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Accounting Information and the Cost of Capital: The Effect on Excess Stock Returns-Evidence from Panel Data

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Abstract: The goal of this paper is to investigate the impact of the firm's accounting information on its cost of capital and, in turn, how the latter affects its excess stock returns. The analysis in this paper has certain novelties: First, it extends prior works by investigating how certain components of accounting information affect stock returns through their direct effect on the cost of capital, second, it makes use of a large sample of US manufacturing firms, and third, it makes use, for the first time in this literature, of the methodology of panel data. The empirical findings displayed that accounting information affects directly the firm's cost of capital. This, in turn, exerts a negative effect on the firm's excess stock returns, an empirical documentation not captured in case that researchers attempt to direct link the cost of capital and excess stock returns.

Key words: accounting information; cost of capital; excess returns; us manufacturing; panel data
JEL Codes: M41, C33

1. Information accounting: Introduction

Most textbooks draw a very distinct line between financial accounting and management accounting. Kieso and Weygandt (1995), for example, define financial accounting as "… the process that culminates in the preparation of financial reports on the enterprise as a whole for use by parties both internal and external to the enterprise". Horngren (1995, 1996), on the other hand, defines management accounting from a broader perspective: "Management accounting is …the process of identifying, measuring, accumulating, analyzing, preparing, interpreting, and communicating information that helps managers fulfill organizational objectives". That definition comes very close to that of management control. Financial accounting in Horngren 's definition is strictly financial in nature: "Financial accounting refers to accounting information developed for the use of external parties such as stockholders, suppliers, banks, and government regulatory agencies".

The above comments are perhaps trivial and irrelevant on how a business operates as a "living entity". De Geus (1997) favors the need of a sound financial policy. Others, however, tend to discard the need for a very detailed financial analysis. Forrester (1961) recognizes the contribution of accounting information to the set of "loops" that feed into the analysis for business policy. That opinion certainly will be welcome by Johnson and

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Kaplan (1991). They explain why today's businesses suffer from a lack of good support for managerial decision-making. They argue that the direct information link between the production environment and a firm's managers is generally broken. The first cause was that, at the time, it was becoming too expensive to collect and consolidate all relevant business information directly and continuously from the business processes. The second cause, they argue, was that businesses were confronted with the need to finance their enterprises with public capital. Accurate financial statements on the health of the business were required by outside investors. The consequence of this requirement was that managers also started to use financial statements for internal organizational and management purposes. Accounting information, along with financial reporting, determines the extent of capital market efficiency (Chen et al., 2001). Kaplan and Norton (1996) offer an alternative to financial perspective, with the definition of three non-financial perspectives that make up their *Balanced Scorecard*. Their framework is designed on the assumption that behind these perspectives lies a "set of hypotheses about cause and effect", and that the "measurement system" should make the relationships (hypothesis) among objectives (and measures) in the various perspectives explicit, so that they can be managed and validated. By contrast, they take it as a fundamental assumption that this is the case. Nonetheless, their format of presentation can lead to a disjoint presentation of quantitative and qualitative information, and certainly of financial and nonfinancial data. The relationship between cause and effect should be made tangible through rigid structural analysis adhering to the systems methodology (Legasto 1980; Randers 1980; Richardson 1996; Sterman 2000).

The remainder of this paper is organized as follows. Section 2 discusses the issue of the cost of capital, while section 3 provides the analysis that justifies the link between accounting information and the cost of capital. Section 4 discusses the data along with the methodology used, while section 5 presents the empirical analysis. Finally, section 6 concludes the paper and provides some policy implications.

2. The cost of capital

The idea of the "cost of capital" is fundamental to what managerial finance and accounting professionals do, directly or indirectly, as part of their participation on cross-functional decision teams. They need to understand and apply techniques for estimating the cost of capital for long-term capital budgeting, merger and acquisition analysis, use of Economic Value Added as a firm-wide financial performance indicator, incentive systems for financial control, using residual income to evaluate financial performance, equity valuation analyses, and accounting for purchased goodwill.

A firm's cost of capital (WACC) is the investor's opportunity cost of investing his or her capital in that firm. An estimate of the firm's WACC is an attempt to quantify the average return expected by all investors in the firm: creditors of short-and long-term interest-bearing debt, preferred stockholders, and common stockholders. The firm's cost of capital is a weighted average, where the weights are determined by the value of the various sources of capital. In case there are only two sources of capital, that is long-term interest-bearing debt and (common) equity, with the definition of the cost of capital being shown in (1):

$$WACC = [w_d][K_d](1-T) + [w_s][K_s] \quad (1)$$

where, $[K_d]$ is the cost of long-term debt, T is the firm's marginal income tax rate, $[K_s]$ is the expected cost of common stock, and $[w_d]$ and $[w_s]$ are the weights of long-term debt and common stock in the firm's capital structure, respectively. When determining the weights of debt and equity, we use their market values rather than their book values, because market values are more reflective of the true value of the firm.

There are two models that can be used to estimate [K_s]: (1) a single-factor model called the Capital Asset Pricing Model (CAPM) and (2) a multiple-factor model called the Arbitrage Pricing Model (APM). Other researchers have popularized the use of a three-factor model consisting of: (1) the "excess return" or risk premium, for the market portfolio ([K_m]-[K_{rf}], (2) the return on a portfolio that represents the difference between the returns on a group of small capitalization stocks and the returns on a group of large capitalization stocks (referred to as a "Small Minus Big" portfolio, or the "SMB" factor, which is related to the size of the firm), and (3) the return on a portfolio that represents the difference between the returns on a group of stocks with high market-to-book equity ratios and the returns on a group of stocks with low market-to-book equity ratios.

As for cost of capital, Botosan (1997) has provided empirical evidence of the advantages of richer disclosure, confirming what is intuitive. Firms have been aware for decades of good relationships with investors being part of an effective financial policy. Good relationships depend on reporting information pertinent to investors' financial interests. Business executives, with respect to disclosure, can have valid concerns about any potential competitive disadvantage, the cost of developing the information, and the risk of liability from its dissemination.

3. The link between accounting information and the cost of capital

Accounting has been extensively dealing with the issue of the mutual association between accounting information and the cost of capital (Botosan, 1997; Botosan and Plumlee, 2002; Francis et al., 2004; Berger et al., 2005; Core et al., 2006). The reason is that it is highly likely that a greater extend of accounting information could lead to lower nondifersifiable risk for the case of the CAPM model. At the same time, this issue seems critical for portfolio theory that needs to separate alternative forms of risks. In other words, it seems substantial for firms to identify how such accounting information affects their cost of capital. Standard asset pricing models make use of discounted cash flows as well as abnormal earnings to infer firms' cost of capital (Botosan, 1997; Gebhardt et al., 2001). This literature characterizes firms' accounting reports as a substantial source of information about the course of future cash flows. In this manner, accounting information has the capacity to affect a firm's cost of capital through the following two channels: First, in a direct way, i.e., a higher degree of accounting information affects the assessments generated by market participants about the trend of the firm's cash flows and second, in an indirect way, according to which, a higher degree of accounting information affects the firm's real decisions, its expected value and, accordingly, its stock price. Both types of information seem to be related to certain variables, as they described through historical time-series observations, describing the potential of the firm's, as it is reflected by certain variables, such as the beta (Barry and Brown, 1985; Coles et al., 1995). Accounting information influences the firm's cost of capital by limiting the amount of cash flows that managers appropriate for themselves, leading to lower cost of capital and, therefore, to higher stock prices. Recent studies use information from both sides of the balance sheet, i.e., assets and liabilities, to assess the value-relevance of accounting information for stock prices (Ohlson, 1995). Previous works have also examined such links through the concept of market liquidity. In particular, studies by Baiman and Verrecchia (1996) and Easley and O'Hara (2004) suggest an indirect link between accounting information and the firm's cost of capital based on market liquidity and adverse selection.

Many studies have attempted to address directly the impact of information accounting on stock prices for global capital markets (Beaver et al., 1979; Amir et al., 1993; Barth and Clinch, 1996; Chan and Seow, 1996; Graham and King, 1998). Others have focused on examining the link between stock returns and earnings for various US firms (Collins, et al., 1989; Hayn, 1995), while Barth et al. (1998) and Burgstaher and Dichev (1997)

give emphasis on the joint role of assets and liabilities, in addition to earnings, for the course of stock prices. Alford et al. (1993) apply this analysis for firms outside the US and particularly in Ausralia, France, the Netherlands and the UK. Their results reach the same conclusions.

The goal of this paper is to empirically investigate the impact of the firm's accounting information on its cost of capital and, in turn, how the latter affects its excess stock returns. The analysis has certain novelties: First, it extends prior works by investigating how certain components of accounting information affect stock returns through their direct effect on the cost of capital, second, it makes use of a large sample of US manufacturing firms, and third, it makes use, for the first time in this literature, of the methodology of panel data.

4. Data

The firm level data sample covers a selected group of US manufacturing firms. Our sample (based on quarterly data) comes from Bloomberg. In case those firms have missing values for any of our variables under investigation are dropped. As a result, 330 firms have been employed spanning the period January 1990-June 2009. Variables such as the beta risk factor (b), the book value (bv), the market value (mv), earnings per share (eps), total earnings (e), and the price-earnings ratio (pe) are used to proxy accounting information. Finally, stock prices (p) are also obtained. This data set is also obtained from Bloomberg. For the empirical goals of the analysis the weighted cost of capital was calculated through equation (1) described above. To this end, data on the cost of long-term debt, the firm's marginal income tax rate, the cost of common stock, and the weights of long-term debt and common stock in the firm's capital structure, is also obtained from Bloomberg. When determining the weights of debt and equity, we use their market values rather than their book values. Data on the three-month T-bills rate (r_f) was also obtained from Bloomberg. In this manner, excess returns (er) are calculated simply by substracting r_f from percentage differences in stock prices. Finally, the RATS (version 6.1) software assists the empirical analysis.

5. Empirical analysis

5.1 Panel unit root tests

At the outset, the statistical properties of value added, the capital stock, labor and depreciation expenses are examined by testing for the presence of unit roots. There are a variety of panel unit root tests, which include Maddala and Wu (1999), Hadri (2000), Levin et al. (LLC, 2002), Im et al. (IPS, 2003), and Carrion-i-Silvestre et al. (2005), among others. Consider the following autoregressive specification:

$$y_{it} = \rho_i y_{it-1} + \delta_i X_{it} + \varepsilon_{it} \tag{2}$$

where $i = 1,..., N$ for each firm in the panel; $t = 1,..., T$ refers to the time period; X_{it} represents the exogenous variables in the model, including fixed effects or individual time trend; ρ_i are the autoregressive coefficients; and ε_{it} are the stationary error terms.If $\rho_i < 1$, y_{it} is considered weakly trend stationary, whereas if $\rho_i = 1$, then y_{it} contains a unit root. The Hadri (2000) and Levin et al. (2002) panel unit root tests assume that the error terms, ε_{it}, are independently and normally distributed random variables for all $i's$ and $t's$ with mean zero and constant variance. This assumption implies that the coefficient of y_{it-1} is homogeneous across all cross-section units of the panel and individual processes are cross-sectionally independent. In the case of dynamic panel data models, the recognition of parameter heterogeneity is important to avoid potential biases, which could emerge due to an improper specification.

In light of parameter heterogeneity, the IPS panel unit root test is utilized which allows for heterogeneous

autoregressive coefficients. Such heterogeneity could occur due to the different economic conditions and stages of economic development in each country. Im et al. (2003) suggest averaging the augmented Dickey-Fuller (ADF) unit root tests, while allowing for different orders of serial correlation, $\varepsilon_{it} = \sum_{j=1}^{p_i} \varphi_{ij} \varepsilon_{it-j} + u_{it}$. Substitution of this expression into (1) yields:

$$y_{it} = \rho_i y_{it-1} + \sum_{j=1}^{p_i} \varphi_{ij} \varepsilon_{it-j} + \delta_i X_{it} + \varepsilon_{it} \quad (3)$$

where p_i represents the number of lags in the ADF regression. The null hypothesis is that each series in the panel contains a unit root ($H_0 : \rho_i = 1 \; \forall_i$). The alternative hypothesis is that at least one of the individual series in the panel is stationary ($H_0 : \rho_i < 1$). Im et al. (2003) specify a $t-bar$ statistic as the average of the individual ADF statistics as follows:

$$t - bar = \frac{1}{N} \sum_{i=1}^{N} t_{\rho_i}$$

where t_{ρ_i} is the individual t-statistic for testing $H_0 : \rho_i = 1 \; \forall_i$ from (3). The $t-bar$ statistic is normally distributed under the null hypothesis, with the critical values for given values of N and T provided by Im et al. (2003).

The LLC test allows heterogeneity of individual deterministic effects and heterogeneous serial correlation structure of the error terms assuming homogeneous first order autoregressive parameters. They also assume that both N and T tend to infinity but T increases at a faster rate, such that N/T→0. Thus, a procedure is developed that uses t-statistics of the estimator to evaluate the hypothesis that each individual time series contains a unit root against the alternative hypothesis that each time series is stationary. The test also makes use of the ADF regression methodology, with the ADF regression defined as:

$$\Delta y_{it} = \alpha_i + \gamma_i \, y_{i,t-1} + \sum_{j=1}^{Pi} b_{ij} \Delta y_{i,t-j} + \varepsilon_{it} \quad (4)$$

Moreover, the test implements a separate ADF regression for each country where the lag order is permitted to vary across individual countries. The appropriate lag order is chosen by allowing the maximum lag order and then uses the t-statistic for the coefficients of the lag terms to determine if a smaller lag order is preferred. Next, it runs two separate regressions, such as:

$$\Delta y_{it} = a_i + \sum_{j=1}^{Pi} b_{ij} \Delta y_{i,t-j} + e_{it} \quad (5)$$

and

$$y_{i,t-1} = a_i + \sum_{j=1}^{Pi} b_{ij} \Delta y_{i,t-j} + v_{i,t-j} \quad (6)$$

and we save the residuals (e_{it} and $v_{i,t-j}$). We divide the saved residuals by the regression standard error of the regression for normalization purposes and, next, we run the regression:

$$e_{it} = \rho \; v_{i,t-j} + \varepsilon_{it} \quad (7)$$

with the null hypothesis being H_0: $\rho_1 = ... = \rho_n = \rho = 0$ and the alternative hypothesis H_1: $\gamma_1 = .. = \gamma_n = \gamma < 0$ for all i. LLC show that the asymptotic properties of the regression estimators are a mixture of properties derived for stationary panel data and properties derived in unit roots testing. This test seems to have certain limitations, such as that it depends seriously upon the independence assumption across individual regressions and hence not applicable if cross sectional correlation is present. In addition, a limitation is associated with the fact that the

autoregressive parameters are considered identical across the panel regressions (see the above null hypothesis). However, this null hypothesis makes sense under some cases. As Maddala and Wu (1999) point out, the alternative hypothesis is too strong to be valid in any empirical case.

Maddala and Wu (1999) offer a strategy that seems to overcome the limitations of both LLC and Im et al. tests. They suggest a non-parametric Fisher-type test, which is based on a combination of the p-values of the t-statistics for a unit root in each cross-sectional unit (the ADF test). The testing approach has the advantage of allowing for as much heterogeneity across units as possible. Under the hypothesis that the test statistics are continuous, the significance of p-values is independent in a uniform manner, e.g., they uniform (0, 1) variables and -2logp has a chi-squared distribution with two degrees of freedom. Using the additive property of the chi-squared variables, the statistic: $\lambda = -2\sum_{i=1}^{N}\log(p_i)$ is constructed, which has a chi-squared distribution with 2N degrees of freedom. The advantage of this test is that it does not require an infinite number of groups to be valid, so we do not have to assume that all groups must have the same type of non-stochastic components. In addition, T is not necessarily assumed to be the same for all the cross-section units, its critical values are not sensitive to the choice of lag lengths in the ADF regressions, and finally, it does not have to assume that none of the groups have a unit root under the alternative hypothesis.

The Carrion-i-Silvestre et al. (2005) test is associated with testing the residuals (ε) from the above individual OLS regression (2). Given those residuals, a Lagrange Multiplier (LM) statistic is constructed defined as:

$$LM = 1/N \left(\sum_{i=1}^{N}\sum_{t=1}^{T} S_{it}^2/T^2/\bar{u}_0\right) \quad (8)$$

where S_{it} denotes the cumulative sum of the residuals, T is the number of time periods and $\bar{u}_0$ is the average of individual estimators of the residual spectrum at frequency zero.

It is defined as, $\bar{u}_0=\sum_{i=1}^{N} u_{i0}/N$. Under certain assumption the statistic: $\sqrt{N}(LM-\zeta)/\xi \rightarrow N(0,1)$

where $\zeta=1/15$ and $\xi=11/6300$. The panel unit root tests indicate all the variables are integrated of order one.

The Hadri (2000) Lagrange Multiplier (LM) test is closely related to that of the Carrion-i-Silvestre *et al.* (2005) test. It has the advantage of combining both stationary and non-stationary variables and permits a formulation for a residual-based LM test of stationarity. Hadri adopts the following representation:

$$y_{it} = z_{it}'\gamma + r_{it} + \varepsilon_{it} \quad (9)$$

where z_{it} is the deterministic component, r_{it} is a random walk process defined as $r_{it} = r_{i,t-1} + u_{it}$, with $u_{it} \rightarrow iid(0, \sigma_u^2)$ and ε_{it} is a stationary process. The null hypothesis of trend stationarity corresponds to the hypothesis that the variance of the random walk is zero. The y_{it} process from above can be written as $y_{it} = z_{it}'\gamma + e_{it}$, where:

$$e_{it} = \sum_{j=1}^{T} u_{ij} + \varepsilon_{it} \quad (10)$$

The residuals from the above regression (e_{it}) are obtained. This time the statistic can be written as:

$$LM = 1/N \sum_{i=1}^{N}\left(\sum_{t=1}^{T} S_{it}^2/T^2/\sigma_\varepsilon^2\right) \quad (11)$$

where σ_ε^2 is the consistent Newey and West (1987) estimate of the long-run variance of residuals, while S_{it} is defined as above. The LM statistic is consistent and has an asymptotic normal distribution as both T and $N \rightarrow \infty$. The main advantage of this test is that the moments of the asymptotic distribution are exactly derived, while the disturbance terms can be heteroskedastic across i. Finally, it is also possible to allow for serial dependence

substituting the assumption that the errors ε_{it} are i.i.d. normally distributed over t with the assumption that they satisfy the strong mixing regularity conditions of Phillips and Perron (1988). In this case we replace σ_{ε}^2 by the long-run variance, defined as:

$$\sigma^2 = 1/N \sum_{i=1}^{N} \lim_{T\to\infty} T^{-1} (S_{iT}^2) \quad (12)$$

A consistent estimator of the above variance is obtained using again the estimators provided by Newey and West (1994).

The results in Table 1 point out that the hypothesis that all the variables, except the weighted cost of capital (wacc), the earnings per share ratio (eps) and excess returns (er), under study contain a unit root, is accepted at the 1% significant level in all tests, suggesting that these variables are I(1), while the wacc, the eps and the er are I(0) variables. These findings reject the presence of cointegation, while Carrion-i-Silvestre et al. (2005) tests, which allow for multiple level shifts, thereby, accommodating general forms of cross-dependence through bootstrap methods, denote that no structural breaks are detected.

Table 1 Panel unit root tests

IPS panel unit root tests		
Variables	Without trend	With trend
b	-1.47(3)	-1.68(3)
Δb	-5.11(2)*	-5.41(1)*
er	-5.10(2)*	-5.57(2)*
bv	-1.25(3)	-1.47(3)
Δbv	-5.07(2)*	-5.38(2)*
mv	-1.23(4)	-1.64(4)
Δmv	-5.06(2)*	-5.77(3)*
eps	-5.43(2)*	-5.86(3)*
e	-2.21(3)	-2.37(3)
Δe	-5.23(1)*	-5.48(2)*
wacc	-5.09(2)*	-5.33(2)*
pe	-4.87(3)*	-5.11(3)*
Δpe	-4.82(2)*	-5.21(2)*
LLC panel unit root tests		
Variables	With trend	
b	-1.32	
Δb	-9.53*	
er	-8.75*	
bv	-1.62	
Δbv	-9.37*	
mv	-1.44	
Δmv	-9.12*	
eps	-4.73*	
e	-2.11	
Δe	-8.47*	
wacc	-7.68*	
pe	-9.36*	

(to be continued)

Δpe	-8.73*
Handri (hom) panel unit root tests	
Variables	With trend
b	11.27*
Δb	1.35
er	1.17
bv	19.85*
Δbv	1.13
mv	23.46*
Δmv	1.25
eps	1.26
e	12.76*
Δe	1.42
wacc	1.44
pe	10.72*
Δpe	1.71
Handri (het) panel unit root tests	
Variables	With trend
b	8.48*
Δb	0.62
er	1.77
bv	18.36*
Δbv	1.47
mv	23.46*
Δmv	1.31
eps	1.54
e	10.91*
Δe	1.37
wacc	1.46
pe	12.44*
Δpe	1.56
Carrion-i-Silvestre *et al.* (no breaks, homogeneous)	
Variables	
b	19.83
er	9.94
bv	16.82
mv	16.79
eps	14.82
e	13.27
wacc	14.58
pe	11.95
Carrion-i-Silvestre *et al.* (no breaks, heterogeneous)	
Variables	
b	14.25
er	9.57
bv	14.51
mv	16.59
eps	15.29

(to be continued)

e	13.39
wacc	14.90
pe	11.75
Fisher-ADF	
Variables	
b	15.68
Δb	94.55*
er	118.33*
bv	21.23
Δbv	131.98*
mv	29.07
Δmv	157.33*
eps	164.95*
e	13.68
Δe	144.94*
wacc	141.23*
pe	14.77
Δpe	144.58*
Fisher-ADF	
Variables	
b	15.68
Δb	94.55*
er	118.33*
bv	21.23
Δbv	131.98*
mv	29.07
Δmv	157.33*
eps	164.95*
e	13.68
Δe	144.94*
wacc	141.23*
pe	14.77
Δpe	144.58*
Fisher-PP	
Variables	
b	21.26
Δb	132.48*
er	147.89*
bv	25.48
Δbv	142.18*
mv	31.22
Δmv	167.92*
eps	154.81*
e	12.72
Δe	139.88*
wacc	146.71*
pe	13.56
Δpe	146.81*

Note: Numbers in parentheses are the augmented lags included in the unit root test, while Δ denotes first differences;
* denotes statistical significance at 1%.

5.2 Dynamic heterogeneity

An issue that it is of major concern is the heterogeneity of the firms included in this data set. In particular, through time and across firms, the effects of accounting information–wacc relationship as well as that of the wacc-excess stock returns relationship. In the statistical framework of this study we first test for heterogeneity and then by controlling for it through appropriate techniques (Holtz-Eakin, 1986; Holtz et al., 1985). The dynamic heterogeneity, i.e., variation of the intercept over firms and time, across a cross-section of the relevant variables can be investigated as follows: In the first step, an ADF(n) equation for each relationship in the panel is estimated; then, the hypothesis of whether regression parameters are equal across these equations is tested. Next, a similar test of parameter equality is performed by estimating a n-order autoregressive model for each of the relationships under investigation. Standard Chow-type F tests under the null of parameter equality across all relationships are also performed. Heterogeneity in cross-sectional parameters is indicated if the results reject the null hypothesis. Finally, homogeneity error variance across groups is also examined as another measure of dynamic heterogeneity. White's tests for group-wise heteroscedasticity are employed to serve this objective. The results of this procedure are reported in Table 2. For both specifications the empirical findings indicate that the relationships under investigation are characterized by heterogeneity of dynamics and error variance across groups, supporting the employment of panel analysis.

Table 2 Tests of dynamic heterogeneity across groups

Specification	ADF(3)	AR(3)	White's test
wacc-Δb-Δbv-Δmv-			
eps-Δe-Δpe	25.68*	36.92*	64.84*
er-wacc	23.44*	32.68*	59.05*

Note: ADF(3) reports the parameter equality test (F-test) across all relationships in the panel. AR(3) displays the F-test of parameter equality conducted in a third-order autoregressive model of the relationships. White's test reports the White's test of equality of variances across the investigated relationships in the panel. Δ denotes first differences; * denotes statistical significance at 1%.

5.3 Panel regression estimates

The long-run relationship between cost of capital, beta, book value, market value, earnings per share, total earnings and the price earings ratio is specified as follows:

$$wacc_{it} = \alpha_{it} + \beta_{1i}\ \Delta b_{it} + \beta_{2i}\ \Delta bv_{it} + \beta_{3i}\ \Delta mv_{it} + \beta_{4i}\ eps_{it} + \beta_{5i}\ \Delta e_{it} + \beta_{6i}\ \Delta pe_{it} + \varepsilon_{it} \quad (13)$$

where i=1,…,N for each firm in the panel and t=1,…,T refers to the time period. Book values are considered important elements in reavealing substantial accounting information, especially for the future course of earnings (Burgstahler and Dichev, 1997). The importance of various measurements of earnings has been also exemplified for the accounting information value relevance (Kormendi and Lipe, 1987; Ramakrishnan and Thomas, 1998). This type of information seems to be extremely important for capital market investors.

Table 3 displays the estimation results. The first panel displays the effect of the variable composing the accounting information concept on wacc. In this model the coefficients are shown to have the expected signs, while they are all statistically significant at the one percent significance level. Looking at the model's overall performance, as reported by a battery of diagnostic tests, the estimated equation satisfies certain econometric criteria, namely absence of serial correlation (LM test), absence of functional misspecification (RESET test) and absence of heteroskedasticity (HE test). Once these estimations are available, the estimated wacc is saved. Next, Table 3 also presents two versions of the panel data model that associates the estimated cost of capital and excess stock returns. In particular, the second panel displays the effect of the cost of capital on excess stock returns

directly from the actual data and without taking into consideration any other accounting information. The results indicate that there exists a positive, albeit statistically insignificant, association between these two variables, which of course is in dispute. By contrast, in the third panel, the estimated cost of capital, i.e. the fitted values of wacc from the first panel of Table 3, which incorporates directly certain amounts of accounting information, is used and it is shown that it exerts a negative and statistically significant impact on excess stock returns. The statistical performance of the model also displays a satisfactory picture. This time, however, its explanatory performance has extensively risen, from 0.39 to 0.88.

Table 3 Panel (fixed effects) regression estimates

Cost of capital and accounting information			
$wacc_{it} = 0.47 + 0.209\ \Delta b_{it} - 0.0945\ \Delta bv_{it} - 0.0575\ \Delta mv_{it} - 0.0542\ eps_{it} - 0.105\ \Delta e_{it} - 0.0401\ \Delta pe_{it}$ (44.5)* (25.2)* (-7.07)* (-6.23)* (-11.8)* (-8.94)* (-6.82)*			
$\overline{R}^2 = 0.63$	LM=1.28[0.40]	RESET=2.13[0.26]	HE=1.17[0.34]
Stock prices and cost of capital (Direct approach)			
er = 0.044 + 0.095 wacc (1.27) (1.36)			
$\overline{R}^2 = 0.39$	LM=1.55[0.48]	RESET=2.06[0.22]	HE=1.78[0.39]
Stock prices and cost of capital (Indirect approach through accounting information)			
er1 = 1.924 – 0.592 wacc1 (20.5)* (-25.2)*			
$\overline{R}^2 = 0.88$	LM=1.45[0.44]	RESET=2.77[0.40]	HE=1.51[0.48]

Note: t-statistics are reported in parentheses. LM is a serial correlation for the residuals test, RESET is a model specification tests and HE is a heteroskedasticity test. Figures in brackets denote p-values, while Δ denotes first differences; * denotes significance at 1%.

6. Conclusions and policy implications

This paper showed empirically the links between accounting information, the cost of capital and excess stock returns for a sample of 330 US manufacturing firms and the panel data methodological approach over the period 1990-2009. The empirical findings displayed that accounting information, as it is proxied by certain variables closely associated with each firm, affects directly the firm's cost of capital. This, in turn, exerts a negative effect on the firm's excess stock returns, an empirical documentation not captured in case that researchers attempt to directly link the cost of capital and excess stock returns. A possible explanation is based on the arguments that improved accounting information affects the firm's real decisions. As a result, investors can assess better the future potential course of the firm, which has a direct effect on the future course of the firm's stock price. As a result of this signal, the stock market reacts quickly to available information. In future research efforts, the concept of accounting information could incorporate more information directly from the balance sheets of firms or other control factors, such as the quality of earnings announcements, the size of the firms and analysts' forecasts.

These findings add more evidence to the claim that accounting information is relevant to the pricing process in the stock markets, since it provides with useful information regarding the relevance of firm's accounting data. Moreover, they strongly suggest that higher levels of disclosure of accounting information produce a reduction of the market's perception of the risk associated to stock returns, which lowers the risk vs return relationship of marketed securities. The above empirical findings have also important implications especially for regulatory authorities that have to make mandatory the disclosure of more accounting information, thus, leading to lower market risk premium and higher stock prices. The power of law can be used to establish structures wherein necessary disclosures are an important condition for the proper working of the market, since good information,

readily available and impossible to ignore, will reduce opportunities for self deception.

Moreover, the results could also be taken seriously into consideration by practitioners, as a mean for better evaluation of accounting policies. Thus, various groups who are involved in this accounting system, as accountants and auditors, with a goal to improve to a great extent the quality of accounting information, should find those mechanisms efficient enough to enable them to transmit such information to final investors and to disclose all possible information that will assist the entire system to avoid potential future crises. For managers they provide insights into the strategies they could follow to increase the extent to which stock prices and returns impound their private information. If managers maintain a high quality reporting system, investors are more responsive to their disclosure performance. In other words, the empirical findings suggest that investors mitigate the risk of resource misallocation by conditioning their reliance on quality disclosures as well as on managerial incentives. At the same time, the results provide evidence that higher disclosure provides more acute information for managers to identify and distinguish between goods vs bad projects. In this manner, accounting information provides better data on expected profitability of investment projects as well as on firm's itself. Given the firm's resistance to disclose, the empirical results of this study might contribute to the clarification of the advantages of disclosing accounting information by firms and to decrease the resistance to disclose. In other words, accounting information is shown to be substantially useful to both investors and firms.

Finally, the empirical findings are highly relevant for the market efficiency hypothesis. In particular, the fact that stock returns do react to the impact of certain pieces of accounting information, is a signal of market inefficiency and in this case there might be opportunities for some market participants to manipulate the market, and such manipulation is clearly disruptive to the price formation process. The findings of this study provide evidence suggesting that the stocks under investigation are not valued in an unbiased manner in relation to their fundamentals and they are likely to be mispriced. In other words, accounting information is not impounded in stock prices in an unbiased manner. If the structure of accounting information were irrelevant, then the findings should have displayed that accounting variables should not have caused any market reaction (no significant effect on stock returns), because they affect neither future operating profitability nor risk. It was found, however, that the market did react. This suggests that accounting information had not been impounded in stock prices.

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