IN 15 MINUTES

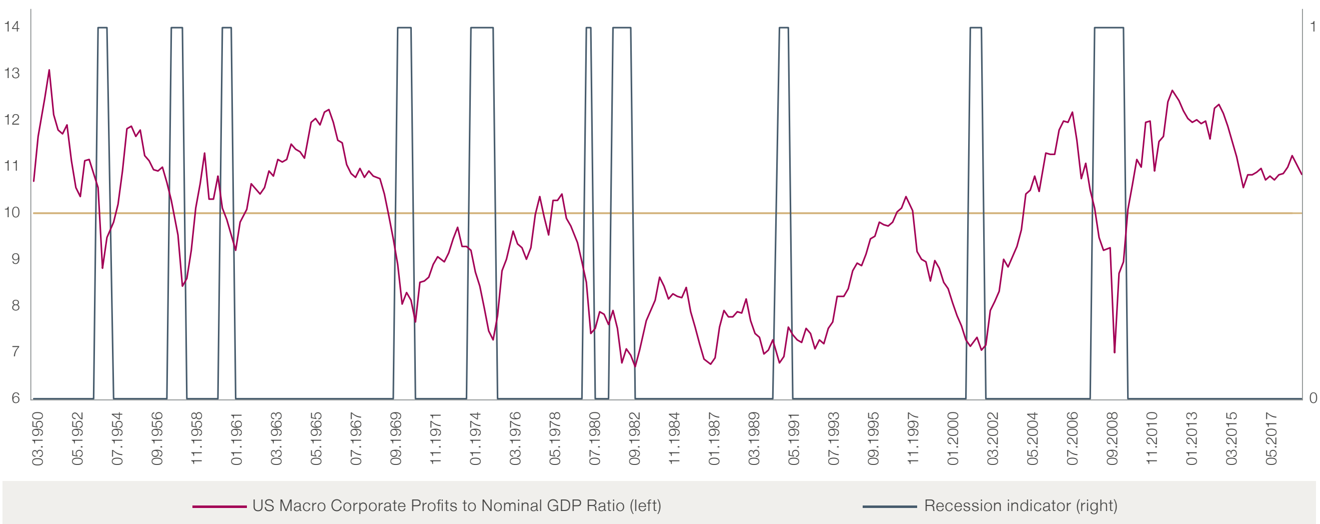
PROFITS: THE MACRO VERSUS THE CORPORATE VIEW

Profits are at the core of financial markets. In this paper we first review different definitions of profits, derived either from macro-economic statistics, or directly at the company level. We then perform a statistical analysis of the European and the US markets in order to assess which profit figures, macro or corporate, might provide the most explanatory power regarding market behaviour.

PROFITS: US VS EUROPEAN FRAMEWORK

Looking at US corporate profits from a macro-economic perspective, we use data provided by the US Bureau of Economic Analysis (BEA). The ratio of corporate profits to nominal GDP can serve as an early indicator of recession. Below the critical threshold of around 10% profits/GDP, the likelihood of a recession increases. The figures released in March 2019 show that we remain above this threshold, as can be seen in chart 1 below.

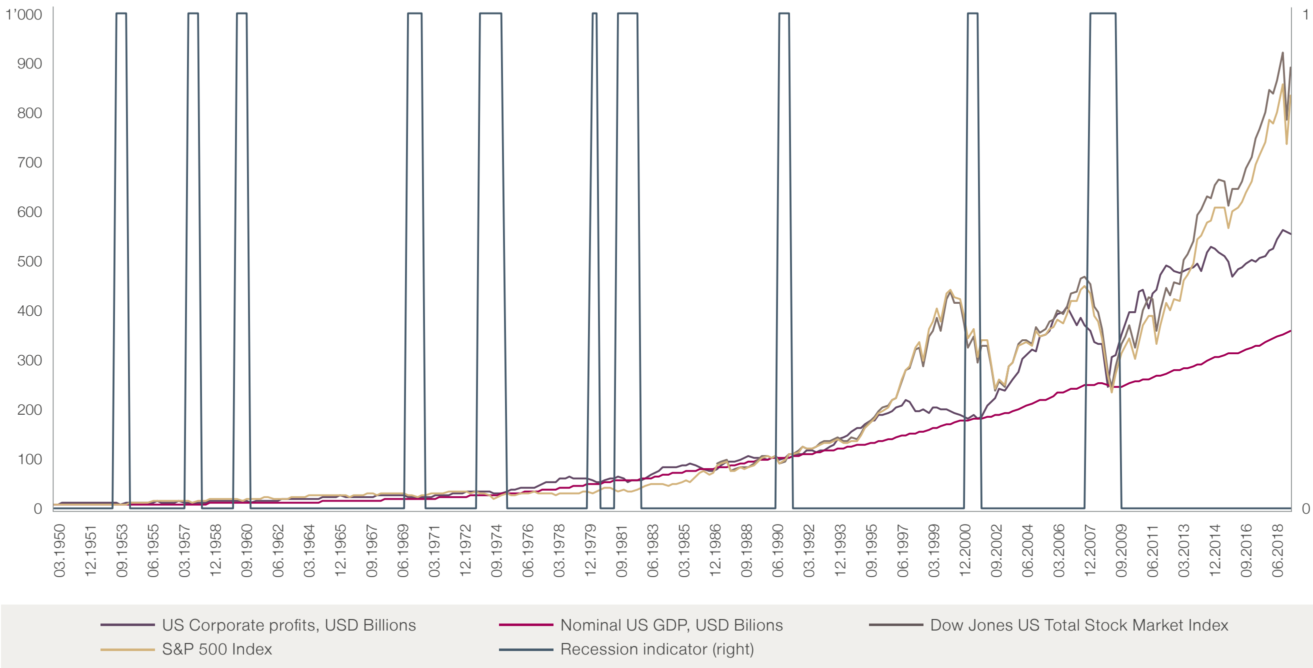
CHART 1: US MACRO CORPORATE PROFITS TO NOMINAL GDP RATIO AND US RECESSION PERIODS



Source: Bloomberg, Indosuez Wealth Management

Turning to the relationship between macro profits and stock markets in the US, chart 2 below shows the S&P 500, the Dow Jones US Total Stock Market Index (this is a broader index), the US corporate profits (before tax with inventory valuation and capital consumption adjustments[1], including depreciation of fixed assets as measured by the BEA), and finally US GDP. All series are indexed to 100 in March 1990. Since the 1990s, corrections in US stock markets have tended to follow any declines in macro profits. This, in and of itself, encourages us to monitor the evolution of profits.

CHART 2: US MACRO CORPORATE PROFITS, NOMINAL GDP, AND US STOCK MARKETS



Source: Bloomberg, Indosuez Wealth Management

USA

The BEA national income measure of corporate profits (called NIPA for National Profits with Inventory valuation and Capital Consumption Adjustment) differs from profits reported by firms in accounting terms. These also diverge from profits as measured in stock market indices. The discrepancies pertain to coverage, industry representation, and accounting principles, amongst others. As outlined by A. W. Hodge[2], "For example, both S&P 500 earnings measures fall by larger percentages during recessions than the NIPA profits measures and then rise faster to converge back toward NIPA profits trends".

In the US, profits reported as part of national income represent the income of US residents, comprising income earned abroad by US-headquartered companies and exclude income earned in the US by foreign companies. While these profits measure the economic concept of "income from current production" of all US listed and non-listed corporations, earnings reported by listed companies (such the members of the S&P 500 index) are on a financial accounting basis under generally accepted accounting principles (GAAP). The BEA's NIPA figures exclude specific items such as dividends and capital gains or losses (because such gains or losses do not result from current production).

In the case of listed companies, the earnings are the aggregate of the corporations in the stock index concerned. GAAP reported earnings are after-tax, and include operating and non-operating earnings. Furthermore, the composition of the index will usually vary over time, which implies that the earnings series also varies. All indices have their own slant, or bias, and do not necessarily reflect the economy as a whole. Instead, they are generally market-capitalisation weighted which can lead to certain sectors being over- or under-represented.

ACCOUNTING RULES

From an accounting perspective, NIPA profits are based on data collected from corporate income tax returns which are thus based on tax accounting rules. Company-reported earnings are based on GAAP, and governed by the Financial Accounting Standards Board.

Under GAAP rules, all transactions must be accounted for, whereas for tax accounting, only items which have an impact on taxation of the company are recorded. GAAP exists to offer accounting principles, standards and practices, which allow for comparisons among firms. Taxable income, however, differs from the definition of revenue under GAAP.

1 - Inventory valuation adjustments and the capital consumption adjustments are used to adjust IRS before-tax profits to NIPA asset valuation concepts. Inventories are thus adjusted by valuing them on a last-in/first-out basis.
2 - See Hodge A.W., "Comparing NIPA profits with S&P 500 profits", BEA Briefing, March 2011, p. 22 et al..

The two frameworks use different timing approached for revenue and expense recognition. For example, fixed assets are often depreciated more slowly under GAAP rules than in tax accounting. Furthermore, under tax accounting, some revenues and expenses are not recognised, whereas GAAP requires completeness with regards to the recording of any item. The fair value gain, or loss, of securities are not counted as profits in NIPA, but can be under GAAP rules.

Also, employee stock options, expenditures associated with plant closings, or with company reorganisations may differ[3], and NIPA profits are seasonally adjusted, while reported earnings from companies in US stock indexes are not. Despite all these differences, long-term trends are broadly similar, especially between S&P 500 operating earnings and the NIPA national profits after tax without inventory valuation and capital consumption adjustments.

TABLE 1: KEY DIFFERENCES BETWEEN GAAP AND NIPA EARNINGS

DIFFERENCES	GAAP EARNINGS	NIPA EARNINGS
Prepared by	Firm managers	BEA experts
Reporting rules set by	FASB	BEA
Managerial discretion in determination	Considerable	Close to none
Political meddling in setting reporting rules	Some	None
Concept of Income	Mixed, Revenues - Expenses, adjusted for net asset changes	"Profits from current production", mostly Revenues-Expenses. Eliminates the effects of gains and losses on PPE and investments and most asset revaluations like asset write-downs
Timeliness	Typically produced within 4-8 weeks of reporting period	Final estimates 2 years after reporting period. First estimates a month after the end of the reporting period, increasingly more precise estimates thereafter
Revisions	Only by exception, in restatements	Routine, several revisions until finalised amounts. Whenever possible, all amounts retroactively adjusted when BEA rules change
Reliability	Moderate	High
Coverage	Publicly-traded companies	All corporations, including private
Audited	Yes, by public accountants	No
Internal cross-checks	Some, articulation between the balance sheet and the income statement	Extensive, as national income amounts are estimated from independent data sources on the output and income side
Earnings true up to cash flows	Yes (with rare exceptions)	Mostly yes but with considerable exceptions. Most importantly, since NIPA earnigs is "profits from current production", capital assets gains and losses are not included in income

Source: Ilia D.Dichev, Indosuez Wealth Management

EUROPE

In the European Union, the measure used for macro profits is the "gross operating surplus and gross mixed income" published by Eurostat. It differs from the US NIPA earnings in that it only reflects "gross profits". However, much like NIPA's national profits, it aims to capture the gross profits of European companies both in the European Union and overseas, it is part of the national income[4], and it is seasonally adjusted.

Eurostat gives the following definition: "Operating surplus is the surplus (or deficit) on production activities before account has been taken of the interest, rents or charges paid or received for the use of assets (…) Mixed income is the remuneration for the work carried out by the owner (or by members of his family) of an unincorporated enterprise. This is referred to as "mixed income" since it cannot be distinguished from the entrepreneurial profit of the owner[5]". Below we use the term GOS (gross operating surplus) to refer to "gross operating surplus and gross mixed income".

The difference between company profits shown in company accounts and GOS estimates involve the fact that only a subset of total costs (costs of intermediate goods and services to give gross value added, compensation of employees and taxes and subsidies on production and imports) are subtracted from gross output to calculate the GOS. GOS also makes no allowance for consumption of fixed capital[6].

In Europe, the commonly used accounting standards are the International Financial Reporting Standards (IFRS). Most of the world's more significant capital markets now require IFRS to be used. At the conceptual level, IFRS is considered more of a principles-based accounting standard in contrast to the more rules-based GAAP standard used in the US. 585 companies out of the 600 companies included in the Stoxx Europe 600 Index reported under IFRS.

Of the many differences highlighted above between these two measures of corporate profits, perhaps the most important is that macro profits include non-listed firms while stock market indices naturally are limited to listed firms.

3 - See Ilia D.Dichev, "Explaining the changing properties of GAAP earnings: Insights from comparing GAAP to NIPA earnings", Goizueta Business School, Emory University, January 10, 2014.
4 - National income represents "total primary income receivable by resident institutional units", i.e. compensation of employees, taxes on production and imports less subsidies, property income (receivable less payable), gross operating surplus, and gross mixed income (gross operating surplus and gross mixed income are one category).
5 - www.ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Income_approach
6 - www.ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Gross_operating_surplus_(GOS)_-_NA

THE EXPLANATORY POWER OF MACRO VERSUS CORPORATE PROFITS ON MARKET BEHAVIOUR

To this end, we have chosen to use three variables:

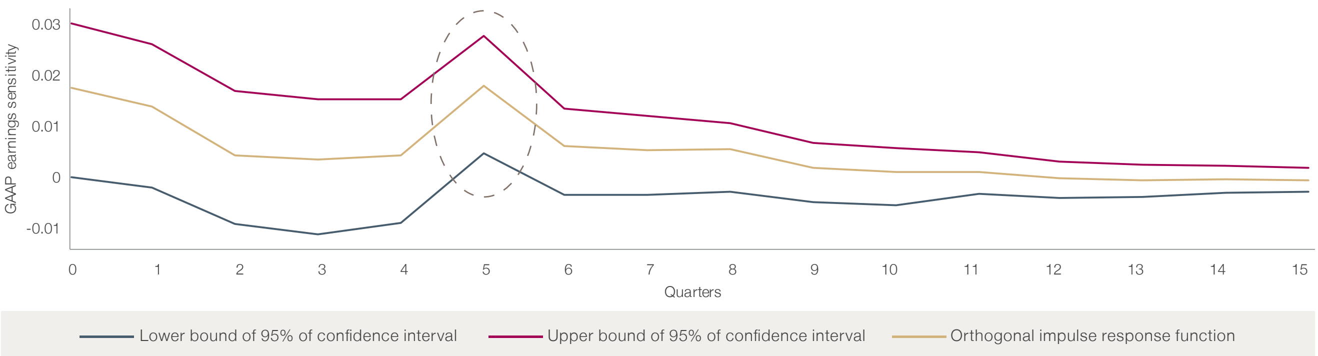
- The log returns of US (respectively EU) index;
- The log returns of US (respectively EU) macro profits;
- The log returns of GAAP earnings corresponding to the US (respectively EU) index.

USA

Looking at which definition of profits that has the most explanatory power in terms of stock market behaviour, we find that for the US, the use of corporate-reported earnings appears statistically more pertinent than the use of macro profits.

Furthermore, it we apply a shock to the reported earnings variable, it triggers a significant spike in the fifth quarter after as can be seen in Chart 3 below, reverting back to its level 2-4 quarters later. Thus, a significant shock to reported earnings could have a material impact on the S&P 500 Index 5 quarters after.

CHART 3: IMPULSE RESPONSE FUNCTION FOR S&P 500 AND GAAP EARNINGS SHOCK

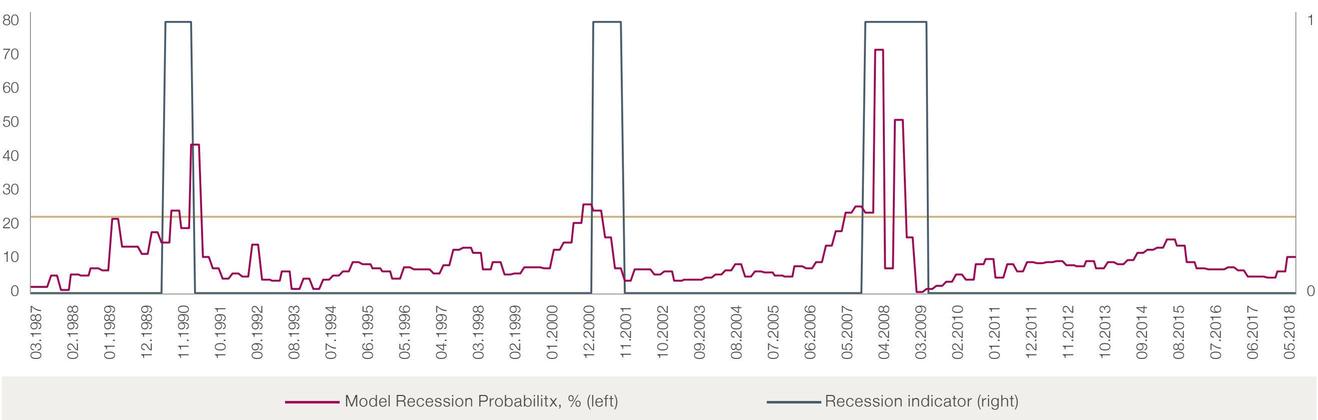


Source: Indosuez Wealth Management

Focussing specifically on the US, we can also look at whether reported earnings can offer any insights in providing a recession signal. (We do this by using a classic probit model - a generalised linear regression with a binary dependent variable - in order to estimate the probability of a recession).

The model output, shown in the chart 4, finds that all recessions since 1987 have been preceded by the estimated recession probability crossing the 28% threshold. In other words, if the model's recession probability exceeds 28%, it signals a potential recession in the coming months. Using macro profits instead yields similar results graphically, but the statistical significance is lower than that obtained using reported earnings.

CHART 4: PROBIT MODEL ESTIMATING PROBABILITY OF RECESSION



Source: Indosuez Wealth Management

EUROPE

Regarding Europe we find that macro-economic profits are the key explanatory factor in the dynamic of the stock market. We also find that a material shock to or change in macro profits can have a significant effect on returns around the second quarter following the shock, and that it tends to take some time (6-9 quarters) before the shock is absorbed (Chart 5). If we instead look at shocking corporate profits, we find that the size of the impact is smaller than in the case of the macro profits shock.

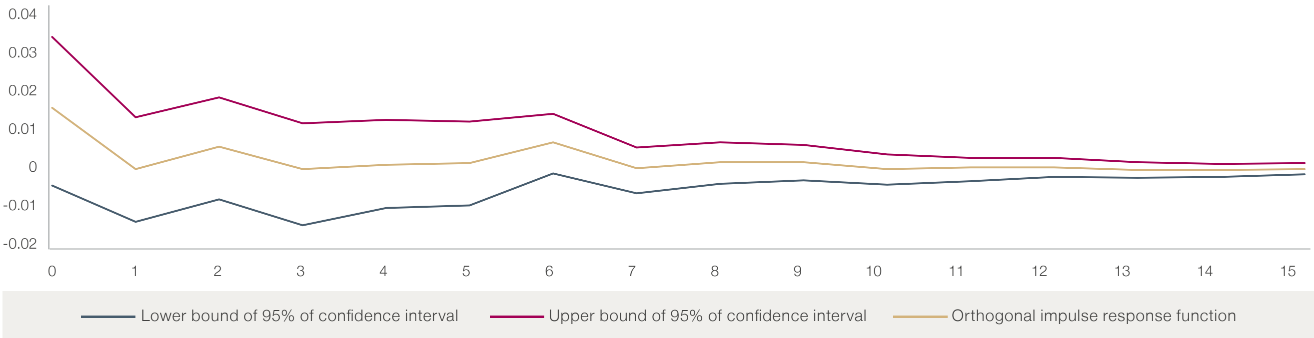
Thus, with regards to European markets, it appears that macro profits is the most pertinent variable in terms of explaining market behaviour in Europe. Understandably, the framework above has its limits and we do not claim that earnings is the "universal variable" to explain all movements on European markets.

KEY TAKE-AWAY

Depending on which measure of profits used, macro or corporate, we find different explanatory power regarding market behaviour. In Europe, our analysis shows that macro profits impact markets the most, whilst in the US, corporate profits are the superior measure. Furthermore, in the US, corporate profits also provide a good indicator in terms of signalling a possible recession.

Clearly, not all profits are equal.

CHART 5: IMPULSE RESPONSE FUNCTION FOR STOXX EUROPE 600 INDEX AND MACRO PROFITS SHOCK



Source: Indosuez Wealth Management

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APPENDIX

STATISTICAL STUDY

The statistical study conducted is to assess the contribution of profits and earnings variables to explain the market behaviour (recession/correction). To this end, we have chosen to use three variables:

- The log returns of US (resp. EU) index;
- The log returns of US (resp. EU) macro profits;
- Log returns of GAAP earnings corresponding to the US (resp. EU) index.

To model the dynamic and the interdependence between these variables, we have fitted a restricted vector autoregressive (VAR) process with the 3 previously mentioned state variables. This step allows us to map out model equations governing the temporal evolution of the variables. In the second step, we focus on studying which variable is the "most causal" and finally, analyse the behaviour of state variables under shocks. All methodological and technical details are specified below.

QUICK BACKGROUND ON VECTOR AUTOREGRESSIVE (VAR) PROCESSES

VAR processes are very common tools to study the interdependence between variables. Mathematically, VAR processes consist in a multidimensional generalisation of classical unidimensional autoregressive processes. In a formal way, they are given by an equation of the following type:

$$Y_t = \mu + \sum_{i=1}^{k} A^i \, Y_{t-i} + \varepsilon_t$$

where $(A_i), i=1,\dots,k$ are constant matrix and μ a constant vector. k is the number of time lags used in the model and ε denotes the residuals.

We do not want to enter much deeper in to the mathematical and statistical details but it is important to keep in mind that all estimation techniques used (least squares, maximum likelihood) and estimators convergence in the literature need a stationarity type assumption to be established. This is why in the study below VAR models have been used with the log returns of variables.

This kind of model is also interesting and widely used since it offers the possibility to see if there is a causality relation (in the sense of Granger for example) between the variables. One can also assess the effect on the system itself (i.e. on all the variables) of a shock of one variable among the others – what we call the impulse response of the VAR process. This tool is widely used in econometrics, in particular to see the impact on the economy of a shock coming from a particular economic variable. There is also another indicator that is computed to interpret VAR models and this is the *forecast error variance decomposition*. It roughly consists in a decomposition of the Mean Squared Error (MSE) to quantify the contribution in the forecast error of one variable in function of the innovations of the others variables.

Of course, there are several extensions of classical VAR formulations, such as Bayesian VAR, Time-Varying VAR, Panel VAR (with cross-sectional dependent variables), but we have chosen to use a simple version for the first study on this subject to see what kind of trends and conclusions we could draw.

EUROPE

The proxy used for the European market is the STOXX Europe 600 Price Index EUR (SXXP Index) and the one used for macro profits is the European Union Gross Operating Surplus and Mixed Income Current Price (ENOPEUS Index). Reported earnings used here are the ones of the STOXX Index. All variables are quarterly.

The statistical estimation procedure lead to the following model:

$$X_t = 0.024 + 0.24 * X_{t-1} - 4.16 * Y_{t-2} + 0.26 * X_{t-2} + 0.34 * X_{t-3} + 0.11 * Z_{t-4} + \varepsilon_t^X \text{ (SXXP Index)}$$

$$Y_t = 0.005 + 0.021 * Z_{t-1} + 0.085 * X_{t-1} + 0.05 * X_{t-4} + \varepsilon_t^Y \text{ (ENOPEUS Index)}$$

$$Z_t = 0.96 * X_{t-1} + 4.54 * Y_{t-2} + 0.53 * X_{t-2} - 4.73 *_{t-3} + \varepsilon_t^Z \text{ (Earnings)}$$

where, by definition:

$$X_t = \ln\left(\frac{SXXP_{t-1}}{SXXP_t}\right),\ Y_t = \ln\left(\frac{ENOPEUS_{t-1}}{ENOPEUS_t}\right),\ Z_t = \ln\left(\frac{Earnings_{t-1}}{Earnings_t}\right)$$

Beyond the model itself, what is interesting to observe in the equations above is the contribution of the negative terms in the first and third equation. For the value -4.16, this means that the two time lagged log returns of macro profits contributes negatively, and in a clearly significant way (4.16 > 0.34 > 0.26 > 0.11 > 0.024) compared to others terms. We can thus expect that, if there is a significant jump between two consecutives values of Y_{t-2}, its impact in X_t will be the most important. All other things being equal, this seems to suggest that macroeconomic profits are a key explanatory factor in the dynamic of the Euro zone market. This observation is by the way confirmed with a Granger causality test at 1% level. This means that, with an error margin of at most 1%, macroeconomic profits (ENOPEUS Index) is the variable that has the most explanatory power in this framework.

Another interesting aspect to study is the behaviour of the system when one of the state variables (macro profits or earnings) is shocked. In other words, the question is how the shock is propagated in the future if it is, and what is the magnitude of the system after the shock. To do this, we evaluate the first order derivative of the interest variable (i.e. X_t) with respect to Y_{t-1} or Z_{t-1}. This quantity, that is reported on chart 5, can be intuitively understood as the difference between forecasted values without shocked variables and forecasted values when one state variable is shocked, all divided by the magnitude of the shock. The shock has to be intuitively seen as a pulse shock, i.e. something very quick with a significant magnitude.

On chart 5, we can see the response of the variable X_t when Y_{t-1} is shocked. The y-axis corresponds to the value of the first order derivative and the x-axis represents the time in quarters, quarter 0 meaning today. We can observe that when we shock the macro profits variable, it provokes a significant spike at the second quarter ahead and it takes some time (between 6 and 9 quarters) to go back to a value close to 0. Concretely, it means that a significant change in the regime of macro profits could potentially have a material impact on SXXP Index returns around the second quarter after the shock and take some time to be absorbed.

By looking at the same impulse response for a shock to reported earnings, we observe that the order of magnitude of the response is smaller than in the case of the macro profits shock. Finally, from the previous results, it appears that macro profits is the most pertinent variable among the ones studied here, in terms of explanatory power, to try to explain the SXXP Index directions. Obviously, these results have their own limits interpreted in the VAR model framework and we do not claim that earnings is the "universal variable" to explain all movements of the European markets.

USA

The proxy used for the US market is the S&P 500 Index (SPX Index) and the one for the macroeconomic profits is the US Corporate Profits Index (CPFTTOT Index). Here again, all variables are quarterly. In this case, the most pertinent fitted model is given by:

$$X_t = 0.30 * Z_{t-1} + 0.35 * Z_{t-5} + \varepsilon_t^X \text{ (SXXP Index)}$$

$$Y_t = 0.015 - 0.26 * Y_{t-1} + 0.54 * Z_{t-2} - 0.18 * X_{t-2} - 0.20 * Z_{t-4} + \varepsilon_t^Y \text{ (CPFTTOT Index)}$$

$$Z_t = 0.27 * Z_{t-1} + 0.42 * Y_{t-1} + 0.19 * Z_{t-2} + \varepsilon_t^Z \text{ (Earnings)}$$

where, by definition:

$$X_t = \ln\left(\frac{SPX_{t-1}}{SPX_t}\right),\ Y_t = \ln\left(\frac{CPFTTOT_{t-1}}{CPFTTOT_t}\right),\ Z_t = \ln\left(\frac{Earnings_{t-1}}{Earnings_t}\right)$$

The first thing we can remark is the fact there are negative coefficients only in the second equation, i.e. the one governing the evolution of the macro profits. Moreover, macro itself, earnings as well as S&P 500 Index have negative contribution. The only positive one comes from the time lagged of order 2 of the S&P 500 Index with the largest magnitude (0.54 > - 0.18 > - 0.20 > - 0. 26 and 0.54 / 0.26 = 2.08, 0.54 / 0.18 = 3, 0.54 / 0.20 = 2.7). The second thing to point out is the fact the evolution of the S&P 500 Index does not depend on the macro profits (Y_{t-1} and Y_{t-5}). At this stage, it is not absurd to assume that the macro profits variable is not more explanatory than the earnings one. This assumption is confirmed by a Granger causality test. At 1% level, i.e. with an error margin of at most 1%, the reported earnings variable is the causal one that contributes the most to explain the evolution of the S&P 500 Index. Moreover, the correlation between ε_t^Y and $\varepsilon_t^X/\varepsilon_t^Z$ is not significant. This means that the model seems to capture all the useful information and thus residuals no longer contain informative information. The Granger's test results are thus more reliable in this context.

In a similar way as we did for Europe, we will now also look at shocking variables to analyse the impact. The response of the S&P 500 Index variable when reported earnings is shocked shows interesting results. On chart 3, we have reported the response of the variable X_t for a shock with respect to Z_t. The y-axis corresponds here again to the first order derivative of the variable X_t with respect to Z_t. We then observe below that a shock on reported earnings triggers a significant spike at the fifth quarter ahead, i.e. after the shock has been done and whereas the system seemed to have recovered a stability during the 2 to 4 quarters. Thus, it means that a significant change in reported earnings could potentially have a significant impact on S&P 500 Index returns around the fifth quarter after the shock.

In conclusion, it appears that the US and Europe do not have the same market structure from the point of view of the relation between markets and profits. In the US, GAAP earnings are the most pertinent variable from a statistical view where for Europe it is the macroeconomic profits. The precise root cause of this behaviour has not been established clearly but an intuitive possibility could be the different accounting and statistical methodologies used by official statistics offices in the US and in the EZ.

APPLICATION FOR THE SETUP OF A RECESSION SIGNAL (EXAMPLE OF THE US)

For the USA, we have concluded above that in the model setup reported earnings are more valuable than macro profits from a statistical (predictive) aspect. Thus, we can try to use this variable, instead of macro profits, to setup a recession signal through a classical probit model. More precisely, we use a probit model (i.e. a generalised linear regression with a binary dependent variable) in order to estimate the probability of a recession. The model output, shown in chart 4, finds that all recessions since 1987 have been preceded by the estimated recession probability crossing the 28% threshold from below. In other words, if the model's recession probability exceeds 28%, it signals a potential recession in the coming months.

The same methodology used with macro profits give, at least graphically, similar results but the statistical significance is less than with the use of reported earnings. We can then conclude that for the US, the use of earnings appears more statistically pertinent than macro profits to set up a recession signal.

All these results have been drawn from a particular set up and framework and all subsequent conclusions have not to be claimed as universal truths but replaced in the framework in which they have been established.

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