ROE	0.179878	0.000451	0.006329	0.060822	**0.000368**	0.071846	0.004577	**0.431924**	0.000722	**0.000368**	**0.431924**
Net Profit Margin	0.004590	0.001094	0.000901	0.023264	0.041239	0.177005	**0.000056**	**0.933236**	0.057856	**0.000056**	**0.933236**
Asset Turnover	0.246392	0.568663	**0.772800**	0.004613	**0.000119**	0.570033	0.001711	0.674616	0.000175	**0.000119**	**0.772800**
CAPEX/TA	0.633165	**0.000194**	0.527668	**0.938730**	0.779397	0.910097	0.867751	0.800639	0.164870	**0.000194**	**0.938730**
PPE/TA	0.000146	**0.000052**	0.000066	0.000106	0.000474	**0.839491**	0.001228	0.015168	0.058671	**0.000052**	**0.839491**
Leverage	0.007177	0.001489	0.000732	0.001717	**0.000019**	0.004167	0.030527	0.000334	**0.078317**	**0.000019**	**0.078317**
Size	3.6*10^-6	0.000062	1.5*10^-6	0.001731	1.1*10^-7	**1.4*10^-7**	**0.068415**	0.000782	0.001421	**1.4*10^-7**	**0.068415**
Productivity	0.002429	**0.000441**	**0.960309**	0.001913	0.214786	0.000791	0.234415	0.311693	0.004740	**0.000441**	**0.960309**
Tobin's Q	0.006420	0.007761	0.009901	0.093448	0.003101	0.027910	**0.001233**	0.025816	**0.600904**	**0.001233**	**0.600904**

The linear model may prove effective for the forecasting of all ratios, depending on the industry under analysis. It seems least effective for the CAPEX and *Activity* ratios and most effective for the ratios of *Leverage* and *Size*. As each ratio displays different effectuality of the regression model, a good rule of thumb could be to select each linear model based on its specific diagnostics from the table above. For further and more analytical diagnostics as to the regression models please refer to the appendix (tables 31-129), where the complete ANOVA tables, t-test tables, adjusted coefficients of determination and parameter confidence bands for all linear models can be found.

5.11 Limitations and Future Directions

It has to be outlined that all results should be considered as the outcomes of the specific methodology that was selected. An average ratio of firms may provide a somewhat fair process to extract an indicator in reference to an industry, but this may also be misleading as it does not take into account other parameters that may be important. The disclaimer that should evidently follow this study is exactly this, that while a definite and clear methodology as to industry ratio calculation and extraction was selected, it cannot be considered as a panacea upon anything.

For example, we have observed that as a general find all profitability ratios are diminishing; this within itself does not produce any relevant corollary that every single one of the Hellenic public firms within their industries is not profitable. This is a trade-off that we have to accept from the beginning: when utilizing a mean calculation, the wheat is not only not separated from the chaff but it is moreover blended together and while the priority is to monitor a specific industry over time and provide a clear outcome from a high-level perspective,

generalizations upon all the members of a specific industry would be erroneous and absolute conclusions may not be effective; whence a pattern, trend or norm emerges, further analysis should be conducted in order to support what seems to be formulating from the initial data manipulation.

Although it is outside the scope of this study to provide discussions for all outcomes and results that have been presented and as many explanations can be given with respect to the causes of these particular results, it could be of substance to point out once again the find considering the relative trends of profitability, financial leverage and *Size*. It is very surprising to assess that the Hellenic industries have maybe found themselves bundled in one of the simplest financial principles, that there can be no sustainable growth without steady (and high) profits fueling it and that growth without profits is a financial disaster waiting to happen. It would be very interesting to further examine this assumption.

From an explicit mathematical standpoint many outcomes of the forecasting component may be contested (as to their applicability), especially the models that have extremely low markers of *goodness of fit*. At this point we have to reference that it has not been an objective to prove the effectiveness of linear models in forecasting any specific time series, but only to inspect if linear regression models can be utilized and in this respect we may have been successful, providing a plethora of results as to the applicability of linear forecasting models whence extracted from financial ratio time series.

One thing that needs to be registered in order to sustain any result and conclusion within the materiality sphere is that we do not venture to extract a universal mathematical model in order to analyze a sovereign-debt crisis, but on the contrary perform an identical query through statistics for a selection of financial ratios in order to obtain an acceptable width of probable future outcomes stemmed from this discipline. It may be of importance that concerning the linear models, most markers are within prediction bands and while they vary in width, a series of future predictions can be extracted based on the specific margin that the prediction bands provide.

The first goal of this study is to provide and consolidate the data calculated and through this process to foster a ground for future studies to utilize as a precedent and/or benchmark. From this work further calculation and analysis can be conducted wherein it is deemed appropriate as well as further focus on specific ratios, industries and time spans in order to monitor specific trends, assumptions and hypotheses over time.

As a future step, it would be interesting to further analyze the industries with more ratios and with further dissection of the former in order to compare results and to recognize further clustering and trends. It would also be of interest to assess forecasting techniques utilizing different models and compare the results with the herein calculated linear regression models. In addition, it would be pertinent to compare the results of this study concerning listed corporations with indicators from public corporations of other regions and with private companies as well.

6. Appendix

Tables 31-129 include the consolidated regression models' diagnostics (adjusted coefficient of determination, coefficient of determination, ANOVA, t-test and parameter confidence interval) tables presented by industry and tables 130-140 the results of single-factor ANOVA for all financial ratios.

Table 31: Regression model diagnostics for Basic Materials – Cash Ratio

AdjustedRSquared	0.60025
RSquared	0.640225
ANOVATable	

	DF	SS	MS	F-Statistic	P-Value
x	1	0.0191136	0.0191136	16.0157	0.00310126
Error	9	0.0107409	0.00119343		
Total	10	0.0298545			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	0.0445455	0.0223399	1.99398	0.0772988
x	0.0131818	0.00329384	4.00196	0.00310126

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	0.0445455	0.0223399	{−0.00599098, 0.0950819}
x	0.0131818	0.00329384	{0.00573063, 0.020633}

Table 32: Regression model diagnostics for Basic Materials – ROA

AdjustedRSquared	0.627371
RSquared	0.664634
ANOVATable	

	DF	SS	MS	F-Statistic	P-Value
x	1	37.6565	37.6565	17.8363	0.00222853
Error	9	19.001	2.11122		
Total	10	56.6575			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	4.27418	0.939614	4.54887	0.00138818
x	−0.585091	0.138539	−4.22331	0.00222853

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	4.27418	0.939614	{2.14863, 6.39974}
x	−0.585091	0.138539	{−0.898487, −0.271695}

Table 33: Regression model diagnostics for Basic Materials – ROE

AdjustedRSquared	0.100273
RSquared	0.190246
ANOVATable	

	DF	SS	MS	F-Statistic	P-Value
x	1	216.357	216.357	2.11448	0.179878
Error	9	920.892	102.321		
Total	10	1137.25			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	7.052	6.54132	1.07807	0.309048
x	−1.40245	0.964466	−1.45413	0.179878

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	7.052	6.54132	{−7.7455, 21.8495}
x	−1.40245	0.964466	{−3.58423, 0.779318}

Table 34: Regression model diagnostics for Basic Materials – Net Profit Margin

AdjustedRSquared	0.565683
RSquared	0.609114
ANOVATable	

	DF	SS	MS	F-Statistic	P-Value
x	1	138.343	138.343	14.0246	0.00459031
Error	9	88.7783	9.86426		
Total	10	227.121			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	6.10055	2.03102	3.00368	0.0148674
x	−1.12145	0.299458	−3.74495	0.00459031

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	6.10055	2.03102	{1.50605, 10.695}
x	−1.12145	0.299458	{−1.79888, −0.444034}

Table 35: Regression model diagnostics for Basic Materials – Activity

AdjustedRSquared	0.0509781
RSquared	0.14588
ANOVATable	

	DF	SS	MS	F-Statistic	P-Value
x	1	0.00305818	0.00305818	1.53716	0.246392
Error	9	0.0179055	0.00198949		
Total	10	0.0209636			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	0.806545	0.0288439	27.9624	4.64903×10^{-10}
x	0.00527273	0.0042528	1.23982	0.246392

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	0.806545	0.0288439	{0.741296, 0.871795}
x	0.00527273	0.0042528	{−0.00434778, 0.0148932}

Table 36: Regression model diagnostics for Basic Materials – CAPEX/TA

AdjustedRSquared	−0.119535
RSquared	0.0403982
ANOVATable	

	DF	SS	MS	F-Statistic	P-Value
x	1	0.286688	0.286688	0.252594	0.633165
Error	6	6.80986	1.13498		
Total	7	7.09655			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	−4.16929	0.830116	−5.02253	0.00239802
x	0.082619	0.164388	0.502587	0.633165

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	−4.16929	0.830116	{−6.20051, −2.13806}
x	0.082619	0.164388	{−0.319623, 0.484861}

Table 37: Regression model diagnostics for Basic Materials – PPE/TA

AdjustedRSquared	0.792935
RSquared	0.813641
ANOVATable	DF SS MS F-Statistic P-Value x 1 157.298 157.298 39.294 0.00014637 Error 9 36.0279 4.0031 Total 10 193.326
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 36.3287 1.29384 28.0782 4.48105×10^{-10} x 1.19582 0.190766 6.26849 0.00014637
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 36.3287 1.29384 {33.4019, 39.2556} x 1.19582 0.190766 {0.764274, 1.62736}

Table 38: Regression model diagnostics for Basic Materials – Leverage

AdjustedRSquared	0.522944
RSquared	0.570649
ANOVATable	DF SS MS F-Statistic P-Value x 1 91.0364 91.0364 11.9619 0.00717669 Error 9 68.4949 7.61054 Total 10 159.531
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 29.3607 1.78398 16.458 5.02801×10^{-8} x 0.909727 0.263034 3.4586 0.00717669
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 29.3607 1.78398 {25.3251, 33.3964} x 0.909727 0.263034 {0.314704, 1.50475}

Table 39: Regression model diagnostics for Basic Materials – Size

AdjustedRSquared	0.908197
RSquared	0.917377
ANOVATable	DF SS MS F-Statistic P-Value x 1 77128.3 77128.3 99.9287 3.58888×10^{-6} Error 9 6946.5 771.834 Total 10 84074.8
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 135.964 17.9657 7.56795 0.0000343946 x 26.4795 2.6489 9.99643 3.58888×10^{-6}
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 135.964 17.9657 {95.3224, 176.605} x 26.4795 2.6489 {20.4873, 32.4718}

Table 40: Regression model diagnostics for Basic Materials – Productivity

AdjustedRSquared	0.620481
RSquared	0.658432
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.0342145 0.0342145 17.3491 0.00242878 Error 9 0.0177491 0.00197212 Total 10 0.0519636
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.186 0.0287177 6.47685 0.000114496 x 0.0176364 0.00423419 4.16523 0.00242878
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.186 0.0287177 {0.121036, 0.250964} x 0.0176364 0.00423419 {0.00805796, 0.0272148}

Table 41: Regression model diagnostics for Basic Materials – Valuation

AdjustedRSquared	0.53395
RSquared	0.580555
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.258263 0.258263 12.4569 0.00641958 Error 9 0.186592 0.0207324 Total 10 0.444855
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 1.08436 0.0931124 11.6457 9.93484×10^{-7} x −0.0484545 0.0137287 −3.52944 0.00641958
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 1.08436 0.0931124 {0.873729, 1.295} x −0.0484545 0.0137287 {−0.079511, −0.0173981}

Table 42: Regression model diagnostics for Consumer Goods – Cash Ratio

AdjustedRSquared	0.447483
RSquared	0.502735
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.0142045 0.0142045 9.099 0.0145627 Error 9 0.01405 0.00156111 Total 10 0.0282545
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.0981818 0.0255505 3.84266 0.00395044 x 0.0113636 0.00376722 3.01645 0.0145627
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.0981818 0.0255505 {0.0403826, 0.155981} x 0.0113636 0.00376722 {0.0028416, 0.0198857}

Table 43: Regression model diagnostics for Consumer Goods – ROA

AdjustedRSquared	0.716411
RSquared	0.744769
ANOVATable	DF SS MS F-Statistic P-Value x 1 80.0541 80.0541 26.2622 0.00062404 Error 9 27.4343 3.04826 Total 10 107.488
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 4.41673 1.12904 3.91194 0.00355425 x −0.853091 0.166467 −5.12467 0.00062404
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 4.41673 1.12904 {1.86267, 6.97079} x −0.853091 0.166467 {−1.22967, −0.476515}

Table 44: Regression model diagnostics for Consumer Goods – ROE

AdjustedRSquared	0.735593
RSquared	0.762034
ANOVATable	DF SS MS F-Statistic P-Value x 1 1204.31 1204.31 28.8205 0.000451267 Error 9 376.08 41.7866 Total 10 1580.39
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 14.082 4.18024 3.36871 0.00827396 x −3.30882 0.616343 −5.36847 0.000451267
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 14.082 4.18024 {4.62564, 23.5384} x −3.30882 0.616343 {−4.70308, −1.91455}

Table 45: Regression model diagnostics for Consumer Goods – Net Profit Margin

AdjustedRSquared	0.68001
RSquared	0.712009
ANOVATable	DF SS MS F-Statistic P-Value x 1 922.897 922.897 22.2509 0.00109355 Error 9 373.291 41.4768 Total 10 1296.19
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 11.6102 4.16471 2.78775 0.0211314 x −2.89655 0.614053 −4.71709 0.00109355
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 11.6102 4.16471 {2.18895, 21.0314} x −2.89655 0.614053 {−4.28563, −1.50746}

Table 46: Regression model diagnostics for Consumer Goods – Sales/TA

AdjustedRSquared	−0.0695164
RSquared	0.0374352
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.00105091 0.00105091 0.35002 0.568663 Error 9 0.0270218 0.00300242 Total 10 0.0280727
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.686 0.0354339 19.36 1.20936×10^{-8} x 0.00309091 0.00522444 0.591625 0.568663
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.686 0.0354339 {0.605843, 0.766157} x 0.00309091 0.00522444 {−0.00872759, 0.0149094}

Table 47: Regression model diagnostics for Consumer Goods – CAPEX/TA

AdjustedRSquared	0.779908
RSquared	0.801918
ANOVATable	DF SS MS F-Statistic P-Value x 1 25.4401 25.4401 36.4356 0.000193724 Error 9 6.28398 0.69822 Total 10 31.7241
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 −7.18 0.540355 −13.2876 3.21735×10^{-7} x 0.480909 0.0796709 6.03619 0.000193724
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 −7.18 0.540355 {−8.40237, −5.95763} x 0.480909 0.0796709 {0.300681, 0.661137}

Table 48: Regression model diagnostics for Consumer Goods – PPE/TA

AdjustedRSquared	0.8349
RSquared	0.85141
ANOVATable	DF SS MS F-Statistic P-Value x 1 293.564 293.564 51.5693 0.0000518784 Error 9 51.2336 5.69262 Total 10 344.798
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 35.2345 1.5429 22.8365 2.8106×10^{-9} x 1.63364 0.227489 7.18118 0.0000518784
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 35.2345 1.5429 {31.7443, 38.7248} x 1.63364 0.227489 {1.11902, 2.14825}

Table 49: Regression model diagnostics for Consumer Goods – Leverage

AdjustedRSquared	0.658139
RSquared	0.692325
ANOVATable	DF SS MS F-Statistic P-Value x 1 246.421 246.421 20.2516 0.00148856 Error 9 109.512 12.168 Total 10 355.933
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 24.196 2.25575 10.7264 1.99032×10^{-6} x 1.49673 0.332593 4.50018 0.00148856
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 24.196 2.25575 {19.0931, 29.2989} x 1.49673 0.332593 {0.74435, 2.2491}

Table 50: Regression model diagnostics for Consumer Goods – Size

AdjustedRSquared	0.828273
RSquared	0.845445
ANOVATable	DF SS MS F-Statistic P-Value x 1 5810.62 5810.62 49.2319 0.0000621038 Error 9 1062.23 118.026 Total 10 6872.85
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 167.731 7.02539 23.875 1.89474×10^{-9} x 7.268 1.03584 7.01654 0.0000621038
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 167.731 7.02539 {151.839, 183.624} x 7.268 1.03584 {4.92477, 9.61123}

Table 51: Regression model diagnostics for Consumer Goods – Productivity

AdjustedRSquared	0.736859
RSquared	0.763173
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.403233 0.403233 29.0024 0.000441369 Error 9 0.125131 0.0139034 Total 10 0.528364
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.0149091 0.0762507 0.195527 0.849323 x 0.0605455 0.0112425 5.38539 0.000441369
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.0149091 0.0762507 {−0.157582, 0.1874} x 0.0605455 0.0112425 {0.035113, 0.0859779}

Table 52: Regression model diagnostics for Consumer Goods – Valuation

AdjustedRSquared	0.515081
RSquared	0.563573
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.295364 0.295364 11.622 0.00776057 Error 9 0.228727 0.0254141 Total 10 0.524091
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 1.16 0.103091 11.2522 1.32944×10^{-6} x −0.0518182 0.0151999 −3.40911 0.00776057
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 1.16 0.103091 {0.926792, 1.39321} x −0.0518182 0.0151999 {−0.0862028, −0.0174336}

Table 53: Regression model diagnostics for Consumer Services – Cash Ratio

AdjustedRSquared	0.258559
RSquared	0.332703
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.0212809 0.0212809 4.48725 0.0632105 Error 9 0.0426827 0.00474253 Total 10 0.0639636
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.228364 0.0445336 5.1279 0.000621331 x 0.0139091 0.00656611 2.11831 0.0632105
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.228364 0.0445336 {0.127622, 0.329106} x 0.0139091 0.00656611 {−0.000944493, 0.0287627}

Table 54: Regression model diagnostics for Consumer Services – ROA

AdjustedRSquared	0.713029
RSquared	0.741726
ANOVATable	DF SS MS F-Statistic P-Value x 1 184.732 184.732 25.8467 0.000659285 Error 9 64.3248 7.1472 Total 10 249.057
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 8.07182 1.72882 4.66897 0.0011703 x −1.29591 0.254901 −5.08397 0.000659285
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 8.07182 1.72882 {4.16095, 11.9827} x −1.29591 0.254901 {−1.87254, −0.719283}

Table 55: Regression model diagnostics for Consumer Services – ROE

AdjustedRSquared	0.535339
RSquared	0.581805
ANOVATable	DF SS MS F-Statistic P-Value x 1 2449.68 2449.68 12.5211 0.00632883 Error 9 1760.8 195.644 Total 10 4210.48
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 27.3709 9.04516 3.02603 0.0143386 x −4.71909 1.33364 −3.53851 0.00632883
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 27.3709 9.04516 {6.90933, 47.8325} x −4.71909 1.33364 {−7.73599, −1.7022}

Table 56: Regression model diagnostics for Consumer Services – Net Profit Margin

AdjustedRSquared	0.693056
RSquared	0.72375
ANOVATable	DF SS MS F-Statistic P-Value x 1 334.639 334.639 23.5792 0.000901005 Error 9 127.729 14.1921 Total 10 462.368
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 9.35236 2.43616 3.83898 0.00397274 x −1.74418 0.359192 −4.85584 0.000901005
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 9.35236 2.43616 {3.84139, 14.8633} x −1.74418 0.359192 {−2.55673, −0.931632}

Table 57: Regression model diagnostics for Consumer Services – Sales/TA

AdjustedRSquared	-0.100287
RSquared	0.00974155
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.000178182 0.000178182 0.0885364 0.7728 Error 9 0.0181127 0.00201253 Total 10 0.0182909
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 1.12327 0.0290104 38.7197 2.54009×10^{-11} x 0.00127273 0.00427735 0.297551 0.7728
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 1.12327 0.0290104 {1.05765, 1.1889} x 0.00127273 0.00427735 {−0.0084033, 0.0109488}

Table 58: Regression model diagnostics for Consumer Services – CAPEX/TA

AdjustedRSquared	-0.0602711
RSquared	0.045756
ANOVATable	DF SS MS F-Statistic P-Value x 1 4.57776 4.57776 0.43155 0.527668 Error 9 95.4694 10.6077 Total 10 100.047
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 −3.08782 2.10617 −1.46608 0.176673 x −0.204 0.310538 −0.656925 0.527668
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 −3.08782 2.10617 {−7.85231, 1.67667} x −0.204 0.310538 {−0.906485, 0.498485}

Table 59: Regression model diagnostics for Consumer Services – PPE/TA

AdjustedRSquared	0.825959
RSquared	0.843363
ANOVATable	DF SS MS F-Statistic P-Value x 1 136.822 136.822 48.4577 0.000066024 Error 9 25.4117 2.82353 Total 10 162.233
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 46.3184 1.08662 42.626 1.07404×10^{-11} x 1.11527 0.160214 6.96116 0.000066024
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 46.3184 1.08662 {43.8603, 48.7765} x 1.11527 0.160214 {0.752844, 1.4777}

Table 60: Regression model diagnostics for Consumer Services – Leverage

AdjustedRSquared	0.70652
RSquared	0.735868
ANOVATable	DF SS MS F-Statistic P-Value x 1 116.884 116.884 25.0738 0.000731566 Error 9 41.9545 4.66161 Total 10 158.839
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 22.7569 1.39621 16.2991 5.47268×10^{-8} x 1.03082 0.20586 5.00738 0.000731566
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 22.7569 1.39621 {19.5985, 25.9154} x 1.03082 0.20586 {0.565131, 1.49651}

Table 61: Regression model diagnostics for Consumer Services – Size

AdjustedRSquared	0.923918
RSquared	0.931526

ANOVATable

	DF	SS	MS	F-Statistic	P-Value
x	1	18654.	18654.	122.438	1.53169×10^{-6}
Error	9	1371.2	152.355		
Total	10	20025.2			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	167.016	7.98199	20.9241	6.09393×10^{-9}
x	13.0224	1.17688	11.0652	1.53169×10^{-6}

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	167.016	7.98199	{148.959, 185.072}
x	13.0224	1.17688	{10.3601, 15.6847}

Table 62: Regression model diagnostics for Consumer Services – Productivity

AdjustedRSquared	−0.110788
RSquared	0.000290828

ANOVATable

	DF	SS	MS	F-Statistic	P-Value
x	1	0.000153636	0.000153636	0.00261821	0.960309
Error	9	0.528119	0.0586799		
Total	10	0.528273			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	0.591636	0.156649	3.77683	0.00437027
x	−0.00118182	0.0230966	−0.0511685	0.960309

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	0.591636	0.156649	{0.237272, 0.946001}
x	−0.00118182	0.0230966	{−0.05343, 0.0510664}

Table 63: Regression model diagnostics for Consumer Services – Valuation

AdjustedRSquared	0.489841
RSquared	0.540857

ANOVATable

	DF	SS	MS	F-Statistic	P-Value
x	1	0.339383	0.339383	10.6017	0.00990141
Error	9	0.288108	0.032012		
Total	10	0.627491			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	1.45418	0.115702	12.5684	5.18644×10^{-7}
x	−0.0555455	0.0170593	−3.25603	0.00990141

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	1.45418	0.115702	{1.19245, 1.71592}
x	−0.0555455	0.0170593	{−0.0941362, −0.0169547}

Table 64: Regression model diagnostics for Health Care – Cash Ratio

AdjustedRSquared	-0.111239
RSquared	0.0122318
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.0013603 0.0013603 0.0990665 0.761005 Error 8 0.10985 0.0137312 Total 9 0.11121
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.120667 0.0800494 1.5074 0.170135 x 0.00406061 0.0129011 0.314748 0.761005
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.120667 0.0800494 {−0.0639275, 0.305261} x 0.00406061 0.0129011 {−0.0256894, 0.0338106}

Table 65: Regression model diagnostics for Health Care – ROA

AdjustedRSquared	0.389261
RSquared	0.450335
ANOVATable	DF SS MS F-Statistic P-Value x 1 496.081 496.081 7.37362 0.0237847 Error 9 605.501 67.2779 Total 10 1101.58
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 9.65273 5.30419 1.81983 0.10213 x −2.12364 0.78206 −2.71544 0.0237847
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 9.65273 5.30419 {−2.34618, 21.6516} x −2.12364 0.78206 {−3.89278, −0.354495}

Table 66: Regression model diagnostics for Health Care – ROE

AdjustedRSquared	0.264068
RSquared	0.337662
ANOVATable	DF SS MS F-Statistic P-Value x 1 14001. 14001. 4.58822 0.0608218 Error 9 27463.5 3051.5 Total 10 41464.5
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 48.1387 35.7223 1.34758 0.210734 x −11.2819 5.26697 −2.14201 0.0608218
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 48.1387 35.7223 {−32.6707, 128.948} x −11.2819 5.26697 {−23.1966, 0.632795}

Table 67: Regression model diagnostics for Health Care – Net Profit Margin

AdjustedRSquared	0.391995
RSquared	0.452795
ANOVATable	DF SS MS F-Statistic P-Value x 1 2030.12 2030.12 7.44723 0.023264 Error 9 2453.4 272.6 Total 10 4483.52
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 18.396 10.6769 1.72297 0.11899 x −4.296 1.57423 −2.72896 0.023264
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 18.396 10.6769 {−5.75686, 42.5489} x −4.296 1.57423 {−7.85714, −0.734855}

Table 68: Regression model diagnostics for Health Care – Sales/TA

AdjustedRSquared	0.565233
RSquared	0.608709
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.0139782 0.0139782 14.0008 0.00461291 Error 9 0.00898545 0.000998384 Total 10 0.0229636
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.579455 0.020433 28.3588 4.10114×10^{-10} x −0.0112727 0.00301268 −3.74177 0.00461291
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.579455 0.020433 {0.533232, 0.625677} x −0.0112727 0.00301268 {−0.0180879, −0.00445758}

Table 69: Regression model diagnostics for Health Care – CAPEX/TA

AdjustedRSquared	−0.165419
RSquared	0.00106934
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.0393149 0.0393149 0.00642289 0.93873 Error 6 36.7264 6.12106 Total 7 36.7657
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 −4.97893 1.92779 −2.58272 0.0416171 x 0.0305952 0.381759 0.0801429 0.93873
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 −4.97893 1.92779 {−9.69605, −0.261806} x 0.0305952 0.381759 {−0.903534, 0.964725}

Table 70: Regression model diagnostics for Health Care – PPE/TA

AdjustedRSquared	0.806905
RSquared	0.826215
ANOVATable	DF SS MS F-Statistic P-Value x 1 363.782 363.782 42.7881 0.00010624 Error 9 76.5175 8.50194 Total 10 440.299
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 47.4396 1.88557 25.1594 1.18984×10^{-9} x 1.81855 0.278011 6.54126 0.00010624
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 47.4396 1.88557 {43.1742, 51.7051} x 1.81855 0.278011 {1.18964, 2.44745}

Table 71: Regression model diagnostics for Health Care – Leverage

AdjustedRSquared	0.647544
RSquared	0.682789
ANOVATable	DF SS MS F-Statistic P-Value x 1 845.294 845.294 19.3723 0.00171688 Error 9 392.707 43.6341 Total 10 1238.
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 20.5811 4.27165 4.81807 0.000949527 x 2.77209 0.62982 4.4014 0.00171688
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 20.5811 4.27165 {10.918, 30.2442} x 2.77209 0.62982 {1.34734, 4.19684}

Table 72: Regression model diagnostics for Health Care – Size

AdjustedRSquared	0.646916
RSquared	0.682224
ANOVATable	DF SS MS F-Statistic P-Value x 1 510367. 510367. 19.3219 0.00173125 Error 9 237726. 26414. Total 10 748093.
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 4.73055 105.099 0.0450103 0.965082 x 68.1154 15.496 4.39566 0.00173125
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 4.73055 105.099 {−233.02, 242.482} x 68.1154 15.496 {33.0609, 103.17}

Table 73: Regression model diagnostics for Health Care – Productivity

AdjustedRSquared	0.684876
RSquared	0.71989
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.0127348 0.0127348 20.5602 0.00191342 Error 8 0.00495515 0.000619394 Total 9 0.01769
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.0806667 0.0170015 4.74468 0.00145516 x 0.0124242 0.00274004 4.53433 0.00191342
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.0806667 0.0170015 {0.0414612, 0.119872} x 0.0124242 0.00274004 {0.0061057, 0.0187428}

Table 74: Regression model diagnostics for Health Care – Valuation

AdjustedRSquared	0.201162
RSquared	0.281045
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.257295 0.257295 3.51818 0.0934482 Error 9 0.658196 0.0731329 Total 10 0.915491
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 1.19109 0.17488 6.81092 0.0000780875 x −0.0483636 0.0257846 −1.87568 0.0934482
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 1.19109 0.17488 {0.795486, 1.5867} x −0.0483636 0.0257846 {−0.106692, 0.00996515}

Table 75: Regression model diagnostics for Industrials – Cash Ratio

AdjustedRSquared	0.28879
RSquared	0.359911
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.0404736 0.0404736 5.06055 0.0510395 Error 9 0.0719809 0.00799788 Total 10 0.112455
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.481455 0.0578322 8.32502 0.0000160804 x −0.0191818 0.0085269 −2.24957 0.0510395
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.481455 0.0578322 {0.350629, 0.61228} x −0.0191818 0.0085269 {−0.038471, 0.000107365}

Table 76: Regression model diagnostics for Industrials – ROA

AdjustedRSquared	0.780385
RSquared	0.802347
ANOVATable	DF SS MS F-Statistic P-Value x 1 82.7725 82.7725 36.5343 0.000191802 Error 9 20.3905 2.26561 Total 10 103.163
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 6.672 0.973364 6.85458 0.000074351 x −0.867455 0.143515 −6.04436 0.000191802
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 6.672 0.973364 {4.4701, 8.8739} x −0.867455 0.143515 {−1.19211, −0.542802}

Table 77: Regression model diagnostics for Industrials – ROE

AdjustedRSquared	0.747034
RSquared	0.77233
ANOVATable	DF SS MS F-Statistic P-Value x 1 591.183 591.183 30.531 0.000367871 Error 9 174.27 19.3634 Total 10 765.453
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 14.9769 2.8456 5.26319 0.000518534 x −2.31827 0.41956 −5.52548 0.000367871
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 14.9769 2.8456 {8.53972, 21.4141} x −2.31827 0.41956 {−3.26738, −1.36916}

Table 78: Regression model diagnostics for Industrials – Net Profit Margin

AdjustedRSquared	0.318039
RSquared	0.386235
ANOVATable	DF SS MS F-Statistic P-Value x 1 2096.03 2096.03 5.66359 0.0412392 Error 9 3330.8 370.088 Total 10 5426.82
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 21.7165 12.4404 1.74564 0.114828 x −4.36518 1.83424 −2.37983 0.0412392
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 21.7165 12.4404 {−6.42566, 49.8587} x −4.36518 1.83424 {−8.51452, −0.215841}

Table 79: Regression model diagnostics for Industrials – Sales/TA

AdjustedRSquared	0.801932
RSquared	0.821739
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.0577309 0.0577309 41.4878 0.000119377 Error 9 0.0125236 0.00139152 Total 10 0.0702545
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.801091 0.0241227 33.209 1.00261×10^{-10} x −0.0229091 0.0035567 −6.4411 0.000119377
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.801091 0.0241227 {0.746521, 0.85566} x −0.0229091 0.0035567 {−0.0309549, −0.0148633}

Table 80: Regression model diagnostics for Industrials – CAPEX/TA

AdjustedRSquared	-0.15021
RSquared	0.0141057
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.147621 0.147621 0.0858449 0.779397 Error 6 10.3178 1.71963 Total 7 10.4654
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 −3.89964 1.58683 −2.45751 0.049286 x 0.0592857 0.202345 0.292993 0.779397
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 −3.89964 1.58683 {−7.78248, −0.0168098} x 0.0592857 0.202345 {−0.435835, 0.554406}

Table 81: Regression model diagnostics for Industrials – PPE/TA

AdjustedRSquared	0.732709
RSquared	0.759438
ANOVATable	DF SS MS F-Statistic P-Value x 1 150.228 150.228 28.4124 0.000474479 Error 9 47.5868 5.28742 Total 10 197.815
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 39.6964 1.48698 26.696 7.02354×10^{-10} x 1.16864 0.219243 5.33033 0.000474479
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 39.6964 1.48698 {36.3326, 43.0601} x 1.16864 0.219243 {0.672675, 1.6646}

Table 82: Regression model diagnostics for Industrials – Leverage

AdjustedRSquared	0.867991
RSquared	0.881192

ANOVATable

	DF	SS	MS	F-Statistic	P-Value
x	1	274.604	274.604	66.7525	0.0000187005
Error	9	37.0239	4.11376		
Total	10	311.628			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	15.8955	1.3116	12.1191	7.07826×10^{-7}
x	1.58	0.193385	8.17022	0.0000187005

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	15.8955	1.3116	{12.9284, 18.8625}
x	1.58	0.193385	{1.14253, 2.01747}

Table 83: Regression model diagnostics for Industrials – Size

AdjustedRSquared	0.957424
RSquared	0.961681

ANOVATable

	DF	SS	MS	F-Statistic	P-Value
x	1	92533.2	92533.2	225.873	1.10929×10^{-7}
Error	9	3687.03	409.67		
Total	10	96220.2			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	122.638	13.0888	9.36971	6.13511×10^{-6}
x	29.0036	1.92984	15.0291	1.10929×10^{-7}

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	122.638	13.0888	{93.0293, 152.247}
x	29.0036	1.92984	{24.638, 33.3692}

Table 84: Regression model diagnostics for Industrials – Productivity

AdjustedRSquared	0.0724557
RSquared	0.16521

ANOVATable

	DF	SS	MS	F-Statistic	P-Value
x	1	0.0476736	0.0476736	1.78116	0.214786
Error	9	0.24089	0.0267656		
Total	10	0.288564			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	0.143273	0.105796	1.35423	0.208684
x	0.0208182	0.0155988	1.3346	0.214786

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	0.143273	0.105796	{−0.0960553, 0.382601}
x	0.0208182	0.0155988	{−0.0144688, 0.0561052}

Table 85: Regression model diagnostics for Industrials – Valuation

AdjustedRSquared	0.600247
RSquared	0.640222
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.371201 0.371201 16.0154 0.00310138 Error 9 0.208599 0.0231777 Total 10 0.5798
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 1.16855 0.0984504 11.8694 8.4518×10^{-7} x −0.0580909 0.0145157 −4.00193 0.00310138
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 1.16855 0.0984504 {0.945835, 1.39126} x −0.0580909 0.0145157 {−0.0909278, −0.0252541}

Table 86: Regression model diagnostics for Oil & Gas – Cash Ratio

AdjustedRSquared	0.0423814
RSquared	0.162084
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.00400167 0.00400167 1.35406 0.282695 Error 7 0.0206872 0.00295532 Total 8 0.0246889
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.0880556 0.0394937 2.22961 0.0610059 x 0.00816667 0.00701821 1.16364 0.282695
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.0880556 0.0394937 {−0.00533216, 0.181443} x 0.00816667 0.00701821 {−0.00842877, 0.0247621}

Table 87: Regression model diagnostics for Oil & Gas – ROA

AdjustedRSquared	0.202165
RSquared	0.281949
ANOVATable	DF SS MS F-Statistic P-Value x 1 10.9905 10.9905 3.53392 0.0928252 Error 9 27.99 3.11 Total 10 38.9805
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 8.12018 1.14041 7.12038 0.0000554224 x −0.316091 0.168145 −1.87987 0.0928252
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 8.12018 1.14041 {5.54039, 10.7} x −0.316091 0.168145 {−0.696461, 0.0642792}

Table 88: Regression model diagnostics for Oil & Gas – ROE

AdjustedRSquared	0.24005
RSquared	0.316045
ANOVATable	DF SS MS F-Statistic P-Value x 1 255.514 255.514 4.15877 0.0718457 Error 9 552.958 61.4398 Total 10 808.472
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 34.5127 5.06883 6.80882 0.0000782726 x −1.52409 0.747358 −2.03931 0.0718457
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 34.5127 5.06883 {23.0462, 45.9792} x −1.52409 0.747358 {−3.21473, 0.16655}

Table 89: Regression model diagnostics for Oil & Gas – Net Profit Margin

AdjustedRSquared	0.102796
RSquared	0.192517
ANOVATable	DF SS MS F-Statistic P-Value x 1 2.49303 2.49303 2.14574 0.177005 Error 9 10.4567 1.16185 Total 10 12.9497
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 3.79418 0.69704 5.44328 0.000409232 x −0.150545 0.102773 −1.46484 0.177005
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 3.79418 0.69704 {2.21737, 5.371} x −0.150545 0.102773 {−0.383034, 0.0819431}

Table 90: Regression model diagnostics for Oil & Gas – Sales/TA

AdjustedRSquared	-0.069805
RSquared	0.0371755
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.0468445 0.0468445 0.347498 0.570033 Error 9 1.21325 0.134805 Total 10 1.26009
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 2.03709 0.23743 8.57975 0.0000126038 x 0.0206364 0.0350072 0.58949 0.570033
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 2.03709 0.23743 {1.49999, 2.5742} x 0.0206364 0.0350072 {−0.0585553, 0.0998281}

Table 91: Regression model diagnostics for Oil & Gas – CAPEX/TA

AdjustedRSquared	-0.163976
RSquared	0.00230612
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.122148 0.122148 0.0138687 0.910097 Error 6 52.8449 8.80749 Total 7 52.9671
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 −6.72857 2.31245 −2.90972 0.0269902 x −0.0539286 0.457932 −0.117765 0.910097
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 −6.72857 2.31245 {−12.3869, −1.07022} x −0.0539286 0.457932 {−1.17445, 1.06659}

Table 92: Regression model diagnostics for Oil & Gas – PPE/TA

AdjustedRSquared	-0.105771
RSquared	0.00480642
ANOVATable	DF SS MS F-Statistic P-Value x 1 2.49303 2.49303 0.0434667 0.839491 Error 9 516.195 57.355 Total 10 518.688
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 44.2867 4.89743 9.04285 8.21251×10^{-6} x 0.150545 0.722087 0.208487 0.839491
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 44.2867 4.89743 {33.208, 55.3655} x 0.150545 0.722087 {−1.48293, 1.78402}

Table 93: Regression model diagnostics for Oil & Gas – Leverage

AdjustedRSquared	0.574465
RSquared	0.617018
ANOVATable	DF SS MS F-Statistic P-Value x 1 264.523 264.523 14.4998 0.00416676 Error 9 164.189 18.2432 Total 10 428.712
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 25.3738 2.76206 9.18656 7.21661×10^{-6} x 1.55073 0.407243 3.80786 0.00416676
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 25.3738 2.76206 {19.1256, 31.622} x 1.55073 0.407243 {0.629479, 2.47198}

Table 94: Regression model diagnostics for Oil & Gas– Size

AdjustedRSquared	0.954967
RSquared	0.95947
ANOVATable	DF SS MS F-Statistic P-Value x 1 1.24628×10^{7} 1.24628×10^{7} 213.06 1.42917×10^{-7} Error 9 526449. 58494.4 Total 10 1.29893×10^{7}
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 937.352 156.401 5.99326 0.000204181 x 336.598 23.0601 14.5966 1.42917×10^{-7}
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 937.352 156.401 {583.548, 1291.16} x 336.598 23.0601 {284.432, 388.764}

Table 95: Regression model diagnostics for Oil & Gas – Productivity

AdjustedRSquared	0.701537
RSquared	0.731383
ANOVATable	DF SS MS F-Statistic P-Value x 1 7.36855 7.36855 24.505 0.000791028 Error 9 2.70626 0.300696 Total 10 10.0748
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.609818 0.354606 1.7197 0.119601 x 0.258818 0.0522838 4.95025 0.000791028
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.609818 0.354606 {−0.192357, 1.41199} x 0.258818 0.0522838 {0.140544, 0.377092}

Table 96: Regression model diagnostics for Oil & Gas – Valuation

AdjustedRSquared	0.369205
RSquared	0.432284
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.448004 0.448004 6.853 0.0279103 Error 9 0.58836 0.0653733 Total 10 1.03636
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 1.52473 0.165342 9.22166 6.99405×10^{-6} x −0.0638182 0.0243783 −2.61782 0.0279103
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 1.52473 0.165342 {1.1507, 1.89876} x −0.0638182 0.0243783 {−0.118966, −0.00867057}

Table 97: Regression model diagnostics for Technology – Cash Ratio

AdjustedRSquared	−0.0878721
RSquared	0.0209151
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.00184091 0.00184091 0.192257 0.671381 Error 9 0.0861773 0.00957525 Total 10 0.0880182
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.232727 0.0632787 3.67781 0.00509272 x 0.00409091 0.00932994 0.438471 0.671381
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.232727 0.0632787 {0.0895809, 0.375874} x 0.00409091 0.00932994 {−0.0170149, 0.0251967}

Table 98: Regression model diagnostics for Technology – ROA

AdjustedRSquared	0.667259
RSquared	0.700533
ANOVATable	DF SS MS F-Statistic P-Value x 1 87.4695 87.4695 21.0534 0.00131203 Error 9 37.3919 4.15466 Total 10 124.861
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 5.814 1.31811 4.41088 0.00169344 x −0.891727 0.194344 −4.58839 0.00131203
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 5.814 1.31811 {2.83224, 8.79576} x −0.891727 0.194344 {−1.33136, −0.45209}

Table 99: Regression model diagnostics for Technology – ROE

AdjustedRSquared	0.565947
RSquared	0.609352
ANOVATable	DF SS MS F-Statistic P-Value x 1 604.33 604.33 14.0387 0.00457707 Error 9 387.428 43.0476 Total 10 991.758
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 10.048 4.24284 2.36822 0.0420311 x −2.34391 0.625573 −3.74682 0.00457707
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 10.048 4.24284 {0.450026, 19.646} x −2.34391 0.625573 {−3.75905, −0.928765}

Table 100: Regression model diagnostics for Technology – Net Profit Margin

AdjustedRSquared	0.831975
RSquared	0.848778

ANOVATable

	DF	SS	MS	F-Statistic	P-Value
x	1	436.965	436.965	50.515	0.0000562133
Error	9	77.8518	8.6502		
Total	10	514.817			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	10.0522	1.90193	5.28524	0.000503596
x	−1.99309	0.280425	−7.10739	0.0000562133

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	10.0522	1.90193	{5.74971, 14.3547}
x	−1.99309	0.280425	{−2.62746, −1.35873}

Table 101: Regression model diagnostics for Technology – Sales/TA

AdjustedRSquared	0.647821
RSquared	0.683039

ANOVATable

	DF	SS	MS	F-Statistic	P-Value
x	1	0.0554627	0.0554627	19.3946	0.00171059
Error	9	0.0257373	0.0028597		
Total	10	0.0812			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	0.994727	0.0345814	28.7648	3.61323×10^{-10}
x	−0.0224545	0.00509875	−4.40393	0.00171059

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	0.994727	0.0345814	{0.916499, 1.07296}
x	−0.0224545	0.00509875	{−0.0339887, −0.0109204}

Table 102: Regression model diagnostics for Technology – CAPEX/TA

AdjustedRSquared	−0.138007
RSquared	0.00424417

ANOVATable

	DF	SS	MS	F-Statistic	P-Value
x	1	0.233619	0.233619	0.0298358	0.867751
Error	7	54.811	7.83014		
Total	8	55.0446			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	−5.99827	2.32194	−2.5833	0.0362976
x	−0.0541899	0.313725	−0.172731	0.867751

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	−5.99827	2.32194	{−11.4888, −0.507742}
x	−0.0541899	0.313725	{−0.796032, 0.687653}

Table 103: Regression model diagnostics for Technology – PPE/TA

AdjustedRSquared	0.665195
RSquared	0.698675
ANOVATable	DF SS MS F-Statistic P-Value x 1 72.2358 72.2358 20.8681 0.00135043 Error 9 31.1539 3.46154 Total 10 103.39
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 30.4924 1.20314 25.3439 1.11502×10^{-9} x 0.810364 0.177394 4.56816 0.00135043
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 30.4924 1.20314 {27.7707, 33.2141} x 0.810364 0.177394 {0.409071, 1.21166}

Table 104: Regression model diagnostics for Technology – Leverage

AdjustedRSquared	0.357738
RSquared	0.421964
ANOVATable	DF SS MS F-Statistic P-Value x 1 173.68 173.68 6.56997 0.0305267 Error 9 237.918 26.4354 Total 10 411.598
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 17.4925 3.32488 5.26111 0.000519965 x 1.25655 0.490226 2.5632 0.0305267
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 17.4925 3.32488 {9.97115, 25.0139} x 1.25655 0.490226 {0.147577, 2.36551}

Table 105: Regression model diagnostics for Technology – Size

AdjustedRSquared	0.247157
RSquared	0.322441
ANOVATable	DF SS MS F-Statistic P-Value x 1 1897.05 1897.05 4.28299 0.0684153 Error 9 3986.34 442.927 Total 10 5883.39
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 106.149 13.6097 7.79954 0.000027094 x 4.15282 2.00664 2.06954 0.0684153
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 106.149 13.6097 {75.3622, 136.937} x 4.15282 2.00664 {−0.386518, 8.69215}

Table 106: Regression model diagnostics for Technology – Productivity

AdjustedRSquared	0.0587612
RSquared	0.152885
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.00626273 0.00626273 1.6243 0.234415 Error 9 0.0347009 0.00385566 Total 10 0.0409636
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.136545 0.0401543 3.40052 0.00786683 x 0.00754545 0.00592042 1.27448 0.234415
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.136545 0.0401543 {0.0457102, 0.227381} x 0.00754545 0.00592042 {−0.00584748, 0.0209384}

Table 107: Regression model diagnostics for Technology – Valuation

AdjustedRSquared	0.671686
RSquared	0.704518
ANOVATable	DF SS MS F-Statistic P-Value x 1 1.56724 1.56724 21.4587 0.00123256 Error 9 0.657319 0.0730355 Total 10 2.22456
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 1.82436 0.174763 10.4391 2.49947×10^{-6} x −0.119364 0.0257674 −4.63235 0.00123256
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 1.82436 0.174763 {1.42902, 2.2197} x −0.119364 0.0257674 {−0.177654, −0.0610737}

Table 108: Regression model diagnostics for Telecommunications – Cash Ratio

AdjustedRSquared	−0.0943474
RSquared	0.0150873
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.00218273 0.00218273 0.137866 0.719002 Error 9 0.14249 0.0158322 Total 10 0.144673
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.318727 0.081368 3.91711 0.00352643 x 0.00445455 0.0119971 0.371303 0.719002
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.318727 0.081368 {0.13466, 0.502794} x 0.00445455 0.0119971 {−0.0226847, 0.0315938}

Table 109: Regression model diagnostics for Telecommunications – ROA

AdjustedRSquared	-0.11062
RSquared	0.000441649
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.099 0.099 0.0039766 0.951097 Error 9 224.061 24.8956 Total 10 224.16
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 −0.279091 3.22659 −0.0864971 0.932965 x 0.03 0.475735 0.0630603 0.951097
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 −0.279091 3.22659 {−7.57815, 7.01997} x 0.03 0.475735 {−1.04619, 1.10619}

Table 110: Regression model diagnostics for Telecommunications – ROE

AdjustedRSquared	-0.0333921
RSquared	0.0699471
ANOVATable	DF SS MS F-Statistic P-Value x 1 154.394 154.394 0.676869 0.431924 Error 9 2052.9 228.1 Total 10 2207.29
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 −5.15382 9.76664 −0.527696 0.610471 x 1.18473 1.44001 0.82272 0.431924
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 −5.15382 9.76664 {−27.2475, 16.9398} x 1.18473 1.44001 {−2.07281, 4.44226}

Table 111: Regression model diagnostics for Telecommunications – Net Profit Margin

AdjustedRSquared	-0.110196
RSquared	0.000823911
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.675495 0.675495 0.00742131 0.933236 Error 9 819.188 91.0209 Total 10 819.864
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 −0.0589091 6.16955 −0.00954837 0.99259 x −0.0783636 0.90965 −0.086147 0.933236
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 −0.0589091 6.16955 {−14.0154, 13.8976} x −0.0783636 0.90965 {−2.13613, 1.97941}

Table 112: Regression model diagnostics for Telecommunications – Sales/TA

AdjustedRSquared	-0.0883501
RSquared	0.0204849
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.00111364 0.00111364 0.18822 0.674616 Error 9 0.05325 0.00591667 Total 10 0.0543636
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.577273 0.0497418 11.6054 1.02319×10^{-6} x −0.00318182 0.00733402 −0.433844 0.674616
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.577273 0.0497418 {0.464749, 0.689796} x −0.00318182 0.00733402 {−0.0197725, 0.0134089}

Table 113: Regression model diagnostics for Telecommunications – CAPEX/TA

AdjustedRSquared	-0.131733
RSquared	0.00973335
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.324135 0.324135 0.0688031 0.800639 Error 7 32.9774 4.71105 Total 8 33.3015
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 −6.81139 1.57683 −4.31968 0.00348157 x −0.0735 0.28021 −0.262303 0.800639
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 −6.81139 1.57683 {−10.54, −3.08278} x −0.0735 0.28021 {−0.736091, 0.589091}

Table 114: Regression model diagnostics for Telecommunications – PPE/TA

AdjustedRSquared	0.442839
RSquared	0.498555
ANOVATable	DF SS MS F-Statistic P-Value x 1 130.735 130.735 8.94814 0.0151678 Error 9 131.492 14.6103 Total 10 262.227
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 61.1698 2.47179 24.7472 1.3779×10^{-9} x 1.09018 0.364445 2.99134 0.0151678
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 61.1698 2.47179 {55.5782, 66.7614} x 1.09018 0.364445 {0.265749, 1.91461}

Table 115: Regression model diagnostics for Telecommunications – Leverage

AdjustedRSquared	0.752282
RSquared	0.777053
ANOVATable	

	DF	SS	MS	F-Statistic	P-Value
x	1	1482.39	1482.39	31.3684	0.000333951
Error	9	425.316	47.2573		
Total	10	1907.7			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	16.0167	4.44546	3.60294	0.00572201
x	3.671	0.655448	5.60075	0.000333951

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	16.0167	4.44546	{5.96039, 26.0731}
x	3.671	0.655448	{2.18827, 5.15373}

Table 116: Regression model diagnostics for Telecommunications – Size

AdjustedRSquared	0.702314
RSquared	0.732083
ANOVATable	

	DF	SS	MS	F-Statistic	P-Value
x	1	4.82192×10^7	4.82192×10^7	24.5925	0.000781507
Error	9	1.76466×10^7	1.96073×10^6		
Total	10	6.58657×10^7			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	3050.59	905.506	3.36893	0.00827103
x	662.085	133.51	4.95908	0.000781507

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	3050.59	905.506	{1002.19, 5098.98}
x	662.085	133.51	{360.065, 964.104}

Table 117: Regression model diagnostics for Telecommunications – Productivity

AdjustedRSquared	0.0181143
RSquared	0.127213
ANOVATable	

	DF	SS	MS	F-Statistic	P-Value
x	1	0.0544776	0.0544776	1.16604	0.311693
Error	8	0.373762	0.0467203		
Total	9	0.42824			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	0.397333	0.147658	2.69091	0.027458
x	−0.025697	0.0237972	−1.07983	0.311693

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	0.397333	0.147658	{0.056834, 0.737833}
x	−0.025697	0.0237972	{−0.0805734, 0.0291795}

Table 118: Regression model diagnostics for Telecommunications – Valuation

AdjustedRSquared	0.37905
RSquared	0.441145
ANOVATable	DF SS MS F-Statistic P-Value x 1 1.584 1.584 7.10436 0.0258163 Error 9 2.00665 0.222962 Total 10 3.59065
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 1.92636 0.30535 6.30871 0.000139533 x −0.12 0.0450214 −2.6654 0.0258163
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 1.92636 0.30535 {1.23561, 2.61711} x −0.12 0.0450214 {−0.221845, −0.0181546}

Table 119: Regression model diagnostics for Utilities – Cash Ratio

AdjustedRSquared	0.168753
RSquared	0.261114
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.276438 0.276438 2.82711 0.131191 Error 8 0.782252 0.0977814 Total 9 1.05869
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.0889394 0.230486 0.385878 0.709646 x 0.054697 0.0325306 1.6814 0.131191
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.0889394 0.230486 {−0.442562, 0.62044} x 0.054697 0.0325306 {−0.0203188, 0.129713}

Table 120: Regression model diagnostics for Utilities – ROA

AdjustedRSquared	0.544907
RSquared	0.590416
ANOVATable	DF SS MS F-Statistic P-Value x 1 17.7202 17.7202 12.9735 0.00573148 Error 9 12.2929 1.36587 Total 10 30.0131
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 7.15273 0.755767 9.4642 5.648×10^{-6} x −0.401364 0.111432 −3.60188 0.00573148
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 7.15273 0.755767 {5.44306, 8.86239} x −0.401364 0.111432 {−0.65344, −0.149287}

Table 121: Regression model diagnostics for Utilities – ROE

AdjustedRSquared	0.707318
RSquared	0.736586
ANOVATable	DF SS MS F-Statistic P-Value x 1 102.242 102.242 25.1668 0.000722377 Error 9 36.5631 4.06257 Total 10 138.805
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 14.7627 1.30342 11.3262 1.25774×10^{-6} x −0.964091 0.192178 −5.01665 0.000722377
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 14.7627 1.30342 {11.8142, 17.7113} x −0.964091 0.192178 {−1.39883, −0.529354}

Table 122: Regression model diagnostics for Utilities – Net Profit Margin

AdjustedRSquared	0.271176
RSquared	0.344058
ANOVATable	DF SS MS F-Statistic P-Value x 1 35.2165 35.2165 4.72073 0.0578562 Error 9 67.1398 7.45997 Total 10 102.356
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 17.384 1.76625 9.84234 4.08363×10^{-6} x −0.565818 0.260419 −2.17272 0.0578562
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 17.384 1.76625 {13.3885, 21.3795} x −0.565818 0.260419 {−1.15493, 0.0232901}

Table 123: Regression model diagnostics for Utilities – Sales/TA

AdjustedRSquared	0.784715
RSquared	0.806244
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.0142045 0.0142045 37.4501 0.000175027 Error 9 0.00341364 0.000379293 Total 10 0.0176182
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.400909 0.0125942 31.8329 1.46311×10^{-10} x −0.0113636 0.00185691 −6.11965 0.000175027
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.400909 0.0125942 {0.372419, 0.429399} x −0.0113636 0.00185691 {−0.0155643, −0.00716301}

Table 124: Regression model diagnostics for Utilities – CAPEX/TA

AdjustedRSquared	0.176552
RSquared	0.294187
ANOVATable	

	DF	SS	MS	F-Statistic	P-Value
x	1	153.106	153.106	2.50084	0.16487
Error	6	367.33	61.2217		
Total	7	520.436			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	−18.6193	6.09674	−3.05397	0.0223975
x	1.90929	1.20734	1.5814	0.16487

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	−18.6193	6.09674	{−33.5375, −3.70109}
x	1.90929	1.20734	{−1.04496, 4.86353}

Table 125: Regression model diagnostics for Utilities – PPE/TA

AdjustedRSquared	0.269193
RSquared	0.342274
ANOVATable	

	DF	SS	MS	F-Statistic	P-Value
x	1	80.0882	80.0882	4.68351	0.0586705
Error	9	153.9	17.1		
Total	10	233.988			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	77.5069	2.67412	28.9841	3.37677×10^{-10}
x	−0.853273	0.394278	−2.16414	0.0586705

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	77.5069	2.67412	{71.4576, 83.5562}
x	−0.853273	0.394278	{−1.74519, 0.0386451}

Table 126: Regression model diagnostics for Utilities – Leverage

AdjustedRSquared	0.227419
RSquared	0.304677
ANOVATable	

	DF	SS	MS	F-Statistic	P-Value
x	1	23.8313	23.8313	3.94363	0.0783174
Error	9	54.3868	6.04298		
Total	10	78.2181			

ParameterTable

	Estimate	Standard Error	t-Statistic	P-Value
1	22.6491	1.58967	14.2476	1.76234×10^{-7}
x	−0.465455	0.234385	−1.98586	0.0783174

ParameterConfidenceIntervalTable

	Estimate	Standard Error	Confidence Interval
1	22.6491	1.58967	{19.053, 26.2452}
x	−0.465455	0.234385	{−0.995669, 0.0647603}

Table 127: Regression model diagnostics for Utilities – Size

AdjustedRSquared	0.661547
RSquared	0.695393
ANOVATable	DF SS MS F-Statistic P-Value x 1 2.31385×10^{6} 2.31385×10^{6} 20.5462 0.0014205 Error 9 1.01355×10^{6} 112617. Total 10 3.3274×10^{6}
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 3065.46 217.012 14.1258 1.89825×10^{-7} x 145.034 31.9967 4.5328 0.0014205
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 3065.46 217.012 {2574.55, 3556.38} x 145.034 31.9967 {72.6529, 217.416}

Table 128: Regression model diagnostics for Utilities – Productivity

AdjustedRSquared	0.72068
RSquared	0.760583
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.0279514 0.0279514 19.0608 0.0047402 Error 6 0.00879859 0.00146643 Total 7 0.03675
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.0510053 0.0351236 1.45217 0.196663 x 0.0198589 0.00454867 4.36587 0.0047402
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.0510053 0.0351236 {−0.034939, 0.13695} x 0.0198589 0.00454867 {0.00872871, 0.0309891}

Table 129: Regression model diagnostics for Utilities – Valuation

AdjustedRSquared	−0.0759762
RSquared	0.0316214
ANOVATable	DF SS MS F-Statistic P-Value x 1 0.0180736 0.0180736 0.293886 0.600904 Error 9 0.55349 0.0614989 Total 10 0.571564
ParameterTable	Estimate Standard Error t-Statistic P-Value 1 0.865091 0.160367 5.39443 0.000436174 x −0.0128182 0.0236449 −0.542112 0.600904
ParameterConfidenceIntervalTable	Estimate Standard Error Confidence Interval 1 0.865091 0.160367 {0.502315, 1.22787} x −0.0128182 0.0236449 {−0.0663066, 0.0406703}

We can observe the inverse analogy of the p-values with the numerical values of the coefficients of determination as well as the equality of the t-test results with the ANOVA for two groups.

Tables 130-140 include ANOVA for each financial ratio.

Table 130: ANOVA for Cash Ratio

Anova: Single Factor	Cash Ratio					
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Basic Materials	11	1.365215555	0.124110505	0.0028738		
Consumer Goods	11	1.827332127	0.166121102	0.002778336		
Consumer Services	11	3.4281176	0.311647055	0.006428533		
Health Care	10	1.420206598	0.14202066	0.012741782		
Industrials	11	4.035499519	0.366863593	0.011260303		
Oil & Gas	9	1.157621105	0.128624567	0.003191318		
Technology	11	2.833986638	0.257635149	0.00867258		
Telecommunications	9	3.013761535	0.334862393	0.016463275		
Utilities	10	4.386138101	0.43861381	0.119078873		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1.113634696	8	0.139204337	7.028163518	4.57348E-07	2.050626555
Within Groups	1.663758147	84	0.019806645			
Total	2.777392844	92				

Table 131: ANOVA for ROA

Anova: Single Factor	ROA					
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Basic Materials	11	0.084115938	0.007646903	0.000566405		
Consumer Goods	11	-0.077256469	-0.007023315	0.001074425		
Consumer Services	11	0.032800635	0.002981876	0.00249011		
Health Care	11	-0.339771787	-0.030888344	0.011016209		
Industrials	11	0.161596032	0.014690548	0.001032114		
Oil & Gas	11	0.684498473	0.062227134	0.000389214		
Technology	11	0.050985751	0.004635068	0.001249904		
Telecommunications	11	-0.010948745	-0.00099534	0.002241422		
Utilities	11	0.521834566	0.047439506	0.000299901		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.069352337	8	0.008669042	3.832147178	0.000644371	2.042985658
Within Groups	0.203597033	90	0.002262189			
Total	0.272949371	98				

Table 132: ANOVA for ROE

Anova: Single Factor	ROE					
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Basic Materials	11	-0.149735164	-0.013612288	0.011376893		
Consumer Goods	11	-0.634814954	-0.05771045	0.015804908		
Consumer Services	11	-0.104010922	-0.009455538	0.042109125		
Health Care	11	-2.150834564	-0.195530415	0.414651809		
Industrials	11	0.117505903	0.010682355	0.007653887		
Oil & Gas	11	2.79050509	0.253682281	0.008085103		
Technology	11	-0.441724313	-0.040156756	0.009916406		
Telecommunications	11	0.214888114	0.019535283	0.022075276		
Utilities	11	0.987436402	0.089766946	0.001388629		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1.275943837	8	0.15949298	2.692813807	0.010564825	2.042985658
Within Groups	5.330620381	90	0.059229115			
Total	6.606564217	98				

Table 133: ANOVA for Net Profit Margin

Anova: Single Factor	Net Profit Margin					
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Basic Materials	11	-0.0692595	-0.006296318	0.002272156		
Consumer Goods	11	-0.634591073	-0.057690098	0.012961313		
Consumer Services	11	-0.122451124	-0.01113192	0.004624416		
Health Care	11	-0.811690866	-0.073790079	0.044835218		
Industrials	11	-0.49229957	-0.044754506	0.054271743		
Oil & Gas	11	0.3180077	0.028909791	0.000129511		
Technology	11	-0.209641601	-0.019058327	0.00514746		
Telecommunications	11	-0.05822286	-0.005292987	0.008195843		
Utilities	11	1.538911467	0.139901042	0.001023077		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.346169651	8	0.043271206	2.918018173	0.006093137	2.042985658
Within Groups	1.334607373	90	0.014828971			
Total	1.680777024	98				

Table 134: ANOVA for Activity

Anova: Single Factor	Activity					
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Basic Materials	11	9.215646118	0.837786011	0.001991778		
Consumer Goods	11	7.74777593	0.704343266	0.002813366		
Consumer Services	11	12.43255315	1.130232104	0.001742655		
Health Care	11	5.640435513	0.512766865	0.002443826		
Industrials	11	7.294182567	0.663107506	0.007014631		
Oil & Gas	11	23.76476351	2.160433046	0.126830712		
Technology	11	9.473328269	0.861211661	0.007882963		
Telecommunications	11	6.130838937	0.557348994	0.005266687		
Utilities	11	3.660490458	0.33277186	0.001809913		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	25.49509207	8	3.186886509	181.7655837	4.08944E-52	2.042985658
Within Groups	1.577965311	90	0.017532948			
Total	27.07305738	98				

Table 135: ANOVA for CAPEX/TA

Anova: Single Factor	CAPEX/TA					
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Basic Materials	8	-0.303721195	-0.037965149	0.000101581		
Consumer Goods	11	-0.472367252	-0.042942477	0.000317055		
Consumer Services	11	-0.474461909	-0.043132901	0.001000645		
Health Care	8	-0.387467689	-0.048433461	0.000525417		
Industrials	10	-0.423516259	-0.042351626	0.000565561		
Oil & Gas	8	-0.557628705	-0.069703588	0.000756306		
Technology	9	-0.572957596	-0.063661955	0.000687957		
Telecommunications	9	-0.64612678	-0.071791864	0.000416179		
Utilities	8	-0.802287677	-0.10028596	0.007433875		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.028555866	8	0.003569483	2.933698836	0.006739815	2.067983657
Within Groups	0.088820392	73	0.001216718			
Total	0.117376258	81				

Table 136: ANOVA for PPE/TA

Anova: Single Factor	PPE/TA					
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Basic Materials	11	4.785427016	0.43503882	0.001932409		
Consumer Goods	11	4.954006653	0.450364241	0.003448726		
Consumer Services	11	5.831167516	0.530106138	0.001623679		
Health Care	11	6.418657867	0.583514352	0.004404588		
Industrials	11	5.137755603	0.467068691	0.001977079		
Oil & Gas	11	4.970817444	0.451892495	0.005183371		
Technology	11	3.888933139	0.353539376	0.001033888		
Telecommunications	11	7.448125235	0.677102294	0.002622017		
Utilities	11	7.962790449	0.723890041	0.002339335		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1.293592299	8	0.161699037	59.24225133	1.42006E-32	2.042985658
Within Groups	0.245650917	90	0.002729455			
Total	1.539243215	98				

Table 137: ANOVA for Leverage

Anova: Single Factor	Leverage					
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Basic Materials	11	3.830184121	0.348198556	0.001595196		
Consumer Goods	11	3.649335311	0.331757756	0.003558231		
Consumer Services	11	3.183622825	0.289420257	0.001587709		
Health Care	11	4.093360757	0.372123705	0.012384506		
Industrials	11	2.791259822	0.253750893	0.003118683		
Oil & Gas	11	3.814685752	0.346789614	0.004287603		
Technology	11	2.753519996	0.25032	0.004117541		
Telecommunications	11	4.184731752	0.380430159	0.019077535		
Utilities	11	2.184320081	0.198574553	0.000782209		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.347952058	8	0.043494007	7.749993363	7.39971E-08	2.042985658
Within Groups	0.505092129	90	0.005612135			
Total	0.853044187	98				

Table 138: ANOVA for Size

Anova: Single Factor	Size					
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Basic Materials	11	3243.26114	294.8419218	8407.703949		
Consumer Goods	11	2324.716782	211.3378892	687.3411814		
Consumer Services	11	2696.656372	245.1505793	2002.658018		
Health Care	11	4547.639127	413.4217388	74809.48408		
Industrials	11	3263.265595	296.6605086	9622.010455		
Oil & Gas	11	32526.3344	2956.939491	1298924.95		
Technology	11	1441.715182	131.0650165	588.3576136		
Telecommunications	11	77254.43895	7023.130814	6586516.41		
Utilities	11	43292.39423	3935.672203	332738.7605		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	520326452	8	65040806.49	70.40489543	2.05118E-35	2.042985658
Within Groups	83142976.76	90	923810.8529			
Total	603469428.7	98				

Table 139: ANOVA for Productivity

Anova: Single Factor	Productivity					
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Basic Materials	11	3.210589523	0.291871775	0.005295507		
Consumer Goods	11	4.166629366	0.378784488	0.052296665		
Consumer Services	11	6.428873787	0.584443072	0.052582619		
Health Care	10	1.502161872	0.150216187	0.002010677		
Industrials	11	2.943909299	0.267628118	0.029190965		
Oil & Gas	11	23.80555374	2.164141249	1.005173567		
Technology	11	2.003979359	0.182179942	0.004023724		
Telecommunications	9	2.318431543	0.257603505	0.053104188		
Utilities	8	1.538234759	0.192279345	0.005258531		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	35.3728452	8	4.42160565	31.04081878	4.97325E-22	2.050626555
Within Groups	11.96536977	84	0.142444878			
Total	47.33821497	92				

Table 140: ANOVA for Valuation

Anova: Single Factor	Valuation					
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Basic Materials	11	8.727601131	0.793418285	0.044518069		
Consumer Goods	11	9.342424609	0.849311328	0.052292653		
Consumer Services	11	12.33332703	1.121211548	0.061906851		
Health Care	11	9.928982079	0.902634734	0.091209278		
Industrials	11	9.020013758	0.820001251	0.057138042		
Oil & Gas	11	12.5629637	1.142087609	0.102463994		
Technology	11	12.18777506	1.107979551	0.222207829		
Telecommunications	11	13.29033228	1.208212025	0.359657896		
Utilities	11	8.669035895	0.788094172	0.056818263		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	2.575492999	8	0.321936625	2.764161455	0.008877739	2.042985658
Within Groups	10.48212874	90	0.116468097			
Total	13.05762174	98				

As could be expected, all analyses of variance register p-values substantially lower than the significance level of 5%; we could extract that for these groups each financial ratio is dependent on industry and/or that industry average ratios show significant variations between different industries (and by corollary that the industries do not compose samples of the same statistical population; an a priori valid conjecture, since by qualitative definition there are significant differences between the industries). It maybe would be of interest to utilize ratio-based analyses of variance such as the above to evaluate different industry classification techniques.

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