Financial Analysts' Forecasts of Company Performance

Incorporation of Macroeconomic Expectations

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Olga-Chara Pavlopoulou-Lelaki

Dissertation Committee Chair: Professor Dimitrios C. Ghicas

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Dissertation Advisory Committee:

Dimitrios C. Ghicas, Professor (Committee Chair)

Afroditi Papadaki, Associate Professor

Georgia Siougle, Associate Professor

Dissertation Examination Committee:

Dimitrios C. Ghicas, Professor (Committee Chair)

Apostolos A. Ballas, Professor

Dimosthenis L. Hevas, Professor

Afroditi Papadaki, Associate Professor

Georgia Siougle, Associate Professor

Efthimios G. Demirakos, Assistant Professor

Christos Tzovas, Assistant Professor

This dissertation is dedicated to my parents, Panagiotis and Angeliki

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Abstract

This dissertation contributes to the financial analysts' literature as well as the equity valuation literature at the intersection of financial accounting and macroeconomics, by providing new evidence on the efficiency with which financial analysts incorporate GDP growth expectations into their earnings forecasts, and on the stock-market relevance of macroeconomic expectations and analysts' earnings expectations, controlling for the state of the economy. Using a sample of listed-companies from Eurozone countries that were severely affected during the recent financial crisis, the dissertation offers empirical evidence of financial analysts' efficiency with respect to the incorporation of real GDP growth forecasts that is robust to the crisis. The macro-informed analysts' earnings news offer value-relevant information to the stock market but their informativeness declines during the period of the crisis. With respect to the incorporation of macroeconomic expectations by the stock market, the dissertation documents significant associations between the components of GDP growth forecasts and current stock returns that are affected during the period of the crisis, and a predictive power of GDP growth forecasts over future stock returns that implies stock market inefficiency.

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Summary in Greek (Περίληψη)

Η παρούσα διατριβή εξετάζει τη σπουδαιότητα των μακροοικονομικών προσδοκιών στη διαμόρφωση προβλέψεων των χρηματοοικονομικών αναλυτών για την κερδοφορία των επιχειρήσεων, δηλαδή προβλέψεων σε μικροοικονομικό επίπεδο. Επιπλέον, εξετάζει την σπουδαιότητα των μακροοικονομικών προσδοκιών καθώς και των προβλέψεων των αναλυτών για τις αγορές κεφαλαίων. Η ερευνητική μέθοδος που ακολουθείται είναι εμπειρική.

Σε περιόδους κρίσης, διαμορφώνονται παράμετροι αβεβαιότητας που μπορούν να επηρεάσουν τις συσχετίσεις μακροοικονομικών και μικροοικονομικών μεγεθών, καθώς και τη σπουδαιότητά τους για τις αγορές κεφαλαίων, συγκεκριμένα για τις συνολικές αποδόσεις των μετοχών. Για αυτόν το λόγο και τα δύο προαναφερθέντα θέματα εξετάζονται υπό το πρίσμα της σοβαρής δημοσιονομικής και χρηματοπιστωτικής κρίσης που έχουν αντιμετωπίσει τα τελευταία έτη χώρες της Ευρωζώνης. Καθώς Ισπανία, Ιταλία, Ελλάδα και Πορτογαλία, αποτελούν τα μέλη της Ευρωζώνης στα οποία παρατηρήθηκαν ιδιαιτέρως έντονες οι οικονομικές συνέπειες της κρίσης, η διατριβή μελετά τις συσχετίσεις που περιγράφονται παραπάνω χρησιμοποιώντας ένα δείγμα επιχειρήσεων εισηγμένων στα χρηματιστήρια των εν λόγω χωρών, καθώς και δείγμα μακροοικονομικών προβλέψεων για βασικά οικονομικά μεγέθη των συγκεκριμένων χωρών. Ως μέτρο κερδοφορίας των επιχειρήσεων χρησιμοποιούνται τα καθαρά κέρδη ανά μετοχή, ενώ τα μακροοικονομικά μεγέθη τα οποία χρησιμοποιούνται είναι: η ετήσια μεγέθυνση στο ονομαστικό ακαθάριστο εγχώριο προϊόν, Α.Ε.Π., καθώς και τα συστατικά αυτής (ετήσια μεγέθυνση στο πραγματικό ακαθάριστο εγχώριο προϊόν, Α.Ε.Π., και ετήσιος ρυθμός πληθωρισμού). Η χρονική περίοδος διεξαγωγής της εμπειρικής έρευνας είναι η περίοδος 2005-2013. Η περίοδος 2005-2008 χαρακτηρίζεται ως περίοδος προ της κρίσης

ενώ η περίοδος 2009-2013 θεωρείται περίοδος κρίσης.

Επί των προαναφερθέντων θεμάτων η διατριβή διατυπώνει και εξετάζει τρία ερευνητικά ερωτήματα, τα οποία δεν έχουν διερευνηθεί όπως προκύπτει από την παρούσα βιβλιογραφία:

Πρώτον, εξετάζει την αποτελεσματικότητα των χρηματοοικονομικών αναλυτών ως προς την ενσωμάτωση των μακροοικονομικών προσδοκιών κατά την πρόβλεψη της κερδοφορίας των επιχειρήσεων. Συγκεκριμένα, οι προβλέψεις καθαρών κερδών των αναλυτών (1ο μοντέλο) καθώς και τα σφάλματά τους (2ο μοντέλο) παλινδρομούνται πάνω στις προβλέψεις της μεγέθυνσης στο ονομαστικό Α.Ε.Π.. Έπειτα, παλινδρομούνται στα συστατικά στα οποία επιμερίζεται αυτή η προσδοκώμενη μεγέθυνση: στην πρόβλεψη μεγέθυνσης στο πραγματικό Α.Ε.Π. και την πρόβλεψη του ρυθμού του πληθωρισμού. Οι παλινδρομήσεις λαμβάνουν υπόψη τους τον παράγοντα της κρίσης για να διαπιστωθεί εάν οι συσχετίσεις που διερευνώνται αλλάζουν σημαντικά κατά την περίοδο της κρίσης. Το μοντέλο μελέτης της συστηματικής σχέσης μεταξύ της προσδοκώμενης μεγέθυνσης στο εγχώριο προϊόν και των προβλέψεων κερδοφορίας των αναλυτών (1ο μοντέλο) στοχεύει στην εμπειρική διερεύνηση της ενσωμάτωσης μακροοικονομικών προβλέψεων κατά τη διαδικασία εκτίμησης της μελλοντικής κερδοφορίας των επιχειρήσεων από τους αναλυτές. Το 2ο μοντέλο μελέτης της συστηματικής σχέσης μεταξύ της προσδοκώμενης μεγέθυνσης στο εγχώριο προϊόν και των σφαλμάτων των αναλυτών στοχεύει στην εμπειρική διερεύνηση της αποτελεσματικότητάς τους ως προς την ενσωμάτωση των μακροοικονομικών προβλέψεων.

Το δεύτερο ερευνητικό ερώτημα αφορά στη σπουδαιότητα που έχουν για τις αγορές κεφαλαίων, συγκεκριμένα για τις αποδόσεις των μετοχών οι μακροοικονομικές προσδοκίες (της μεγέθυνσης στο ονομαστικό Α.Ε.Π. και των συστατικών στα οποία επιμερίζεται). Το τρίτο ερευνητικό ερώτημα αφορά στη σπουδαιότητα που έχουν για τις αγορές κεφαλαίων οι προβλέψεις των χρηματοοικονομικών αναλυτών επί της

μεταβολής στην κερδοφορία των επιχειρήσεων. Στο δεύτερο και το τρίτο ερευνητικό ερώτημα εξετάζεται η ενσωμάτωση από την αγορά και η αποτελεσματικότητα της αγοράς ως προς αυτές τις προβλέψεις, μακροοικονομικές και μικροοικονομικές αντίστοιχα. Συγκεκριμένα, οι τρέχουσες αποδόσεις και έπειτα οι μελλοντικές αποδόσεις παλινδρομούνται πάνω στις μακροοικονομικές προβλέψεις και στις προβλέψεις μεταβολής κερδοφορίας των αναλυτών, λαμβάνοντας υπόψη τον παράγοντα της κρίσης, για να διαπιστωθεί εάν οι συσχετίσεις που διερευνώνται αλλάζουν σημαντικά κατά την περίοδο της κρίσης.

Τα εμπειρικά ευρήματα που προκύπτουν από τη μελέτη των μοντέλων που σχετίζονται με το πρώτο ερευνητικό ερώτημα (ενσωμάτωση και αποτελεσματικότητα αναλυτών ως προς τις μακροοικονομικές προσδοκίες) υποδεικνύουν τα εξής:

Στην περίοδο πριν από την κρίση, η μεγέθυνση στο ονομαστικό Α.Ε.Π. συνδέεται θετικά με την κερδοφορία των επιχειρήσεων. Επιμερίζοντας στις επιδράσεις του πραγματικού προϊόντος και του πληθωρισμού, διαπιστώνεται ότι ενώ η μεγέθυνση στο πραγματικό Α.Ε.Π. συνδέεται θετικά με την κερδοφορία, ο πληθωρισμός συνδέεται αρνητικά με την κερδοφορία. Η θετική συσχέτιση της κερδοφορίας με τη μεγέθυνση στο πραγματικό Α.Ε.Π. είναι πιο ισχυρή από την αρνητική της συσχέτιση με τον πληθωρισμό και ως εκ τούτου η συνολική επίδραση της μεγέθυνσης στο ονομαστικό Α.Ε.Π. πάνω στην κερδοφορία είναι θετική. Κατά την περίοδο της κρίσης, η σπουδαιότητα των μακροοικονομικών δεδομένων για την κερδοφορία μειώνεται, και ο πληθωρισμός δεν συσχετίζεται πλέον με την κερδοφορία. Ωστόσο, η μεγέθυνση στο πραγματικό Α.Ε.Π. (άρα συνολικά και στο ονομαστικό Α.Ε.Π.) εξακολουθεί να συσχετίζεται θετικά με την κερδοφορία και κατά την κρίση. Ως προς την αποτελεσματικότητα των αναλυτών ως προς τις μακροοικονομικές προβλέψεις, τα αποτελέσματα της διατριβής υποδεικνύουν αποτελεσματικότητα ως προς την ενσωμάτωση των προβλέψεων της μεγέθυνσης του πραγματικού Α.Ε.Π. και πριν από την περίοδο της κρίσης και κατά την περίοδο της κρίσης. Εν αντιθέσει, ως προς την

ενσωμάτωση των προσδοκιών πληθωρισμού, παρατηρείται συστηματική αναποτελεσματικότητα των αναλυτών, κατά την περίοδο προ της κρίσης. Κατά την κρίση, σύμφωνα με τα εμπειρικά ευρήματα ο πληθωρισμός δεν συσχετίζεται σημαντικά με τη κερδοφορία των επιχειρήσεων.

Αναφορικά με το δεύτερο ερευνητικό ερώτημα, τα εμπειρικά αποτελέσματα υποδεικνύουν ότι στην περίοδο πριν από την κρίση, η προσδοκώμενη μεγέθυνση στο πραγματικό Α.Ε.Π. συνδέεται θετικά με τις τρέχουσες αποδόσεις των μετοχών, εύρημα που αποδίδεται κυρίως στη θετική συσχέτισή του με την προσδοκώμενη κερδοφορία, ενώ ο πληθωρισμός συνδέεται αρνητικά με τις αποδόσεις των μετοχών, εύρημα που αποδίδεται στη θετική συσχέτισή του με το ποσοστό προεξόφλησης. Συνολικά, η επίδραση του πραγματικού Α.Ε.Π. είναι πιο ισχυρή, με αποτέλεσμα η συσχέτιση της προβλεπόμενης μεγέθυνσης στο ονομαστικό Α.Ε.Π. με τις τρέχουσες αποδόσεις των μετοχών (προ της κρίσης) να είναι θετική. Αντιθέτως, κατά την περίοδο της κρίσης, παρατηρείται μία αντιστροφή στη συσχέτιση της προσδοκώμενης μεγέθυνσης στο πραγματικό Α.Ε.Π. με τις τρέχουσες αποδόσεις των μετοχών, αντιστροφή η οποία αποδίδεται στο ιδιαίτερα αβέβαιο περιβάλλον της περιόδου, κατά την οποία στην αγορά παρατηρείται απαισιοδοξία και δυσπιστία ως προς την πορεία της οικονομίας. Η συσχέτιση του προσδοκώμενου πληθωρισμού με τις τρέχουσες αποδόσεις δεν μεταβάλλεται σημαντικά στην κρίση. Οι μελλοντικές αποδόσεις συσχετίζονται συστηματικά με τις προβλέψεις μεγέθυνσης στο ονομαστικό Α.Ε.Π., εύρημα που υποδεικνύει αναποτελεσματικότητα της αγοράς και αποδίδεται σε υπεραισιοδοξία των σχετικών προβλέψεων που οδηγεί σε αντιστροφή των αποδόσεων κατά το επόμενο έτος.

Όσον αφορά τη σπουδαιότητα των προβλέψεων μεταβολής κερδοφορίας των αναλυτών για τις αποδόσεις των μετοχών (τρίτο ερευνητικό ερώτημα), διαπιστώνεται μία θετική συσχέτιση στην περίοδο πριν από την κρίση. Κατά την κρίση, η συσχέτιση αυτή μειώνεται. Σημειώνεται ότι η μείωση της σπουδαιότητας στην κρίση δεν

αποδίδεται σε μειωμένη ικανότητα των αναλυτών, αλλά σε δυσπιστία της αγοράς ως προς τις προβλέψεις για την μελλοντική πορεία της οικονομίας και της επίδοσης των επιχειρήσεων γενικότερα. Οι μελλοντικές αποδόσεις δεν συσχετίζονται συστηματικά με τις προβλέψεις των αναλυτών για μεταβολή στην κερδοφορία υποδεικνύοντας αποτελεσματικότητα της αγοράς.

Η διατριβή συμβάλλει στην καλύτερη κατανόηση της συμπεριφοράς και προβλεπτικής ικανότητας των χρηματοοικονομικών αναλυτών, παρουσιάζοντας ευρήματα που υποδεικνύουν την αποτελεσματικότητα των αναλυτών ως προς κάποιους μακροοικονομικούς δείκτες και συστηματική αναποτελεσματικότητα ως προς άλλους (πληθωρισμός) υπό το πρίσμα της οικονομικής κρίσης. Επιπροσθέτως, η διατριβή παρουσιάζει ευρήματα τα οποία επισημαίνουν τη σπουδαιότητα των μακροοικονομικών προσδοκιών για τις αγορές κεφαλαίου καθώς και της πληροφόρησης που παρέχουν στην αγορά οι χρηματοοικονομικοί αναλυτές.

Chapter 1 Introduction

1.1 Motivation

Estimating a firm's future profitability with reliability is at the core of equity valuation. Reliable earnings forecasts are associated with more accurate predictions of future residual earnings, and thus can lead to more reliable equity valuations. Equity valuations are instrumental for capital market participants who make investment decisions and direct capital to selected firms. Consequently, valuations based on reliable forecasts of company profitability are crucial for the capital markets to function efficiently, and for the investors' capital to be directed to firms that will use it productively.

A long line of research starting with Ball and Brown (1968) and Beaver (1968) has explored the implications of accounting fundamentals for equity valuation. A relatively more recent line of research examines the properties of available forecasts of company profitability: forecasts issued by financial analysts, forecasts issued by company management, and forecasts derived from time series earnings prediction models.

The role of financial analysts as information intermediaries for the market has received particular research attention. Financial analysts' earnings forecasts have been studied in the accounting and finance literature as a proxy for unobservable market earnings expectations. The value-relevance of earnings forecasts is assessed by examining their contribution to equity valuation improvement, thus the confidence we derive from an accounting valuation model is linked to the confidence we place on the earnings forecasts employed in the model. Prior studies that examine the information content of analysts' forecasts, have documented that financial analysts are experts who can conduct in-depth financial statement analysis, and combine the results of their analysis with other sources of information, both public and private, to translate them into value-relevant

forecasts of future earnings and stock recommendations (e.g., Block, 1999; Healy et al., 1999; Gu and Chen, 2004). The accuracy of analysts' earnings forecasts will depend on the efficiency of incorporation of the earnings-relevant information available to the analysts at the time of the forecast. Several studies have examined factors that determine analysts' efficiency (number of analyst following and analysts' experience, brokerage characteristics, timeliness, forecast horizon, availability of public and private information, and firm complexity), and others have presented evidence of analysts' systematic inefficiencies (e.g., Abarbanell and Bernard, 1992; Elliott et al., 1995; Abarbanell and Lehavy, 2003; Conrad et al., 2006; Barron et al., 2008)[1].

There are two schools of thought on the origins of analysts' inefficiency. The behavioural finance literature (e.g., Kahneman and Tversky, 1973; De Bondt and Thaler, 1985) offers explanations of agents' inefficiencies based on psychological and cognitive systematic biases. According to De Bondt and Thaler (1990), these theories extend to security analysts and market participants who systematically misinterpret or delay responding to new information. Conversely, market efficiency and rationality proponents propose that analysts' strategic incentives (instead of behavioural biases) such as analysts' compensation, investment banking activities and affiliated brokerage business are responsible for the observation of the inefficiencies (e.g., Das et al., 1998; Bernhardt et al., 2006; Gu and Xue, 2007; Lundholm et al., 2016).

Investors' reliance on inefficient analysts' forecasts will have implications for market efficiency. This finding has recently led researchers to propose explanations of capital markets anomalies such as the post-earnings announcement drift documented by Bernard and Thomas (1990) based on analysts' inefficiency (e.g., Basu et al., 2010).

[1] Relevant studies on analysts' efficiency have also been conducted by Jacob et al. (1999), Brown (2001), Teoh and Wong (2002), Mikhail et al. (2003), Mozes (2003), Gu (2004), Boni and Womack (2006), and Gu and Xue (2008).

One of the major earnings-relevant factors is expectations of future economic growth. Early research has documented that almost half of the variation in corporate earnings is driven by macroeconomic factors (e.g., Brown and Ball, 1967), and that corporate earnings show a conformity with business cycles that is of greater amplitude than other series (Lucas, 1977). The Gross Domestic Product (GDP) is considered a comprehensive indicator of economic activity (e.g., Henderson et al., 2012; Aruoba et al., 2016), and forecasted GDP growth has been established as a signal of macroeconomic expectations in the accounting and finance literature. In accounting valuation models the growth in GDP is considered the benchmark for corporate growth (e.g., Penman, 2005; Penman, 2011). Moreover, recent findings underline the importance of combining fundamental variables such as earnings with macroeconomic variables to forecast future profitability and perform equity valuations. Li et al. (2014) combine geographic segments sales disclosures with country-level macroeconomic forecasts, and produce superior forecasts of firm fundamentals which have predictive ability of future excess stock returns. Doukakis et al. (2016) develop an expectation of future earnings based on current earnings and on the interaction of current earnings with macroeconomic expectations. Their measure is informative for future profitability, as well as for future stock market returns controlling for periods of economic crisis.

Despite the findings that earnings variability is partly driven by macroeconomic factors, the vast literature on analysts' forecasts has largely ignored this aspect. A relatively recent line of research has introduced macroeconomic variables such as inflation in the study of analysts' forecast efficiency (e.g., Basu et al., 2010). Basu et al. (2010) demonstrate that financial analysts underreact to inflation forecasts, and that the ability of inflation forecasts to predict cross-sectional variation in stock returns is partly attributed to the stock market's reliance on financial analysts' earnings forecasts that contain systematic inflation errors.

Stock returns are exposed to macroeconomic factors not only through an association between macroeconomic factors and earnings expectations, but also through an association between macroeconomic factors and the discount rate.

Thus, it has been documented that macroeconomic factors (and innovations in macroeconomic factors) are priced by the market also as a source of systematic non-diversifiable risk. Prior studies have examined the stock-market pricing of macroeconomic variables such as interest rate spreads, inflation, industrial production, and GDP growth, and have linked them with risk, specifically due to their association with required returns (e.g., Fama and French, 1989; Fama, 1990; Sharpe, 2002; Nissim and Penman, 2003; Vassalou, 2003; Konchitchki, 2013). Several studies have also linked the market-pricing of macroeconomic indicators with the phase in the business cycle, controlling for expansions and contractions (e.g. Fama and French, 1989).

It should be noted, that the stock-market relevance of inflation expectations has been studied in the context of Modigliani and Cohn's (1979) inflation illusion hypothesis, according to which investors fail to incorporate the effect of inflation on nominal earnings growth rates even though they fully adjust the discount rates, leading to mis-valuation in stock returns and the ability to gain abnormal returns through utilization of inflation-related investment strategies. Modigliani and Cohn (1979) demonstrate that this mis-valuation will lead to undervaluation for firms whose earnings are positively associated with inflation, and to overvaluation for firms whose earnings are negatively associated with inflation. Other studies document a positive relation between inflation and the required real returns impacting the inflation-returns association (e.g., Sharpe, 2002).

The research on the market pricing of macroeconomic factors and the market pricing of analysts' forecasts has been expanding in the recent years, however, the two streams of literature have largely developed separately. Studies on the stock-market relevance of macroeconomic variables have primarily been conducted at the aggregate level, using market indexes to proxy for economy-wide figures, while studies on the

stock-market relevance of analysts' forecasts have primarily been conducted at the firm-level.

Moreover, studies examining the incorporation of macroeconomic variables by analysts in their forecasts of earnings, and the stock market relevance of these forecasts, have largely focused on U.S. listed-companies samples without constraining on the state of the economy, i.e. differentiating between expansions and contractions, or controlling for periods of severe financial crisis. Recent studies on the stock market relevance of earnings properties controlling for the state of the economy (e.g., Jenkins et al., 2009; Jorgensen et al., 2012; Kalay et al., 2014), emphasize the importance of controlling for the business cycle phase (or state of the economy) when examining earnings' value-relevance. Other studies on financial analysts' and investors' macro-related efficiency (e.g., Chordia and Shivakumar, 2005; Basu et al., 2010), provide evidence on macro-related inefficiencies exhibited by analysts and investors when they form their earnings expectations and make investment decisions respectively.

However, there is no study that directly examines the comparative effects of the two main components of expected growth (real growth and inflationary growth) on the associations between macroeconomic expectations and analysts' forecasts, and on the stock-market implications of these effects. Furthermore, prior studies have not investigated the valuation implications of the macro-related efficiency of financial analysts' forecasts, constraining on the state of the economy. The recent Eurozone financial crisis that severely affected countries of Southern Europe (especially countries with high levels of debt), presents an opportunity to study these largely unexplored associations using the crisis as a state of the economy constraint. The importance of earnings forecasts' efficiency for accurate equity valuations and, thus, efficient allocation of the investors' capital, combined with the recent severe crisis that introduced unprecedented conditions in the markets, provide the motivation for this dissertation.

1.2 Research Questions

This dissertation addresses three main research questions that have largely been unexplored in the accounting and finance literature.

Research Question 1:

a) Do the analysts incorporate macroeconomic expectations in the development of their earnings forecasts? b) Does the crisis have an effect on the association between macroeconomic expectations and analysts' earnings forecasts?

With the first research question the dissertation addresses the efficiency of financial analysts with respect to macroeconomic expectations incorporation by examining a) whether financial analysts incorporate Nominal GDP growth forecasts and their components (Real GDP Growth and Inflation forecasts) in their development of company earnings expectations, b) whether this incorporation is performed efficiently or not, and c) whether the particular conditions of uncertainty prevailing during the crisis period affect analysts' efficiency with respect to these macroeconomic forecasts.

To empirically assess the research question of macro-related analysts' efficiency, regressions of analysts' earnings forecasts and news in analysts' earnings forecasts (expected earnings growth), and regressions of analysts' forecast errors on the macroeconomic forecasts are performed. The incorporation of these macroeconomic expectations in analysts' forecasts implies that the effects of GDP growth forecasts and their components (Real GDP Growth Forecasts and Inflation forecasts) on company earnings will be fully reflected in the analysts' forecasts, i.e. GDP growth forecasts will be associated with analysts' earnings forecasts and news in analysts' earnings forecasts. Analysts' efficiency implies that these GDP growth forecasts and their components will not be associated with analysts' forecast errors.

During periods of financial crisis, due to the conditions of high uncertainty and volatility prevailing, the quality of macroeconomic information and the efficiency with which analysts incorporate the macroeconomic information in their forecasts may have been affected. The recent period of financial crisis in the Eurozone is of particular research interest, thus the research question is examined for the period of 2005-2013 using a sample of listed-companies from four countries of Southern Europe that were strongly affected by the crisis (Spain, Italy, Portugal, and Greece), using the crisis as the state of the economy constraint.

Research Question 2:

a) Does the market efficiently price macroeconomic expectations? b) Does the crisis have an effect on the association between macroeconomic expectations and stock returns?

To examine the stock-market relevance of macroeconomic expectations conditioning on the state of the economy, the dissertation studies the incorporation of Nominal GDP growth forecasts and its components (Real GDP Growth and inflation forecasts), in current and future stock returns controlling for analysts' expectations (analysts' earnings forecasts and news in earnings forecasts). Market efficiency implies that the GDP growth forecasts will be associated with current stock returns and not future stock returns.

During periods of financial crisis, stock prices may deviate from their fundamental values. Moreover, investors' judgement and macroeconomic forecasts' quality may be affected due to the market uncertainty and ambiguity. Thus, the empirical investigation of market efficiency with respect to the GDP growth forecasts' incorporation is performed using the recent Eurozone crisis as a state of the economy constraint.

Research Question 3:

a) Does the market efficiently price news in analysts' earnings forecasts (expected earnings growth)? b) After abstracting macroeconomic information contained in analysts' earnings forecasts, do the analysts convey their own value-relevant ''private'' information to the market that is beyond and above macroeconomic expectations, and c) Does the crisis have an effect on the association between financial analysts' expectations and stock returns?

To examine the stock-market relevance of analysts' expectations conditioning on the state of the economy, the dissertation studies the incorporation of analysts' expectations (analysts' earnings forecasts and news in earnings forecasts) in current and future stock returns. The empirical models condition the associations on the macroeconomic expectations and the state of the economy. Market efficiency implies that analysts' forecasts and news will be associated with current stock returns and not with future stock returns. To examine the incremental explanatory power of financial analysts' forecasts over macroeconomic expectations, information related to GDP growth expectations is abstracted from the analysts' earnings forecasts. Current and future stock returns are then regressed on the residual analysts' earnings forecasts controlling for the state of the economy.

During periods of severe financial crisis, the conditions prevailing may have a detrimental effect on informativeness of analysts' forecasts for valuation purposes as well as on investors' ability to process and incorporate the analysts' forecasts in the valuation process. Thus, to draw inferences on the valuation implications of analysts' forecasts and news taking into consideration the particular conditions of a severe financial crisis, the associations are examined constraining for the crisis period.

1.3 Main Findings and Contribution to related literature

The empirical findings of the dissertation indicate that real GDP growth is positively associated with corporate earnings and earnings growth, while GDP Deflator growth (the inflation rate) is negatively associated with corporate earnings and earnings growth. During the period of the crisis, the relevance of both GDP growth components declines, and only the real GDP growth maintains a significant explanatory power over earnings and earnings growth variation. The decline in the significance of the GDP growth in the period of the crisis is attributed to the uncertainty and high volatility of the period, reduced total factor productivity, and market frictions that can alter the contribution of corporate profits to GDP.

The results on the research question of financial analysts' macro-related efficiency support analyst efficiency with respect to real GDP growth expectations' incorporation that is robust to the severe Eurozone crisis, but inefficiency with respect to inflation expectations' incorporation that is affected by the crisis. Analysts' earnings forecasts and news in earnings forecasts are significantly and positively associated with forecasted real GDP growth both in the pre-crisis and the crisis period, and the forecasted real GDP growth cannot systematically predict analysts' forecast errors. Thus, analysts fully incorporate the earnings implications of forecasted real GDP growth. Despite inflation's relevance for company earnings in the pre-crisis period, analysts fail to incorporate it, and exhibit an underreaction bias to the negative earnings implications of inflation (inflation forecasts predict a systematic component of analysts' forecast errors in the pre-crisis period), but incorporate inflation in their earnings forecast news in the crisis period.

On the research question of market efficiency with respect to GDP growth forecast components, controlling for the crisis and for information conveyed to the market by financial analysts, the empirical results show a positive association between real GDP growth forecasts and current stock returns in the pre-crisis period, primarily attributed

to a positive impact on expected earnings growth, and a negative association in the crisis period, attributed to higher risk premia prevailing at that time. The empirical results on inflation forecasts' value-relevance indicate a negative association between the inflation rate and current stock returns attributed to the inflation expectations' impact on the required return. The association between inflation forecasts and current stock returns is not significantly altered during the crisis. Overall, the association between nominal GDP growth expectations and current stock returns is positive in the pre-crisis period and negative in the crisis period. Testing for market efficiency, the forecasted GDP growth rate can significantly predict future stock returns, implying market inefficiency with respect to macroeconomic forecasts' incorporation that can be linked to the over-optimistic nature of macroeconomic forecasts in the studied time period.

On the value-relevance of news contained in earnings forecasts, the results are consistent with efficient incorporation by the stock market, and a decline in value-relevance in the crisis period due to the uncertain environment. For residual earnings forecasts however, the findings indicate incorporation in current stock returns that is intensified during the crisis, and incorporation in future stock returns as well. These findings indicate that the stock market is relatively slower at incorporating analysts' generated information that is above and beyond the macroeconomic information. Residual analysts' earnings forecasts have a value-relevant component that is magnified in the period of the crisis.

This dissertation contributes to the analysts' forecast literature by providing empirical evidence on the association between macroeconomic expectations and analysts' earnings forecasts, news in earnings forecasts, and systematic forecast errors, controlling for the state of the economy. The dissertation documents separate effects for the components of the nominal GDP growth expectations (i.e. real GPD growth and GDP Deflator growth forecasts) on forecasted company performance and analysts' forecast errors, concluding that financial analysts can efficiently incorporate the impact of real

GDP growth expectations on company profitability (even during the crisis) but find it more challenging to incorporate other earnings-relevant macroeconomic indicators such as the expected inflation rate.

The dissertation also contributes to the equity valuation literature by providing empirical evidence on the value-relevance of macroeconomic expectations and analysts' earnings expectations controlling for the state of the economy. On the value-relevance of macroeconomic expectations, it differentiates between the stock-market implications of real GDP growth and inflation expectations, documenting a positive association between stock returns and real GDP growth expectations that is reversed during the financial crisis, and a negative association between stock returns and inflation expectations that is largely unaltered during the crisis period. On the value-relevance of analysts' earnings forecasts, the dissertation provides corroborative evidence on the previously documented positive association between analysts' earnings expectations and stock returns. The findings offer some new insight into the macro-related information analysts' earnings forecast news convey to the market which is sensitive to the state of the economy, as well as on the value-relevance of residual information contained in analysts' forecasts beyond macroeconomic expectations, which is robust to the recent severe sovereign and financial crisis in the Eurozone, and is of heightened significance during this crisis.

The dissertation proceeds as follows. Chapter 2 presents an overview of related prior studies. Chapter 3 states the hypotheses of the dissertation and the theoretical foundations of each hypothesis. Chapter 4 describes the models used to test the hypotheses and the measurement method of the model variables. Chapter 5 presents descriptive information on the sample used in the empirical analysis, and Chapter 6 presents the empirical results and inferences. Chapter 7 summarizes the main findings and concludes with suggestions for future research.

Chapter 2 Literature Review

2.1 Forecasting Company Performance and Macroeconomic Indicators

2.1.1 Studies on Earnings Forecasting

Forecasting earnings is a main requirement in equity valuation models. Prior literature has extensively studied fundamentals that can predict future earnings, such as current earnings and investment, accruals, dividends, and size factors. The persistence of current earnings, earnings changes, and investment, and their relation to future profitability have been documented in studies such as in Penman (1991), Lakonishok et al. (1994), Elgers and Lo (1994), Fama and French (1995), and Fama and Frech (2000). Fama and French (2000) provide evidence that in a competitive environment, profitability is mean reverting and they employ a simple partial adjustment model that produces a rate of mean reversion of about 38 percent per year. It has also been documented that smaller firms tend to be less profitable (Fama and French, 1995), thus, earnings prediction models typically control for the size factor (usually market capitalization).

The autoregressive properties of quarterly earnings have also received particular research attention. Maines and Hand (1996) examine whether individuals' earnings forecasts correctly reflect the positive autocorrelation in seasonal quarterly changes documented by studies such as in Brown and Rozeff (1979), and Bernard and Thomas (1990). Their results suggest that the stock market underreacts to quarterly earnings and this under-reaction may be composed of underreactions to firms with strong autocorrelation in seasonal changes and overreactions to firms with weak autocorrelation in seasonal changes.

On the association between dividends and profitability, Nissim and Ziv (2001) find that dividend changes provide information about the level of company profitability in subsequent years that is incremental to market and accounting data. Dividend paying firms tend to be more profitable but to grow more slowly. Fama and French (2001) examine NYSE, AMEX, and Nasdaq firms, and note that the proportion of dividend payers falls from 66.5 percent in 1978 to only 20.8 percent in 1999. They attribute this lower propensity to pay dividends not only to the avalanche of new listings of small firms with low profitability and strong growth opportunities in that period, but also to a general propensity of paying less dividends among large, profitable firms.

The accruals ability to forecast earnings and their negative association with future earnings (mainly attributed to earnings management) has been documented in studies such as in Sloan (1996), Fairfield et al. (2002), and Richardson et al. 2004. Chan et al. (2004) examine how current accruals affect future earnings and measure the size of this effect. They find that the aggregate future earnings will decrease by $0.046 and $0.096, respectively, in the next one and three years for a $1 increase of current accruals, but over the very long-term (25 years), 20 percent of current accruals will reverse. This negative accrual effect is more significant for firms with high price-earnings ratios, high market-to book ratios and high accruals where earnings management is more likely to occur. Lev and Nissim (2006) study the negative relationship between accounting accruals and subsequent stock returns (accruals anomaly) and show that the accruals anomaly is exploited by certain active institutional investors, but the magnitude of this accruals-related trading is rather small. Main reasons are that extreme accruals firms have characteristics undesirable for most sophisticated investor mandates (small size, low profitability, and high risk), and that there are high information and transaction costs associated with implementing a consistently profitable accruals strategy.

The efficiency of company management's forecasts with respect to information contained in financial statements has also been investigated, and compared with the

respective efficiency of analysts' earnings forecasts. Gong et al. (2009) find a positive association between current year accruals and subsequent year management's earnings forecast errors, and that management's earnings forecasts exhibit greater optimism (pessimism) when accruals are relatively high (low). This positive association is stronger for firms operating in more uncertain business environments. Lev et al. (2010) examine the contribution of accounting estimates embedded in accruals to the quality of financial information, as reflected by their usefulness in the prediction of earnings and cash flows. Their results indicate that accounting estimates beyond those in working capital items (excluding inventory) do not improve the prediction of cash flows but they improve the prediction of next year's earnings. Brown and Zhou (2012) examine interactions between analysts' earnings forecasts and management's earnings forecasts in terms of their efficiency in incorporating financial statement information (past earnings changes and accruals), and non-financial statement information (stock returns) into their earnings forecasts. They show that managers have a greater comparative advantage with respect to incorporating non-financial information, and that after observing management forecasts, analysts improve their earnings forecasts by incorporating non-financial information into them.

2.1.2 Studies on Macroeconomic Forecasting

With respect to macroeconomic indicators (forecasts), a large literature examines their properties and efficiency. Ahlers and Lakonishok (1983) study economists' forecasts of ten major macroeconomic variables, using the Livingston data set. Their results show that in general, for the period from 1947 through 1978, economists' forecasts were not able to outperform simple statistical models in terms of accuracy. However, they document a substantial and consistent improvement in forecasting performance by

economists over the same period. Öller and Barot (2000) examine the accuracy of 13 European countries' GDP growth and inflation forecasts. The root mean squared error was found to be 1.9% for GDP growth and 1.6% for inflation. Overall, inflation forecasts were significantly more accurate than growth forecasts, and in contrast to growth forecasts, inflation forecasts generally improved over time, a finding with implications for economic policy. Konchitchki and Patatoukas (2014) document that even though aggregate accounting earnings are incrementally significant for future GDP growth, professional macro forecasters do not incorporate the predictive component embedded in publicly available accounting data, and thus, future GDP growth forecast errors are predictable based on accounting earnings data that are available to macro forecasters at the time of forecast.

Overreaction and underreaction behaviours but also country characteristics and volatility, have been linked to the ability of macroeconomists to anticipate expansions, contractions and predict serious crisis periods. Fildes and Stekler (2002) examine the historical accuracy of US and UK macroeconomic forecasts and suggest that researchers have paid too little attention to the issue of improving the forecasting accuracy record. They find that most forecasters fail to predict recessions in advance and sometimes fail to recognize them contemporaneously. Forecasters seem to make systematic errors such as underestimating growth during periods of economic expansion, overestimating it during contractions, under-predicting inflation when it is accelerating and over-predicting it when it is decelerating. However, despite the relatively large quantitative errors observed, almost all forecasts are superior to the predictions that could have been obtained from time series models.

Furthermore, several studies have examined the impact of macroeconomic uncertainty and financial crises on macroeconomic forecasting. Berkmen et al. (2009) explain the differences of the financial crisis' impact on growth forecast revisions across developing countries and emerging markets. Countries with more leveraged domestic

financial systems and more rapid credit growth tended to suffer larger downward growth forecast revisions to their growth outlooks. Trade linkages played a role in the transmission of the crisis, and exchange-rate flexibility clearly helped in buffering the impact of the shock. There is also some evidence that countries with a stronger fiscal position prior to the crisis were hit less severely. Blanchard and Leigh (2013) investigate the relation between growth forecast errors and planned fiscal consolidation during the crisis, and find that in advanced economies stronger fiscal consolidation has been associated with lower growth than expected, with the relation being particularly strong early in the crisis. A natural interpretation is that fiscal multipliers were substantially higher than implicitly assumed by forecasters. Multipliers vary across countries and across time and can be affected by confidence. As economies recover, and economies exit the liquidity trap, multipliers are likely to return to their pre-crisis levels. Pennings et al. (2015) conduct an event study to estimate the effect of monetary policy shocks on financial markets (stock returns and exchange rates) using eight small open economies. Overall their findings suggest that an unexpected 100bps increase in the policy rate leads to a 1% appreciation in the exchange rate and a 0.5-1% decline in stock prices; the effect of unexpected policy shocks may be weaker during a crisis.

Jurado et al. (2013) provide econometric estimates of time-varying macro uncertainty, useful to the study of uncertainty shocks' importance for business cycle fluctuations. They find that quantitatively important uncertainty episodes appear far more infrequently than indicated by popular uncertainty proxies, but when they do occur, they have larger and more persistent correlations with real activity. Gourio et al. (2015) study a large panel of emerging markets over a 40-year period and find that when stock market return volatility increases, capital inflows decrease and capital outflows increase. They decompose the country's market return volatility into two components: exposure to systematic volatility (uncertainty betas) and country-specific volatility.

Capital inflows respond to both systematic and country-specific shocks to volatility, and they respond more strongly in high uncertainty beta countries.

Since asset prices affect the real allocation of an economy, especially during crisis periods, it is important to understand the circumstances under which these prices can seriously deviate from their fundamental values. Brunnemeier (2009) conducts a survey of the literature on asset bubbles, referring to asset prices that exceed an asset's fundamental value because current owners believe they can resell the asset at an even higher price, usually occurring as dramatic price increases followed by a collapse. He presents the literature on asset bubbles in four main strands of models: (i) all investors have rational expectations and symmetric information, (ii) investors are asymmetrically informed and bubbles can emerge because their existence is not commonly known, (iii) limits to arbitrage prevent rational investors from eradicating the price impact of behavioural traders, (iv) investors hold heterogeneous beliefs about fundamental value, potentially due to psychological biases.

As evidence by behavioural economists indicates significant deviations from the 'economic man' assumption, Akerlof and Shiller (2009) suggest that the inclusion of behavioural features in conventional macroeconomic models can offer better (microeconomic) foundations and improved models. Milani (2011) finds that expectational shocks explain about 50% of business cycle fluctuations, and that expectations matter more than structural demand shocks for understanding business cycle fluctuations. Milani supports that news about the macroeconomy can cause fluctuations in business cycles due to behavioural characteristics of agents. Driscoll and Holden (2014) suggest that the introduction of behavioural theory principles in macroeconomic methods during the past twenty years has helped fix deficiencies of standard forecasting models. They incorporate behavioural assumptions in the New Keynesian model to particularly study consumption and expectations formation. They find that behavioural assumptions (such as anchoring, framing, and status quo) help

explain puzzles in the macroeconomic literature such as the existence of multiple equilibria, asset bubbles and reactions to news.

2.2 Analysts' Incorporation of Fundamentals in Forecasts of Company Performance

2.2.1 Analysts' Forecasting Process, Efficiency and Systematic Errors

There has been ample evidence on factors that affect the financial analysts' forecasting process. Prior literature documents that analysts focus more on earnings and cash flows rather than on dividends and book values to forecast company performance, and rely more heavily on earnings multiples to value equities instead of discounted cash flow models (Block, 1999). Demirakos et al. (2004) study the valuation methodologies of financial analysts using Investext reports for 26 large U.K.-listed companies, and provide evidence that analysts primarily refer to P/E multiples models so as to support their stock recommendations. The substitute use of earnings and dividends by financial analysts varies across the noisiness of earnings announcements (Ely and Mande, 1996). Earnings announcements have extensively been covered as a valuable source of analyst information for subsequent periods' forecasts. Barron et al. (2002b) show there is a decline in consensus forecasts following earnings announcements, with the idiosyncratic information in forecast revisions increasing with the number of analysts. Mest and Plummer (1999) show that the proportion of transitory earnings components reflected in earnings forecasts decreases as forecast horizons increase, suggesting that short-term forecasts are directed at reported firm earnings whereas long-term forecasts reflect expectations about persistent earnings.

Analysts' recommendations are found to strongly respond to large stock price movements. Conrad et al. (2006) provide empirical evidence of analysts' conservatism: following price increases analysts are equally likely to upgrade or downgrade their recommendations, but are more likely to downgrade their recommendations following large stock price declines. Furthermore, Bradshaw (2002) examines a sample of analyst reports regarding the frequency with which target prices are disclosed by analysts as justification for stock recommendations. In the case of more favorable recommendations analysts refer to low P/E ratios (identifying value stocks as attractive) relative to growth projections, while in the case of least favorable recommendations other qualitative statements are used as justification.

Regarding reliability of forecasts across different sources (databases), Ramnath et al. (2005) evaluate the properties of forecasts across Value Line and IBES databases, and show that actual EPS data are comparable between the two databases but IBES consensus forecasts are more accurate and a better proxy for the market's earnings expectations. IBES detailed individual forecasts are used in order to construct the consensus earnings forecasts in this dissertation. O'Brien (1988) examines three composite analysts' forecasts of earnings and finds that the most recent forecast weakly dominates the mean and median forecasts in terms of accuracy. O'Brien finds that analysts' forecasts are more accurate than time series models, however, prior analysts' forecast errors are not as significant in predicting future excess stock returns as are the forecast errors from a quarterly autoregressive model. O'Brien (1990) studies analysts' accuracy in nine different industries and concludes that even though analysts do not exhibit consistent differences in forecasting ability, they differ in their response towards new information. Analysts do not compete on the basis of the accuracy of their point estimates, but rather compete on the basis of timely incorporation of new information, which caters to the needs of investors for forecasts that are updated in a timely manner to reflect new information.

Analysts have been found to value segmental reporting quality, candidness in the management discussion and analysis section of reports, supplemental disclosures, and expanded management voluntary disclosure (Healy et al., 1999). Williams (1996) demonstrates that prior management earnings forecasts' usefulness provides incremental power in explaining financial analysts' forecasts, suggesting that management reputation based on prior earnings forecasts affects the incorporation of relevant management information into analysts' forecasts. With respect to their analytical ability, even though analysts exclude specific non-recurring items from the forecasting process and the earnings reports they issue, there has been empirical evidence that the items they include have greater persistence and higher valuation multiples than those excluded (Gu and Chen, 2004), concluding that analysts possess a high ability to analyze persistent components of earnings. On the contrary, analysts have been considered good predictors of within industry performance, but not cross-industry performance, and their revised recommendations can lead to more profitable trading strategies within industries rather than across industries (Boni and Womack, 2006).

Apart from establishing factors and accounting fundamentals that are deemed relevant for earnings by financial analysts, prior literature has extensively focused on identifying factors that are related with analysts' systematic inefficiency. For example, Elliott et al. (1995) document that analysts systematically underweight new information particularly when revising their forecasts downward. Teoh and Wong (2002) demonstrate that analysts do not fully adjust earnings forecasts for past abnormal accruals, and that analysts' systematic inefficiency with respect to prior accruals is associated with the post-issue underperformance of equity issuers due to the market's reliance on these analysts' forecasts. With respect to firms' accruals, Abarbanell and Lehavy (2003) find an empirical link between firms' recognition of unexpected accruals and the presence of asymmetries in distributions of forecast errors that suggests that firm reporting choices play an important role in determining analysts' forecast errors. Mozes

(2003) shows that analysts' response speed to significant changes in the publicly available information set (forecast immediacy) is negatively related with analysts' accuracy and positively related to analysts' forecast dispersion and usefulness.

Research on the incorporation of macroeconomic indicators by analysts has been relatively recent, with Basu et al. (2010) documenting analyst inefficiency with respect to inflation incorporation at the firm-level, and proposing that this can explain the earlier documented post-earnings announcement drift (Bernard and Thomas, 1990).

Considering the analysts' inefficiencies that have been documented, several prior studies have attempted to identify factors that can improve forecast accuracy. Mikhail et al. (1997) suggest that forecast accuracy increases with firm-specific experience, while Jacob et al. (1999) demonstrate that forecast accuracy improves with analyst aptitude, brokerage size and industry specialization, with learning-by-doing, and with the number of forecasts made in a forecasting interval, but not with general experience. Moreover, firm complexity and international diversification have been considered as factors that further complicate the forecasting process and lead to a decline in analysts' accuracy (Duru and Reeb, 2002). To distinguish accurate from less accurate forecasters various models have been designed. To identify superior analysts, Brown (2001b) contends that prior accuracy is a reliable measure for future accuracy, finding that a simple model using past accuracy predicts future accuracy as well as a model using current analysts' characteristics.

Among the factors that can improve accuracy, access to information and use of public compared to private information has received attention in prior studies on financial analysts. Gu (2004) provides generalized measures of analysts' common and private information based on observable forecasts, and finds that the accuracy of mean forecasts is monotonically related to the precision of common (private) information but not to that of private (common) information. Barron et al. (2008) show that larger (or

negative) earnings surprises motivate analysts to work harder in acquiring more private information, and are associated with subsequently lower forecast errors.

The accounting and finance literature has focused on establishing factors that can determine analyst efficiency, because more accurate analysts' forecasts and reports will be associated with more accurate equity valuations. On the stock market value relevance of analysts' forecasts, Lev and Thiagarajan (1993) study earnings persistence, growth, and the earnings response coefficient using financial analysts' descriptions to establish twelve value-relevant fundamental persistence indicators. They document that investors use these fundamental signals to assess the persistence and quality of reported earnings, conditioning the returns-fundamental relationship on macroeconomic indicators. Bandyopadhyay et al. (1995) document that that the stock market value relevance of forecasted earnings rises as the earnings forecast horizon increases. Bartov et al. (2002) find that firms that meet or beat current analysts' earnings expectations enjoy a higher return over the quarter than firms with similar quarterly earnings forecast errors that fail to meet these expectations. Since earnings forecasts are important for valuation, and analyst recommendations are expected to reflect analysts' opinion of the value relative to the current price, Bradshaw (2004) examines the consistency between valuation estimates based on analysts' earnings forecasts and their stock recommendations using four different models, and finds that analysts' projections of long-term earnings growth have the greatest explanatory power for stock recommendations.

2.2.2 Behavioural Biases in Analysts' Forecasts

There are two literature streams related to the reasons analysts may exhibit biases: the behavioural finance literature and the incentives literature. The behavioural finance literature offers explanations of analysts' inefficiencies based on cognitive and

psychological biases. Kahneman and Tversky (1973) examine the judgmental heuristic 'representativeness' on agents that make financial decisions, according to which when forming expectations, the agents tend to overweight salient information such as recent news, and underweight less salient data such as long-term averages. Consequently, intuitive predictions are insensitive to the reliability of the evidence or to the prior probability of the outcome, in violation of the logic of statistical prediction, and may lead to severe and systematic errors. In their paper published in 1985, Werner De Bondt and Richard Thaler perform a study of market efficiency, applying theories of experimental psychology on stock market prices. Their results are consistent with substantial weak form market inefficiency, and support the overreaction hypothesis, whereby, in violation of Bayes' rule, most people tend to "overreact" to unexpected and dramatic news events[2]. In 1990 De Bondt and Thaler challenge the rational agent assumption in the economy, and examine the rationality of security analysts. They conclude that financial analysts' company earnings forecasts present an overreaction pattern. Abarbanell and Bernard (1992) also examine analysts' overreaction or underreaction to prior earnings information, and show that consensus forecast errors are positively autocorrelated over the first three lags, in declining magnitude. Kahneman and Lovallo (1993) document that when agents develop forecasts they isolate the current scenarios from future opportunities or from learning from past scenarios and statistics. This behaviour may result in overly cautious attitudes, with the systematic biases having practical implications for company decision making.

Easterwood and Nutt (1999) find that analysts underreact to negative information but overreact to positive information and interpret this as corroborative evidence of systematic optimism in response to new information. Mikhail et al. (2003) provide

[2] In 1987, De Bondt and Thaler present further evidence on past losers significantly outperforming past winners (systematic stock price reversals), further supporting investor overreaction theory.

evidence of analysts' underreaction to past earnings information, but show that the underreaction is less pronounced for analysts' with greater experience.

On the contrary, several studies posit that the reasons for observed inefficiencies are based on rational, strategic incentives. Das et al. (1998) show that analysts are relatively more biased (optimistic) when earnings are less predictable based on past information (for example past returns), and that through more optimistic forecasts analysts believe that they can obtain non-public information from managers more easily; so, they resort to upwards forecast revisions to elicit more information from company management. Bernhardt et al. (2006) find evidence consistent with a large contrarian bias in analysts' forecasts, but not consistent with systematic analysts' herding. Analysts anti-herd and direct the publicly-available consensus closer to their private information.

Examining analysts' overreaction to extreme good news in earnings, Gu and Xue (2007) offer an alternative explanation for the observed forecast optimism: it is the result of analysts' rational behavior in the face of high earnings uncertainty (that is associated with extreme actual earnings) rather than cognitive bias. Zhang (2006) shows that greater information uncertainty (proxied by dispersion) increases analysts' underreaction behavior. When greater uncertainty is present, positive (negative) forecast errors and forecast revisions follow good (bad) news (post-analyst-revision drift). Chen and Jiang (2006) provide evidence that on average analysts overweight their private information, with the overweighting being more pronounced for more optimistic than consensus forecasts, and offer incentive-based rather than behavioural-based explanations.

More recently, literature on analysts' reasons for inefficiency provides both behavioural and incentive based explanations. For instance, Lundholm et al. (2016) find that the cross-section of analysts' forecasts is excessively volatile approximately eight percent of the time, and observe that excessively volatile forecasts are likely to be produced by All Star analysts and for larger firms, offering both behavioral and strategic reasons for this occurrence.

2.3 Stock Returns and Expected Company Performance

2.3.1 The use of fundamentals to estimate future earnings performance and stock returns

A long line of research starting with the Ball and Brown (1968) and Beaver (1968) has explored the implications of accounting fundamentals for equity valuation. The accounting literature around equity valuation models focuses on the idea that valuation is actually a question of accounting for value (Penman, 2011). Value Investing, closely associated with fundamentals focuses on the justifiable value of a stock. This means buying into a stock at a price that is well below a conservative valuation of the business and is important because it allows profit on the upside as the market eventually revalues the stock to its fair value, but also gives some protection on the downside if things don't work out as planned and the business falters (Penman, 2011). Lev (1989) reviews the accounting literature of two decades (1968-1989) on the usefulness of earnings to investors. He finds that the prior studies on the returns-earnings association have produced evidence of limited usefulness of earnings despite their widespread use by investors, attributed to either methodological shortcomings or investors' irrationality (noise trading). Lev attributes the findings mainly to low information content (quality) of currently reported earnings and other financial variables that result from biases induced by accounting measurement and valuation principles, and in some cases, management manipulation of reported data.

Through extensive financial statement analysis, Ou and Penman (1989a) create a summary financial statement measure which predicts the direction of one-year-ahead earnings changes and future stock returns. Ou and Penman (1989b) document that financial statements are prospective like prices, and that they reveal both current earnings that are explicitly identified in the income statement, as well as future earnings that can

be predicted using an accounting indicator (weighted measure of 68 accounting variables such as change in sales and profitability margins). While prices reflect information about future earnings, they also reflect transitory elements of current earnings that are negatively related with future earnings changes. Ou and Penman (1989b) demonstrate that the stock market prices information contained in financial statements about future earnings with a lag but also prices information about current earnings with a lag.

Ohlson (1995) develops and analyzes a valuation model that relates a firm's market value to accounting data (contemporaneous and future earnings, book values, and dividends) under two accounting assumptions: i) the clean surplus relation holds, and ii) dividends reduce current book value but do not affect current earnings. The model is related to the Modigliani-Miller (1961) fundamental value displacement property, according to which the sequence of expected abnormal earnings depends neither on current dividends nor on the future dividend policy, because dividends reduce market value on a dollar-for-dollar basis. Liu et al. (2002) examine the valuation performance of a comprehensive list of value drivers, and find that multiples derived from forward earnings explain stock prices remarkably well. They find that performance declines when more complex measures of intrinsic value are considered, and the overall rankings of valuation performance of multiples are consistent for almost all industries. Ballas and Hevas (2005) jointly estimate Ohlson's valuation model with linear information dynamics equations and document significant explanatory power of earnings and book value of equity for the cross-sectional variation in market values. They find that earnings valuation multiples differ significantly across countries and industries while book value multiples vary significantly across industries, and that industry-specific valuation multiples reduce forecasting error more than country-specific ones, suggesting there is a need for more sector-specific standards.

Beaver and Ryan (2000) decompose the book-to-market ratio into two components which capture persistent bias and transitory lags, and show that their associations with

future book return on equity differ in predictable ways that facilitate the forecasting of book return on equity. They also show that the two components (persistent bias and transitory lags) provide incremental information beyond current book return on equity for predicting the terminal value in the discounted residual income valuation model. Some studies also investigate predictability of the book to market ratio in conjunction with financial analysts' forecasts. Billings and Morton (2001) find that the persistent (bias) component and the delayed recognition (lag) component of book-to-market are related to analysts' expectations of future earnings and subsequent forecast revisions (with the lag component being dominant across forecast horizons), and that they can capture systematic stock price reversals. Cheng (2005) assesses the usefulness and the limitations of analysts' forecasts to predict future earnings and explain the market-to-book ratio, and finds that analysts' forecasts reflect a large portion of the value relevant information contained in earnings quality signals, industry characteristics, risk and growth proxies. Controlling for analysts' forecasts results in an incremental increase in adjusted R^2 in the prediction of future earnings and of the market-to-book ratio.

Momentum effects have extensively been covered in the finance and accounting literature. Chopra et al. (1992) find a significant stock market overreaction effect even after controlling for size and beta, which is more pronounced for smaller firms. Their evidence suggests that the documented overreaction effect is distinct from tax-loss selling effects. Jackson and Johnson (2006) find that momentum-persistence in returns and post-event drift after important corporate news or exceptional returns is manifest when they coincide with changes in earnings and changes in earnings growth forecasts. They underline the importance of linking return patterns to expectations about fundamentals like earnings and growth rates. They find both a biased response of the market to analysts' forecasts, and a biased response of analysts' forecasts (underreaction) to the market. The alternative explanation they offer is that returns persist because expectations

do change, implying that investors are fully aware of the impact of fundamental news, and demand higher or lower returns because of it.

Ball and Sadka (2015) discuss the contribution of aggregate earnings studies to the capital markets literature, and the importance of combining firm-level earnings studies with aggregate earnings studies, as well as studying the effect of risk on the pricing of firm-level earnings. In theory, any risk in earnings should manifest itself through systematic earnings risk, therefore, to understand the stock market pricing of firm-level earnings, it is necessary to understand how earnings covary with aggregate earnings shocks and macroeconomic shocks. Consequently, firm-level earnings variation is priced to the extent that it covaries with aggregate shocks that are priced by investors.

2.3.2 Analysts' short-term and long-term Earnings Forecasts and the Stock Market

The relationship between analysts' forecasts and stock market pricing has been examined both from the perspective of analysts adding significant value to the price formation process, as well as from the perspective of market inefficiencies due to reliance of the stock market on analysts' forecasts. Liu and Thomas (2000) derive a specification of the residual income valuation model adding analyst forecast revisions and discount rate changes which helps to better explain the relation between stock returns and reported earnings, and show that the returns-earnings regressions R^2 can be strongly improved by including analysts' forecast revisions of next year or two years ahead earnings. Abarbanell et al. (1992) document that analysts' earnings forecasts do not incorporate information in price changes and show a positive association between analysts' forecasts and prior price changes. An underreaction is implied following price decreases (more optimism), and also following price increases (less optimism), resulting

from analysts' inefficiency in interpreting public signals, or analysts revising forecasts only when they receive new private information (irrespective of prior price change). If investors are aware of this fact they are likely to take it into account when forming their expectations.

The superior returns of contrarian strategies and incidents of investor over-optimism have been linked with biased analysts' forecasts. Dechow and Sloan (1997) find no empirical support that stock prices systematically reflect a naïve extrapolation of past trends in earnings and sales growth, but they find that stock prices appear to naively reflect analysts' biased forecasts of future earnings growth. They document that this relationship explains over half of the superior returns of contrarian strategies. Frankel and Lee (1998) factor IBES consensus earnings forecasts in a residual income model to estimate fundamental firm values. The model can well predict cross-sectional returns and supports over-optimism in firms with higher forecasted earnings growth and higher forecasted ROEs relative to current ROEs. Dechow et al. (1999) empirically assess the residual income valuation model using analysts' forecasts, and find that analysts' year-ahead earnings forecasts fail to fully account for mean-reversion in the abnormal earnings component of current year earnings. This error is reflected in stock prices, suggesting that investors do not adjust for predictable errors in analysts' forecasts. Shane and Brous (2001) find that both the stock market and financial analysts underreact similarly to earnings news (contained in announcements), and also to non-earnings surprise information (conference calls, management information etc.) leading to predictable stock returns and analysts' earnings forecast revisions. The underreaction in analysts' earnings forecasts with respect to the information in earnings announcements explains about 50% of the post-earnings announcement drift.

Sloan (1996) investigates whether stock prices reflect information about future earnings contained in the accrual and cash flow components of current earnings. The extent to which current earnings performance persists into the future is shown to depend

on the relative magnitudes of the cash and accrual components of current earnings. Investors appear to "fixate" on earnings, undervaluing cash flows and overvaluing accruals, and fail to incorporate relevant information in stock returns until that information impacts future earnings.

Information acquisition and the nature of the available information set affects analysts' efficiency and the value relevance of their forecasts. Abarbanell et al. (1995) study the implications of the association between analysts' forecasts and investors' beliefs for the stock return–earnings surprise relationship. They show that market uncertainty can be proxied by a combination of forecast dispersion and the assumption of either endogenous or exogenous private information acquisition. When private information acquisition is exogenous, the earnings–price response coefficient is unrelated to forecast precision while when it is endogenous it is increasing in the forecast precision. Abarbanell and Bushee (1997) find that analysts' forecast revisions fail to impound all information contained in signals about future earnings, and that the signals convey value-relevant information orthogonal to the forecast revisions, possibly due to signals containing non-earnings information (related to risk for example) that the analysts are not used to incorporating when forming short-term forecasts. Fischer and Stocken (2001) develop a mathematical model analysing the relation between the quality of a sender's and receiver's information when their incentives are not aligned. One implication is that the quantity of information provided by analysts is maximized when analysts receive imperfect information. When information is more complete, firms communicate directly with investors. This extension of their model helps provide a better understanding of the link between analysts' following and investor information. Fischer and Stocken (2010) show that the availability of public information affects information accuracy that the analyst gathers and communicates to the decision-maker (investor). When analyst credibility is less easily assessed, the analyst gathers more accurate information after

observing favorable public information, than after observing unfavorable public information.

However, the usefulness of analysts' forecasts to investors is not only dependent on accuracy. Investors process analysts' forecasts to benefit from constantly updated information that they reflect. For example, Clement and Tse (2003) show that investors respond to analysts' forecast revisions using a subset of characteristics that determine forecast accuracy, and that forecast accuracy is not the only determinant of investor response; factors related to analysts such as timeliness of forecasts are also value-relevant.

An interesting viewpoint on the value-relevance of analysts' forecasts is that the stock market prices highly forecast revisions issued by analysts that diverge from the consensus; sophisticated investors may be the driver behind this higher pricing that can be associated with forecasts perceived as superior. Prior studies, such as Gleason and Lee (2003), produce empirical evidence that the pricing of forecast revisions is greater for forecasts that diverge from the consensus. Price adjustment is faster and more complete for celebrity analysts and for firms with greater analysts' coverage. Chen et al. (2016) study the post-forecast revision price drift, and find that analysts' systematically underreact when revising their forecasts. When investors price analysts' forecast revisions they do not adjust for the analysts' forecast errors, thus investors' reliance on the biased analysts' revisions explains a significant portion of the post-forecast revision price drift. Both the analysts' underreaction and the post-forecast revision price drift are stronger a) for downward revisions, b) for larger innovations (revision magnitudes), and c) for firms with lower analyst coverage. Mikhail et al. (2007) examine who trades on analysts' stock recommendations. Their findings are consistent with large investors being more sophisticated processors of the information contained in analysts' reports, while smaller investors may not see through analysts' conflicts of interest and make suboptimal investment decisions.

Loh and Mian (2006) find that analysts who issue more accurate forecasts also issue more profitable recommendations, implying that analysts use their earnings forecasts to generate superior recommendations, and that accurate forecasts are priced highly in the stock market.

2.3.3 Market Efficiency and Financial Analysts' Forecasts

Kothari (2001) reviews empirical research conducted on the relation between capital markets and financial statements contending that the principal areas of research on capital markets are fundamental analysis and valuation, tests of market efficiency with respect to accounting information, the role of accounting numbers in contracts, and the political process. Givoly and Lakonishok (1979) present some evidence of semi-strong market inefficiency, as revisions of financial analysts' earnings forecasts are value-relevant but the market reaction to the disclosure of analysts' forecasts is relatively slow, thus investors that can act upon this publicly available information (revisions) can potentially earn abnormal returns.

Bernard and Thomas (1990) provide evidence that stock prices do not fully reflect the implications of current earnings for future earnings. They find that three-day price reactions to announcements of earnings for the four quarters ahead are predictable, using prior quarter earnings information, and the signs and magnitudes of the three-day reactions are related to the autocorrelation structure of earnings, as if stock prices fail to reflect the extent to which each firm's earnings series differs from a seasonal random walk. The results partially reflect a naive earnings expectation which raises questions about market efficiency. Chan et al. (1996) examine whether the predictability of future returns from past returns is due to the market's underreaction to information (past earnings news), and document that past return and past earnings surprises each predict

large drifts in future returns. Analysts also respond to news in earnings announcements with a delay, particularly for poor past performers. Ball and Bartov (1996) state that the seasonal random walk expectation for quarterly earnings assumes no relation between events of adjacent quarters. They use the seasonal random walk model of Bernard and Thomas (1990), and show that the market acts as if it does not use a simple seasonal random walk model; however, they document that the market does not use the correct signs in exploiting serial correlation at the four prior lags, underestimating the magnitude of serial correlation by approximately 50% on average. Battalio and Mendenhall (2005) provide evidence that large volume investors respond to analysts' forecast errors, while smaller volume investors do not. The results suggest that small volume, less sophisticated investors drive the earlier documented (Bernard and Thomas 1990) post-earnings announcement drift.

Dechow et al. (2000) evaluate the role of sell-side analysts' long-term earnings growth forecasts in the pricing of common equity offerings, and find that, in general, sell-side analysts' long-term growth forecasts are systematically overly optimistic around equity offerings with the post-offering underperformance being more pronounced for firms with the highest growth forecasts made by affiliated analysts. Ghicas et al. (2007) examine the value-relevance of audit qualifications using a sample of firms that went public at the Athens Stock Exchange over the period 1987–2002. They find that underwriters and their affiliated analysts do not incorporate the negative information provided by auditors' financial statement qualifications (estimated amount by which assets are overstated and/or liabilities are understated) into earnings forecasts and offer prices. Investors, however, appear to efficiently impound the negative implications of the audit qualifications into stock market prices within the first day of trading.

2.3.4 Market Pricing of Risk related to Information contained in Analysts' Forecasts

Baginski and Wahlen (2003) develop a measure based on accounting fundamentals for pricing market risk (difference between actual share price and a residual income model produced economic value). They show that systematic risk and total volatility in the residual income return on equity partially explain this pricing differential, thus, historical earnings volatility is significant in explaining implied firm-specific risk premia. The explanatory power of total volatility is incremental to the Fama and French (1993) three factors.

Various studies explain the risk-reward relationship using explanations based on analysts' forecast errors. La Porta (1996) examines value stocks that have been documented to earn high returns and offers a risk explanation: high return may be a risk-reward issue. However, empirical results support that systematic errors in financial analysts' expectations for future earnings growth and stock return performance of value stocks may be associated with the mispricing (errors-in-expectations explanation). They suggest that analysts' underestimate future performance. Diether et al. (2002) provide evidence that analysts' forecast dispersion does not proxy for ex-ante risk as securities with high forecast dispersions subsequently earn negative returns. Prices will reflect the optimistic view whenever investors with the lowest valuations do not trade. This could be due to short-sale constraints but also due to the incentive structure of analysts that prevents them from expressing significantly pessimistic opinions. However, Easton (2004) shows that analysts' short-term earnings growth rate forecasts effectively proxy for ex-ante risk estimates. He develops a procedure for simultaneously estimating the implied market expectation of the rate of return and the implied market expectation of the long-run change in abnormal growth in earnings for a portfolio of stocks.

Kothari et al. (2009) study the risk effects of disclosures from a large set of sources from the print media (management, analysts, and the business press) and find that when content analysis indicates favorable disclosures, the firm's risk, as proxied by the cost of capital, stock return volatility, and analyst forecast dispersion, declines significantly. In contrast, unfavorable disclosures are accompanied by significant increases in risk measures.

2.4 Stock Returns and Macroeconomic Expectations

2.4.1 Stock Market Pricing of Macroeconomic Indicators

The value relevance of macroeconomic indicators such as GDP, inflation, interest rates, and exchange rates has been the subject of investigation in several prior studies.

Fama (1990) shows that production growth rates, used to proxy the shocks in expected cash flows, explain 43 percent of the variance of annual NYSE value-weighted returns. Replicating Fama's (1990) study, Schwert (1990) analyzes the relation between real stock returns and real activity from 1889-1988, and finds that future production growth rates explain a large fraction of the variation in current stock returns, with the significance declining for shorter horizons (monthly and quarterly). Fama and French (1989) document that required returns on common stocks and long-term bonds contain a maturity premium with a clear business-cycle pattern (low near peaks, high near troughs). The variation in this premium through time increases for lower grade bonds and is stronger for stocks than for bonds. The general message is that required returns are lower when economic conditions are strong and higher when conditions are weak. Balvers et al. (1990) develop models in which required returns depend on output growth. Their models can in principle explain a) why future production captures variation in

returns, and b) why future production growth absorbs the required return variation captured by the term spread.

On the value-relevance of GDP growth, Vassalou (2003) provides evidence that a model which includes a factor that captures news related to future GDP growth, along with the market factor, can explain the cross-section of equity returns about as well as the Fama-French model. In a more recent study that takes into account the international exposure of firms, Li et al. (2014) provide a systematic approach to incorporate macroeconomic information into forecasting of firm fundamentals from an investor's perspective, by combining geographic segments sales disclosures with country level macroeconomic forecasts. This approach produces superior forecasts of firm fundamentals which have predictive ability for future excess stock returns. Doukakis et al. (2016) develop an expectation of future earnings based on current earnings, and on the interaction of current earnings with macroeconomic expectations. They find that this expected profitability measure is informative for future profitability both in crisis and non-crisis periods, and that the stock market is quite slow in incorporating this information during crisis periods, as well as in non-crisis periods for low profitability firms.

2.4.2 The Significance of Business Cycles for Equity Valuation

The significance of macroeconomic indicators for equity valuation has also been studied in conjunction with earnings persistence, controlling for the phase of the business cycle. Johnson (1999) documents that earnings are more persistent when economic growth rates are high (during economic expansions) than when they are low (during contractions), and thus the earnings response coefficient is positively associated with the rate of growth in economic activity. Jenkins et al. (2009) study the value-relevance of

earnings as a function of the business cycle differentiating between current and future earnings. They provide evidence that current earnings are relatively more value-relevant in contractionary economic periods, and that expected future earnings are relatively more value-relevant in expansionary periods. Jorgensen et al. (2012) find that increases in expected earnings dispersion signal increases in uncertainty and increases in unemployment, thereby causing required returns to rise, which in turn causes prices to decline.

Aggregate earnings news can also contain incremental information about the state of the economy as a leading indicator (Gallo et al., 2013), and are useful in predicting the Fed's future monetary policy stance. This association holds after controlling for contemporaneous macroeconomic news about inflation, unemployment, and real GDP growth. Kalay et al. (2014) find a robust relation between the equity risk premium and cross-sectional earnings dispersion, and prove that it is driven by a relation between earnings dispersion and the macroeconomy (positively related to unemployment and negatively related to industrial production). Finally, they find that macroeconomic forecasters fail to incorporate the implications of conditional dispersion in their forecasts, leading to predictable macro-forecast errors.

2.4.3 The Pricing of Inflation News

Prior literature has assessed the real economic effects of inflation news, examining the associations between inflation news and real rates, equity risk premia, and company profitability. Mundell (1963) was the first to show that expected inflation has real economic effects documenting that in response to inflation hikes, nominal interest rates would rise less as the decline in money accounts holdings would drive real interest rates down. Gultekin (1983) examines the behaviour of required real returns on common stocks

over time, and shows that they are positively correlated with expected inflation, thus differentiating his findings from the Mundell Effect. He also provides evidence that unanticipated inflation has a significantly negative effect on stock returns. As the required return consists of the nominal rate and the equity risk premium, the observed relationships may not only be driven by an association between inflation and the interest rate but also by an association between inflation and the risk premium. Sharpe (2002) uses the Campbell-Shiller model and empirically confirms the negative relation between equity valuations and expected inflation that is driven by both a positive association of inflation with the required returns as well as a negative association of inflation with earnings growth.

Modigliani and Cohn (1979) develop and empirically support the ''inflation illusion hypothesis'', according to which investors fail to incorporate the effect of inflation on nominal earnings growth rates even though they fully adjust the discount rates, leading to market inefficiency. Chordia and Shivakumar (2005) examine the cross-sectional implications of the inflation illusion hypothesis for the post-earnings-announcement drift. They demonstrate that the sensitivity of earnings growth to inflation varies monotonically across stocks sorted on standardized unexpected earnings (SUE), and that lagged inflation predicts future earnings growth, abnormal returns, and earnings announcement returns. Basu et al. (2010) also offer empirical evidence consistent with the inflation illusion hypothesis explanation of the post-earnings announcement drift. They document that financial analysts do not fully incorporate expected inflation in their earnings forecasts for individual stocks despite the expected inflation's predictability of future earnings growth, and that analysts' inflation-related systematic forecast errors can predict future stock returns. Their findings are consistent with the Chordia and Shivakumar (2005) hypothesis and extend the analysis from inflation as a driver of earnings to expected inflation as a driver of earnings forecasts.

Konchitchki (2011) studies the impact of inflation on earnings and stock prices and shows that the constant purchasing power assumption of financial accounting is violated in periods of deflation, and that stock prices incorporate but do not fully reflect inflation implications for future cash flows, as if investors do not differentiate between non-monetary and monetary assets of the balance sheet. Konchitchki (2013) finds that investing based on the inflation effect on companies' net monetary holdings results in insignificant abnormal hedge returns. In contrast, investing based on the inflation effect on companies' nonmonetary holdings consistently yields economically and statistically significant abnormal hedge returns, consistent with companies' nonmonetary holdings accumulating inflationary effects over time whereas monetary holdings are naturally hedged.

2.4.4 The Value-Relevance of Interest Rates and Exchange Rates

Interest rates are strongly linked to equity valuation mainly through their impact on discount rates. Nissim and Penman (2003) find that interest rate changes positively impact the discount rate and are thus negatively related to stock returns but they also positively impact subsequent earnings and are thus positively related to stock returns. However, the change in earnings is typically not large enough to offset the change in the required return. Hence the net effect of interest rates on equity value is negative. Cochrane (2011) surveys discount-rate variation in asset-pricing research, and notes that most of the puzzles and anomalies documented amount to discount-rate variation that we do not understand, as most theoretical controversies are about how discount rates are formed. He points towards the need to refocus research on prices and long-run payoff streams rather than one-period returns.

Other macroeconomic indicators that are priced by the market have also been studied. Bartov and Bodnar (1994) show that lagged changes in currency exchange rates can predict analysts' forecast errors and current abnormal stock returns. Bartram and Bodnar (2012) also examine the importance of exchange rate exposure in the return generating process for a large sample of non-financial firms. Their results indicate that foreign exchange rate exposures play an important role in generating cross-sectional return variation. Vassalou (2000) tests for the pricing of exchange rate and foreign inflation risk in equities, and documents that both exchange rate and foreign inflation risk factors can explain part of the within-country cross-sectional variation in returns.

2.4.5 Forecasting Company Fundamentals based on Macro Considerations

Analysts' and management's forecast accuracy based on business cycle considerations has significance for equity valuation and has thus been examined in prior literature. Hutton et al. (2012) find that analysts' forecasts are more accurate than management's forecasts when a firm's prospects are tied to macroeconomic factor realizations, as the analysts have an advantage to analyze macroeconomic effects compared to company management. Management's information advantage resides at the firm level, and management forecasts are more accurate when outsiders cannot easily anticipate management actions. Bonsall et al. (2013) show that management forecasts combined with earnings announcements for firms for which macroeconomic realizations explain the greatest variation in their earnings forecasts, provide timely macroeconomic news. Changes in market-wide uncertainty (measured by the VIX) are negatively associated with the bundled forecast of bellwether firms. They also show that the macroeconomic news in individual forecasts is more pronounced for bad news.

Hann et al. (2012) document that analysts' aggregate earnings forecasts and economists' real GDP growth forecasts are highly correlated, but they differ in terms of efficiency of incorporation of common macroeconomic information. While their results do not indicate inefficiencies on the part of macroeconomists, they indicate that financial analysts are inefficient with respect to macroeconomic news; analysts underreact to negative macroeconomic news. The stock market overweights aggregate earnings forecasts in forming its expectations about the economy. Hugon et al. (2015) provide corroborative evidence of analysts' underreaction to negative macroeconomic news. However, they show that the underreaction is less pronounced for analysts employed at firms with active in-house macroeconomists. Investors react more strongly to these analysts' forecast revisions, thus, in-house macroeconomist presence improves the credibility of analysts' forecasts, their macro-related efficiency, and ultimately stock market relevance.

Chapter 3 Hypothesis Development

3.1 Actual GDP Growth and Company Profitability

Hypothesis 1a: *Macroeconomic information related to GDP growth is significantly associated with company profitability. H1.1a: Real GDP growth is positively associated with company profitability. H1.2a: The GDP Deflator growth (inflation rate) is associated with company profitability.*

Agents that have a vested interest in future company performance, namely company management, financial analysts, and investors, update their expectations about future company performance using signals related to news about the macroeconomy. These signals affect future company performance via means that are directly associated with it, and can either drive performance improvement or hamper it. Consequently, the signals enable agents to update their expectations about future company performance.

The means sensitive to economic growth that can impact company performance are primarily the following:

- Aggregate demand and consumer spending
- Prices
- Competitive environment and market sentiment
- Investment opportunities
- Credit markets (both capital markets and commercial banks)
- Capital inflows-outflows patterns by international investors

The macroeconomic measure used in the dissertation is GDP growth as it can measure how rapidly the economy is expanding and what its future prospects are. Positive macroeconomic growth has a positive impact on the above performance measures. As these affect company revenues and expenses, they will also have an impact on company profitability.

The nominal GDP measures the value of output using the prices of a specific time period. But the general level of prices can rise due to inflation, leading to an increase in nominal GDP even if the volume of goods and services produced is unchanged. Higher levels of GDP driven solely by price increases do not indicate a higher level of real economic activity. To measure the volume of goods and services produced, real GDP is used (total expenditures on the real output of goods and services, if prices were unchanged), as it gives a more accurate view of the economy's prospects. Thus, it is important to examine the effect of nominal GDP growth on company performance, accounting for the possible different separate effects of its components, real GDP growth and inflation, on company performance.

Growth in the Real GDP can either be driven by increases in the total factor productivity through more efficient use of the factors ''intensive growth'' (for example, more efficient use of labour and capital due to technological innovation), or driven by increases in the total factor amounts ''extensive growth''. Corporate profits constitute part of GDP. As the GDP grows, corporate profits are also expected to grow, and thus GDP growth is positively associated with earnings. Especially in the case of technological innovation driving the real GDP growth, revenues will grow faster than expenses, and the real GDP growth will be associated with increased corporate profits (through more efficient use of total productivity factors). Consequently, company profitability is expected to be positively associated with real GPD growth.

Inflation affects sales prices, labor cost and commodity-energy cost, ultimately affecting the revenues and expenses of a company. However, since it affects both input and output prices, the rate of adjustment of revenues and expenses to the inflation rate can differ between revenues and expenses and among companies, leading to inflation being associated with cross-sectional differences in company performance (profitability). The relative effects of inflation on revenues and expenses will depend on the company's market position and its bargaining power, and its ability to pass through any inflation-related cost to its end-consumers. It is possible that while a company may face upward adjustments in its cost (materials) due to higher inflation, it is slower in incorporating inflation through increased prices for fear of market share loss.

Furthermore, the inflation rate can affect the cost of funds needed to finance a company through two possibly opposite (signed) effects. An increase in the rate of inflation is associated with an increase in the cost of funds due to increased interest rates, but also leads to a decline in the real value of company liabilities (bank debt and other liabilities); negative inflation, i.e. deflation, increases the real value of company liabilities.

The inflation rate can be considered to represent a risk of future wealth erosion for the company that negatively affects profitability. Moreover, extreme inflation effects can affect demand patterns because they can change the level of uncertainty for consumers, who will as a result either postpone consumption or accelerate it based on expectations for the level of prices.

As a result, inflation is expected to have an impact on company profitability but the association is subject to empirical investigation. The combined effect of real GDP growth on profitability and of the inflation rate on profitability will determine the overall association between the Nominal GDP growth and company profitability.

Hypothesis 1b: *There is a decline in the informativeness of macroeconomic information related to GDP growth for company profitability from the period before the crisis to the period of the crisis.*

During a serious recession, such as the recent Eurozone crisis, the following factors may reduce the significance of macroeconomic growth for company profitability; the significance of the components of Nominal GDP growth, i.e. of Real GDP growth and inflationary growth (growth in the GDP Deflator) for company profitability may decline as well:

- Market conditions (credit crunch, inability to raise funds due to disruptions in capital markets and foreign investors' strategies, obsolescence of capital, no innovation) are likely to disrupt the relationship between macroeconomic growth and firm-level profitability during crisis periods.
- Accounting treatment practices (increased impairments, increased bad debt) and possible earnings manipulation to avoid loss of the –anyway scarce– funding (upwards earnings management practices to avoid covenant breaches) may also alter the relationship between macroeconomic growth and firm-level profitability during crisis periods.
- Severe shift in risk aversion due to very high volatility/uncertainty (rejection of company investment projects that add value that would have otherwise been implemented, and would have improved the competitive position of the company, its cost structure and profitability, deterioration in financial planning strategy due to the uncertainty the company management faces).
- Permanent detrimental effects of the crisis on total factor (labor and capital) productivity. The same macroeconomic growth may be associated with weaker corporate profits growth in the period of the crisis compared to the period before the crisis.

- Quantitative easing and a more firm commitment of the European Central Bank to proceed with stimulative actions during the crisis may have changed the sensitivity of firm-level profitability to GDP growth and its components.
- Implementation of austerity measures aimed at fiscal consolidation can lead to a change in the association between macroeconomic growth and firm-level profitability growth due to market frictions related with tax hikes and spending cuts (continued recession, fiscal multipliers that were higher than the pre-crisis period and stronger than expected).

3.2 Macroeconomic Expectations and Analysts' Forecasts of Company Profitability

Hypothesis 2a: *Macroeconomic information related to GDP growth expectations and its components is efficiently incorporated by financial analysts in their forecasts of future company profitability, i.e. GDP growth forecasts are significantly associated with forecasted profitability (analysts' earnings forecasts and forecast news), and not associated with analysts' forecast errors.*

Financial Analysts are expected to efficiently incorporate macroeconomic growth expectations when forecasting company earnings for the following reasons:

- Their knowledge, experience and expertise enables analysts to efficiently incorporate the impact of macroeconomic expectations on future company performance when making their earnings forecasts.
- Analysts are perceived as more sophisticated than the average investor not only due to their expertise but also due to their firms offering them access to high quality research resources. The resources are not limited to availability of databases and

institutional sources but also include in-house expertise in analyzing macroeconomic conditions (in-house macroeconomists). This in-house expertise assists financial analysts to meaningfully incorporate the impact of macroeconomic expectations when forecasting company performance[3].

- As their main professional objective is to provide buy-sell-hold recommendations based on their view on future company performance and generate supporting reports, being rational agents, financial analysts are expected to be aiming for accuracy in their company profitability estimates, consequently macroeconomic expectations are expected to be efficiently incorporated when analysts form their future earnings expectations.
- Analysts' unbiasedness has been corroborated by prior studies' findings that analysts value highly expanded voluntary disclosure[4], and examine managers' reputation and prior accuracy[5] when they incorporate management releases information in their earnings forecasts. Moreover, analysts' superior analytical ability has also been documented. Analysts possess a high ability to conduct in-depth financial statement analysis that enables them to correctly estimate the value-relevance and persistence of accounting fundamentals[6].

Possible shortcomings include:

- The exact incorporation of macroeconomic information in forecasts of company performance might represent a high cost for the financial analyst compared to the benefit of accuracy for which the analyst may be rewarded. Thus, despite their

[3] Hugon et al., 2016.
[4] Healy et al., 1999.
[5] Williams, 1996.
[6] Lev and Thiagarajan, 1993; Gu and Chen, 2004.

expertise and ability to efficiently incorporate GDP growth forecasts' effects on earnings, they do not invest the time and effort on conducting a thorough macro-analysis.

- Behavioral finance theory suggests that security analysts can present biases such as overconfidence and anchoring, which may hamper their ability to update their beliefs timely and efficiently when new information arrives[7].
- Changes in inflation sensitivity due to monetary policy, quantitative easing actions, European Central Bank intervention might have changed the perception of economic projections' impact on company performance as now there exists a widespread notion that the European Central Bank will smooth out any extreme conditions. The financial analysts not having access to the European Central Bank's decision-making process will not be able to accurately predict its actions.

Hypothesis 2b: *The financial analysts continue to efficiently incorporate macroeconomic information related to GDP growth expectations and its components in their forecasts of future profitability during the crisis period, but the association between GDP growth forecasts and forecasted profitability declines in magnitude.*

During the crisis, the state of macroeconomic forecasting is ambiguous, rendering macroeconomic forecasts less credible[8] (of lower quality) and also less relevant for future company performance. Moreover, due to the unusual market circumstances prevailing in the crisis, there is a declining ability to interpret the macroeconomic expectations' impact on company profitability. However, the financial analysts are expected to be able to see through the ambiguity, both due to their expertise as well as their access to valuable

[7] De Bondt and Thaler, 1990.
[8] Pain et al., 2014.

resources (for instance, in-house macroeconomists[9]), and correctly interpret the information conveyed by macroeconomic signals in the crisis, forming efficient reliable forecasts of company profitability. Since the earnings-relevance of macroeconomic forecasts is expected to decline during the crisis, and analysts can see through this decline and adjust their forecasting process to reflect that, the association between GDP growth forecasts and analysts' forecasts of earnings (and forecast news) will decline.

Notwithstanding the quality of macroeconomic forecasts and their earnings-relevance, risk aversion and high market uncertainty during the crisis might affect the average agent's judgement. According to the behavioral finance theory, agents overreact to good news and underreact to bad news, and the behavioral literature has suggested that the cognitive and psychological biases documented for the average agent extend to financial analysts[10]. However, financial analysts are considered rational and unbiased experts, who aim for accuracy in their forecasts of company performance, and use their forecasts to also perform equity valuations and issue reliable stock recommendations. The uncertainty is not likely to affect their judgement.

What is more, during a crisis, with the possibility of deteriorating company performance and fear of bank debt covenant breach, companies might resort more frequently to creative accounting mainly to mask deficits. This makes the state of forecasting more difficult in a crisis, however, the experience and expertise of financial analysts to conduct thorough financial statement analysis, and see through the manipulations will enable them to interpret correctly the effect of macro forecasts on company performance despite the apparent disconnect created from accounts manipulation.

[9] Hugon et al., 2016.
[10] De Bond and Thaler, 1990.

3.3 The Incorporation of Macroeconomic Expectations and Financial Analysts' Forecasts of Company Profitability by the Stock Market

3.3.1 Introduction

Accounting valuation literature studies how accounting variables can be employed to evaluate a company. It involves predicting the expected profitability and growth of the company to derive the implied earnings and cash flow series, and discounting these series to obtain an estimate of intrinsic value for the company. This intrinsic price is a benchmark for the investor to decide whether the stock is overpriced, underpriced or fairly priced in the actual market. So, from a valuation perspective, forecasting earnings is crucial for valuing a company.

All standard valuation models posit three principal sources of stock return variation[11]: expected company profitability (represented by earnings forecasts as well as their future growth rates), variation through time in the discount rates (rates that are used to discount the future earnings), and shocks in returns (due to unexpected company profitability or unexpected events that affect either company profitability or the required return).

As valuation involves discounting expected profitability using a required return to derive the estimate of intrinsic value, expected profitability is positively associated with stock price and the required return is negatively associated with stock price. The variation in stock returns attributed to expected company profitability then represents a "positive value effect" (is the numerator in the valuation model) while the variation in stock returns attributed to a "discount-rate effect" represents a "negative value effect" (is the denominator in the valuation model). The total stock return variation can be

[11] Fama, 1990.

explained by the combined effect on returns of a) expected company profitability, and of b) required returns.

The stock market will rely on prior beliefs, private information, prices and other public information, analysts' forecasts of company performance, management forecasts of company performance, and macroeconomic forecasts to form value-relevant expectations about future earnings and risk (required return).

This dissertation examines the stock market incorporation of a) the financial analysts' earnings forecasts and forecast news, and b) macroeconomic forecasts by the stock market. The dissertation uses expectations about future GDP growth (real GPD growth and GDP Deflator growth forecasts) to represent expectations of future economic activity (macroeconomic forecasts). To proxy for expectations of future company profitability, the dissertation uses financial analysts' forecasts of future earnings per share, and news in analysts' forecasts (analysts' forecasts of earnings growth).

3.3.2 Analysts' Forecasts of Earnings and Stock Returns

Hypothesis 3a: *The stock market efficiently incorporates financial analysts' earnings forecasts and earnings forecast news, i.e. financial analysts' earnings forecasts and earnings forecast news are associated with current stock returns and not future stock returns.*

The stock market is expected to incorporate analysts' forecasts of earnings in forming value-relevant expectations, and consequently these analysts' forecasts can proxy for stock market earnings expectations. As equity valuation involves predicting the expected profitability and growth of the company to derive the implied earnings series, and discount these series to obtain an estimate of intrinsic value, the analysts' earnings forecasts and news (projected earnings growth), will be positively associated with stock returns (numerator effect).

However, earnings forecasts can also proxy for ex-ante risk estimates. Favorable disclosures of earnings (by management, financial analysts and the press)[12] have been associated with a decline in the firm's perceived risk, so when the stock market receives favourable information about the firm's future performance (positive earnings news), the required return will decline, increasing stock returns. When it receives negative information, increases in the perceived risk may follow, decreasing stock returns. When investors expect higher earnings they require lower present discount rates, and thus earnings are expected to be positively associated with stock returns[13]. So, both through the numerator effect and the denominator effect of the valuation model, forecasted earnings are expected to be positively associated with stock returns.

As the stock market efficiently incorporates the analysts' forecasts to form earnings expectations and value equities, the analysts' forecasts and news in analysts' forecasts will be able to explain current stock returns but not future stock returns.

Hypothesis 3b: *There is a decline in the association between financial analysts' earnings forecasts (and earnings forecast news) and stock returns from the period before the crisis to the period of the crisis.*

During periods of unusual circumstances a divergence of market prices from fundamentals is observed[14]. It is considered to be a result of irrational agents, asymmetric information or short sale constraints. This divergence observed in crisis periods does not necessarily question the validity of fundamentalism in valuation, but may certainly have implications for the relevance of accounting variables and their estimates for stock market

[12] Kothari et al., 2009.
[13] Bonsall et al., 2013; Ball and Sadka, 2015; Choi et al., 2016.
[14] Brunnermeier, 2009.

valuation. Earnings' (and expected earnings') value-relevance in rare-events (crisis or unusual circumstance periods) may decline for several reasons:

- The stock market pays less attention to fundamentals as they are perceived as more transitory in nature due to heightened uncertainty. This is expected to have implications for actual and forecasted performance's value-relevance in crisis periods.
- Investors are prone to behavioural biases and may overreact to good news and underreact to bad news during the crisis (behavior indicative of over-optimism)[15]. During the crisis, the behavioural biases both psychological and cognitive may be accentuated due to sharp increase in uncertainty about the future. The occurrence of bad news in a crisis is expected to be higher and the posited investor underreaction to the bad news will lead to a decline in the value-relevance of information contained in analysts' forecasts.
- Due to perceived ambiguity of forecasting during the crisis, investors do not trust the reports, buy-sell-hold recommendations or forecasts produced by the financial analysts on future company earnings. They believe that the unpredictability of the market will also apply to forecasters. The unusually high uncertainty and risk aversion is also likely to impair the ability of investors to interpret analysts' forecasts' significance for future company performance.
- Asymmetric information and non-aligned incentives between financial analysts and investors[16] may also reduce the relevance of forecasts during times of crisis. When information is more complete, firms have more opportunities to communicate directly with investors, and analyst credibility can be assessed more easily. On the contrary, during crisis periods, the scarce availability of public

[15] De Bondt and Thaler, 1990.

[16] Fischer and Stocken, 2001, and 2010.

information affects the accuracy and quantity of information provided by financial analysts, and the assessment of analysts' credibility by the stock market is expected to be more difficult. The combined implications of a) lower availability of public information, and b) difficulty in evaluating analysts' credibility, may hamper the confidence investors place on analysts' forecasts, and ultimately, reduce the significance of financial analysts' forecasts for stock market expectations during a crisis.

- Investors doubt that accruals will be converted into cash flows, thus during the highly volatile crisis period, they cannot make the necessary adjustments to the reported earnings that will help them determine the persistent component of company performance, and thus enable them to form valid expectations about future company performance.

As a result, the relevance of financial analysts' earnings forecasts and earnings forecast news for stock market returns declines from the period before the crisis to the period of the crisis.

3.3.3 Macroeconomic Expectations of GDP Growth and Stock Returns

Hypothesis 4a: *The stock market efficiently incorporates macroeconomic expectations related to GDP growth and its components (real GDP growth and GDP Deflator growth), i.e. GDP growth forecasts are associated with current stock returns and not future stock returns.*

H4.1a: Real GDP growth forecasts are positively related with current stock returns.

H4.2a: The GDP Deflator growth forecasts are associated with current stock returns.

3.3.3a Real GDP Growth Forecasts and Stock Returns

Expected company profitability and required returns (discount rates) are related to business conditions, thus, their association with indicators of future macroeconomic prospects is at the core of the assessment of the significance of future macroeconomic prospects for stock returns. Economic activity prospects are proxied in this dissertation by nominal GDP growth. Nominal GDP growth consists of real GPD growth and inflationary growth (growth in the GDP Deflator). Both real GDP growth forecasts and inflation forecasts, are expected to have implications for stock return variation. Even though causality in the macroeconomic prospects – stock returns relationship has been examined in different research settings in the firm-level and aggregate-level literature, a positive hypothesis of significance of expected real economic prospects for stock returns can be stated.

There are several theoretical relationships behind the stock returns – real economic activity relationship, beyond the posited hypothesis that macroeconomic expectations about the future economic activity have implications for future company performance (profitability). Information about future real economic activity may be reflected in stock prices before it occurs (notion that stock prices are a leading indicator). Moreover, stock prices and GDP growth may respond together to changes in other variables (a decline in

interest rates can cause increases in stock prices and increases in real investments as well, thus increases in real GDP). Stock returns could cause changes in real economic activity (increase in stock prices represents an increase in wealth, which is likely to increase investments as well as the demand for consumption of goods) [17].

Positive real growth prospects create a positive business environment for the stock market as positive real growth prospects are expected to lead to improvements in profitability. The positive macroeconomic prospects are expected to be translated into increased corporate profitability through increases in demand and consumer spending, positive market sentiment, more investment opportunities and investment spending, as well as the availability of credit provided by the capital markets and commercial financial institutions for working capital and expansion. As real GDP growth expectations are expected to be positively related to company performance expectations, they are also expected to be positively related to stock returns (through the numerator positive value effect).

Earnings risk should manifest itself through systematic earnings risk (covariation with aggregate earnings and macroeconomic indicators)[18]. The aggregate pricing of macroeconomic news is very important in how they affect the market risk premium (discount rates). The expectations of real future economic growth will affect the investors' perceptions of risk and the level of return they require to hold the stock. Firm-level earnings variation is priced to the extent that it covaries with macroeconomic news that are priced by investors, so the explanatory power of macroeconomic news over stock returns stems from the strength of the covariation of the firm's earnings with economic activity. It has been documented that required returns on common stocks contain a term premium with a business-cycle pattern (low near peaks, high near troughs)[19] which

[17] Fama, 1990.
[18] Ball and Sadka, 2015.
[19] Fama and French, 1989.

implies that required returns are lower when economic conditions are strong (positive GDP growth) and higher when conditions are weak (negative GDP growth). The better the real economic prospects are for the whole of the economy, as conveyed by positive real GDP growth expectations, the lower the required rate of return will be. The lower the required rate of return the higher the stock price, thus, real GDP growth expectations are expected to be positively related with stock returns (through the denominator effect).

Consequently, real GDP growth forecasts are expected to be able to predict variation in current stock returns, and to be positively associated with current stock returns. Market efficiency implies that the real GDP growth forecasts will not be associated with future stock returns.

3.3.3b Inflation Forecasts and Stock Returns

With regards to the inflation forecasts' impact on the company stock returns, the GDP Deflator growth forecasts can have an impact on company profitability as well as the required return.

Inflation can affect company performance mainly through a non-symmetric impact on the revenue-expense structure. The rate of adjustment of revenues and expenses to inflation expectations can differ between revenues and expenses and among companies. The adjustment of revenues and expenses to expected inflation will depend on the company's bargaining power and business model. As a result, even though expected inflation affects both input and output prices, in the case of differential adjustment of revenues and expenses to expected inflation, the expected inflation is expected to be associated with future company profitability. However, the signed association between inflation expectations and company profitability cannot be determined, and it is subject to empirical investigation.

When studying the impact of inflation on stock valuation, stock market efficiency is key. According to the inflation illusion hypothesis[20], stock market investors fail to incorporate inflation when forecasting future earnings growth, and this causes mispricing in the stock market; firms whose earnings growth is positively (negatively) related to inflation will be undervalued (overvalued).

With respect to the association between expected inflation and the required return of the valuation model, the impact can be driven by an association between expected inflation and the interest rates, an association between the expected inflation and the equity risk premium, or both.

According to the Fisher theoretical effect there will be a one-for-one adjustment of the nominal interest rate to the expected inflation rate so that the real interest rate remains constant. However, contrary to the constant real rate proposition, empirical evidence suggests that the adjustment of the interest rate to variation in expected inflation is only partial. Thus, contingent on any nominal rate, a rise in expected inflation would result in only a smaller rise in the nominal interest rate. That is, when prices are rising, the rate of interest tends to be high but not as high as it should be to compensate for the rise; and when prices are falling, the rate of interest tends to be low, but not as low as it should be to compensate for the fall[21]. From a different viewpoint, expectations of higher inflation would induce investors to hold less in money accounts and more in other assets, driving the real interest rate down[22].

However, the required rate of return on common stocks consists of the riskless nominal rate of interest and the equity risk premium. A rise in inflation may cause a change in consumption and investment behavior inducing agents to increase current real spending as they expect an erosion of the value of their wealth in the future. So,

[20] Modigliani and Cohn, 1979.
[21] Fisher, 1930.
[22] Mundell, 1963; Tobin, 1965.

notwithstanding the magnitude of response of the riskless rate of interest towards expected inflation, the expected inflation is expected to be positively associated with the equity risk premium. Expected inflation represents a future erosion in wealth from both the investors' and companies' perspective, thus is expected to be positively related with the required return[23], and thus negatively related with stock returns.

Concluding, while inflation expectations are expected to be positively associated with required returns, and thus negatively related with stock returns, the signed association between inflation expectations and expected profitability cannot be determined. Thus, the overall association between inflation expectations and stock returns is subject to empirical investigation.

The combined effects of real GDP growth and inflation expectations on stock returns will determine the association between the nominal GDP growth expectations and stock returns. Market efficiency implies that the nominal GDP growth forecasts will not be associated with future stock returns.

Hypothesis 4b: *There is a decline in the association between macroeconomic expectations and stock returns from the period before the crisis to the period of the crisis.*

Macroeconomic expectations' value-relevance during the crisis may decline for several reasons:

- Impaired investors' judgment: Unusually high uncertainty impairs investors' judgement as well as their ability to interpret macroeconomic signals and incorporate their impact on company performance when making investment decisions.

[23] Gultekin, 1983; Sharpe, 2002.

- Biased responses: Investors may be more prone to behavioral biases[24] in times of uncertainty and may overreact to good macroeconomic news and underreact to bad macroeconomic news, leading to a decline in the relevance of macroeconomic forecasts for stock returns during the crisis.
- Increased required returns due to increased risk aversion: In the crisis, due to high uncertainty, utility curves may shift and risk aversion is likely to increase sharply. Despite the very low inflation and very low nominal interest rates prevailing, lower rates are offset by the increased risk of potential defaults, thus the more risk averse investors will demand a higher equity premium (higher required return), notwithstanding the signals about economic prospects. A decline in the association between macroeconomic forecasts and stock returns (through the required return) is thus expected during the crisis.
- Ambiguous state of macroeconomic forecasting: It has been documented that macroeconomic forecasts produced during the crisis were controversial due to the employment of multipliers of the pre-crisis period in the macro-forecasting process[25]. Investors view macroeconomic news with skepticism during the crisis, and the explanatory power of GDP growth forecasts for stock returns is expected to decline.
- Central Bank intervention: Investors' expectations on the Central Bank commitment to maintain inflation at low levels but also take any necessary stimulative actions in parallel, is very important in the investors' determination of the strength of the effect of real GDP and inflation on stock returns. As the Central Bank commitment can be seen as exogenous in this dissertation's research setting, and we can stipulate that investors or financial analysts cannot influence Central Bank strategy and actions, the increase in the level of commitment of the European

[24] De Bondt and Thaler, 1985.
[25] Pain et al., 2014.

Central Bank during the crisis may be one of the arguments supporting the hypothesis that the informativeness of the components of GDP growth (real GDP growth and inflation forecasts) declines from the period before the crisis to the period of the crisis.

The uncertainty, possible behavioral biases, central bank expectations, and their skepticism towards the macroeconomic news they receive during the crisis, will mean that at that time, investors' incorporation of macroeconomic news when forming performance expectations and taking investment decisions will decline. Thus, the stock market relevance of macroeconomic news during the crisis is expected to decline.

Chapter 4 Experimental Design

4.1 Company Profitability: Actual GDP Growth Impact

For testing Hypothesis 1a on the significance of GDP growth and its components for company profitability, and Hypothesis 1b on the decline in significance during the crisis, the dissertation uses the following earnings prediction models. The models are estimated by using OLS. The reported t-statistics are based on heteroscedasticity- and autocorrelation-consistent Newey-West standard errors.

To examine the association between GDP growth and its components and the level of actual earnings, the dissertation empirically estimates models 1a and 1a'.

$$EPS_{t,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 EPS_{t-1,i} + \beta_2 BV_{t-2,i} + \beta_3 B/M_{t-1,i} + \beta_4 lnMV_{t-1,i} +$$

$$+ \beta_5 Div_{t-1,i} + \beta_6 D/B_{t-1,i} + \beta_7 DNOA_{t-1,i} + \beta_8 AssetGrowth_{t-1,i} +$$

$$+ \beta_9 NominalGDPGrowth_{t,j} + \beta_{10} NominalGDPGrowth_{t,j} * Crisis + \varepsilon_t \quad (Model\ 1a)$$

$$EPS_{t,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 EPS_{t-1,i} + \beta_2 BV_{t-2,i} + \beta_3 B/M_{t-1,i} + \beta_4 lnMV_{t-1,i} +$$

$$+ \beta_5 Div_{t-1,i} + \beta_6 D/B_{t-1,i} + \beta_7 DNOA_{t-1,i} + \beta_8 AssetGrowth_{t-1,i} +$$

$$+ \beta_9 RealGDPGrowth_{t,j} + \beta_{10} RealGDPGrowth_{t,j} * Crisis +$$

$$+ \beta_{11} GDPDeflatorGrowth_{t,j} + \beta_{12} GDPDeflatorGrowth_{t,j} * Crisis + \varepsilon_t \quad (Model\ 1a')$$

For the association between GDP growth and its components and the actual earnings changes (earnings growth), the dissertation empirically estimates models 1b and 1b′:

$$\Delta(EPS)_{t,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 \Delta(EPS)_{t-1,i} + \beta_2 B/M_{t-1,i} + \beta_3 lnMV_{t-1,i} +$$

$$+\beta_4 Div_{t-1,i} + \beta_5 D/B_{t-1,i} + \beta_6 DNOA_{t-1,i} + \beta_7 AssetGrowth_{t-1,i} +$$

$$+\beta_8 NominalGDPGrowth_{t,j} + \beta_9 NominalGDPGrowth_{t,j} * Crisis + \varepsilon_t \quad (Model\ 1b)$$

$$\Delta(EPS)_{t,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 \Delta(EPS)_{t-1,i} + \beta_2 B/M_{t-1,i} + \beta_3 lnMV_{t-1,i} + \beta_4 Div_{t-1,i} + \beta_5 D/B_{t-1,i} +$$

$$+\beta_6 DNOA_{t-1,i} + \beta_7 AssetGrowth_{t-1,i} + \beta_8 RealGDPGrowth_{t,j} + \beta_9 RealGDPGrowth_{t,j} * Crisis +$$

$$+\beta_{10} GDPDeflatorGrowth_{t,j} + \beta_{11} GDPDeflatorGrowth_{t,j} * Crisis + \varepsilon_t \quad (Model\ 1b')$$

where:

$EPS_{t,i}$ and $EPS_{t-1,i}$ = actual earnings per share of company i for current year t and prior year t-1 as reported in IBES. Both $EPS_{t,i}$ and $EPS_{t-1,i}$ are multiplied by the number of shares outstanding at t and t-1 respectively and deflated by total assets t-2 (beginning of t-1)

$\Delta(EPS)_t = [EPS_t - EPS_{t-1}]$

$\Delta(EPS)_{t-1} = [EPS_{t-1} - EPS_{t-2}]$. Earnings per share are multiplied with the number of shares outstanding. Δ(EPS) is deflated by total assets t-2

$BV_{t-2,i}$ = book value at t-2 deflated by total assets t-2

$B/M_{t-1,i}$ = book to market ratio at t-1

$lnMV_{t-1,i}$ = log(market value of equity) at t-1

$Div_{t-1,i}$ = indicator variable {==1 for company paying a dividend in year t-1 and 0 otherwise}

$D/B_{t-1,i}$ = dividend to book value ratio at t-1

$DNOA_{t-1,i} = (NOA_{t-1,i} - NOA_{t-2,i})/Total\ Assets_{t-2,i}$

where:

$NOA_{t-1,i}$ = (Current Operating $Assets_{t-1,i}$ + Non-Current Operating $Assets_{t-1,i}$) –
(Current Operating $Liabilities_{t-1,i}$ + Non-Current Operating $Liabilities_{t-1,i}$)

$NOA_{t-2,i}$ = (Current Operating $Assets_{t-2,i}$ + Non-Current Operating $Assets_{t-2,i}$) –
(Current Operating $Liabilities_{t-2,i}$ + Non-Current Operating $Liabilities_{t-2,i}$)

$AssetGrowth_{t-1,i}$ = (Total $Assets_{t-1,i}$ – Total Assets $_{t-2,i}$) / Total $Assets_{t-2,i}$

$GDPGrowth_{t,j}$ = actual year-on-year nominal GDP growth in year t for country j for models 1a and 1b and its components (real GPD growth and change in the GDP deflator) for models 1a' and 1b'. As reported by the International Monetary Fund.

Crisis = indicator (dummy) variable ==1 if fiscal year t = {2009,2013}
== 0 if fiscal year t = {2005,2008}

GDP $Growth_{t,j}$ * Crisis = interaction term of the macroeconomic variable with the Crisis Dummy

In the accounting and finance literature, the GDP growth has been considered a comprehensive indicator of macroeconomic activity, and the benchmark for corporate earnings growth at a steady state (Penman 2011).

Growth in the Real GDP, economic growth, can either be driven by increases in the total factor productivity through more efficient use of the factors ''intensive growth'' (for example, more efficient use of labour and capital due to technological innovation), or driven by increases in the total factor amounts ''extensive growth''. Corporate profits constitute part of GDP. As the GDP grows, corporate profits are also expected to grow (at a rate higher or lower than the GDP growth), and the real GDP growth is positively associated with earnings. In practice, the growth in earnings can either come from an increase in the number of firms in business (that satisfy the higher demand in the case of extensive growth), and/or from the increased profits of existing firms (associated with more efficient use of total productivity factors).

Inflation affects both input and output prices. The inflation rate's relative effects on the company's input and output prices will be determined by the bargaining power of the company, and its ability to pass through any inflation-related cost to its end-consumers by increasing products'/services' prices. Consequently, inflation can be significantly associated with earnings but the association is subject to empirical investigation.

The real GDP growth is expected to be positively associated with earnings and earnings growth, i.e. estimated regression coefficient β_9 (for model 1a') and β_8 (for model 1b') is expected to be positive and significant. As the association between inflation and earnings is subject to empirical investigation, the dissertation does not set a prediction for the significance and sign of the regression coefficient β_{11} (for model 1a') and β_{10} (for model 1b'). Overall, the nominal GDP growth is expected to be significantly associated with earnings (β_9 in model 1a and β_8 in model 1b are expected to be significant). The sign of the coefficient will depend on the combined effect of real GDP growth and inflation on earnings.

As the significance of the macroeconomic information in the crisis period for predicting earnings is expected to decline, the regression coefficients of the interaction terms between the Crisis indicator variable and the macroeconomic variable (slope that represents the change in association between the macro variable and earnings during the crisis) are expected to be significant and of an opposite sign compared to the sign of the relevant macroeconomic variable. Thus, for model 1a', the sum of the coefficients [β_9+β_{10}] that stands for the association between real GDP growth and earnings in the crisis period is expected to be significantly lower in magnitude than β_9 (similarly, [β_8+β_9] for model 1b' is expected to be lower in magnitude than β_8). The association between the inflation rate and earnings during the crisis is a matter of empirical investigation.

The models control for fundamental variables whose significance for future earnings has been documented in prior literature[26]: earnings at t-1 (for the level of earnings prediction model), change in earnings at t-1 (for the earnings change prediction model), Book Value (at t-2), B/M and Size (represented by the natural logarithm of market value of equity) at t-1, prior period accruals, investment at t-1, an indicator variable for the dividend-paying status of the firm (t-1), and the ratio of dividends to book value of equity (D/B) at t-1.

4.2 Analysts' Forecasts and Efficient Incorporation of Macroeconomic Expectations

To test Hypotheses 2a and 2b (efficient incorporation of GDP growth forecasts by financial analysts controlling for the crisis) the following models are estimated by using OLS. The reported t-statistics are based on heteroscedasticity- and autocorrelation-consistent Newey-West standard errors.

To test the association between GDP growth forecasts and the level of analysts' earnings forecasts, the dissertation estimates Models 2a and 2a':

$$EPSForecast_{t,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 EPSForecast_{t-1,i} + \beta_2 FE(EPS)_{t-1,i} + \beta_3 B/M_{t-1,i} +$$

$$+ \beta_4 lnMV_{t-1,i} + \beta_5 Div_{t-1,i} + \beta_6 D/B_{t-1,i} + \beta_7 DNOA_{t-1,i} + \beta_8 AssetGrowth_{t-1,i} + \beta_9 MarketMomentum_{t-1,i} +$$

$$+ \beta_{10} ForecastedNominalGDPGrowth_{t,j} + \beta_{11} ForecastedNominalGDPGrowth_{t,j} * Crisis + \varepsilon_t \text{ (Model 2a)}$$

[26] Penman, 1991; Lakonishok et al., 1994; Elgers and Lo, 1994; Fama and French, 1995; Sloan, 1996; Fama and French, 2000; Nissim and Ziv, 2001; Fairfield et al., 2003; Chan et al., 2004; Fama and French, 2015.

$$EPSForecast_{t,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 EPSForecast_{t-1,i} + \beta_2 FE(EPS)_{t-1,i} + \beta_3 B/M_{t-1,i} +$$

$$+ \beta_4 lnMV_{t-1,i} + \beta_5 Div_{t-1,i} + \beta_6 D/B_{t-1,i} + \beta_7 DNOA_{t-1,i} + \beta_8 AssetGrowth_{t-1,i} + \beta_9 MarketMomentum_{t-1,i} +$$

$$+ \beta_{10} ForecastedRealGDPGrowth_{t,j} + \beta_{11} ForecastedRealGDPGrowth_{t,j} * Crisis +$$

$$+ \beta_{12} ForecastedGDPDeflatorGrowth_{t,j} + \beta_{13} ForecastedGDPDeflatorGrowth_{t,j} * Crisis + \varepsilon_t \text{ (Model 2a')}$$

To test the association between GDP growth forecasts and news in analysts' earnings forecasts, the dissertation estimates Models 2b and 2b':

$$EPSForecastNews_{t,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 EPSForecastNews_{t-1,i} + \beta_2 FE(EPS)_{t-1,i} + \beta_3 B/M_{t-1,i} +$$

$$+ \beta_4 lnMV_{t-1,i} + \beta_5 Div_{t-1,i} + \beta_6 D/B_{t-1,i} + \beta_7 DNOA_{t-1,i} + \beta_8 AssetGrowth_{t-1,i} + \beta_9 MarketMomentum_{t-1,i} +$$

$$+ \beta_{10} ForecastedNominalGDPGrowth_{t,j} + \beta_{11} ForecastedNominalGDPGrowth_{t,j} * Crisis + \varepsilon_t \text{ (Model 2b)}$$

$$EPSForecastNews_{t,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 EPSForecastNews_{t-1,i} + \beta_2 FE(EPS)_{t-1,i} + \beta_3 B/M_{t-1,i} +$$

$$+ \beta_4 lnMV_{t-1,i} + \beta_5 Div_{t-1,i} + \beta_6 D/B_{t-1,i} + \beta_7 DNOA_{t-1,i} + \beta_8 AssetGrowth_{t-1,i} + \beta_9 MarketMomentum_{t-1,i} +$$

$$+ \beta_{10} ForecastedRealGDPGrowth_{t,j} + \beta_{11} ForecastedRealGDPGrowth_{t,j} * Crisis +$$

$$+ \beta_{12} ForecastedGDPDeflatorGrowth_{t,j} + \beta_{13} ForecastedGDPDeflatorGrowth_{t,j} * Crisis + \varepsilon_t \text{ (Model 2b')}$$

To examine the association between GDP growth forecasts and analysts' forecast errors, the dissertation estimates Model 2c:

$$FE(EPS)_{t,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 FE(EPS)_{t-1,i} +$$

$$+\beta_2 ForecastedRealGDPGrowth_{t,j} + \beta_3 ForecastedRealGDPGrowth_{t,j} * Crisis +$$

$$+ \beta_4 ForecastedGDPDeflatorGrowth_{t,j} + \beta_5 ForecastedGDPDeflatorGrowth_{t,j} * Crisis + \varepsilon_t \text{ (Model 2c)}$$

where:

$EPSForecast_{t,i}$ = Consensus Forecast $EPS_{t,i}$

$EPSForecast_{t-1,i}$ = Consensus Forecast $EPS_{t-1,i}$.

Analyst Consensus Forecasts per firm-year are constructed as the mean of the individual analyst forecasts for firm i and fiscal year t that are reported in IBES after announcement of t-1 actual financial results and before the announcement of t actual financial results for firm i. The Consensus Forecasts are multiplied by the average number of shares outstanding and deflated by total assets at beginning of t-1.

$EPSForecastNews_{t,i}$ = [Consensus Forecast $EPS_{t,i}$ – Actual $EPS_{t-1,i}$]

where Actual $EPS_{t-1,i}$ are the earnings per share of firm i for prior fiscal year t-1 as reported in IBES (multiplied by the number of shares outstanding).

$EPSForecastNews_{t,i}$ and $EPSForecastNews_{t-1,i}$ are deflated by total assets at beginning of t-1.

$FE(EPS)_{t,i}$ is the current period analysts' forecast error = [Actual $EPS_{t,i}$ - $ConsensusForecastEPS_{t,i}$]

$FE(EPS)_{t-1,i}$ is the prior period analysts' forecast error = [Actual $EPS_{t-1,i}$ -$ConsensusForecastEPS_{t-1,i}$]

The forecast errors are deflated by total firm assets at beginning of t-1.

$B/M_{t-1,i}$ is the book value to market value of equity ratio of firm i at t-1.

$lnMV_{t-1,i}$ is the natural logarithm of the market value of equity of firm i at t-1.

$Div_{t-1,i}$ is an indicator variable equal to 1 for firms distributing a dividend in year t-1 and 0 otherwise.

$D/B_{t-1,i}$ is the dividend to book value ratio at t-1.

$DNOA_{t-1,i} = (NOA_{t-1,i} - NOA_{t-2,i})/\text{Total Assets}_{t-2,i}$ are the prior period accruals calculated as the change in net operating assets deflated by total assets at t-2

where net operating assets are calculated as

$NOA_{t-1,i}$ = (Current Operating $\text{Assets}_{t-1,i}$ + Non-Current Operating $\text{Assets}_{t-1,i}$) –
(Current Operating $\text{Liabilities}_{t-1,i}$ + Non-Current Operating $\text{Liabilities}_{t-1,i}$)

$NOA_{t-2,i}$ = (Current Operating $\text{Assets}_{t-2,i}$ + Non-Current Operating $\text{Assets}_{t-2,i}$) –
(Current Operating $\text{Liabilities}_{t-2,i}$ + Non-Current Operating $\text{Liabilities}_{t-2,i}$)

$\text{AssetGrowth}_{t-1,i}$ = (Total $\text{Assets}_{t-1,i}$ – Total $\text{Assets}_{t-2,i}$) / Total $\text{Assets}_{t-2,i}$

$\text{MarketMomentum}_{t-1,i}$ = Market adjusted daily compounded company returns from the last day of fiscal year t-1 to actual t-1 announcement date within t, i.e. the start of the analysts' forecast horizon for year t

$\text{ForecastedNominalGDPgrowth}_{t,j}$ is the Nominal GDP Growth forecast (% growth yoy) for year t and country j issued by the IMF in April t.

$\text{ForecastedNominalGDPgrowth}_{t,j}$ *Crisis is an interaction term of the Forecasted GDP Growth with the crisis dummy.

$\text{ForecastedRealGDPGrowth}_{t,j}$ and $\text{ForecastedGDPDeflatorGrowth}_{t,j}$ is the Real GDP Growth and GDP Deflator Growth forecast (% growth yoy) respectively for year t and country j issued by the IMF in April t.

Forecasted $\text{growth}_{t,j}$ * Crisis is an interaction term of the Forecasted Growth (Real GDP Growth or GDP Deflator Growth) with the crisis dummy.

Financial analysts have four main sources of available (public) information when forecasting earnings: prior accounting fundamentals, prior market signals, their own prior forecasts and forecast errors, and macroeconomic expectations.

Analysts are expert forecasters of a company's financial standing, and they are expected to incorporate fundamental and market variables that are relevant for earnings when forecasting EPS (prior B/M, size, accruals, dividends, recent momentum of the company's stock returns, and asset growth). Prior studies have indicated that financial analysts rely on corporate earnings growth potential and earnings quality to forecast future earnings as well as to value securities and issue stock recommendations[27], thus the inherent importance of producing reliable estimates of future earnings for equity valuation is understood by the analysts. Moreover, analysts are expected to learn from their past forecasting process and past errors, and fully incorporate any information contained in their prior forecasts' errors when forecasting earnings. Consequently, the models include prior analysts' forecast errors and prior forecasts of earnings and earnings news as controls.

Models 2a and 2b test the incorporation of macroeconomic expectations by financial analysts into their earnings forecasts, controlling for the crisis, fundamentals, and market variables that are relevant for company earnings.

Macroeconomic expectations matter for the understanding of business cycle fluctuations which are associated with company performance. The GDP growth is a comprehensive indicator of macroeconomic activity, and the corporate earnings growth rate at a steady state, thus the GDP growth forecast is a signal of future macroeconomic activity and the expected rate of corporate earnings growth at the steady state. The dissertation uses GDP growth forecasts issued by the IMF at the beginning of the analysts' forecast horizon. Access to in-house economists and resources which is frequently the case for large brokerage houses, means that it is reasonable to expect that the expert financial analysts will be able to interpret the effect of the macroeconomic forecasts on the companies they follow[28], and correctly incorporate it when forecasting

[27] Block, 1999.
[28] Hugon et al., 2016.

earnings and earnings changes. Thus regression coefficient estimate of real GPD growth forecasts β_{10} (in models 2a′ and 2b′) is expected to be significant and positive. The regression coefficient estimate of the GDP Deflator growth (inflation rate) forecast β_{12} is subject to empirical investigation. The overall effect of the nominal GDP growth forecasts on analysts' earnings and earnings news will depend on the combined incorporation of real GDP growth and inflation forecasts by the analysts. It should be noted that the dissertation does not examine the validity of the macro forecasts; financial analysts are expected to incorporate these expectations in their earnings forecasts.

During the crisis, estimation difficulties may have led to macroeconomic forecasts of lower credibility (employment of normal period multipliers during the crisis, slower than expected recovery, high uncertainty), leading to a decline in the relevance of macroeconomic news for company performance. Previous studies have also documented that timeliness is of essence in forecasting earnings, and that the market responds highly to timely forecasters (Cooper et al., 2001). On the contrary, the market-relevance of the forecasts may not only be associated with the speed of response to new information (whether public or private) but also with the reliability of that information. Due to uncertainty during the crisis and decline in information quality, the information environment in which analysts produce their earnings forecasts is complex and challenging. However, the financial analysts are considered experts, and are thus expected to detect and correctly interpret the decline of the macroeconomic signals' significance for earnings during the crisis. Thus, the estimated slope of interaction term β_{11} (models 2a′ and 2b′) is expected to be significant and negative, and the sum of coefficients $[\beta_{10}+\beta_{11}]$ is expected to be of lower magnitude than β_{10}. The regression coefficients of the inflation rate forecast and the nominal GDP growth forecast (and the respective interaction terms' coefficients) are subject to empirical investigation.

To test for analysts' efficiency with respect to macroeconomic forecasts incorporation, model 2c is employed. The model regresses analysts' signed forecast error

(that represents Bias) on the prior period forecast error and on the real GDP growth and inflation forecasts, controlling for the crisis. The model is used to detect any systematic analyst inefficiency with respect to the correct incorporation of the macroeconomic forecasts' impact on earnings. Analysts are expected to fully incorporate the macroeconomic forecasts' impact on earnings when making their earnings forecasts, thus, the regression coefficient estimates β_2 and β_4 (model 2c) will not significantly differ from zero.

4.3 Macroeconomic Expectations and Analysts' News: Implications for Stock Returns

To test hypotheses 3a-3b and 4a-4b on the stock market efficiency with respect to information contained in analysts' forecasts and forecast news, and forecasts of GDP Growth the following models are estimated by using OLS. The reported t-statistics are based on heteroscedasticity- and autocorrelation-consistent Newey-West standard errors.

Association between Current Stock Returns and Nominal GDP Growth forecasts controlling for Residual Earnings forecasts (Model 3a)

$$Returns_{t,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 Size_{t-1,i} + \beta_2 B/M_{t-1,i} + \beta_3 Inv_{t-1,i} + \beta_4 BetaCoefficient_{t-1,i} +$$

$$+\beta_5 ForecastedNominalGDPGrowth_{t,j} + \beta_6 ForecastedNominalGDPGrowth_{t,j} * Crisis +$$

$$+\beta_7 EPSForecast_{RESIDUALSt,i} + \beta_8 EPSForecast_{RESIDUALSt,i} * Crisis + \varepsilon_t \quad (Model\ 3a)$$

Association between Current Stock Returns and Nominal GDP Growth forecasts controlling for Earnings Forecast News (Model 3a)

$$Returns_{t,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 Size_{t-1,i} + \beta_2 B/M_{t-1,i} + \beta_3 Inv_{t-1,i} + \beta_4 BetaCoefficient_{t-1,i} +$$

$$+ \beta_5 ForecastedNominalGDPGrowth_{t,j} + \beta_6 ForecastedNominalGDPGrowth_{t,j} * Crisis +$$

$$+ \beta_7 EPSForecastNews_{t,i} + \beta_8 EPSForecastNews_{t,i} * Crisis + \varepsilon_t \quad (Model\ 3a)$$

Association between Current Stock Returns and Real GDP Growth forecasts / GDP Deflator Growth forecasts controlling for Residual Earnings forecasts (Model 3a')

$$Returns_{t,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 Size_{t-1,i} + \beta_2 B/M_{t-1,i} + \beta_3 Inv_{t-1,i} + \beta_4 BetaCoefficient_{t-1,i} +$$

$$+ \beta_5 ForecastedRealGDPGrowth_{t,j} + \beta_6 ForecastedRealGDPGrowth_{t,j} * Crisis +$$

$$+ \beta_7 ForecastedGDPDeflatorGrowth_{t,j} + \beta_8 ForecastedGDPDeflatorGrowth_{t,j} * Crisis +$$

$$+ \beta_9 EPSForecast_{RESIDUALS\ t,i} + \beta_{10} EPSForecast_{RESIDUALS\ t,i} * Crisis + \varepsilon_t \quad (Model\ 3a')$$

Association between Current Stock Returns and Real GDP Growth forecasts / GDP Deflator Growth forecasts controlling for Earnings Forecast News (Model 3a')

$$Returns_{t,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 Size_{t-1,i} + \beta_2 B/M_{t-1,i} + \beta_3 Inv_{t-1,i} + \beta_4 BetaCoefficient_{t-1,i} +$$

$$+ \beta_5 ForecastedRealGDPGrowth_{t,j} + \beta_6 ForecastedRealGDPGrowth_{t,j} * Crisis +$$

$$+ \beta_7 ForecastedGDPDeflatorGrowth_{t,j} + \beta_8 ForecastedGDPDeflatorGrowth_{t,j} * Crisis +$$

$$+ \beta_9 EPSForecastNews_{t,i} + \beta_{10} EPSForecastNews_{t,i} * Crisis + \varepsilon_t \quad (Model\ 3a')$$

Association between Future Stock Returns and Nominal GDP Growth forecasts controlling for Residual Earnings forecasts (Model 3b)

$$Returns_{t+1,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 Size_{t,i} + \beta_2 B/M_{t,i} + \beta_3 Inv_{t,i} + \beta_4 BetaCoefficient_{t,i} +$$

$$+ \beta_5 ForecastedNominalGDPGrowth_{t,j} + \beta_6 ForecastedNominalGDPGrowth_{t,j} * Crisis +$$

$$+ \beta_7 EPSForecast_{RESIDUALSt,i} + \beta_8 EPSForecast_{RESIDUALSt,i} * Crisis + \varepsilon_t \quad (Model\ 3b)$$

Association between Future Stock Returns and Nominal GDP Growth forecasts controlling for Earnings Forecast News (Model 3b)

$$Returns_{t+1,i} = \alpha_0 + \alpha_1 Crisis + \beta_1 Size_{t,i} + \beta_2 B/M_{t,i} + \beta_3 Inv_{t,i} + \beta_4 BetaCoefficient_{t,i} +$$

$$+ \beta_5 ForecastedNominalGDPGrowth_{t,j} + \beta_6 ForecastedNominalGDPGrowth_{t,j} * Crisis +$$

$$+ \beta_7 EPSForecastNews_{t,i} + \beta_8 EPSForecastNews_{t,i} * Crisis + \varepsilon_t \quad (Model\ 3b)$$

where:

$Returns_{t,i}$ = Annual stock returns constructed with compounding of daily stock returns for firm-year t,i using a buy-hold strategy from the announcement date of the prior fiscal year (t-1) actual results to the announcement date of the current fiscal year (t) actual results.

$Returns_{t+1,i}$ = Annual stock returns constructed with compounding of daily stock returns for firm-year t+1,i using a buy-hold strategy from the announcement date of the current fiscal year (t) actual results to the announcement date of the next fiscal year (t+1) actual results.

Crisis is an indicator (dummy) variable equal to 1 if fiscal year t = {2009,2013} and equal to 0 if fiscal year t = {2005,2008}.

$Size_{t-1,i}$ = $lnMV_{t-1,i}$ (natural logarithm of the market value of equity of firm i at t-1)

$Size_{t,i}$ = $lnMV_{t,i}$ (natural logarithm of the market value of equity of firm i at t)

$B/M_{t-1,i}$ = book value to market value of equity ratio of firm i at t-1

$B/M_{t,i}$ = book value to market value of equity ratio of firm i at t

$Inv_{t-1,i}$ = log(CAPEX from the cash flow statement) at t-1

$Inv_{t,i}$ = log(CAPEX from the cash flow statement) at t

$BetaCoefficient_{t-1,i}$ = estimated slope b of the regression

CompanyReturn = $\alpha + \beta$ * MarketReturn

estimated using daily returns for the two years prior to the announcement date of actual financial results of t-1

$BetaCoefficient_{t,i}$ = estimated slope b of the regression

CompanyReturn = $\alpha + \beta$ * MarketReturn

estimated using daily returns for the two years prior to the announcement date of actual financial results of t

$ForecastedNominalGDPgrowth_{t,j}$ is the Nominal GDP Growth forecast (% growth yoy) for year t and country j issued by the IMF World Economic Outlook in April t.

$ForecastedNominalGDPgrowth_{t,j}$ * Crisis is an interaction term of the Forecasted GDP Growth with the crisis dummy.

$ForecastedRealGDPGrowth_{t,j}$ and $ForecastedGDPDeflatorGrowth_{t,j}$ are the Real GDP Growth and GDP Deflator Growth forecast (% growth yoy) respectively for year t and country j issued by the IMF World Economic Outlook in April t.

Forecasted $growth_{t,j}$ * Crisis is an interaction term of the Forecasted Growth (either RealGDPGrowth or GDPDeflatorGrowth) with the crisis dummy.

$EPSForecast_{RESIDUALSt,i}$ are the residuals from an OLS regression of the $EPSForecast_{t,i}$ on the Forecasted Nominal GDP Growth of year t:

$$EPSForecast_{t,i} = \alpha + \beta\, ForecastedGDPGrowth_{t,j} + \varepsilon_t$$

where:

$EPSForecast_{t,i}$ is the consensus forecast for firm i and year t, multiplied by the number of shares outstanding, and deflated by total assets at beginning of t-1

and $ForecastedGDPGrowth_{t,j}$ is the forecasted Nominal GDP Growth for country j and year t as issued by the IMF World Economic Outlook in April of year t.

$EPSForecastNews_{t,i}$ = [Consensus Forecast $EPS_{t,i}$ – Actual $EPS_{t-1,i}$]

where:

Consensus Forecast $EPS_{t,i}$ is the analysts' consensus forecast per firm-year constructed as the mean of the individual analyst forecasts for firm i and fiscal year t that are reported in IBES after announcement of t-1 actual financial results and before the announcement of t actual financial results for firm i. The Consensus Forecasts are multiplied by the average number of shares outstanding.

Actual $EPS_{t-1,i}$ is the earnings per share of firm i for prior fiscal year t-1 as reported in IBES (multiplied by the number of shares outstanding).

$EPSForecastNews_{t,i}$ is deflated by total assets at beginning of t-1.

$EPSForecast_{RESIDUALSt,i}$ * Crisis and $EPSForecastNews_{t,i}$ * Crisis are interaction terms of the Crisis dummy with $EPSForecast_{RESIDUALSt,i}$ and $EPSForecastNews_{t,i}$ respectively.

Analysts' forecasts are expected to be a proxy for unobservable market expectations of future earnings. Several studies have documented that earnings forecasts are signals that convey value-relevant information[29] to the stock market, and that the stock market moves in the direction of analysts' forecasts, their revisions and recommendation changes,[30] indicating that analysts' forecasts are important for stock market earnings expectations and the price formation process.

To examine the importance of analysts' expected earnings growth (analysts' consensus of projected growth in earnings compared to prior year actual earnings), the model is estimated controlling for News in earnings forecasts (EPSForecastNews). To examine the extent to which the value-relevance of information contained in analysts' forecasts to the stock market is incremental to the value-relevance of information

[29] Abarbanell et al., 1995; Abarbanell and Bushee, 1997; Cheng, 2005; Jackson and Johnson, 2006.

[30] Givoly and Lakonishok, 1979; Clement and Tse, 2003; Frankel et al., 2006.

contained in macroeconomic forecasts, analysts' consensus earnings forecasts per firm-year are regressed on nominal GDP growth forecasts. The residuals that result from this regression ($EPSForecast_{RESIDUALS}$), and represent the information contained in the consensus earnings forecasts that is orthogonal to the GDP Forecast-related information, are then used as an explanatory variable in the current stock return models (3a-3a') and the future stock return model (3b).

The stock market is expected to incorporate analysts' earnings forecasts and forecast news efficiently when forming expectations, and earnings forecasts and forecast news are expected to be positively related to stock returns. Thus β_7 coefficient (in model 3a) and β_9 coefficient (in model 3a') are expected to be significant and positively associated with current stock returns, and not associated with future stock returns (coefficient β_7 in model 3b is expected to be insignificant).

Controlling for the crisis, the value relevance of forecasted earnings and news is expected to decline, thus, the coefficient estimate of the interaction term between $EPSForecast_{RESIDUALS_{t,i}}$ (or $EPSForecastNews_{t,i}$) and the Crisis (coefficient β_8 in model 3a, and coefficient β_{10} in model model 3a') is expected to be negative and significant leading to a lower crisis association between analysts' forecasts and Stock Returns. The sum of the coefficients [β_7+β_8] for model 3a, and [β_9+β_{10}] for model 3a', are expected to be significantly lower than the β_7 and β_9 regression coefficient estimates, respectively. As the market is expected to be efficient in its incorporation of earnings forecasts and forecast news both before and during the crisis, coefficient estimates β_7 and β_8 in model 3b (future stock returns model) are expected to be insignificant for predicting future stock returns.

The stock market is trying to look into the uncertain future and assess the risks and rewards associated with expected growth, and required returns are much more a matter of anticipated future growth than they are of past growth, thus expected growth in GDP represents an important factor that is expected to be priced by the market. Real GDP growth forecasts are expected to be positively associated with stock returns both

through a positive association with expected profitability as well as a negative association with required returns. The stock market is expected to efficiently incorporate these forecasts, thus coefficient estimate β_5 (model 3a') is expected to be positive and significant. Inflation expectations are expected to be of economic significance for stock returns primarily through a positive association between inflation and the required rate of return (discount rate). Since the association between inflation and profitability is subject to empirical investigation, the sign of the estimated coefficient of the GDP Deflator growth forecast (β_7 in model 3a') is subject to empirical investigation. The overall association between the nominal GDP growth forecasts and current stock returns is as a result also subject to empirical investigation (regression coefficient β_5 in model 3a).

Controlling for the crisis, the value relevance of macroeconomic forecasts is expected to decline, thus, the coefficient estimate of the interaction term between real GDP growth forecasts and the Crisis (coefficient β_6 in model 3a') is expected to be negative significant leading to a lower crisis relationship between real GDP growth forecasts and stock returns. The interaction term between the inflation forecast and the crisis (β_8 model 3a') is subject to empirical investigation. As the market is expected to be efficient, regression coefficient estimates β_5 (GDP growth forecast) and β_6 (GDP growth forecast*Crisis) in model 3b are expected to be insignificant in predicting future stock returns.

The model uses four main control variables, Size (market capitalisation), B/M, Investment, and market systematic risk (beta coefficient). The fundamental company characteristics usually used in the equity valuation literature such as size and the book-to-market factor, may differentiate the sensitivity of the firm's exposure to macroeconomic fluctuations, and are consequently taken into consideration when examining the systematic component of stock return variation that is attributed to fluctuations in the macroeconomic forecasts.

Chapter 5 Sample Description

5.1 Introduction

The analysis focuses on countries of the Eurozone that were especially affected by the financial crisis. The sample includes data from four countries: Spain, Italy, Portugal, and Greece. Cyprus and Ireland are excluded due to failure to meet certain sampling criteria. Thomson One IBES detailed data files were used as a source for individual analyst forecasts of annual Earnings per Share (EPS) and their respective realizations (actual values). It should be noted that time relevance of information is a crucial concept in the dissertation. Consequently, and since one period ahead consensus EPS analyst forecasts readily available from IBES are constructed with no strict time-specific constraint regarding the date on which the forecast was produced and/or activated on the data file (to the author's best knowledge), creation of a measure of consensus analysts' forecast of EPS that would take into account this time relevant factor was deemed more appropriate.

After the full series of Common Equities listed on the respective exchanges was obtained from Datastream, a filtering process was employed. Criteria of filtering include a) the currency in which EPS are denominated (only companies with data denominated in Euro in the data files are selected), b) the presence of data in Thomson One IBES database, c) the company being primarily quoted in the relevant stock exchange, d) the company Sector being other than: Banks, Financial Institutions/ Other Financial Services, Insurance (life or non-life), REITS, and unclassified companies with no recognizable/acceptable 4-digit SIC code, and e) the company reporting on a quarterly basis (so as to ensure homogeneity across the forecasting periods of analysts and information dissemination by the companies).

After this filtering, and using Thomson one based programming, only companies whose fiscal year coincides with the calendar year (closing of fiscal year on 31/12) are kept in the sample. After completion of the aforementioned process, the resulting sample of companies includes 485 companies. However, since Ireland and Cyprus have a limited sample (4 equities and 7 equities respectively meeting the sampling criteria), they are both excluded from the sample. From the four final countries, the sample includes 474 companies that fulfil the above criteria.

Table 5.1: Selected European Equity markets

Stock Exchange of primary listing	Country	Number of Selected Firms
Lisbon Euronext	Portugal	36
Borsa Italiana	Italy	168
Madrid Stock Exchange	Spain	83
Athens Stock Exchange	Greece	187
		474

Since an important parameter of the dissertation is the behaviours and associations during the crisis, and with the European sovereign debt crisis leading the above countries into a "full" recession in late 2008 (4q2008), the selected horizon is 2005-2013 (all Eurozone listed companies are IFRS-compliant after 2005), so as to avoid any effects of IFRS transition. The Eurozone recession for the Eurozone as a whole started in the second quarter of 2008, during the same period as the fall of Lehman Brothers in the U.S. (September 2008) that caused panic in the interbank lending market, and after the severe credit boom that led to the sub-prime loan market crisis in 2007 in the U.S. This was a time when the speculative bubble in equities and real estate led to increases in oil and food prices and over-inflated asset prices. The global recession that ensued reduced international trade, increased unemployment and reduced commodity prices. The

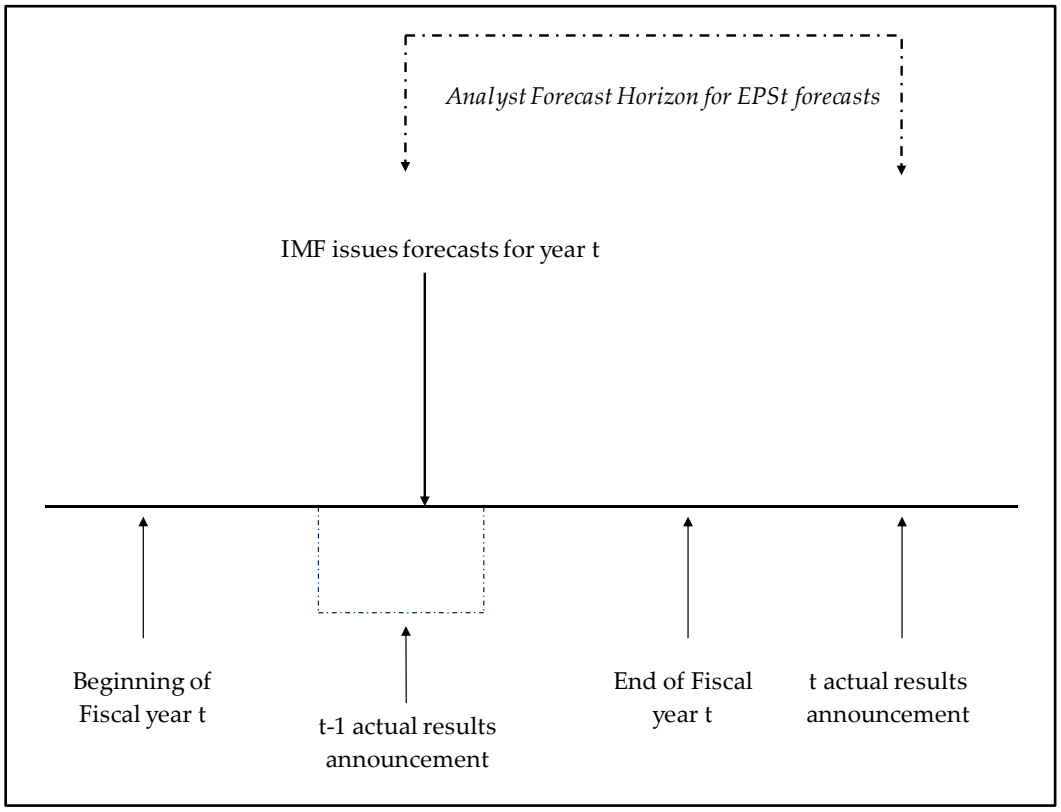
Eurozone as a whole technically entered a recession in 3q2008 and returned to growth in the second quarter of 2009. The average Eurozone contraction between 2q2008-2q2009 was at a -1.15% per quarter. However, a number of Eurozone countries, especially the (PIGS) countries of Southern Europe included in the sample, have faced serious continued difficulties that led to strict fiscal policies implementation. The European Sovereign Debt crisis still faces obstacles to reach full recovery from the Great Recession.

5.2 Analysts' Earnings Forecasts

The dissertation uses the Detailed File of the Reuters IBES database to retrieve data related to analysts' forecasts of earnings and actual earnings per firm-year as well as the deflators (e.g. total assets), Datastream for company identification and characteristics and fundamental accounting variables, and the International Monetary Fund's semi-annual World Economic Outlook reports for macroeconomic data.

With appropriate programming, individual analysts' forecasts of annual EPS per company and per country were obtained and consensus estimates were constructed as follows. As a prerequisite for keeping a forecast in the sample, it is required to have the value of the detailed forecast as well as its activation date on IBES. For all forecasts that qualify in this respect, we know the start date and end date of the fiscal year. Two more dates are of interest: the actual announcement date of prior period t-1 results, and the actual announcement date of the reference period t results. The forecasts that are available in IBES can be issued a) before the beginning of the year in question, b) between the beginning of the year and the announcement date of actual t-1 results, c) between the announcement date of actual t-1 results and the end of the fiscal year t, d) after the end of the fiscal year t and before the announcement date of actual results of fiscal year t. The forecasts of EPS_t that are activated in IBES after the announcement date of results of year t are removed from the sample of forecasts.

Figure 5.1: Key Timing Aspects of the analysis



The forecasts that are issued after the announcement date of actual results of fiscal year t-1 and before the announcement date of actual results of fiscal year t are used to construct the consensus earnings per share forecast per firm-year. The consensus forecast is the mean of these individual analyst forecasts.

The following tables show individual analysts' annual forecast statistics and the mean consensus forecasts for the time horizon of the dissertation (2005-2013) per country (Table 5.2.a), and the detailed per country per year number of selected forecasts (Table 5.2.b).

Table 5.2.a: EPS forecasts per country					
2005-2013	**GREECE**	**ITALY**	**PORTUGAL**	**SPAIN**	**Grand Total**
All forecasts	2.428	7.824	1.717	7.758	19.727
Forecasts that are issued after announcement of results of fiscal year t (-)	218	783	122	635	1.758
Forecasts that are issued before announcement of results of fiscal year t-1 (-)	64	201	47	127	439
Selected Individual Forecasts *	***2.146***	***6.840***	***1.548***	***6.996***	***17.530***
Mean Consensus Forecasts	***376***	***969***	***218***	***549***	***2.112***

** Forecasts issued after announcement of t-1 and before announcement of t*

Table 5.2.b: EPS forecasts per country per year					
FISCAL YEAR	**GREECE**	**ITALY**	**PORTUGAL**	**SPAIN**	**Grand Total**
2005	270	563	131	598	1.562
2006	293	640	120	648	1.701
2007	266	718	169	741	1.894
2008	289	729	189	784	1.991
2009	310	866	195	841	2.212
2010	296	928	195	865	2.284
2011	181	892	218	914	2.205
2012	130	802	175	868	1.975
2013	111	702	156	737	1.706
Grand Total (2005-2013)	***2.146***	***6.840***	***1.548***	***6.996***	***17.530***

5.3 The Macroeconomic Variables

The dissertation uses forecasted GDP growth and its components to represent macroeconomic expectations in the analysts' forecast models (earnings forecasts, news and forecast errors) as well as stock return models. The dissertation uses actual GDP growth and its components in the actual earnings and earnings growth models. Table 5.3 describes the macroeconomic variables.

Table 5.3: Macroeconomic Variables used in the empirical models

Type of Macroeconomic Measure	Macroeconomic Measure Description	Calculation Method
Actual yoy growth in the level of Nominal GDP (%)	Actual Nominal GDP growth $_t$	(Actual Nominal GDP level $_t$ / Actual Nominal GDP level $_{t-1}$) - 1
Actual yoy growth in the level of Real GDP (%)	Actual Real GDP growth $_t$	(Actual Real GDP level $_t$ / Actual Real GDP level $_{t-1}$) - 1
Actual yoy growth in the level of the GDP Deflator (%)	Actual GDP Deflator growth $_t$ (Inflation rate $_t$)	(Actual GDP Deflator $_t$ / Actual GDP Deflator $_{t-1}$) - 1
Forecasted yoy growth in the level of Nominal GDP (%)	Forecasted Nominal GDP growth $_t$	(Forecasted Nominal GDP level $_t$ / Actual Nominal GDP level $_{t-1}$) - 1
Forecasted yoy growth in the level of Real GDP (%)	Forecasted Real GDP growth $_t$	(Forecasted Real GDP level $_t$ / Actual Real GDP level $_{t-1}$) - 1
Forecasted yoy growth in the level of the GDP Deflator (%)	Forecasted GDP Deflator growth $_t$ (Inflation rate $_t$)	(Forecasted GDP Deflator $_t$ / Actual GDP Deflator $_{t-1}$) - 1

where GDP Deflator t = Nominal GDP level t / Real GDP level t

Source: IMF semi-annual World Economic Outlooks.
More specifically, for the forecasted growth of year t, the forecasts of the World Economic Outlook of April year t are used, so as to ensure financial analysts will have knowledge of the forecasts during their forecast horizon.
The World Economic Outlook Database of October 2015 of IMF is used for the macro realisations (actuals).
Note: In some cases (only for Greece's forecasts for fiscal years 2007, 2008, 2012), the actual GDP and its components (of t-1) may not be finalised when the forecasts for year t are issued in April of year t, thus forecasted growth of year t may be estimated by the IMF vs the preliminary GDP levels of the prior year.

Analysts receive forecasts of GDP growth as proxies of macroeconomic expectations. The forecasted GDP growth (for the current fiscal year) and its components (real GDP growth and deflator growth, i.e. inflation rate) released in April of the current year by the International Monetary Fund are used in the models.

Macroeconomic forecasts during the financial crisis: according to recent research[31], institutional economic projections under-predicted the depth of the collapse in activity in 2008-09 and over-estimated the pace of recovery. The deepening of the euro area sovereign debt crisis and the persistently high sovereign bond yield differentials were not expected. Forecast errors were larger in the economies that are most open, in terms of trade and finance, suggesting that globalization has increased exposure to external shocks and made countries more connected than in the past. The sub period of 2005-2008 of the sample is considered the period before the crisis and the sub period of 2009-2013 is considered the period of the crisis. During the period of the crisis the real GDP growth is negative for all countries of the sample, and the Debt/GDP ratio is higher than 70 percent[32]. Table 5.4 presents the average Debt/GDP ratio per country for the pre-crisis and crisis periods, and Tables 5.5-5.6 provide summary statistics for the main macroeconomic variables used per country.

Table 5.4: Average Debt/GDP ratio per country (%)

	Pre-Crisis Period (2005-2008)	**Crisis Period (2009-2013)**
SPAIN	39.03	71.69
ITALY	101.62	119.17
PORTUGAL	65.63	109.26
GREECE	103.15	154.86

(Source: IMF)

[31] e.g. Pain et al., 2014.

[32] Prior studies have provided evidence of high debt levels (at around 70 percent of GDP or higher) leading to a negative impact on GDP growth, through detrimental effects on private savings, public investments, and total factor productivity (Checherita and Rother, 2010, ECB). Debt/GDP ratios of above 90 percent lead to stronger declines in the GDP (Reinhart and Rogoff, 2010).

Table 5.5: Actual GDP Growth per country					
Variable		**2005-2013**	**Pre-Crisis Period (2005-2008)**	**Crisis Period (2009-2013)**	**T-test Difference of Subperiod Means**
Nominal GDP Growth[a]	SPAIN	0.0230346	0.067116	-0.0122306	(65.7803)***
Real GDP Growth[a]		0.0058711	0.03195	-0.014992	(51.6259)***
GDP Deflator Growth[a]		0.0166667	0.0339903	0.0028078	(77.0438)***
Nominal GDP Growth[a]	ITALY	0.0120254	0.0303768	-0.0026556	(36.2924)***
Real GDP Growth[a]		-0.0047456	0.00845	-0.015302	(22.4658)***
GDP Deflator Growth[a]		0.0168712	0.021761	0.0129594	(38.5259)***
Nominal GDP Growth[a]	PORTUGAL	0.0123623	0.0409892	-0.0105392	(22.9612)***
Real GDP Growth[a]		-0.00392	0.0125275	-0.017078	(16.5122)***
GDP Deflator Growth[a]		0.0161522	0.0280803	0.0066098	(22.9968)***
Nominal GDP Growth[a]	GREECE	-0.004408	0.058563	-0.0547848	(102.2101)***
Real GDP Growth[a]		-0.0215278	0.0245	-0.05835	(81.0669)***
GDP Deflator Growth[a]		0.0169296	0.0332862	0.0038442	(47.1752)***

****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively (Source: IMF)*

Table 5.6: Forecasted GDP Growth per country					
Variable		**2005-2013**	**Pre-Crisis Period (2005-2008)**	**Crisis Period (2009-2013)**	**T-test Difference of Subperiod Means**
Nominal GDP Growth[f]	SPAIN	0.0255839	0.0646417	-0.0056624	(76.3465)***
Real GDP Growth[f]		0.0060552	0.0286415	-0.0120138	(51.1444)***
GDP Deflator Growth[f]		0.0191149	0.0349885	0.006416	(94.1156)***
Nominal GDP Growth[f]	ITALY	0.0162481	0.0344558	0.001682	(37.1379)***
Real GDP Growth[f]		-0.0016123	0.0112028	-0.0118644	(28.7073)***
GDP Deflator Growth[f]		0.0178163	0.0230103	0.0136612	(58.5672)***
Nominal GDP Growth[f]	PORTUGAL	0.0118324	0.041089	-0.0115728	(33.1903)***
Real GDP Growth[f]		-0.0057708	0.0142495	-0.021787	(27.7060)***
GDP Deflator Growth[f]		0.0175409	0.0264547	0.0104098	(33.9982)***
Nominal GDP Growth[f]	GREECE	0.0194891	0.0679705	-0.019296	(78.5938)***
Real GDP Growth[f]		-0.0006482	0.0340482	-0.0284054	(103.5167)***
GDP Deflator Growth[f]		0.0196656	0.0328047	0.0091542	(42.5837)***

****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively (Source: IMF)*

5.4 Descriptive Statistics

Descriptive statistics (mean and standard deviation) are reported for the main model variables, both for firm-level and macroeconomic variables, for the whole sample period (2005-2013) as well as the pre-crisis sub period (2005-2008) and crisis sub period (2009-2013), accompanied by statistical significance t-tests for the differences in the variables' means between the pre-crisis period and the crisis period.

Table 5.7: Descriptive Statistics of Main Firm Variables

Variable		2005-2013	Pre-Crisis Period (2005-2008)	Crisis Period (2009-2013)	T-test Difference of Subperiod Means
EPS_t	Mean	0.035912	0.0456589	0.0236539	(6.068)***
	St. Dev.	0.0922135	0.0988762	0.0814819	
$EPS_{tchange}$	Mean	-0.0026635	-0.0015889	-0.0039675	(0.918)
	St. Dev.	0.0635579	0.0702562	0.0543368	
BV_{t-2}	Mean	0.38261	0.4146192	0.3595526	(6.599)***
	St. Dev.	0.2570669	0.2760047	0.2399416	
$ConsensusForecastEPS_t$	Mean	0.0447784	0.0652129	0.0298322	(10.681)***
	St. Dev.	0.076097	0.0860639	0.063911	
$EPSForecastNews_t$	Mean	0.00244	0.0032258	0.0018498	(0.627)
	St. Dev.	0.0471459	0.0514801	0.0436233	
$FEEPS_t$	Mean	-0.0047376	-0.0035871	-0.0056005	(1.332)*
	St. Dev.	0.0329363	0.0349454	0.031333	
$Dividend/BV_{t-1}$	Mean	0.0301233	0.0408501	0.0216544	(9.856)***
	St. Dev.	0.0526215	0.0576691	0.0465686	
$DividendDummy_{t-1}$	Mean	0.5195258	0.6811365	0.3916302	(16.085)***
	St. Dev.	0.4997057	0.4662200	0.4882672	
$DNOA_{t-1}$	Mean	0.0341085	0.0734034	0.0026144	(9.628)***
	St. Dev.	0.1744244	0.1954963	0.1482277	
$AssetGrowth_{t-1}$	Mean	0.0835447	0.1643358	0.022267	(15.137)***
	St. Dev.	0.3039604	0.3505552	0.24616	
$MarketMomentum_{t-1}$	Mean	0.0280345	0.0331839	0.0212798	(1.662)**
	St. Dev.	0.1643596	0.1732662	0.151714	

All variables are deflated by total assets at beginning of t-1 and winsorized at 1%

****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

Table 5.7 shows some descriptive statistics for the main firm variables of the research models. As expected the crisis has a negative impact on the firms' profitability,

as EPS (standardized by assets) drops significantly from approximately 0.046 eur (per eur of total assets) on average in the pre-crisis period to 0.024 in the crisis period. The book value of equity also declines from an average of 0.415 (for every eur of total assets) to 0.360, erosion attributed to losses recognition. Consensus analysts' earnings forecasts are also significantly reduced in the crisis, from 0.065 in the period before the crisis to 0.030 in the crisis period. The forecast error of earnings indicates a larger over-optimism on the part of analysts in the crisis, however the change from the period before the crisis to the crisis period is not strongly significant (it is significant at a less than 10 percent level). Earnings growth (year-on-year change in actual earnings) also declines during the crisis however the change is not statistically significant. News in analysts' earnings forecasts (forecasted earnings growth) decline as well. The stock market momentum observed by the analysts ($MarketMomentum_{t-1}$) significantly declines in the crisis period.

Table 5.7: Descriptive Statistics of Main Firm Variables ***(cont'd)***

Variable		2005-2013	Pre-Crisis Period (2005-2008)	Crisis Period (2009-2013)	T-test Difference of Subperiod Means
$lnMV_t$	Mean	18.62022	18.98798	18.34598	(9.3080)***
	St. Dev.	2.205257	2.063254	2.267387	
$lnMV_{t-1}$	Mean	18.66506	19.05672	18.38198	(9.9054)***
	St. Dev.	2.155334	2.056863	2.18085	
B/M_t	Mean	1.305365	0.9955138	1.537309	(-8.2559)***
	St. Dev.	2.061672	1.306888	2.455528	
B/M_{t-1}	Mean	1.340722	0.8500485	1.691666	(-14.5370)***
	St. Dev.	1.829458	1.067407	2.1521	
INV_t	Mean	15.82043	16.12474	15.57037	(5.1521)***
	St. Dev.	2.856155	2.704101	2.952762	
INV_{t-1}	Mean	15.92212	16.08414	15.79679	(2.6852)***
	St. Dev.	2.793658	2.665904	2.883218	
$BetaCoefficient_{t-1}$	Mean	0.7261815	0.7805376	0.667258	(8.8679)***
	St. Dev.	0.3395399	0.3618823	0.3028292	
$BetaCoefficient_t$	Mean	0.7150187	0.7661444	0.6533298	(8.9530)***
	St. Dev.	0.3288934	0.3357962	0.3094483	
$ReturnsR_{it}$	Mean	0.0848262	0.0114758	0.1838173	(-7.1422)***
	St. Dev.	0.5244175	0.5068931	0.5316715	
$ReturnsR_{it+1}$	Mean	0.034731	-0.0095719	0.0915519	(-4.1993)***
	St. Dev.	0.5026173	0.5108315	0.4863333	

All variables are deflated by total assets at beginning of t-1 and winsorized at 1%

****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

As shown in table 5.7, market value of equity as well as investments decline significantly in the crisis period due to the economic downturn, and the uncertainty of the environment. The book-to-market ratio increases from the pre-crisis to the crisis period due to lower valuations, and a much harsher effect on market capitalization than book value. Stock returns are forward-looking. The decline in total asset growth is sharply affected, reducing from an average of 16.4 percentage points to an average of 2.3 percentage points in the crisis. The mean dividend to book value ratio also significantly declines in the crisis period as firms' distribution of dividends declines due to cautiousness, lower profitability and possibly lenders' constrains. The significant decline in the dividend indicator variable means that on average firms distribute lower dividends in the crisis period.

Table 5.8: Descriptive Statistics of Main Macroeconomic Variables

Variable		2005-2013	Pre-Crisis Period (2005-2008)	Crisis Period (2009-2013)	T-test Difference of Subperiod Means
Nominal GDP Growth[a]	Mean	0.0074955	0.0487359	-0.0254967	(84.9592)***
	St. Dev.	0.0465284	0.0241593	0.0313131	
Real GDP Growth[a]	Mean	-0.0094447	0.0192066	-0.0323657	(65.8078)***
	St. Dev.	0.0361058	0.019819	0.0291579	
GDP Deflator Growth[a]	Mean	0.0168038	0.0289292	0.0071035	(68.9342)***
	St. Dev.	0.0149404	0.0083967	0.0115612	
Nominal GDP Growth[f]	Mean	0.0188261	0.0534673	-0.0088869	(90.2051)***
	St. Dev.	0.0382548	0.0163946	0.0262852	
Real GDP Growth[f]	Mean	-0.0002052	0.0235007	-0.0191698	(86.1577)***
	St. Dev.	0.026608	0.0115214	0.0189434	
GDP Deflator Growth[f]	Mean	0.0187523	0.0292334	0.0103675	(71.4789)***
	St. Dev.	0.0126989	0.0056439	0.0103244	

Source of Macroeconomic variables: The variables were calculated using data from the International Monetary Fund World Economic Outlooks. [a] and [f] indicate actual and forecasted growth respectively.

****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

Both the real and the deflator components of the GDP growth rate significantly decline from the pre-crisis to the crisis period. As demonstrated in Table 5.8 despite the

fact that lower forecasts for both the real and inflationary component of growth were issued on average during the crisis compared to the period before the crisis, they were still over-predicted as the actual average real GDP growth and GDP Deflator growth (and overall the nominal GDP growth) were lower than the respective forecasts.

5.5 Testing for the Statistical Significance of Pairwise Correlations

Table 5.9 includes the Pearson correlations (below the diagonal) between pairs of the main variables examined in the dissertation and included in the different models that are estimated (** denotes statistical significance at the 5 percent level).

The Pearson correlations evaluate the linear relationships between the paired variables, to examine whether a change in one variable is significantly associated with a proportional change in the other variable. The results indicate that increases in actual earnings are likely to be associated with higher prior period earnings (pearson = 0.695**), increased book value at t-2 (pearson=0.166**), and lower B/M ratios (pearson = -0.120**). Moreover, higher earnings are likely to be reported by firms of larger size ($lnMV_{t-1}$). Dividend paying firms are likely to be more profitable. Asset growth is also positively correlated with earnings, as high earnings firms are more likely to invest in assets, and firms that invest in assets are likely to produce higher earnings in the future (pearson=0.176**).

The correlation between actual earnings and GDP Growth is positive (pearson=0.124**). Both Real growth and GDP Deflator growth (inflation rate) are positively correlated with actual earnings (correlation coefficients are 0.115** and 0.102** for real GDP growth and inflation respectively). The correlation between earnings growth (EPStchange) and prior earnings growth is negative, consistent with earnings changes reversing in the subsequent year. The correlations between nominal GDP (and real GDP growth) with earnings growth are similar to the correlations they exhibit with the

earnings level, however the GDP Deflator growth is not significantly correlated with earnings growth.

Analysts' earnings forecasts and forecast news are positively correlated with the nominal GDP growth forecasts, a finding mainly attributable to their positive correlations with real GDP growth forecasts (pearson = 0.233** for earnings forecasts, and 0.095** for earnings news, respectively). The analysts' earnings forecast errors are positively correlated with the prior forecast errors (pearson = 0.226**), and not correlated with GDP growth forecasts, a finding that can point to analysts' efficiency with respect to macroeconomic forecasts and is further examined in the empirical regressions of Chapter 6.

Current Stock Returns ($Returns_t$) are significantly correlated with analysts' earnings forecast news (analysts' forecasts of earnings growth) with a positive correlation of 0.123**. Increases in analysts' earnings forecast levels are also likely to be associated with increases in stock returns (pearson = 0.142**). Stock Returns are significantly and negatively correlated with prior period firm size ($lnMV_{t-1}$), and positively correlated with the value factor (B/M_{t-1}). The correlations between the GDP growth forecast and its components with stock returns are significantly negative. Moreover, future stock returns are also correlated with GDP growth forecasts. The significance of this correlation can point to stock market inefficiency with respect to GDP growth forecasts. These findings are examined in the empirical analysis of the models in Chapter 6.

Table 5.9: Pearson pairwise correlations

	CRISIS	EPS_t	$EPSchange_t$	EPS_{t-1}	$EPSchange_{t-1}$	BV_{t-2}	B/M_{t-1}	$lnMV_{t-1}$	$Ddiv_{t-1}$	D/B_{t-1}	$DNOA_{t-1}$	Asset growth $_{t-1}$	Nominal GDP growth actual $_t$	Real GDP growth actual $_t$	GDP Deflator growth actual $_t$
CRISIS	1.000														
EPS_t	-0.119**	1.000													
$EPSchange_t$	-0.019	0.498**	1.000												
EPS_{t-1}	-0.132**	0.695**	-0.210**	1.000											
$EPSchange_{t-1}$	-0.137**	0.217**	-0.159**	0.428**	1.000										
BV_{t-2}	-0.106**	0.166**	-0.008	0.244**	0.004	1.000									
B/M_{t-1}	0.227**	-0.120**	-0.049**	-0.104**	-0.063**	0.205**	1.000								
$lnMV_{t-1}$	-0.155**	0.232**	0.007	0.308**	0.049**	-0.040**	-0.282**	1.000							
$Ddiv_{t-1}$	-0.288**	0.329**	-0.001	0.417**	0.108**	0.055**	-0.190**	0.489**	1.000						
D/B_{t-1}	-0.181**	0.386**	0.028	0.429**	0.118**	-0.056**	-0.230**	0.491**	0.551**	1.000					
$DNOA_{t-1}$	-0.202**	0.138**	0.009	0.152**	0.104**	0.126**	-0.058**	0.179**	0.186**	0.120**	1.000				
Asset growth $_{t-1}$	-0.232**	0.176**	-0.052**	0.196**	0.142**	0.105**	-0.100**	0.185**	0.199**	0.126**	0.833**	1.000			
Nominal GDP growth actual $_t$	-0.793**	0.124**	0.082**	0.096**	0.132**	0.083**	-0.277**	0.265**	0.337**	0.198**	0.201**	0.229**	1.000		
Real GDP growth actual $_t$	-0.710**	0.115**	0.106**	0.082**	0.132**	0.058**	-0.284**	0.283**	0.313**	0.186**	0.173**	0.192**	0.964**	1.000	
GDP Deflator growth actual $_t$	-0.726**	0.102**	-0.005	0.093**	0.081**	0.115**	-0.165**	0.136**	0.283**	0.165**	0.203**	0.242**	0.751**	0.549**	1.000

Pearson correlations between the variables of the models are presented below the diagonal
Firm Variables are winsorized at 1%
*** denotes statistical significance at the 5% level*

Table 5.9: Pearson pairwise correlations *(cont'd)*

	CRISIS	$EPSForecast_t$	$EPSForecast_{t-1}$	EPSForecast $News_t$	EPSForecast $News_{t-1}$	$FEEPS_t$	$FEEPS_{t-1}$	B/M_{t-1}	$lnMV_{t-1}$	$Ddiv_{t-1}$	D/B_{t-1}	$DNOA_{t-1}$	Asset growth $_{t-1}$	Analyst $Momentum_{t-1}$	Nominal $GDPforecast_t$	Real GDP forecast $_t$	GDP Deflator forecast $_t$
CRISIS	1.000																
$EPSForecast_t$	-0.230**	1.000															
$EPSForecast_{t-1}$	-0.198**	0.810**	1.000														
EPSForecast $News_t$	-0.014	0.299**	-0.125**	1.000													
EPSForecast $News_{t-1}$	-0.087**	0.248**	0.292**	0.014	1.000												
$FEEPS_t$	-0.0303	0.010	0.026	-0.095**	-0.054**	1.000											
$FEEPS_{t-1}$	-0.090**	0.156**	0.032	-0.410**	-0.082**	0.226**	1.000										
B/M_{t-1}	0.227**	-0.257**	-0.242**	-0.053**	-0.109**	0.023	0.035	1.000									
$lnMV_{t-1}$	-0.155**	0.231**	0.273**	-0.072**	-0.032	0.124**	0.146**	-0.282**	1.000								
$Ddiv_{t-1}$	-0.288**	0.329**	0.360**	-0.104**	0.020	0.152**	0.223**	-0.190**	0.489**	1.000							
D/B_{t-1}	-0.181**	0.452**	0.483**	-0.033	0.105**	0.095**	0.110**	-0.230**	0.491**	0.551**	1.000						
$DNOA_{t-1}$	-0.202**	0.105**	0.147**	0.032	0.015	-0.016	0.094**	-0.058**	0.179**	0.186**	0.120**	1.000					
Asset growth $_{t-1}$	-0.232**	0.215**	0.250**	-0.032	0.132**	-0.138**	0.091**	-0.100**	0.185**	0.199**	0.126**	0.833**	1.000				
Market $Momentum_{t-1}$	-0.036	0.073**	-0.003	0.126**	0.045	0.027	0.056**	0.049**	-0.006	0.016	-0.014	-0.011	0.015	1.000			
Nominal GDPforecast t	-0.810**	0.240**	0.170**	0.076**	0.116**	-0.010	0.071**	-0.240**	0.176**	0.326**	0.183**	0.197**	0.235**	-0.002	1.000		
Real GDP forecast t	-0.797**	0.233**	0.149**	0.095**	0.117**	-0.006	0.075**	-0.253**	0.191**	0.322**	0.182**	0.193**	0.227**	0.003	0.984**	1.000	
GDP Deflator forecast t	-0.738**	0.217**	0.188**	0.023	0.097**	-0.016	0.050**	-0.186**	0.129**	0.300**	0.167**	0.182**	0.224**	-0.014	0.920**	0.835**	1.000

Pearson correlations between the variables of the models are presented below the diagonal

Firm Variables are winsorized at 1%

*** denotes statistical significance at the 5% level*

Table 5.9: Pearson pairwise correlations *(cont'd)*

	CRISIS	$Returns_t$	$Returns_{t+1}$	$lnMV_{t-1}$	B/M_{t-1}	$lnINV_{t-1}$	$Beta_{t-1}$	$lnMV_t$	B/M_t	$lnINV_t$	$Beta_t$	$EPSForecast\ News_t$	$EPSForecast_{RESIDUALSt}$	Nominal GDP growth F	Real GDP growth F	GDP Deflator F
CRISIS	1.000															
$Returns_t$	0.163**	1.000														
$Returns_{t+1}$	0.100**	0.015	1.000													
$lnMV_{t-1}$	-0.155**	-0.081**	-0.013	1.000												
B/M_{t-1}	0.227**	0.117**	0.095**	-0.282**	1.000											
$lnINV_{t-1}$	-0.051**	0.008	0.044	0.812**	-0.060**	1.000										
$Beta_{t-1}$	-0.167**	-0.074**	-0.028	0.118**	0.064**	0.134**	1.000									
$lnMV_t$	-0.144**	0.123**	-0.050**	0.968**	-0.261**	0.799**	0.087**	1.000								
B/M_t	0.130**	-0.158**	0.128**	-0.160**	0.755**	-0.014	0.099**	-0.207**	1.000							
$lnINV_t$	-0.097**	0.006	0.027	0.826**	-0.097**	0.922**	0.124**	0.818**	-0.041**	1.000						
$Beta_t$	-0.171**	0.027	-0.114**	0.174**	0.056**	0.178**	0.794**	0.175**	0.061**	0.182**	1.000					
$EPSForecastNews_t$	-0.014	0.123**	-0.096**	-0.072**	-0.053**	-0.090**	-0.016	-0.021	-0.105**	-0.074**	0.004	1.000				
$EPSForecast_{RESIDUALSt}$	-0.040	0.142**	0.029	0.196**	-0.201**	-0.003	-0.050**	0.240**	-0.204**	0.002	-0.057**	0.289**	1.000			
GDP nominal forecast	-0.810**	-0.222**	-0.175**	0.176**	-0.240**	0.071**	0.179**	0.155**	-0.086**	0.107**	0.173**	0.076**	0.000	1.000		
GDP real forecast	-0.797**	-0.220**	-0.218**	0.191**	-0.253**	0.077**	0.171**	0.176**	-0.112**	0.112**	0.175**	0.095**	-0.002	0.984**	1.000	
GDP Deflator forecast	-0.738**	-0.209**	-0.057**	0.129**	-0.186**	0.056**	0.172**	0.098**	-0.018	0.089**	0.145**	0.023	0.003	0.920**	0.835**	1.000

Pearson correlations between the variables of the models are presented below the diagonal

Firm Variables are winsorized at 1%

*** denotes statistical significance at the 5% level*

Chapter 6 Empirical Findings

6.1 Introduction

This Chapter presents the empirical findings related to the models used to test the hypotheses of the dissertation. The models are estimated by using OLS. The reported t-statistics (in parentheses) are based on heteroscedasticity- and autocorrelation-consistent Newey-West standard errors.

6.2 The Macroeconomy and Company Profitability

Tables 6.1-6.2 present the empirical findings related to models 1a-1a' and 1b-1b' that test the association between actual GDP growth and company earnings and earnings growth respectively.

Table 6.1 Panel A presents the results of the earnings prediction model including actual nominal GDP growth as the macroeconomic explanatory variable. Prior period fundamentals are used as controls. Consistent with prior literature[33] current period earnings are positively related with prior period earnings (estimated regression coefficient β_1 = 0.668, t-stat = 9.103), the dividend to book ratio (estimated regression coefficient β_6 = 0.181, t-stat = 3.970), and asset growth (estimated regression coefficient β_8 = 0.047, t-stat = 3.074), and negatively related with prior period accruals (estimated regression coefficient β_7 = -0.048, t-stat = -2.033)[34].

[33] For example Penman, 1991; Lakonishok et al., 1994; Fama and French, 2000.

[34] Prior studies have documented that prior accruals can forecast profitability and are negatively related to it (e.g., Sloan, 1996; Fairfield et al., 2003; Richardson et al., 2005).

The actual nominal GDP growth is positively related to actual earnings (estimated regression coefficient $\beta_9 = 0.241$ with t-stat = 2.799). The association between the nominal GDP growth and earnings is highly statistically significant (at a less than one percent level) and of economic significance[35] as well. The pre-crisis nominal GDP growth regression coefficient of 0.241 means that in the period before the crisis, a one-standard-deviation increase of 4.05 percentage points in the nominal GDP growth is on average associated with an increase in earnings of 0.113 standard deviations[36] i.e. of approximately 0.98 cents (per euro of total assets). The empirical results are consistent with Hypothesis 1a that supports a significant association between macroeconomic information related to GDP growth and company profitability.

During the crisis, the nominal GDP growth continues to be positively associated with earnings (association statistically significant at a less than 5 percent level). The decline in the association between the nominal GDP growth and earnings is not significant, however, the regression coefficient is of lower magnitude estimated at 0.163 (t-stat = 2.01) indicating a decline in the magnitude of the GDP impact on earnings, consistent with expectations of Hypothesis 1b (decline in relevance of macroeconomic information for company profitability from the period before the crisis to the period of the crisis). As corporate profits are a component of GDP it is expected that an expansion in GDP is likely associated with an expansion in profits, thus a positive association

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[35] The economic significance is illustrated using standardized coefficients, to interpret the average change in the dependent variable in terms of standard deviations, as a response to the change in one independent variable (in terms of standard deviations) holding all other independent variables constant.
To get the standardized coefficient, the regression coefficient is multiplied by the standard deviation of the independent variable whose economic significance is interpreted and divided by the standard deviation of the dependent variable. For a dependent variable Y and independent variable Xj: $\beta stand_{Xj} = \beta_{Xj} * \{SD(X_j) / SD(Y)\}$.
A one-standard-deviation change in Xj leads to $\beta standxj$ standard-deviation changes in Y.

[36] $\beta x * (SDx/SDy)$ = 0.2407 * [0.0405/0.0864] = 0.1134
0.1134 * SDy = 0.1134 * 0.0864 = 0.0098 eur

between GDP growth and earnings is plausible. Without frictions, growth in corporate profits should be closely related to economic growth, but in the presence of frictions, such as differential tax regimes[37] that are more frequent during a crisis (for example due to austerity measures) the association between economic growth and corporate profit growth can be lower. The decline of relevance in the crisis is not only attributed to frictions but primarily to worsened market conditions, earnings management, severe risk aversion, and detrimental effects on factor productivity.

[37] Khan et al., 2016.

Table 6.1: Association between actual company Earnings and actual GDP growth (Model 1a)

Panel A: Association between actual company Earnings and actual Nominal GDP growth Controlling for the Crisis

$$EPS_{t,i} = a_0 + a_1\ Crisis + \beta_1\ EPS_{t-1,i} + \beta_2\ BV_{t-2,i} + \beta_3\ B/M_{t-1,i} + \beta_4\ lnMV_{t-1,i} + \beta_5\ Div_{t-1,i} + \beta_6\ D/B_{t-1,i} +$$

$$+ \beta_7\ DNOA_{t-1,i} + \beta_8\ AssetGrowth_{t-1,i} + \beta_9\ NominalGDPGrowth_{t,j} + \beta_{10}\ NominalGDPGrowth_{t,j}*Crisis + \varepsilon_t \quad \text{(Model 1a)}$$

α_0	α_1	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	**β_9**	**β_{10}**	Adj. R^2	N
-0.054**	0.003	0.668***	0.020	0.002	0.002*	0.002	0.181***	-0.048**	0.047***	**0.241*** **	**-0.077**	50.09%	1357
(-2.318)	(0.419)	(9.103)	(0.979)	(0.674)	(1.838)	(0.355)	(3.970)	(-2.033)	(3.074)	**(2.799)**	**(-0.635)**		

t-tests crisis period:

$\beta_9+\beta_{10} = 0$	0.163**

$EPS_{t,i}$ and $EPS_{t-1,i}$ are actual earnings per share of firm i for current fiscal year t and prior fiscal year t-1 respectively as reported in IBES. Both $EPS_{t,i}$ and $EPS_{t-1,i}$ are multiplied by the number of shares outstanding at t and t-1 respectively and deflated by total assets t-2 (beginning of t-1).

$BV_{t-2,i}$ is the book value of firm i at t-2 deflated by total assets t-2. $B/M_{t-1,i}$ is the book value to market value of equity ratio of firm i at t-1. $lnMV_{t-1,i}$ (Size factor) is the natural logarithm of the market value of equity of firm i at t-1. $Div_{t-1,i}$ is and indicator variable equal to 1 for firms distributing a dividend in year t-1 and 0 otherwise. $D/B_{t-1,i}$ is the dividend to book value ratio at t-1. $DNOA_{t-1,i} = (NOA_{t-1,i} - NOA_{t-2,i})/Total\ Assets_{t-2,i}$ are the prior period accruals calculated as the change in net operating assets deflated by total assets at t-2 (beginning of t-1) where net operating assets are calculated as NOA_{t-1} = (Current Operating Assets $_{t-1}$ + Non-Current Operating Assets $_{t-1}$) – (Current Operating Liabilities $_{t-1}$ + Non-Current Operating Liabilities $_{t-1}$). $AssetGrowth_{t-1,i}$ is the prior period growth in total assets calculated as (Total Assets $_{t-1}$ – Total Assets $_{t-2}$) / Total Assets $_{t-2}$. Crisis is an indicator (dummy) variable equal to 1 if fiscal year t = {2009,2013} and equal to 0 if fiscal year t = {2005,2008}

$NominalGDPGrowth_{t,j}$ = realized yoy nominal GDP growth in year t for country j as reported by the International Monetary Fund.

*NominalGDPGrowth*Crisis is an interaction term of the Nominal GDP Growth with the crisis dummy.*

t-statistics reported (in parentheses) are based on heteroskedasticity- and autocorrelation- consistent Newey-West standard errors.

****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

Decomposing the realized GDP growth into real GDP growth and inflation (change in the GDP Deflator), the empirical results (Table 6.1 Panel B) indicate that in the pre-crisis period the real GDP growth is positively associated with company profitability (estimated regression coefficient $\beta_9 = 0.573$ with t-stat = 4.493). The association is highly statistically significant at a less than one percent level. To illustrate its economic meaning, a one-standard-deviation increase of 3.15 percentage points in real GPD growth is on average associated with a 1.81 cents increase in earnings[38] (per euro of total assets), or, with a 1.81 percentage point increase in return on assets. The GDP deflator change is negatively associated with company profitability in the pre-crisis period (estimated regression coefficient $\beta_{11} = -1.065$ with t-stat = -3.271). The association is highly statistically significant at a less than one percent level, and of economic relevance. To illustrate, a one-standard-deviation increase of 1.3 percentage points in inflation is associated (on average) with a 1.39 percentage point decline in return on assets[39]. The negative empirical finding for the association of the GDP Deflator change and company profitability can be interpreted as a sign that inflation represents a risk of future wealth erosion that negatively affects profitability. Furthermore, it is possible that while a company may face upward adjustments in its cost (materials) due to higher inflation, it is slower in incorporating inflation through increased prices for fear of market share loss.

The positive association between real GDP growth and earnings is stronger than the negative association between GDP deflator change (inflation rate) and earnings, and the combined effect on earnings as represented by the nominal GDP growth – earnings relationship is positive.

[38] $\beta x * (SDx/SDy) = 0.573 * [0.0315/0.0864] = 0.2089$
0.2089 * SDy = 0.2089 * 0.0864 = 0.0181 eur

[39] $\beta x * (SDx/SDy) = (-1.065) * [0.0130/0.0864] = - 0.1602$
(- 0.162) * SDy = (-0.162) * 0.0864 = - 0.0139 eur

Controlling for the crisis, the empirical evidence indicates that the significance of real GDP growth for company profitability declines. The decline is statistically significant at a less than 5 percent level (interaction term estimated regression coefficient β_{10} = -0.398 with t-stat = -2.549, Table 6.1 Panel B). However, real GDP growth in the crisis period continues to be significantly and positively associated with earnings ($\beta_9+\beta_{10}$ = 0.175, with t-stat = 2.11). The decline of the earnings-relevance of the GDP Deflator growth (inflation rate) is highly statistically significant at a less than one percent level (interaction term estimated regression coefficient β_{12} regression coefficient estimated at 1.107 with t-stat = 2.809), rendering inflation non-significant for company profitability during the crisis.

Thus in the crisis period, the Real GDP growth rate retains its positive association with company profitability while the inflation rate is non-significant, and consequently the overall association between the nominal GDP growth rate and company profitability is positive. The empirical results are consistent with Hypothesis 1a that supports a positive association between macroeconomic information related to real GDP growth and company profitability, and also with Hypothesis 1b that supports a decline in the earnings-relevance of GDP growth and its components, in the period of the crisis.

Table 6.1: Association between actual company Earnings and actual GDP growth (Model 1a')

Panel B: Association between actual company Earnings and actual Real GDP growth and GDP Deflator growth (inflation rate) Controlling for the Crisis

$$EPS_{t,i} = a_0 + a_1\ Crisis + \beta_1\ EPS_{t-1,i} + \beta_2\ BV_{t-2,i} + \beta_3\ B/M_{t-1,i} + \beta_4\ lnMV_{t-1,i} + \beta_5\ Div_{t-1,i} + \beta_6\ D/B_{t-1,i} + \beta_7\ DNOA_{t-1,i} + \beta_8\ AssetGrowth_{t-1,i} +$$
$$+ \beta_9 RealGDPGrowth_{t,j} + \beta_{10} RealGDPGrowth_{t,j}*Crisis + \beta_{11} GDPDeflatorGrowth_{t,j} + \beta_{12} GDPDeflatorGrowth_{t,j}*Crisis + \varepsilon_t \quad \text{(Model 1a')}$$

α_0	α_1	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	**β_9**	**β_{10}**	**β_{11}**	**β_{12}**	Adj. R^2	N
-0.019	-0.027***	0.673***	0.020	0.001	0.002	0.002	0.182***	-0.051**	0.050***	**0.573*** **	**-0.398** **	**-1.065*** **	**1.107*** **	50.97%	1357
(-0.800)	(-2.855)	(9.233)	(1.018)	(0.582)	(1.628)	(0.320)	(4.015)	(-2.164)	(3.265)	**(4.493)**	**(-2.549)**	**(-3.271)**	**(2.809)**		

t-tests crisis period:

$\beta_9+\beta_{10} = 0$	0.175**
$\beta_{11}+\beta_{12} = 0$	-0.042

$EPS_{t,i}$ and $EPS_{t-1,i}$ are actual earnings per share of firm i for current fiscal year t and prior fiscal year t-1 respectively as reported in IBES. Both $EPS_{t,i}$ and $EPS_{t-1,i}$ are multiplied by the number of shares outstanding at t and t-1 respectively and deflated by total assets t-2 (beginning of t-1). $BV_{t-2,i}$ is the book value of firm i at t-2 deflated by total assets t-2. $B/M_{t-1,i}$ is the book value to market value of equity ratio of firm i at t-1. $lnMV_{t-1,i}$ (Size factor) is the natural logarithm of the market value equity of firm i at t-1. $Div_{t-1,i}$ is and indicator variable equal to 1 for firms distributing a dividend in year t-1 and 0 otherwise. $D/B_{t-1,i}$ is the dividend to book value ratio at t-1. $DNOA_{t-1,i} = (NOA_{t-1,i} - NOA_{t-2,i})/Total\ Assets_{t-2,i}$ are the prior period accruals calculated as the change in net operating assets deflated by total assets at t-2 (beginning of t-1) where net operating assets are calculated as NOA_{t-1} = (Current Operating Assets $_{t-1}$ + Non-Current Operating Assets $_{t-1}$) – (Current Operating Liabilities $_{t-1}$ + Non-Current Operating Liabilities $_{t-1}$). $AssetGrowth_{t-1,i}$ is the prior period growth in total assets calculated as (Total Assets $_{t-1}$ – Total Assets $_{t-2}$) / Total Assets $_{t-2}$. Crisis is an indicator (dummy) variable equal to 1 if fiscal year t = {2009,2013} and equal to 0 if fiscal year t = {2005,2008}.

*$RealGDPGrowth_{t,j}$ and $GDPDeflatorGrowth_{t,j}$ are the realized yoy real GDP growth and GDP Deflator growth (inflation rate) in year t for country j as reported by the International Monetary Fund. GDPGrowth*Crisis is an interaction term of the GDP Growth (Real or Deflator) with the crisis dummy.*

t-statistics reported (in parentheses) are based on heteroskedasticity- and autocorrelation- consistent Newey-West standard errors.
****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

The models are also developed using earnings changes (earnings growth) as the dependent variable. Table 6.2 Panel A presents the results of model 1b that tests the association between earnings changes and actual nominal GDP growth. Prior period earnings changes are negatively associated with current period earnings changes, a finding consistent with a reversal in earnings changes from the one year to the next documented in prior literature (e.g., Elgers and Lo, 1994; Fama and French, 2000). Prior period accruals (change in net operating assets) and asset growth are significantly associated with current period earnings changes (negative and positive associations respectively). The nominal GDP growth is positively associated with earnings changes (estimated regression coefficient β_8 = 0.172 with t-stat = 1.973) and is statistically significant at a less than 5 percent level.

Table 6.2 Panel B presents the results of model 1b testing the association between earnings changes and the components of GDP growth, i.e. real GDP growth and GDP Deflator change (inflation rate). The real GDP growth is positively associated with the change in earnings in the pre-crisis period (estimated regression coefficient β_8 = 0.536, t-stat = 4.270), and highly statistically significant at a less than one percent level. To illustrate the economic significance of real GDP growth for company earnings changes (earnings growth), a one-standard-deviation increase of 3.14 percentage points in real GDP growth is associated (on average) with a 1.68 percentage point increase in earnings growth[40].

The GDP Deflator growth (inflation rate) is negatively associated with earnings growth in the pre-crisis period (estimated regression coefficient β_{10} = -1.249, t-stat = -3.963), and highly statistically significant at a less than one percent level. To illustrate the economic significance of the inflation rate for company earnings growth in the pre-crisis

[40] $\beta x * (SDx/SDy)$ = 0.536 * [0.0314/0.05899] = 0.2853
0.2853 * SDy = 0.2853 * 0.05899 = 0.01683 (1.68%)

period, a one-standard-deviation increase of 1.32 percentage points in the inflation rate is associated (on average) with a 1.65 percentage point decline in earnings growth[41].

In the pre-crisis period, the real GDP growth and earnings relationship is stronger in magnitude and statistical significance, and overall, the nominal GDP growth is positively associated with earnings growth.

Controlling for the crisis, the findings indicate that in the crisis period the inflation rate's earnings growth relevance declines significantly, and there is no significant association between inflation and earnings growth. Real GDP growth remains highly statistically significant ($\beta_8+\beta_9 = 0.300$, t-stat = 4.23), however the magnitude of its impact on earnings growth declines. During the crisis, a one-standard-deviation increase in the real GDP growth increases earnings growth (on average) by 0.74 percentage points less than it would increase earnings growth in the pre-crisis period[42].

Overall, the empirical findings indicate that macroeconomic growth is relevant for company profitability both for company earnings as well as earnings growth in the pre-crisis period, and less relevant in the crisis period, in accordance with the expectations of Hypotheses 1a and 1b. As discussed in the Hypothesis Development, the decline in the relevance of macroeconomic growth for company earnings and earnings growth from the period before the crisis to the period of the crisis is attributed to factors such as the high uncertainty of the period, market frictions and reduced total factor productivity.

[41] $\beta x * (SDx/SDy)$ = (- 1.249) * [0.0132/0.05899] = - 0.2795
(- 0.2795) * SDy = (- 0.2795) * 0.05899 = - 0.016488 (-1.65%)

[42] Decline in association is computed as the regression coefficient of the interaction term (between the independent variable and the crisis dummy) multiplied by the standard deviation of the independent variable. [(-0.236) * 0.0314] = - 0.74%

Table 6.2: Association between actual company Earnings changes and actual GDP growth (Model 1b)

Panel A: Association between actual company Earnings changes and actual Nominal GDP growth Controlling for the crisis

$$\Delta(EPS)_{t,i} = a_0 + a_1\ Crisis + \beta_1\ \Delta(EPS)_{t-1,i} + \beta_2\ B/M_{t-1,i} + \beta_3\ lnMV_{t-1,i} + \beta_4\ Div_{t-1,i} + \beta_5\ D/B_{t-1,i} + \beta_6\ DNOA_{t-1,i} +$$

$$+ \beta_7\ AssetGrowth_{t-1,i} + \beta_8\ NominalGDPGrowth_{t,j} + \beta_9\ NominalGDPGrowth_{t,j}*Crisis + \varepsilon_t \quad \text{(Model 1b)}$$

α_0	α_1	β_1	β_2	β_3	β_4	β_5	β_6	β_7	**β_8**	**β_9**	Adj. R^2	N
-0.025	0.005	-0.176**	-0.003	0.001	-0.006	0.033	-0.045**	0.047***	**0.172****	**0.107**	4.58%	1304
(-1.146)	(0.715)	(-2.332)	(-1.049)	(1.062)	(-1.220)	(1.053)	(-2.122)	(3.329)	**(1.973)**	**(0.943)**		

t-tests crisis period:

$\beta_8+\beta_9 = 0$	**0.280*** **

$\Delta(EPS)_{t,i} = [EPS_{t,i} - EPS_{t-1,i}]$ and $\Delta(EPS)_{t-1,i} = [EPS_{t-1,i} - EPS_{t-2,i}]$. $EPS_{t,i}$, $EPS_{t-1,i}$ and $EPS_{t-2,i}$ are actual earnings per share of firm i for current fiscal year t and prior fiscal years t-1 and t-2 respectively as reported in IBES (multiplied by the number of shares outstanding). $\Delta(EPS)_{t,i}$ and $\Delta(EPS)_{t-1,i}$ are deflated by total assets at beginning of t-1. $B/M_{t-1,i}$ is the book value to market value of equity ratio of firm i at t-1. $lnMV_{t-1,i}$ (Size factor) is the natural logarithm of the market value of equity of firm i at t-1. $Div_{t-1,i}$ is and indicator variable equal to 1 for firms distributing a dividend in year t-1 and 0 otherwise. $D/B_{t-1,i}$ is the dividend to book value ratio at t-1. $DNOA_{t-1,i} = (NOA_{t-1,i} - NOA_{t-2,i})/Total\ Assets_{t-2,i}$ are the prior period accruals calculated as the change in net operating assets deflated by total assets at t-2 (beginning of t-1) where net operating assets are calculated as $NOA_{t-1} = (Current\ Operating\ Assets_{t-1} + Non\text{-}Current\ Operating\ Assets_{t-1}) - (Current\ Operating\ Liabilities_{t-1} + Non\text{-}Current\ Operating\ Liabilities_{t-1})$. $AssetGrowth_{t-1,i}$ is the prior period growth in total assets calculated as $(Total\ Assets_{t-1} - Total\ Assets_{t-2}) / Total\ Assets_{t-2}$. Crisis is an indicator (dummy) variable equal to 1 if fiscal year t = {2009,2013} and equal to 0 if fiscal year t = {2005,2008}

*$NominalGDPGrowth_{t,j}$ = realized yoy nominal GDP growth in year t for country j as reported by the International Monetary Fund. NominalGDPGrowth*Crisis is an interaction term of the Nominal GDP Growth with the crisis dummy.*

t-statistics reported (in parentheses) are based on heteroskedasticity- and autocorrelation- consistent Newey-West standard errors.
****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

Table 6.2: Association between actual company Earnings changes and actual GDP growth (Model 1b')

Panel B: Association between actual company Earnings changes and actual Real GDP growth and GDP Deflator growth Controlling for the crisis

$$\Delta(EPS)_{t,i} = a_0 + a_1\ Crisis + \beta_1\ \Delta(EPS)_{t-1,i} + \beta_2\ B/M_{t-1,i} + \beta_3\ lnMV_{t-1,i} + \beta_4\ Div_{t-1,i} + \beta_5\ D/B_{t-1,i} + \beta_6\ DNOA_{t-1,i} + \beta_7\ AssetGrowth_{t-1,i} +$$

$$+ \beta_8\ RealGDPGrowth_{t,j} + \beta_9\ RealGDPGrowth_{t,j}*Crisis + \beta_{10}\ GDPDeflatorGrowth_{t,j} + \beta_{11}\ GDPDeflatorGrowth_{t,j}*Crisis + \varepsilon_t \quad \text{(Model 1b')}$$

α_0	α_1	β_1	β_2	β_3	β_4	β_5	β_6	β_7	**β_8**	**β_9**	**β_{10}**	**β_{11}**	Adj. R^2	N
0.017	-0.026***	-0.182**	-0.003	0.001	-0.005	0.037	-0.050**	0.052***	**0.536*** **	**-0.236**	**-1.249*** **	**1.251*** **	6.99%	1304
(0.735)	(-2.854)	(-2.437)	(-1.115)	(0.731)	(-1.196)	(1.152)	(-2.352)	(3.642)	**(4.270)**	**(-1.608)**	**(-3.963)**	**(3.097)**		

t-tests crisis period:

$\beta_8+\beta_9 = 0$	**0.300*** **
$\beta_{10}+\beta_{11} = 0$	**-0.002**

$\Delta(EPS)_{t,i} = [EPS_{t,i} - EPS_{t-1,i}]$ and $\Delta(EPS)_{t-1,i} = [EPS_{t-1,i} - EPS_{t-2,i}]$. $EPS_{t,i}$, $EPS_{t-1,i}$ and $EPS_{t-2,i}$ are actual earnings per share of firm i for current fiscal year t and prior fiscal years t-1 and t-2 respectively as reported in IBES (multiplied by the number of shares outstanding). $\Delta(EPS)_{t,i}$ and $\Delta(EPS)_{t-1,i}$ are deflated by total assets at beginning of t-1. $B/M_{t-1,i}$ is the book value to market value of equity ratio of firm i at t-1. $lnMV_{t-1,i}$ (Size factor) is the natural logarithm of the market value of equity of firm i at t-1. $Div_{t-1,i}$ is and indicator variable equal to 1 for firms distributing a dividend in year t-1 and 0 otherwise. $D/B_{t-1,i}$ is the dividend to book value ratio at t-1. $DNOA_{t-1,i} = (NOA_{t-1,i} - NOA_{t-2,i})/Total\ Assets_{t-2,i}$ are the prior period accruals calculated as the change in net operating assets deflated by total assets at t-2 (beginning of t-1) where net operating assets are calculated as NOA_{t-1} = (Current Operating Assets $_{t-1}$ + Non-Current Operating Assets $_{t-1}$) – (Current Operating Liabilities $_{t-1}$ + Non-Current Operating Liabilities $_{t-1}$). $AssetGrowth_{t-1,i}$ is the prior period growth in total assets calculated as (Total Assets $_{t-1}$ – Total Assets $_{t-2}$) / Total Assets $_{t-2}$. Crisis is an indicator (dummy) variable equal to 1 if fiscal year t = {2009,2013} and equal to 0 if fiscal year t = {2005,2008}.

*$RealGDPGrowth_{t,j}$ and $GDPDeflatorGrowth_{t,j}$ are the realized yoy real GDP growth and GDP Deflator growth (inflation rate) in year t for country j as reported by the International Monetary Fund. GDPGrowth*Crisis is an interaction term of the GDP Growth (Real or Deflator) with the crisis dummy.*

t-statistics reported (in parentheses) are based on heteroskedasticity- and autocorrelation- consistent Newey-West standard errors.
****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

6.3 Macroeconomic Expectations and Analysts' Earnings Forecasts

To test models 2a-a' and 2b-b' that are associated with the hypothesis of incorporation of macroeconomic information related to GDP growth by financial analysts when forecasting company profitability, analysts' earnings forecasts and analysts' earnings forecast news (expected change in company earnings) respectively are regressed on forecasted GDP growth and its components controlling for fundamental variables such as size, book to market, prior accruals, recent momentum in the company's stock returns, and asset growth. The prior period earnings forecasts (or earnings forecasts' news) as well as the prior period forecast errors are employed as additional controls in the model. To test analysts' efficiency with respect to the incorporation of macroeconomic expectations, model 2c is estimated: analysts' earnings forecast errors are regressed on prior forecast errors and GDP growth forecast components. Analysts' macro-related efficiency implies that the GDP growth forecasts will not be able to systematically predict variation in analysts' earnings forecast errors.

Tables 6.3 and 6.4 present the empirical findings related to models 2a and 2b respectively. Analysts incorporate information contained in their prior period prediction errors. They also incorporate the prior period value factor (book to market value of equity ratio), recently observed momentum in the company stock returns and investment in assets.

As presented in Table 6.3 Panel A, the forecasted nominal GDP growth is positively associated with analysts' earnings forecasts in the pre-crisis period, with a highly statistically significant association at a less than 1 percent level (estimated regression coefficient $\beta_{10} = 0.290$ with t-stat = 2.780). To illustrate the economic relevance of this finding, a one-standard-deviation increase in nominal GDP growth of 3.4 percentage points is on average associated with an increase in the consensus analysts' earnings forecast of 0.99 cents

(for every euro of company assets)[43]. The association between GDP growth expectations and analysts' earnings forecasts is attributed to the real GDP growth forecast incorporation by the analysts. The findings are presented in Table 6.3 Panel B and indicate that during the pre-crisis period analysts incorporate forecasted real GDP growth in their earnings forecasts (estimated regression coefficient β_{10} = 0.469 with t-stat = 3.277). The association is highly statistically significant at a less than one percent level, and of economic meaning as well. A one-standard deviation increase of 2.4 percentage points in the real GDP growth forecast is on average associated with a 1.13 cents (for every euro of company assets) increase in the earnings forecast[44]. Analysts do not seem to incorporate inflation expectations in their earnings forecasts during the pre-crisis period.

The findings of analysts' incorporation of nominal and real GDP growth forecasts are consistent with Hypothesis 2a that expects analysts incorporate macroeconomic forecasts when forecasting company profitability. However, the findings are inconsistent with this hypothesis with respect to inflation incorporation as there is no association between inflation forecasts and analysts' earnings forecasts. The estimation of model 2c (analysts' forecast errors) will confirm whether this documented incorporation of GDP growth forecasts is efficient.

Controlling for the crisis, there is no indication of a decline in the significance of GDP growth forecasts (both nominal and real) for analysts' forecasts of company profitability. The analysts continue to incorporate the real part of expected growth in GDP also during the crisis period. Even though there is no significant change in the statistical significance of the GDP growth forecasts for analysts' forecasts during the crisis, the resulting associations are of lower magnitude as demonstrated by the lower regression coefficients

[43] $\beta x * (SDx/SDy)$ = 0.290 * (0.034 / 0.0715) = 0.1379
0.1379 * SDy = 0.1379 * 0.0715 = 0.0099 eur

[44] $\beta x * (SDx/SDy)$ = 0.469 * (0.024 / 0.0715) = 0.1574
0.1574 * SDy = 0.1574 * 0.0715 = 0.0113 eur

($\beta_{10}+\beta_{11}$ = 0.251*** for model 2a in Table 6.3 Panel A, and $\beta_{10}+\beta_{11}$ = 0.389*** for model 2a' in Table 6.3 Panel B, for nominal growth forecasts and real growth forecasts respectively).

The finding of incorporation of real GDP growth forecasts in the development of analysts' earnings forecasts is consistent with Hypothesis 2b that supports that macroeconomic information related to GDP growth is less relevant for analysts' earnings forecasts during the period of the crisis. Analysts continue to incorporate real GPD growth forecasts during the crisis but the analyst-perceived impact of GDP growth on earnings declines. The decline in relevance is not attributed to a decline in analysts' ability, but to a decline in the significance of GDP growth forecasts for company profitability, which the analysts correctly recognize.

Table 6.3: Association between Analysts' forecasts of earnings and Forecasted GDP growth (Model 2a)

Panel A: Association between Earnings Forecasts and Forecasted Nominal GDP growth Controlling for the Crisis

$$EPSForecast_{t,i} = a_0 + a_1\ Crisis + \beta_1\ EPSForecast_{t-1,i} + \beta_2\ FE(EPS)_{t-1,i} + \beta_3\ B/M_{t-1,i} + \beta_4\ lnMV_{t-1,i} + \beta_5\ Div_{t-1,i} + \beta_6\ D/B_{t-1,i} + \beta_7\ DNOA_{t-1,i} + \beta_8\ AssetGrowth_{t-1,i} +$$
$$+ \beta_9\ MarketMomentum_{t-1,i} + \beta_{10}\ ForecastedNominalGDPGrowth_{t,j} + \beta_{11}\ ForecastedNominalGDPGrowth_{t,j} * Crisis + \varepsilon_t \quad \text{(Model 2a)}$$

α_0	α_1	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	β_9	**β_{10}**	**β_{11}**	Adj. R^2	N
0.005	0.007	0.880***	0.367***	-0.001**	-0.000	-0.006*	0.063	-0.018	0.023**	0.048***	**0.290*** **	**-0.040**	77.51%	932
(0.275)	(1.310)	(11.401)	(3.661)	(-2.189)	(-0.483)	(-1.836)	(1.489)	(-1.041)	(2.140)	(3.901)	**(2.780)**	**(-0.318)**		

t-tests crisis period:

$\beta_{10}+\beta_{11} = 0$	0.251***

$EPSForecast_{t,i}$ = Analyst Consensus Forecast EPS $_{t,i}$ and $EPSForecast_{t-1,i}$ = Analyst Consensus Forecast EPS $_{t-1,i}$. Analyst Consensus Forecasts per firm-year are constructed as the mean of the individual analyst forecasts for firm i and fiscal year t that are reported in IBES after announcement of t-1 actual financial results and before the announcement of t actual financial results for firm i. The Consensus Forecasts are multiplied by the average number of shares outstanding and deflated by total assets at beginning of t-1. $FE(EPS)_{t-1,i}$ is the prior period analyst forecast error = Actual EPS $_{t-1,i}$ - EPSForecast $_{t-1,i}$. The forecast error is deflated by total firm assets at beginning of t-1. $B/M_{t-1,i}$ is the book value to market value of equity ratio of firm i at t-1. $lnMV_{t-1,i}$ (Size factor) is the natural logarithm of the market value of equity of firm i at t-1. $Div_{t-1,i}$ is and indicator variable equal to 1 for firms distributing a dividend in year t-1 and 0 otherwise. $D/B_{t-1,i}$ is the dividend to book value ratio at t-1. $DNOA_{t-1,i} = (NOA_{t-1,i} - NOA_{t-2,i})/Total\ Assets_{t-2,i}$ are the prior period accruals calculated as the change in net operating assets deflated by total assets at t-2 (beginning of t-1) where net operating assets are calculated as NOA_{t-1} = (Current Operating Assets $_{t-1}$ + Non-Current Operating Assets $_{t-1}$) – (Current Operating Liabilities $_{t-1}$ + Non-Current Operating Liabilities $_{t-1}$). $AssetGrowth_{t-1,i}$ is the prior period growth in total assets calculated as (Total Assets $_{t-1}$ – Total Assets $_{t-2}$) / Total Assets $_{t-2}$. $MarketMomentum_{t-1}$ = Market adjusted daily compounded company returns from the last day of fiscal year t-1 to actual t-1 announcement date within t, i.e. the start of the analysts' forecast horizon for year t

*$ForecastedNominalGDPgrowth_{t,j}$ is the Nominal GDP Growth forecast (% growth yoy) for year t and country j issued by the IMF in April t. $ForecastedNominalGDPgrowth_{t,j}$ *Crisis is an interaction term of the Forecasted GDP Growth with the crisis dummy.*

t-statistics reported (in parentheses) are based on heteroskedasticity- and autocorrelation- consistent Newey-West standard errors.
****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

Table 6.3: Association between Analysts' forecasts of earnings and Forecasted GDP growth (Model 2a')

Panel B: Association between Earnings Forecasts and forecasted Real GDP growth and GDP Deflator growth (inflation rate) Controlling for the crisis

$$EPSForecast_{t,i} = a_0 + a_1\ Crisis + \beta_1\ EPSForecast_{t-1,i} + \beta_2\ FE(EPS)_{t-1,i} + \beta_3\ B/M_{t-1,i} + \beta_4\ lnMV_{t-1,i} + \beta_5\ Div_{t-1,i} + \beta_6\ D/B_{t-1,i} + \beta_7\ DNOA_{t-1,i} + \beta_8\ AssetGrowth_{t-1,i} +$$
$$+ \beta_9 MarketMomentum_{t-1,i} + \beta_{10} ForecastedRealGDPGrowth_{t,j} + \beta_{11} ForecastedRealGDPGrowth_{t,j} * Crisis + \beta_{12} ForecastedGDPDeflatorGrowth_{t,j} + \beta_{13} ForecastedGDPDeflatorGrowth_{t,j} * Crisis + \varepsilon_t \quad \text{(Model 2a')}$$

α_0	α_1	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	β_9	**β_{10}**	**β_{11}**	**β_{12}**	**β_{13}**	Adj. R^2	N
0.014	0.007	0.884***	0.367***	-0.001**	-0.001	-0.006*	0.064	-0.019	0.023**	0.047***	**0.469*** **	**-0.080**	**-0.085**	**-0.095**	77.59%	932
(0.863)	(0.819)	(11.375)	(3.638)	(-2.084)	(-0.639)	(-1.842)	(1.511)	(-1.100)	(2.175)	(3.807)	**(3.277)**	**(-0.472)**	**(-0.298)**	**(-0.268)**		

t-tests crisis period:

$\beta_{10}+\beta_{11} = 0$	0.389***
$\beta_{12}+\beta_{13} = 0$	-0.181

$EPSForecast_{t,i}$ = Analyst Consensus Forecast EPS $_{t,i}$ and $EPSForecast_{t-1,i}$ = Analyst Consensus Forecast EPS $_{t-1,i}$. Analyst Consensus Forecasts per firm-year are constructed as the mean of the individual analyst forecasts for firm i and fiscal year t that are reported in IBES after announcement of t-1 actual financial results and before the announcement of t actual financial results for firm i. The Consensus Forecasts are multiplied by the average number of shares outstanding and deflated by total assets at beginning of t-1. $FE(EPS)_{t-1,i}$ is the prior period analyst forecast error = Actual EPS $_{t-1,i}$ - EPSForecast $_{t-1,i}$. The forecast error is deflated by total firm assets at beginning of t-1. $B/M_{t-1,i}$ is the book value to market value of equity ratio of firm i at t-1. $lnMV_{t-1,i}$ (Size factor) is the natural logarithm of the market value of equity of firm i at t-1. $Div_{t-1,i}$ is and indicator variable equal to 1 for firms distributing a dividend in year t-1 and 0 otherwise. $D/B_{t-1,i}$ is the dividend to book value ratio at t-1. $DNOA_{t-1,i} = (NOA_{t-1,i} - NOA_{t-2,i})/Total\ Assets_{t-2,i}$ are the prior period accruals calculated as the change in net operating assets deflated by total assets at t-2 (beginning of t-1) where net operating assets are calculated as NOA_{t-1} = (Current Operating Assets $_{t-1}$ + Non-Current Operating Assets $_{t-1}$) – (Current Operating Liabilities $_{t-1}$ + Non-Current Operating Liabilities $_{t-1}$). $AssetGrowth_{t-1,i}$ is the prior period growth in total assets calculated as (Total Assets $_{t-1}$ – Total Assets $_{t-2}$) / Total Assets $_{t-2}$. $MarketMomentum_{t-1}$ = Market adjusted daily compounded company returns from the last day of fiscal year t-1 to actual t-1 announcement date within t, i.e. the start of the analysts' forecast horizon for year t

*$ForecastedRealGDPGrowth_{t,j}$ and $ForecastedGDPDeflatorGrowth_{t,j}$ is the Real GDP Growth and GDP Deflator Growth forecast (% growth yoy) for year t and country j issued by the IMF in April t. Forecasted growth $_{t,j}$ *Crisis is an interaction term of the Forecasted Growth with the crisis dummy.*

t-statistics reported (in parentheses) are based on heteroskedasticity- and autocorrelation- consistent Newey-West standard errors.
****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

The empirical findings on the model that tests whether macroeconomic expectations are reflected in earnings forecast news (analysts' consensus forecast of earnings changes), are presented in Table 6.4. Analysts incorporate forecasted GDP growth in their news of earnings forecasts, with a highly statistically significant association at a less than 1 percent level between the real GDP growth forecast and news in earnings forecasts (estimated regression coefficient β_{10} = 0.446, t-stat = 2.863, Table 6.4 Panel B). A one-standard-deviation increase of 2.41 percentage points in the real GDP growth forecast is on average associated with a 1.07 percentage point increase in earnings forecast news (forecasted earnings change)[45]. Controlling for the crisis, the real GDP growth forecasts remain highly significantly associated with analysts' forecasts of earnings changes at a less than 1 percent level (estimated regression coefficient $\beta_{10}+\beta_{11}$ = 0.503 with t-stat = 5.29). Despite failing to incorporate inflation expectations in the pre-crisis period, the findings indicate that analysts incorporate inflation expectations in the crisis period when forecasting changes in earnings. The association is statistically significant at a less than 5 percent level (estimated regression coefficient $\beta_{12}+\beta_{13}$ = -0.465 with t-stat = -1.99).

Overall, analysts incorporate macroeconomic expectations of real GDP growth when forecasting company profitability, but fail to incorporate macroeconomic expectations of inflation.

[45] $\beta x * (SDx/SDy)$ = 0.446 * (0.0241 / 0.0385) = 0.2792
0.2792 * SDy = 0.2792 * 0.0385 = 0.0107 (1.07%)

Table 6.4: Association between Earnings Forecast News and Forecasted GDP growth (Model 2b)

Panel A: Association between EPSForecastNews and Forecasted Nominal GDP growth Controlling for the crisis

$$EPSForecastNews_{t,i} = a_0 + a_1\ Crisis + \beta_1 EPSForecastNews_{t-1,i} + \beta_2 FE(EPS)_{t-1,i} + \beta_3 B/M_{t-1,i} + \beta_4 lnMV_{t-1,i} + \beta_5 Div_{t-1,i} + \beta_6 D/B_{t-1,i} + \beta_7 DNOA_{t-1,i} +$$

$$+ \beta_8\ AssetGrowth_{t-1,i} + \beta_9\ MarketMomentum_{t-1,i} + \beta_{10}\ ForecastedNominalGDPGrowth_{t,j} + \beta_{11}\ ForecastedNominalGDPGrowth_{t,j} * Crisis + \varepsilon_t \quad \text{(Model 2b)}$$

α_0	α_1	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	β_9	**β_{10}**	**β_{11}**	Adj. R^2	N
-0.004	0.003	0.028	-0.861***	-0.002**	0.000	-0.006*	0.001	-0.023	0.022**	0.048***	**0.192***	**0.076**	29.76%	925
(-0.227)	(0.489)	(0.375)	(-7.862)	(-2.309)	(0.254)	(-1.862)	(0.048)	(-1.317)	(1.978)	(4.789)	**(1.759)**	**(0.581)**		

t-tests crisis period:

$\beta_{10}+\beta_{11} = 0$	**0.268*** **

$EPSForecastNews_{t,i}$ = [Consensus Forecast EPS $_{t,i}$ – Actual EPS $_{t-1,i}$] and $NewsEPS_{t-1,i}$ = [Consensus Forecast EPS $_{t-1,i}$ – Actual EPS $_{t-2,i}$]. EPS $_{t,i}$, EPS $_{t-1,i}$ and EPS $_{t-2,i}$ are the earnings per share of firm i for current fiscal year t and prior fiscal years t-1 and t-2 respectively as reported in IBES (multiplied by the number of shares outstanding at the same year). Consensus Forecast EPS per firm-year is constructed as the mean of the individual analyst forecasts for firm i and fiscal year t that are reported in IBES after announcement of t-1 actual financial results and before the announcement of t actual financial results for firm i.

$EPSForecastNews_{t,i}$ and $EPSForecastNews_{t-1,i}$ are deflated by total assets at beginning of t-1. $FE(EPS)_{t-1,i}$ is the prior period analyst forecast error = Actual EPS $_{t-1,i}$ - Forecasted EPS $_{t-1,i}$. The prior forecast error is deflated by total firm assets t-2. $B/M_{t-1,i}$ is the book value to market value of equity ratio of firm i at t-1. $lnMV_{t-1,i}$ (Size factor) is the natural logarithm of the market value of equity of firm i at t-1. $Div_{t-1,i}$ is an indicator variable equal to 1 for firms distributing a dividend in year t-1 and 0 otherwise. $D/B_{t-1,i}$ is the dividend to book value ratio at t-1. $DNOA_{t-1,i} = (NOA_{t-1,i} – NOA_{t-2,i})$/Total Assets $_{t-2,i}$ are the prior period accruals calculated as the change in net operating assets deflated by total assets at t-2 (beginning of t-1) where net operating assets are calculated as NOA_{t-1} = (Current Operating Assets $_{t-1}$ + Non-Current Operating Assets $_{t-1}$) – (Current Operating Liabilities $_{t-1}$ + Non-Current Operating Liabilities $_{t-1}$). $AssetGrowth_{t-1,i}$ is the prior period growth in total assets calculated as (Total Assets $_{t-1}$ – Total Assets $_{t-2}$) / Total Assets $_{t-2}$. $MarketMomentum_{t-1}$ = Market adjusted daily compounded company returns from the last day of fiscal year t-1 to actual t-1 announcement date within t, i.e. the start of the analysts' forecast horizon for year t. Crisis is an indicator (dummy) variable equal to 1 if fiscal year t = {2009,2013} and equal to 0 if fiscal year t = {2005,2008}.

*$ForecastedNominalGDPgrowth_{t,j}$ is the Nominal GDP Growth forecast (% growth yoy) for year t and country j issued by the IMF in April t. $ForecastedNominalGDPgrowth_{t,j}$ *Crisis is an interaction term of the Forecasted GDP Growth with the crisis dummy.*

t-statistics reported (in parentheses) are based on heteroskedasticity- and autocorrelation- consistent Newey-West standard errors.

****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

Table 6.4: Association between Earnings Forecast News and Forecasted GDP growth (Model 2b')

Panel B: Association between EPSForecastNews and Forecasted Real GDP growth and GPD Deflator growth Controlling for the crisis

$$EPSForecastNews_{t,i} = a_0 + a_1\ Crisis + \beta_1 EPSForecastNews_{t-1,i} + \beta_2 FE(EPS)_{t-1,i} + \beta_3 B/M_{t-1,i} + \beta_4 lnMV_{t-1,i} + \beta_5 Div_{t-1,i} + \beta_6 D/B_{t-1,i} + \beta_7 DNOA_{t-1,i} + \beta_8\ AssetGrowth_{t-1,i} +$$

$$+ \beta_9\ MarketMomentum_{t-1,i} + \beta_{10} ForecastedRealGDPGrowth_{t,j} + \beta_{11} ForecastedRealGDPGrowth_{t,j} * Crisis + \beta_{12} ForecastedGDPDeflatorGrowth_{t,j} + \beta_{13} ForecastedGDPDeflatorGrowth_{t,j} * Crisis + \varepsilon_t \quad \text{(Model 2b')}$$

α_0	α_1	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	β_9	**β_{10}**	**β_{11}**	**β_{12}**	**β_{13}**	Adj. R^2	N
0.012	0.004	0.024	-0.861***	-0.002**	-0.000	-0.006*	0.005	-0.026	0.024**	0.046***	**0.446*** **	**0.057**	**-0.351**	**-0.114**	30.85%	925
(0.749)	(0.475)	(0.312)	(-7.989)	(-2.224)	(-0.062)	(-1.855)	(0.178)	(-1.447)	(2.084)	(4.644)	**(2.863)**	**(0.315)**	**(-1.166)**	**(-0.297)**		

t-tests crisis period:

$\beta_{10}+\beta_{11} = 0$ **0.503*****

$\beta_{12}+\beta_{13} = 0$ **-0.465****

$EPSForecastNews_{t,i}$ = [Consensus Forecast EPS $_{t,i}$ – Actual EPS $_{t-1,i}$] and $NewsEPS_{t-1,i}$ = [Consensus Forecast EPS $_{t-1,i}$ – Actual EPS $_{t-2,i}$]. EPS $_{t,i}$, EPS $_{t-1,i}$ and EPS $_{t-2,i}$ are the earnings per share of firm i for current fiscal year t and prior fiscal years t-1 and t-2 respectively as reported in IBES (multiplied by the number of shares outstanding at the same year). Consensus Forecast EPS per firm-year is constructed as the mean of the individual analyst forecasts for firm i and fiscal year t that are reported in IBES after announcement of t-1 actual financial results and before the announcement of t actual financial results for firm i. $EPSForecastNews_{t,i}$ and $EPSForecastNews_{t-1,i}$ are deflated by total assets at beginning of t-1. $FE(EPS)_{t-1,i}$ is the prior period analyst forecast error = Actual EPS $_{t-1,i}$ - Forecasted EPS $_{t-1,i}$. The prior forecast error is deflated by total firm assets t-2. $B/M_{t-1,i}$ is the book value to market value of equity ratio of firm i at t-1. $lnMV_{t-1,i}$ (Size factor) is the natural logarithm of the market value of equity of firm i at t-1. $Div_{t-1,i}$ is an indicator variable equal to 1 for firms distributing a dividend in year t-1 and 0 otherwise. $D/B_{t-1,i}$ is the dividend to book value ratio at t-1. $DNOA_{t-1,i}$ = (NOA $_{t-1,i}$ – NOA $_{t-2,i}$)/Total Assets $_{t-2,i}$ are the prior period accruals calculated as the change in net operating assets deflated by total assets at t-2 (beginning of t-1) where net operating assets are calculated as NOA_{t-1} = (Current Operating Assets $_{t-1}$ + Non-Current Operating Assets $_{t-1}$) – (Current Operating Liabilities $_{t-1}$ + Non-Current Operating Liabilities $_{t-1}$). $AssetGrowth_{t-1,i}$ is the prior period growth in total assets calculated as (Total Assets $_{t-1}$ – Total Assets $_{t-2}$) / Total Assets $_{t-2}$. $MarketMomentum_{t-1}$ = Market adjusted daily compounded company returns from the last day of fiscal year t-1 to actual t-1 announcement date within t, i.e. the start of the analysts' forecast horizon for year t. Crisis is an indicator (dummy) variable equal to 1 if fiscal year t = {2009,2013} and equal to 0 if fiscal year t = {2005,2008}.

$ForecastedRealGDPGrowth_{t,j}$ and $ForecastedGDPDeflatorGrowth_{t,j}$ is the Real GDP Growth and GDP Deflator Growth forecast (% growth yoy) for year t and country j issued by the IMF in April t. Forecasted growth $_{t,j}$

**Crisis is an interaction term of the Forecasted Growth with the crisis dummy.*

t-statistics reported (in parentheses) are based on heteroskedasticity- and autocorrelation- consistent Newey-West standard errors.

****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

Analysts' efficiency in the incorporation of macroeconomic expectations should also be demonstrated in the examination of analysts' forecast errors. Analysts' efficient incorporation of GDP growth forecasts implies that the GDP growth forecasts will not be able to systematically predict variation in analyst earnings forecast errors.

Table 6.5 presents the results of the regression of analysts' Forecast Errors (Actual EPS – Consensus Forecast EPS) on real GDP growth forecasts and inflation forecasts controlling for prior analyst forecast errors (model 2c). The model is used to test whether analysts exhibit any systematic inefficiency (bias) with respect to macroeconomic expectations. The Crisis dummy is significantly negative (-0.014***), an indication that during the crisis the negative surprises (actual EPS – Forecasted EPS) representing analysts' earnings over-prediction are on average stronger than in the pre-crisis period.

The empirical results support the hypothesis of analysts' efficiency with respect to incorporation of real GDP growth forecasts into their earnings forecasts. The real GDP growth forecast does not have any predictive ability over analysts' forecast errors neither before nor during the crisis. Combined with the strong association between real GDP growth forecasts and analysts' earnings forecasts and forecast news (Tables 6.3-6.4), these findings of no systematic association between real GDP growth forecasts and earnings forecast errors indicate analyst efficiency with respect to the real economic growth prospects. Analysts fully incorporate the impact of expected real GDP growth on earnings when forecasting company performance, and the association is positive.

The finding of analysts' efficiency with regards to real GPD growth forecast incorporation further confirms Hypothesis 2a (with respect to real growth expectations) that supports financial analysts fully incorporate macroeconomic information in their forecasts of future company profitability and that macroeconomic information is not associated with analysts' forecast errors. The findings are in contrast with prior literature that has mainly presented evidence of analyst inefficiencies with respect to macroeconomic variables such as GNP and GDP growth (e.g., Ackert and Hunter, 1995; Hugon et al., 2016; Hann et al., 2012).

However, the empirical results indicate that analysts' bias (forecast error) is significantly associated with the GDP Deflator growth (inflation rate) forecast in the pre-crisis period. The analysts cannot fully incorporate the inflation expectations' projected impact on earnings when forecasting EPS. Consequently, analysts fail to incorporate inflation forecasts in the pre-crisis period when they are relevant for earnings and negatively associated with earnings (as demonstrated in Tables 6.1-6.2). The GDP Deflator change forecast is highly significantly associated with analysts' forecast error (estimated regression coefficient β_4 = -0.479 with t-stat = -2.336). The association is negative, and conditional on the negative systematic association between earnings and inflation that was presented in Table 6.1 Panel B, is interpreted as a finding of underreaction on the part of analysts with respect to the inflation rate forecast that leads to over-optimistic forecasts of earnings, i.e. forecasts that do not reflect the negative impact of inflation on earnings.

To illustrate the economic meaning of the statistically significant predictive ability of inflation forecasts over the analysts' earnings forecast error, an increase of one-standard-deviation (1.08 percentage points) in the inflation rate forecast in the pre-crisis period is associated with a 0.172 standard deviations decline (on average) in the signed forecast error (the forecast error declines by 0.5 cents per eur of total company assets, or equivalently, analysts over-predict the return on assets by 0.5 percentage points on average due to their failure to incorporate the negative association between inflation and earnings)[46].

Controlling for the crisis, the inflation is no longer able to predict analysts' forecast errors; the finding is not attributed to analysts' efficiency but rather to inflation's insignificance for earnings during the crisis period (Table 6.1, Panel B).

These findings of inflation-related analyst inefficiency are in contrast with Hypothesis 2a that supports financial analysts fully incorporate macroeconomic information

[46] $\beta x * (SDx/SDy)$ = (-0.479) * [0.0108 / 0.030] = - 0.17244
(-0.17244) * SDy = (-0.17244) * 0.030 = - 0.0052 eur (0.5 cents per eur of total assets, equivalently, 0.5% over-predicted return on assets).

in their forecasts of future company profitability and that macroeconomic information is not associated with analysts' forecast errors. These findings are consistent with the findings of analyst inflation-related inefficiencies documented in Basu et al. (2010).

The inflation impact on profitability and market value has been considered difficult to estimate. The inflation impact on profitability depends on the relation between the firm's input and output prices, a relationship driven by underlying factors such as the intensity of competition and the relative balance between fixed and variable expenses. Moreover, increased competition from abroad that discourages domestic companies from raising their prices, and increased trade and investment flows that have made goods prices less sensitive to demand pressures[47] have been linked with a decline in the sensitivity of corporate prices to domestic output, and difficulty in estimating inflation and its effects. Thus, incorporating inflation expectations in earnings is a more challenging task for analysts than incorporating real GDP growth expectations.

Overall, the empirical findings of models 2a-2c support analysts' efficiency with respect to real GDP growth expectations that is robust to the crisis (i.e. analysts continue to be efficient during the crisis), but also document systematic inefficiency with respect to inflation expectations.

[47] e.g., Laxton and N'Diaye, 2002; IMF 2006.

Table 6.5: Association between Analysts' Bias and Forecasted GDP growth (Model 2c)

$$FE(EPS)_{t,i} = a_0 + a_1\ Crisis + \beta_1\ FE(EPS)_{t-1,i} + \beta_2\ ForecastedRealGDPGrowth_{t,j} + \beta_3\ ForecastedRealGDPGrowth_{t,j}*Crisis +$$
$$+ \beta_4\ ForecastedGDPDeflatorGrowth_{t,j} + \beta_5\ ForecastedGDPDeflatorGrowth_{t,j}*Crisis + \varepsilon_t \quad (Model\ 2c)$$

Association between Analysts' Bias (analysts' forecast errors of earnings) and Forecasted Real GDP growth and GDP Deflator growth (inflation rate) Controlling for the crisis

α_0	α_1	β_1	β_2	β_3	β_4	β_5	Adj. R^2	N
0.009**	-0.014***	0.288***	**0.116**	**-0.193**	**-0.479****	**0.452***	5.22%	1725
(1.997)	(-2.857	(4.115)	**(0.990)**	**(-1.493)**	**(-2.336)**	**(1.863)**		

t-tests crisis period:

$\beta_2+\beta_3 = 0$ **-0.077**

$\beta_4+\beta_5 = 0$ **-0.027**

$FE(EPS)_{t,i}$ is the current period analyst forecast error = [Actual $EPS_{t,i}$ - Consensus Forecast $EPS_{t,i}$]. $FE(EPS)_{t-1,i}$ is the prior period analyst forecast error = [Actual $EPS_{t-1,i}$ - Consensus Forecast $EPS_{t-1,i}$]. ConsensusForecastEPS per firm-year is constructed as the mean of the individual analyst forecasts for firm i and fiscal year t that are reported in IBES after announcement of t-1 actual financial results and before the announcement of t actual financial results for firm i. The forecast error is deflated by total firm assets at beginning of t-1.
Crisis is an indicator (dummy) variable equal to 1 if fiscal year t = {2009,2013} and equal to 0 if fiscal year t = {2005,2008}.

*$ForecastedRealGDPGrowth_{t,j}$ and $ForecastedGDPDeflatorGrowth_{t,j}$ are the Real GDP Growth and GDP Deflator Growth forecast respectively (% growth yoy) for year t and country j issued by the IMF in April t. Forecasted $growth_{t,j}$ *Crisis is an interaction term of the Forecasted Growth with the crisis dummy.*

t-statistics reported (in parentheses) are based on heteroskedasticity- and autocorrelation- consistent Newey-West standard errors.
****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

6.4 The Association between Macroeconomic Expectations and Analysts' News with Stock Returns

Stock returns respond to news related to macroeconomic variables and expected company performance. The macroeconomic news and earnings news represent sources of future earnings variation (priced to the extent that they affect corporate earnings) as well as sources of risk (priced to the extent that they affect discount rates). With analysts being significant information intermediaries that transmit earnings forecast information to the stock market, it is important to examine the market pricing of macroeconomic expectations in the presence of analysts' forecasts of company performance. Thus, the dissertation examines the extent to which information in analysts' forecasts and information in macroeconomic forecasts are value-relevant for investors.

Table 6.6 presents the empirical results of the estimation of models 3a-a' and 3b (related to Hypotheses 3 and 4) that test the associations between macroeconomic forecasts and current or future stock returns respectively, controlling for information in analysts' forecasts.

Panel A presents the findings related to the incorporation of nominal GDP growth forecasts in current stock returns controlling for analysts' earnings forecasts and earnings forecast news. The model also controls for factors whose value-relevance has been documented in prior studies such as the size factor (market value of equity), the value factor (book to market value of equity ratio), the investment factor (capital expenditures), and a systematic risk factor (beta coefficient)[48].

The results indicate that in the pre-crisis period the nominal GDP growth forecasts are positively associated with current stock returns (estimated regression coefficient β_5 =

[48] Fama and French (2015) introduce a five-factor model in which the market factor, size factor, value factor as well as investment and profitability factors are used to explain the cross-section of stock returns.

3.432, t-stat = 2.484, Table 6.6 Panel A). The association is statistically significant at a less than 5 percent level. To illustrate the economic significance of the finding, a one-standard-deviation increase of 3.4 percentage points in the nominal GDP growth forecast in the pre-crisis period is on average associated with approximately 11.67 percentage point increase in the current stock returns[49] (equivalently a 1 percentage point increase in expected nominal GDP growth leads on average to a 3.43 percentage point increase in stock returns).

The empirical findings indicate that the association between nominal GDP growth forecasts and current stock returns declines during the crisis (estimated regression coefficient β_6 = -10.954, t-stat = -6.647, Table 6.6 Panel A), and this decline is highly statistically significant (at a less than 1 percent level) as well as of economic meaning. A one-standard-deviation increase in the nominal GDP growth forecast in the crisis period is associated with a decline of approximately 37 percentage points in stock returns compared to its effect in the pre-crisis period[50], i.e. an increase of 1 percentage points in GDP growth during the crisis is on average associated with a decline of 7.45 percentage points in stock returns.

The association between macroeconomic conditions and stock returns has been documented in several studies such as in Fama and French (1989), and Schwert (1990). Stock market expectations and equity returns are closely linked to the productivity of the economy. The positive association between expected growth in GDP and expected growth in corporate profits that translates into stock price increases, is indicated from the empirical results presented in Table 6.6 Panel A. The documented reversal in the

[49] $\beta x * (SDx/SDy)$ = 3.432 * [0.034 / 0.5175] = 0.2255

0.2255 * SDy = 0.2255 * 0.5175 = 0.1167 (11.67%) change in stock return for a one-standard-deviation (3.4%) change in the nominal GDP growth forecast

[50] Decline in association is computed as the regression coefficient of the interaction term (between the independent variable and the crisis dummy) multiplied by the standard deviation of the independent variable. [$\beta x * SDx$] = [(-10.954) * 0.034] = - 0.37

association between nominal GDP growth expectations and stock returns during the crisis is attributed to the high uncertainty prevailing among stock market participants during that time as well as a declining confidence in institutional predictions related to macroeconomic growth and forecasts of recovery.

The role of earnings forecasts as signals that convey to the stock market value-relevant information has been documented in several prior studies[51]. To examine the extent to which the value-relevance of information contained in analysts' forecasts to the stock market is incremental to the value-relevance of information contained in macroeconomic forecasts, analysts' consensus earnings forecasts per firm-year are regressed on the nominal GDP growth forecasts. The residuals that result from this regression ($EPSForecast_{RESIDUALS}$), and represent the information contained in the consensus earnings forecasts that is orthogonal to the GDP Forecast-related information, are then used as an explanatory variable in the current stock return model (3a-a') and the future stock return model (3b). To examine the importance of macro-informed earnings forecast news (analysts' consensus of projected growth in earnings compared to prior year realised earnings), the model is also estimated controlling for News in earnings forecasts (EPSForecastNews).

Table 6.6 Panel A presents the nominal GDP growth forecasts' relevance for current stock returns controlling for either Residual earnings forecasts ($EPSForecast_{RESIDUALS}$) or News in earnings forecasts (EPSForecastNews). Residual Earnings forecasts are highly significant for current stock returns (estimated regression coefficient β_7 = 1.025, t-stat = 3.215, Table 6.6 Panel A). The association in the pre-crisis period is highly statistically significant (at a less than 1 percent level) as well as of economic importance. To illustrate, a one-standard-deviation increase in the Consensus

[51] e.g., Abarbanell et al., 1995; Abarbanell and Bushee, 1997; Cheng, 2005; Jackson and Johnson, 2006.

Earnings Forecast (Residual) is associated with a 6.97 percentage point increase in current stock returns[52].

Analysts' forecasts convey information to the stock market that is of statistical and economic significance above and beyond the macroeconomic information contained in GDP growth forecasts. Controlling for the crisis, the Residual Earnings forecasts maintain their value-relevance and high statistical significance, with an increased association with current stock returns in the crisis period (estimated regression coefficient [β_7+β_8] = 1.359 for residual forecasts, t-stat = 2.96). During the crisis, a time of high uncertainty with respect to company performance expectations, the information about future corporate profitability that analysts' forecasts convey to the market is of higher relevance than in the pre-crisis period.

Table 6.6 Panel A also presents the empirical results of model 3a controlling for News in analysts' earnings forecasts. News in analysts' forecasts of earnings are positively associated with current stock returns (estimated regression coefficient β_7 = 3.345, for forecast news, t-stat = 4.280). The news in analysts' forecasts of earnings also convey macroeconomic information (as presented in Chapter 6.3) that is value-relevant for the stock market. The association between the news in analysts' forecasts and current stock returns is highly statistically significant at a less than 1 percent level, and of economic importance, with a one-standard-deviation change in news (3.93 percentage points increase in projected earnings growth) associated on average with a 13.15 percentage point increase in stock returns[53]. This association significantly declines during the crisis (estimated regression coefficient β_8 = -2.180, with t-stat = -2.119).

[52] $\beta x * (SDx/SDy)$ = 1.025 * [0.068 / 0.5175] = 0.1347
0.1347 * SDy = 0.1347 * 0.5175 = 0.0697 (6.97%)

[53] $\beta x * (SDx/SDy)$ = 3.347 * [0.0393 / 0.5175] = 0.2542
0.2542 * SDy = 0.2542 * 0.5175 = 0.1315 (13.15%)

Table 6.6: Stock Returns Association with GDP Growth Forecasts controlling for Analysts' Earnings Forecasts and Forecast News

Panel A: Current Stock Returns Association with Nominal GDP Growth Forecasts (Model 3a)

$$Returns_{t,i} = a_0 + a_1\ Crisis + \beta_1\ Size_{t-1,i} + \beta_2\ B/M_{t-1,i} + \beta_3\ Inv_{t-1,i} + \beta_4 BetaCoefficient_{t-1,i} + \beta_5\ ForecastedNominalGDPGrowth_{t,j} +$$
$$+ \beta_6\ ForecastedNominalGDPGrowth_{t,j}*Crisis + \beta_7\ EPSForecast_{RESIDUALSt,i} + \beta_8\ EPSForecast_{RESIDUALSt,i}*Crisis + \varepsilon_t \quad \text{(Model 3a)}$$
$$+ \beta_6\ ForecastedNominalGDPGrowth_{t,j}*Crisis + \beta_7\ EPSForecastNews_{t,i} + \beta_8\ EPSForecastNews_{t,i}*Crisis + \varepsilon_t \quad \text{(Model 3a)}$$

α_0	α_1	β_1	β_2	β_3	β_4	β_5	β_6	$\beta_{7Residuals}$	$\beta_{8Residuals}$	β_{7News}	β_{8News}	Adj. R^2	N
0.678***	0.273***	-0.064***	0.020*	0.031***	-0.104*	**3.432****	**-10.954*****	**1.025*****	**0.333**			15.21%	1093
(2.977)	(3.606)	(-3.774)	(1.951)	(2.649)	(-1.916)	**(2.484)**	**(-6.647)**	**(3.215)**	**(0.616)**				
0.368*	0.268***	-0.034**	0.024**	0.015	-0.105*	**2.645***	**-11.134*****			**3.345*****	**-2.180****	16.42%	1081
(1.652)	(3.626)	(-2.095)	(2.223)	(1.330)	(-1.943)	**(1.906)**	**(-6.679)**			**(4.280)**	**(-2.119)**		

t-tests crisis period:

_b[ForecastedNominalGDPGrowth]+_b[ForecastedNominalGDPGrowth*Crisis] = 0	$\beta_5 + \beta_6 = 0$	**-7.522*****
_b[$EPSForecast_{RESIDUALSt}$]+_b[$EPSForecast_{RESIDUALSt}$*Crisis] = 0	$\beta_7 + \beta_8 = 0$	**1.359*****
_b[ForecastedNominalGDPGrowth]+_b[ForecastedNominalGDPGrowth*Crisis] = 0	$\beta_5 + \beta_6 = 0$	**-8.490*****
_b[$EPSForecastNews_t$]+_b[$EPSForecastNews_t$*Crisis] = 0	$\beta_7 + \beta_8 = 0$	**1.165***

$Returns_{t,i}$ = Current stock returns constructed with daily compounding of the total index return for firm i from the announcement date of actual financial results of t-1 to the announcement date of actual financial results of t. $EPSForecastNews_{t,i} = [EPSForecast_{t,i} - EPSActual_{t-1,i}]$. $EPSForecast_{t,i}$ is the Consensus Forecast of EPS for firm i and year t constructed as the Mean of individual Analyst Forecasts of EPS $_{t,i}$ sourced from the Thomson Reuters IBES database issued after the announcement date of actual financial results of t-1 and before the announcement date of actual financial results of t. $EPSActual_{t-1,i}$ is the actual value of earnings per share of t-1 as reported in IBES. $EPSForecast_{t,i}$ and $EPSActual_{t-1,i}$ are multiplied by the number of shares outstanding and deflated by total assets at beginning of t-1. $EPSForecast_{RESIDUALSt}$ are the residuals from an OLS regression of the $EPSForecast_{t,i}$ on the Forecasted Nominal GDP Growth of year t:

$$EPSForecast_{t,i} = a + \beta\ ForecastedGDPGrowth_{t,j} + e_t$$

Crisis is an indicator (dummy) variable equal to 1 if fiscal year t = {2009,2013} and equal to 0 if fiscal year t = {2005,2008}.
$lnMV_{t-1,i}$ (Size factor) is the natural logarithm of the market value of equity of firm i at t-1. $B/M_{t-1,i}$ is the book to market value of equity ratio of firm i at t-1. Inv = log(CAPEX from the cash flow statement) at t-1.
*$BetaCoefficient_{t-1,i}$ = estimated slope of CompanyReturn = $\alpha + \beta$ * MarketReturn estimated using daily returns for the two years prior to the announcement date of actual financial results of t-1.*
*$ForecastedNominalGDPgrowth_{t,j}$ is the Nominal GDP Growth forecast (% growth yoy) for year t and country j issued by the IMF in April t. $ForecastedNominalGDPgrowth_{t,j}$ *Crisis is an interaction term of the Forecasted GDP Growth with the crisis dummy. $EPSForecast_{RESIDUALSt,i}$*Crisis and $EPSForecastNews_{t,i}$*Crisis are interaction terms of the $EPSForecast_{RESIDUALSt,i}$ and $EPSForecastNews_{t,i}$ with the crisis dummy.*

t-statistics reported (in parentheses) are based on heteroskedasticity- and autocorrelation- consistent Newey-West standard errors.
****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

The dissertation next proceeds to decompose expectations of nominal GDP growth into their components, real GDP growth forecasts and GDP Deflator change (inflation rate) forecasts. Several prior studies have examined the importance of real GDP growth expectations for stock pricing and have documented that a large part of stock return variation as well as cross-sectional differences in stock returns can be explained by real GDP growth and related news (e.g., Fama, 1990; Chen et al., 1986; Vassalou, 2003; Li et al., 2014). The value-relevance of inflation has been examined in prior literature mainly providing evidence of a negative association between inflation and stock returns driven by a negative association of inflation with earnings growth and positive association with the required return (Sharpe, 2002), as well as evidence of stock market inefficiencies due to inflation-related errors of investors and analysts (Modigliani and Cohn, 1979; Campbell and Vuolteenaho, 2004; Chordia and Shivakumar, 2005; Basu et al., 2010).

Table 6.6 Panel B presents the regression results of the stock returns model (3a') on the association between real GDP growth and inflation expectations and current stock returns, controlling for either residual earnings forecasts or earnings forecast news. The empirical findings indicate that in the pre-crisis period, real GDP growth forecasts are positively associated with current stock returns (estimated regression coefficient β_5 = 10.308, t-stat = 5.092). The value-relevance of real GDP growth forecasts is highly statistically significant at a less than 1 percent level. Controlling for the crisis, the findings indicate that the value-relevance of real GDP growth forecasts diminishes sharply (estimated regression coefficient of the interaction term β_6 = -16.511, t-stat = -6.691). The observed reversal in the relation between real GDP growth expectations and returns in the crisis period is attributed to risk considerations (high risk aversion, volatility, higher required returns).

The inflation forecast is negatively associated with current stock returns (estimated regression coefficient β_7 = -11.363, t-stat = -2.592). The association is highly statistically significant at a less than 1 percent level, and remains largely unchanged

during the crisis. The negative relationship of the expected inflation and stock returns is mainly attributed to a positive relationship between expected inflation and the discount rate.

The empirical results on the real GDP growth forecasts' value-relevance are consistent with Hypothesis 4a that predicts a positive association between real GDP growth forecasts and current stock returns in the pre-crisis period. This positive association is mainly attributed to a positive association of expected real GDP growth with expected corporate earnings growth. The reversal in the association in the crisis period and its strong significance are inconsistent with Hypothesis 4b that predicts a decline in the association in the crisis period. The reversal is attributed to risk considerations.

The empirical results on inflation forecasts' value-relevance indicate a negative association between the inflation rate and current stock returns that does not change during the crisis. The finding is consistent with Hypothesis 4a prediction of a negative association between inflation expectations and stock returns through the inflation expectations' impact on the required return, and inconsistent with Hypothesis 4b prediction of a decline in significance during the crisis. Overall, the association between nominal GDP growth expectations and current stock returns is positive in the pre-crisis period and negative in the crisis period.

The regression results and inferences with respect to the value-relevance of residual earnings forecasts and forecast news are similar to those of Panel A. It is notable that since earnings forecast news convey macroeconomic information mainly related to real GDP growth expectations, the predictive ability of real GDP growth forecasts (β_5) for stock returns declines by approximately 11.06 percent (regression coefficient change = [9.168 – 10.308]/10.308, Table 6.6 Panel B) when macro-informed earnings forecast news are included in the regression, while the predictive ability of inflation forecasts remains unaltered. This finding indicates that earnings forecast news convey macroeconomic

information to the stock market mainly about real economic growth expectations and not inflation expectations.

Table 6.6: Stock Returns Association with GDP Growth Forecasts controlling for Analysts' Earnings Forecasts and Forecast News

Panel B: Current Stock Returns Association with Real GDP Growth Forecasts and GDP Deflator growth (inflation rate) Forecasts (Model 3a')

$$Returns_{t,i} = a_0 + a_1\ Crisis + \beta_1\ Size_{t-1,i} + \beta_2\ B/M_{t-1,i} + \beta_3\ Inv_{t-1,i} + \beta_4 BetaCoefficient_{t-1,i} + \beta_5\ ForecastedRealGDPGrowth_{t,j} + \beta_6\ ForecastedRealGDPGrowth_{t,j}*Crisis +$$
$$+ \beta_7\ ForecastedGDPDeflatorGrowth_{t,j} + \beta_8\ ForecastedGDPDeflatorGrowth_{t,j}*Crisis + \beta_9\ EPSForecast_{RESIDUALS\ t,i} + \beta_{10}\ EPSForecast_{RESIDUALS\ t,i}*Crisis + \varepsilon_t \quad \text{(Model 3a')}$$
$$+ \beta_7\ ForecastedGDPDeflatorGrowth_{t,j} + \beta_8\ ForecastedGDPDeflatorGrowth_{t,j}*Crisis + \beta_9\ EPSForecastNews_{t,i} + \beta_{10}\ EPSForecastNews_{t,i}*Crisis + \varepsilon_t \quad \text{(Model 3a')}$$

α_0	α_1	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	$\beta_{9Residuals}$	$\beta_{10Residuals}$	β_{9News}	β_{10News}	Adj. R^2	N
0.941***	0.067	-0.065***	0.021**	0.032***	-0.107**	**10.308*** **	**-16.511*** **	**-11.363*** **	**-0.412**	**1.005*** **	**0.370**			16.09%	1093
(3.904)	(0.574)	(-3.823)	(1.990)	(2.765)	(-1.983)	**(5.092)**	**(-6.691)**	**(-2.592)**	**(-0.078)**	**(3.318)**	**(0.697)**				
0.585***	0.050	-0.034**	0.024**	0.017	-0.108**	**9.168*** **	**-16.835*** **	**-11.384*** **	**0.268**			**3.259*** **	**-2.174** **	17.11%	1081
(2.602)	(0.444)	(-2.127)	(2.227)	(1.441)	(-2.010)	**(4.248)**	**(-6.444)**	**(-2.646)**	**(0.051)**			**(4.291)**	**(-2.147)**		

t-tests crisis period:

_b[ForecastedRealGDPGrowth]+_b[ForecastedRealGDPGrowth*Crisis] = 0	$\beta_5+\beta_6 = 0$	**-6.204 *** **
_b[ForecastedGDPDeflatorGrowth]+_b[ForecastedGDPDeflatorGrowth*Crisis] = 0	$\beta_7+\beta_8 = 0$	**-11.775*** **
_b[$EPSForecast_{RESIDUALSt}$]+_b[$EPSForecast_{RESIDUALSt}$*Crisis] = 0	$\beta_9+\beta_{10} = 0$	**1.375*** **
_b[ForecastedRealGDPGrowth]+_b[ForecastedRealGDPGrowth*Crisis] = 0	$\beta_5+\beta_6 = 0$	**-7.667*** **
_b[ForecastedGDPDeflatorGrowth]+_b[ForecastedGDPDeflatorGrowth*Crisis] = 0	$\beta_7+\beta_8 = 0$	**-11.117*** **
_b[$EPSForecastNews_t$]+_b[$EPSForecastNews_t$*Crisis] = 0	$\beta_9+\beta_{10} = 0$	**1.085**

$Returns_{t,i}$ = Current stock returns constructed with daily compounding of the total index return for firm i from the announcement date of actual financial results of t-1 to the announcement date of actual financial results of t. $EPSForecastNews_{t,i} = [EPSForecast_{t,i} - EPSActual_{t-1,i}]$. $EPSForecast_{t,i}$ is the Consensus Forecast of EPS for firm i and year t constructed as the Mean of individual Analyst Forecasts of $EPS_{t,i}$ sourced from the Thomson Reuters IBES database issued after the announcement date of actual financial results of t-1 and before the announcement date of actual financial results of t.

$EPSActual_{t-1,i}$ is the actual value of earnings per share of t-1 as reported in IBES. $EPSForecast_{t,i}$ and $EPSActual_{t-1,i}$ are multiplied by the number of shares outstanding and deflated by total assets at beginning of t-1.

$EPSForecast_{RESIDUALSt}$ are the residuals from an OLS regression of the $EPSForecast_{t,i}$ on the Forecasted Real GDP Growth and GDP Deflator growth of year t:

$$EPSForecast_{t,i} = a + \beta\ ForecastedGDPGrowth_{t,j} + e_t$$

Crisis is an indicator (dummy) variable equal to 1 if fiscal year t = {2009,2013} and equal to 0 if fiscal year t = {2005,2008}.

$lnMV_{t-1,i}$ (Size factor) is the natural logarithm of the market value of equity of firm i at t-1. $B/M_{t-1,i}$ is the book to market value of equity ratio of firm i at t-1. Inv = log(CAPEX from the cash flow statement) at t-1.

$BetaCoefficient_{t-1,i}$ = estimated slope of $CompanyReturn = \alpha + \beta * MarketReturn$ estimated using daily returns for the two years prior to the announcement date of actual financial results of t-1.

*$ForecastedRealGDPgrowth_{t,j}$ and $ForecastedGDPDeflatorgrowth_{t,j}$ is the Real GDP Growth and GDP Deflator Growth forecast (% growth yoy) for year t and country j issued by the IMF in April t. Forecasted $growth_{t,j}$ *Crisis is an interaction term of the Forecasted Growth with the crisis dummy. $EPSForecast_{RESIDUALSt,i}$ *Crisis and $EPSForecastNews_{t,i}$ *Crisis are interaction terms of the $EPSForecast_{RESIDUALSt,i}$ and $EPSForecastNews_{t,i}$ with the crisis dummy.*

t-statistics reported (in parentheses) are based on heteroskedasticity- and autocorrelation- consistent Newey-West standard errors.

****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

To test stock market efficiency with respect to macroeconomic information and earnings forecasts and forecast news, the dissertation also estimates the future stock return model (3b) regressing future stock returns on the nominal GDP growth forecasts, and controlling for either residual earnings forecasts or earnings forecast news. Regression results are presented in Table 6.6 Panel C.

The findings indicate that the stock market is inefficient with respect to GDP growth forecasts (estimated regression coefficient β_5 = -3.532, t-stat = -2.839). This observed systematic reversal of the association between stock returns and the GDP growth forecasts is attributed to an over-reaction due to reliance on over-optimistic macro-forecasts that is eventually corrected by the market. The magnitude of the coefficient increases during the crisis (estimated regression coefficient $\beta_5+\beta_6$ = -4.212, with t-stat = -5.22). The finding of a significant predictive ability of GDP growth over future stock returns, is inconsistent with the expectations of the hypothesis of market efficiency with respect to macroeconomic forecasts (Hypothesis 4a). However, this stock return reversal with respect to GDP forecasts as well as the increased reversal in the highly volatile crisis period is attributed to a sharp increase in risk and over-estimation in macroeconomic growth forecasts. The macro-forecasts over-estimation has been discussed in recent studies such as in Pain et al. (2014).

The model of future stock returns (model 3b) also examines stock market efficiency with respect to residual earnings forecasts and earnings forecast news. The findings indicate that the stock market is efficient with respect to the macro-informed earnings forecast news which are able to explain variation in current stock returns but not future stock returns. However, residual earnings forecasts are positively associated with future stock returns (estimated regression coefficient $\beta_{7RESIDUALS}$ = 0.519, with t-stat = 2.456). The association between residual earnings forecasts and future stock returns is statistically significant (at a less than 5 percent level) and of economic meaning. A one-standard-

deviation increase in the analysts' earnings forecasts is associated with a 3.54 percentage point increase in future stock returns[54].

For news in earnings forecasts, the results are consistent with the hypotheses of value-relevance and efficient incorporation by the stock market (association with current but not future stock returns, Hypothesis 3a), and decline in the value-relevance in the crisis period (Hypothesis 3b).

For residual earnings forecasts, the findings indicate incorporation in current stock returns but also future stock returns (lower association with future stock returns), a finding not fully consistent with the expectations of Hypothesis 3a. Moreover, the findings on the value-relevance of residual earnings forecasts controlling for the crisis are not consistent with Hypothesis 3b, as the results indicate a value-relevant impact of higher magnitude on stock returns during the crisis. The association of residual earnings forecasts with future stock returns indicates that the stock market is relatively slower at incorporating analysts' generated information that is above and beyond the macroeconomic information, especially during the crisis period.

The finding of a relatively slower market response to residual analysts' forecasts that is magnified during the crisis can be attributed to the market's underreaction to the current year forecasts and to factors such as investors' scepticism during the highly uncertain period of the crisis. A sluggish response of the stock market to analysts' forecasts and forecast revisions has been documented in several studies as a price continuation (momentum) anomaly, and attributed to investors' slow response (underreaction) to the analysts' forecasts and revisions (e.g., Givoly and Lakonishok, 1979; Chan et al., 1996; Gleason and Lee, 2003; Zhang, 2006). Gleason and Lee (2003), provide evidence that the stock market pricing of analysts' forecast revisions (thus the price momentum anomaly) is higher for forecasts issued by analysts that diverge from

[54] $\beta x * (SDx/SDy) = 0.519 * [0.068/0.498] = 0.071$
$0.071 * SDy = 0.071 * 0.498 = 0.0354$ (3.54%)

the consensus. In a more recent study, Chen et al. (2016) show that analysts systematically underreact when revising their forecasts, thus investors' reliance on the biased analysts' revisions explains a significant portion of the price continuation anomaly.

Table 6.6: Stock Returns Association with GDP Growth Forecasts controlling for Analysts' Earnings Forecasts and Forecast News

Panel C: Future Stock Returns Association with Nominal GDP Growth Forecasts (Model 3b)

$$Returns_{t+1,i} = a_0 + a_1\ Crisis + \beta_1\ Size_{t,i} + \beta_2\ B/M_{t,i} + \beta_3\ Inv_{t,i} + \beta_4 BetaCoefficient_{t,i} + \beta_5\ ForecastedNominalGDPGrowth_{t,j} +$$
$$+ \beta_6\ ForecastedNominalGDPGrowth_{t,j}*Crisis + \beta_7\ EPSForecast_{RESIDUALSt,i} + \beta_8\ EPSForecast_{RESIDUALSt,i}*Crisis + \varepsilon_t \quad \text{(Model 3b)}$$
$$+ \beta_6\ ForecastedNominalGDPGrowth_{t,j}*Crisis + \beta_7\ EPSForecastNews_{t,i} + \beta_8\ EPSForecastNews_{t,i}*Crisis + \varepsilon_t \quad \text{(Model 3b)}$$

α_0	α_1	β_1	β_2	β_3	β_4	β_5	β_6	$\beta_{7Residuals}$	$\beta_{8Residuals}$	β_{7News}	β_{8News}	Adj. R^2	N
0.802***	-0.142**	-0.065***	0.031***	0.044***	-0.126**	**-3.532*** **	**-0.680**	**0.519****	**0.517**			7.83%	1066
(3.814)	(-1.988)	(-3.863)	(2.851)	(3.506)	(-2.357)	**(-2.839)**	**(-0.454)**	**(2.456)**	**(1.298)**				
0.657***	-0.126*	-0.047***	0.029***	0.031**	-0.134**	**-3.315*** **	**-1.015**			**-0.509**	**0.265**	6.73%	1048
(3.204)	(-1.730)	(-2.927)	(2.618)	(2.531)	(-2.464)	**(-2.619)**	**(-0.668)**			**(-1.016)**	**(0.313)**		

t-tests crisis period:

_b[ForecastedNominalGDPGrowth]+_b[ForecastedNominalGDPGrowth*Crisis] = 0	$\beta_5+\beta_6 = 0$	**-4.212*** **
$_b[EPSForecast_{RESIDUALSt}]+_b[EPSForecast_{RESIDUALSt}*Crisis] = 0$	$\beta_7+\beta_8 = 0$	**1.036*** **
_b[ForecastedNominalGDPGrowth]+_b[ForecastedNominalGDPGrowth*Crisis] = 0	$\beta_5+\beta_6 = 0$	**-4.330*** **
$_b[EPSForecastNews_t]+_b[EPSForecastNews_t*Crisis] = 0$	$\beta_7+\beta_8 = 0$	**-0.244**

$Returns_{t+1,i}$ = Future stock returns constructed with daily compounding of the total index return for firm i from the announcement date of actual financial results of t to the announcement date of actual financial results of t+1. $EPSForecastNews_{t,i} = [EPSForecast_{t,i} – EPSActual_{t-1,i}]$. $EPSForecast_{t,i}$ is the Consensus Forecast of EPS for firm i and year t constructed as the Mean of individual Analyst Forecasts of EPS $_{t,i}$ sourced from the Thomson Reuters IBES database issued after the announcement date of actual financial results of t-1 and before the announcement date of actual financial results of t.

$EPSActual_{t-1,i}$ is the actual value of earnings per share of t-1 as reported in IBES. $EPSForecast_{t,i}$ and $EPSActual_{t-1,i}$ are multiplied by the number of shares outstanding and deflated by total assets at beginning of t-1.

$EPSForecast_{RESIDUALSt}$ are the residuals from an OLS regression of the $EPSForecast_{t,i}$ on the Forecasted Nominal GDP Growth of year t:

$$EPSForecast_{t,i} = a + \beta\ ForecastedGDPGrowth_{t,j} + e_t$$

Crisis is an indicator (dummy) variable equal to 1 if fiscal year t = {2009,2013} and equal to 0 if fiscal year t = {2005,2008}.

$lnMV_{t,i}$ (Size factor) is the natural logarithm of the market value of equity of firm i at t. $B/M_{t,i}$ is the book to market value of equity ratio of firm i at t. Inv = log(CAPEX from the cash flow statement) at t.

$BetaCoefficient_{t,i}$ = estimated slope of $CompanyReturn = \alpha + \beta * MarketReturn$ estimated using daily returns for the two years prior to the announcement date of actual financial results of t.

*$ForecastedNominalGDPgrowth_{t,j}$ is the Nominal GDP Growth forecast (% growth yoy) for year t and country j issued by the IMF in April t. $ForecastedNominalGDPgrowth_{t,j}$ *Crisis is an interaction term of the Forecasted GDP Growth with the crisis dummy. $EPSForecast_{RESIDUALSt,i}$ *Crisis and $EPSForecastNews_{t,i}$ *Crisis are interaction terms of the $EPSForecast_{RESIDUALSt,i}$ and $EPSForecastNews_{t,i}$ with the crisis dummy.*

t-statistics reported (in parentheses) are based on heteroskedasticity- and autocorrelation- consistent Newey-West standard errors.
****, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.*

Chapter 7 Conclusions

7.1 Summary of Main Findings and Contribution

The dissertation provides evidence of financial analysts' efficiency with respect to real GDP growth expectations' incorporation into earnings forecasts and evidence of inefficiency with respect to the incorporation of inflation expectations. The research is conducted using a sample of listed-companies from four Eurozone countries (Spain, Italy, Portugal, and Greece) that were severely affected during the recent financial crisis. The crisis is employed as a state of the economy constraint revealing that financial analysts are fully efficient with respect to incorporation of real GDP growth expectations both before and during the crisis. However, their inefficiency with respect to incorporation of inflation expectations is observed in the period before the crisis, when analysts' forecasts fail to reflect the negative association between inflation and earnings. In the crisis period, inflation is no longer relevant for earnings, thus an inference with regards to analysts' inflation-related efficiency cannot be drawn.

On the area of market efficiency, the dissertation documents a positive association between real GDP growth forecasts and current stock returns in the pre-crisis period, mainly driven by a positive impact on expected earnings growth. The empirical results on inflation forecasts' value-relevance indicate a negative association between the inflation rate and current stock returns that stays largely unaffected during the crisis. Testing for efficiency, the forecasted GDP growth rate can significantly predict future stock returns, implying stock market inefficiency towards macroeconomic forecasts that is attributed to the over-optimistic nature of macroeconomic forecasts of the period. The macro-informed analysts' forecasts of earnings growth offer value-relevant information to the market that efficiently reacts to them. However, the empirical findings indicate that

the stock market is relatively slower at incorporating analysts' generated information that is above and beyond the macroeconomic information. After abstracting macroeconomic information contained in analysts' earnings forecasts, the residual analysts' forecasts have a persistent value-relevant component that is magnified in the period of the crisis.

This dissertation contributes to the analysts' forecast literature as well as the equity valuation literature at the intersection of financial accounting and macroeconomics, by providing novel evidence on the efficiency with which financial analysts incorporate the GDP growth expectations components (real GDP growth and inflation), as well as on the stock-market relevance of macroeconomic expectations and of analysts' earnings expectations. The associations are studied using the state of the economy as a constraint, taking the opportunity to analyze the models during the recent unprecedented Eurozone financial crisis that is of particular interest.

7.2 Limitations

The dissertation is limited with respect to the number of observations that are dependent on the availability of analysts' forecasts. The analysts do not cover a large number of firms in Europe, thus, the number of individual analysts' forecasts available is lower compared to that of U.S. samples, especially for periods before 2005. The analysis results are dependent on the start and end dates of the time series of the panel, however, the start of the sample period, 2005, also coincides with the mandatory adoption date of IFRS by the listed companies in the examined countries.

Another limitation of the dissertation is the employment of IMF produced estimates to proxy for macroeconomic expectations. The IMF estimates are a publicly available institutional source of macroeconomic news, and are thus used in the dissertation. However, alternative measures of macroeconomic expectations (by both

institutional and private sources) could be employed to further analyze the associations between analysts' forecasts and macroeconomic variables. Moreover, analysts employed in large brokerage houses usually have access to in-house expert macroeconomists that can assist them in the interpretation of macroeconomic expectations' impact on the firms they follow. The dissertation does not control for this in-house macroeconomist presence, which has recently been documented to have a positive effect on analysts' efficiency (Hugon et al., 2016). Moreover, despite the geographical diversification of international companies, the GDP growth measures employed in the dissertation are country-specific, and do not adjust for this international exposure (see Li et al., 2014; Doukakis et al., 2016, for recent findings with these specifications). However, the interest of the dissertation primarily lies on the financial analysts' incorporation of widely available macroeconomic forecasts, and thus the country-level GDP growth and inflation are deemed appropriate.

7.3 Suggestions for Future Research

The study of macroeconomic expectations' incorporation by financial analysts using the state of the economy as a constraint can expand to include other macroeconomic indicators such as industrial production growth, the unemployment rate, interest rate spreads, and confidence indicators. Given that financial analysts are considered to be important information intermediaries to the market (Kothari, 2001), their efficient incorporation with regards to various aspects of the economy will lead to more accurate forecasts of future profitability, and thus more reliable current equity valuations. The analysts' macro-related efficiency can also be examined controlling for analyst characteristics (for instance, experience, prior forecast accuracy, firm coverage), and

compared with the relative macro-related efficiency of management earnings forecasts and forecasts derived from time-series earnings models.

With respect to the macroeconomic expectations' incorporation by the stock market, future research can revisit the prior literature on the pricing of macroeconomic indicators, to offer more insight into the mechanics of information transmission from the aggregate level macroeconomic relationships to the firm-level cross-sectional differences.

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