

In the Perspective of Total Beta - Accounting Beta: Which Measure Is The Best?

Findings from Italian Market

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Abstract

The importance of the estimation of a congruous discount rate for unlisted companies is due to its use in evaluation process. The cost of equity is usually defined from CAPM that does not suit for unlisted companies. In the previous paper we analyzed the accounting beta model, using CAPM beta as comparison point, identifying the stability of the model. However CAPM beta is based on the hypothesis that all the investors diversify their portfolio, while in some context most of investor do not. So the aim of this research is to pay attention on the accounting beta, that is a model suitable for unlisted companies, starting from total beta that consider the phenomenon of non-diversification. In order to reach the goal, after a literature review, we have conduct an empirical analysis to find the differences from the approach of total beta and the approach of CAPM beta.

Keywords: total beta, diversification, cost of equity, SME, CAPM beta, accounting beta, unlisted companies, Italian market

1. Introduction

This paper is a continuation of Intrisano, Palomba, Di Nallo, Calce (2017). The aim of this article is to verify the adaptability of accounting beta model, using as comparison point the total beta, that considers non-diversification. In particular we want to identify any differences respect to Intrisano, Palomba, Di Nallo, Calce (2017), in order to check stability of accounting beta among total beta.

This need born from the entrepreneurial condition of some countries. In fact as reported in Muller et al (2015) SMEs are backbone of the European economy because they represent 99% of all businesses. In particular in France, Italy, Portugal and Spain they play a fundamental role. Some research like Friend and Blume (1975), Polkovnichenko (2005), Goetzmann and Kumar (2002), Calvet, Campblell e Sodini (2007) show that investors tend to center their financial resources in few stocks, for different reasons, included the need of concentrate their resources in SME's capital. Focusing on Italy, It can be said that SMEs are very popular. The idea that SMEs are often not listed is confirmed by Pagano, Panetta, Zingales (1998), in fact they assert that the likelihood of an IPO is increasing in the company's size and the industry's market-to-book ratio. So in Italy, like in other countries where SMEs are widely diffused, the necessity of a model that consider non diversification emerges. The model mostly used to calculate cost of equity is CAPM introduced by Sharpe (1964) as a pursuance of Markowitz (1958). As already mentioned this model does not suit for unlisted companies, due to diversification problem. So some academics have focus on model built for unlisted companies. The most important model are fundamental beta and accounting beta. Fundamental beta is introduced by Beaver, Kettler, Scholes (1970) and Rosenberg, Marathe (1979). The idea is to link CAPM beta to explanatory financial data. Also Damodaran (2006) follows this setting. Accounting beta provides a linear regression between accounting measure of company and the average of the same accounting measure of related to all the listed companies of the market. Accounting beta represents a model suitable for unlisted companies and not related to CAPM beta.

In the next paragraph, we will pay attention on academic literature about total beta and accounting beta.

2. Literature review

Camp ed Eubank (1981) first introduce the total beta measure, initially identified as the beta quotient. The two authors, starting from the consideration that often even the funds present beta with R^2 not very high, condition that represent an inefficient diversification, try to identify a risk measure that also incorporates the specific risk. Beta quotient is the ratio between the beta resulting from the CAPM and the square root of the R^2 of the regression.

Next the steps for the definition of total beta.

It starts from the definition of R^2 . In the linear regression:

$$R^2 = \rho^2 (1)$$

from which $R = \rho$
 Correlation coefficient:

$$\rho = \frac{\text{cov}(j,m)}{\sigma_j \sigma_m} \quad (2)$$

We can explain covariance in terms of beta:

$$\beta = \frac{\text{cov}(j,m)}{\sigma_m^2} \quad (3);$$

$$\text{cov}(j,m) = \beta \sigma_m^2 \quad (4)$$

So replacing (4) in (2):

$$\rho = \frac{\beta \sigma_m^2}{\sigma_j \sigma_m} \quad (5),$$

Simplifying:

$$\rho = \frac{\beta \sigma_m}{\sigma_j} \quad (6)$$

$$\text{Remembering (1): } \frac{\beta \sigma_m}{\sigma_j} = R \quad (7)$$

Now from (7) explain σ_j :

$$\sigma_j = \frac{\beta \sigma_m}{R}$$

From which:

$$\sigma_j = \text{Beta quotient} * \sigma_m;$$

$$\frac{\sigma_j}{\sigma_m} = \text{Beta quotient}.$$

Given the expression of CAPM beta

$$\beta_m = \frac{\rho_{j,m} * \sigma_j}{\sigma_m}$$

It is possible to affirm

$$\beta_m = \text{Beta quotient} * \rho_{j,m}$$

$$\text{Beta quotient} = \frac{\beta_m}{\rho_{j,m}}$$

This concept is then taken up again by Damodaran (2006) with the definition of total beta. The main proponents of this approach are Butler and Pinkerton (2006) who try to provide empirical and academic evidence to support this risk measure. Their main purpose is not the determination of the total risk but of the specific risk, as they assume inappropriate the practice according to the benchmark for the specific risk is equal to 0%.

As in Camp, Eubank, It starts from the concept of diversification. The basic assumption to use total beta is the presence of an investor with a non-diversified portfolio. If a non-diversified buyer competes with a fully diversified buyer who uses the CAPM, according to which only systematic risk is considered, the return requested by the non-diversified investor will be higher and therefore the market will accept the investor's return with diversified portfolio. So in this case the non-diversified buyer can not be recognized all his risk and therefore It is necessary to add an additional factor, the specific risk.

There are two empirical conditions for optimal use of total beta: presence of a high R^2 ; not high beta.

Some criticisms have been made towards the total cost of equity approach, in particular by von Helfenstein

(2009), Conn (2011) and Kasper (2008). The first author expresses some perplexities regarding the statistical significance of the intermediate results necessary for the determination of total beta. It supports facts that some statistical expressions can not undergo simple arithmetic adjustments. He also has some doubts about the relationship between the two standard deviations in fact he says that a direct comparison between two or more dispersion measures is impossible. Moreover, according to the author, it does not matter which arguments are used to justify a series of equations, if those equations violate known fundamental principles. The same accusation is raised by Kasper (2008) that say that total beta breaks the financial theory. In response, Butler and Pinkerton argue that this does not happen if we refer to cases in which the specific risk is not at all considered or is considered only marginally. Lastly, Conn, who consider not significant the accusations that the total beta is not a valid substitute for the classic beta, because in the hypothetical case of a correlation coefficient equal to one the two variables converge. He is more interested in the risk premium, and in fact, in the perspective of total betam he does not consider consistent the use of the classic risk premium of the CAPM, that is coherent with the remuneration of only systematic risk.

Regarding to accounting beta, It represents a good alternative to CAPM beta for unlisted companies because It is not linked to CAPM beta, that do not consider the problem of diversification and also because the only information about unlisted company required is an accounting measure. Instead in CAPM beta price information are necessary and unlisted companies do not have these information.

Accounting beta is the result of the linear regression between an accounting measure (dependent variable) and the market average of the same accounting measure (independent variable).

Accounting beta is introduced by Ball, Brown (1969), concluding that accounting income have an explanatory power of about 40% of the changes in CAPM beta.

Beaver, Kettles, Scholes (1970) deal with this topic. They show an high degree of association between beta and accounting variables. This association is confirmed by Beaver, Manegold (1975). Ismail, Kim (1989) tell about relationship among cash flow measures and CAPM beta. However these studies concentrate on connection between accounting beta and CAPM beta, while the aim of this paper is to investigate the contact between accounting beta and total beta.

About accounting measures emerges that: net income is used by Ball, Brown (1969), Beaver, Kettles, Scholes (1970), Beaver, Manegold (1975), Kim (2004), Almisher, Kish (2000), operating income by Ball, Brown (1969), Kim (2004).

3. Data and Methodology

Data about price and accounting measures are collected from Thomson Reuters Datastream for a ten years period (2006-2015). Panel is composed by the 303 companies that was listed in Italian market in 2015.

The data and methodology used in this paper are the same of Intrisano, Palomba, Di Nallo, Calce (2017). The aim of this paper is to verify any differences with previous study. So in order to achieve the goal the following steps are necessary: reckoning of accounting beta (ROE, net income, operating income); calculation of total beta; comparison.

As reported in literature review accounting beta model involves a linear regression between accounting measure of single stock and average accounting measure of the market. We compute this beta only for companies that have n. 10 balance sheet (2006-2015) available. When a company does not have balance sheet even for a single years the accounting beta is not calculated, while the accounting measures of the previous years are used in order to calculate average of the market. Following the literature we select net income, operating income and ROE as accounting measure.

The calculation of total beta involves other two passage: computation of CAPM beta and correlation between market index (FTSE MIB) and single stock. CAPM beta are calculated for a five years period (2011-2015) with monthly observations, as in professional practice. We do not calculate all CAPM beta but only for stocks that have complete price information in the time. The next steps are the detection of pearson correlation coefficient and the computation of total beta.

As mentioned the empirical analysis is about Italian market that in 2015 was composed by 303 companies. Only 157 companies are taken in our analysis because they have complete information to calculate at the same time total beta and three measures of accounting beta.

4. Results

The first result is that the average of total beta of 157 companies is 2,12, an higher value than average CAPM beta (0,29) of Intrisano, Palomba, Di Nallo, Calce (2017). So because total beta includes specific risk.

Results are summarized in the following table.

Table 1: Accounting Beta and Total Beta

	Accounting Beta - ROE	Accounting Beta - Net Income	Accounting Beta - Operating Income	Total Beta
Company n. 1	0,306843557	9,732393911	3,716238008	2,202900494
Company n. 2	-0,443969901	0,036174882	0,03186258	2,642466142
Company n. 3	0,069587849	-0,203426024	-0,332504998	1,696515953
Company n. 4	0,170115248	0,170186633	0,468447691	1,437145909
Company n. 5	0,596853673	0,180788549	0,207109027	1,869968083
Company n. 6	-1,169638099	-0,452466028	-0,548411894	2,095839057
Company n. 7	0,111165293	0,119584335	0,194072015	2,389172185
Company n. 8	0,089456589	2,369902658	-4,140280527	2,218085194
Company n. 9	0,05964944	0,248257264	0,143263826	1,627735798
Company n. 10	0,964025987	3,309689933	6,232524361	2,362915074
Company n. 11	0,312794913	0,419830807	0,744912219	1,432863364
Company n. 12	0,149279056	6,405877017	6,179436193	2,37844915
Company n. 13	0,155629644	1,012218403	4,388436746	2,119145266
Company n. 14	0,058848621	0,261907552	1,084145793	2,001159969
Company n. 15	0,18742559	2,649926844	3,5624753	3,226217992
Company n. 16	0,495795998	23,26468863	27,584306	2,945407339
Company n. 17	-0,000457987	-0,033101596	0,11800655	2,003848283
Company n. 18	0,299616094	10,04001251	13,15334	2,791362148
Company n. 19	0,544434363	61,64408235	76,21914869	2,565520777
Company n. 20	0,392500396	35,43793498	27,92580289	2,056946769
Company n. 21	0,364573102	0,131612478	0,402410221	2,02708525
Company n. 22	0,155680473	0,454915541	1,688801947	1,970007636
Company n. 23	0,048372369	-0,151853548	-0,724880128	1,042977719
Company n. 24	0,015801421	-0,022495158	-0,029516196	1,411060831
Company n. 25	0,040980763	-0,016311533	-0,094644664	1,125461899
Company n. 26	-0,030902867	-0,190172312	-0,512993719	1,831909232
Company n. 27	0,214465126	0,066599599	0,258110615	1,766871085
Company n. 28	0,132103236	0,38415405	1,195814468	1,471984433
Company n. 29	0,155966511	0,032008023	0,074829986	0,838478373
Company n. 30	0,290300154	0,238863512	0,307224265	2,095695234
Company n. 31	0,162609607	0,048176218	-0,005926686	0,887925725
Company n. 32	0,15141171	0,074955378	0,156160217	1,861517559
Company n. 33	0,216366248	2,377118163	5,524755543	2,618725812
Company n. 34	0,148684214	0,385473101	0,890873448	1,838903143
Company n. 35	0,276405777	1,738810339	3,842813347	1,642658486
Company n. 36	0,184367964	1,491167296	5,614129977	2,326390744
Company n. 37	0,033260019	-0,535873365	-0,345271557	1,972005247
Company n. 38	0,014531582	0,00912385	-0,003216919	1,204245906
Company n. 39	-0,013631318	0,05380593	-0,37558855	1,693607685
Company n. 40	-1,39746891	-0,028239315	-0,050557309	2,134350364
Company n. 41	0,084796571	6,072134356	-15,45702258	1,320832053
Company n. 42	-0,028256076	-0,389099435	-1,874851395	0,877649779
Company n. 43	0,084256563	0,164572198	-1,051058886	1,491584522
Company n. 44	0,244003708	2,119981147	0,467185861	1,991668906
Company n. 45	0,351631795	0,092829974	0,329176668	1,718127143
Company n. 46	0,20565801	0,002965547	0,056447082	1,750545657
Company n. 47	-0,013640995	-0,075027716	-0,047515867	1,093697741
Company n. 48	0,396427394	0,025516658	0,087796153	1,796694915
Company n. 49	0,118846971	-0,007031767	0,000780581	1,266812801
Company n. 50	0,122771257	0,034873983	0,062766043	1,34310763
Company n. 51	0,26356041	0,015481113	0,082317689	1,561363737
Company n. 52	0,112415664	0,001479266	0,160378149	1,193333251
Company n. 53	0,239303716	0,143861028	0,260868796	1,123105314
Company n. 54	0,067993169	-0,224200525	-0,456344013	1,762499813
Company n. 55	-0,043432185	-0,275912387	-0,835078113	1,667528305
Company n. 56	0,119855536	0,234708825	0,794191618	2,149721865

	Accounting Beta - ROE	Accounting Beta - Net Income	Accounting Beta - Operating Income	Total Beta
Company n. 57	-0,063401741	-0,063352406	0,015260137	1,025772445
Company n. 58	1,011591372	-0,017736524	-0,014545013	1,469703116
Company n. 59	-0,215292647	-3,254792835	-32,46737869	1,399097036
Company n. 60	0,495597285	-0,001647693	0,002994918	6,938665602
Company n. 61	-0,032625312	-0,019253161	-0,047127653	2,105533494
Company n. 62	0,254540657	25,49548843	11,55352419	1,541057799
Company n. 63	-0,041441031	-0,100751511	-0,068621868	1,229821399
Company n. 64	0,160766271	1,421130301	-0,111842714	1,247283476
Company n. 65	0,052456707	0,007984494	0,013259806	1,936965196
Company n. 66	0,009143028	-1,732781338	-7,41203577	0,844058314
Company n. 67	0,12667619	0,401111931	0,291796101	2,267083721
Company n. 68	-0,010608323	-0,220786409	0,540818001	1,124405744
Company n. 69	-0,031049528	-0,026961919	-0,014553697	1,561129903
Company n. 70	0,092976003	4,548219285	0,541762472	1,301951969
Company n. 71	0,097543079	-0,030986182	0,024703594	0,960986583
Company n. 72	-0,046377445	-0,035138325	0,053177475	1,997291265
Company n. 73	0,317900044	0,8276536	3,766033848	1,475491185
Company n. 74	0,430291291	0,078371347	0,198044661	1,362274526
Company n. 75	0,05837026	-0,071830738	-0,200456997	1,033570563
Company n. 76	-0,011559765	-0,307774163	-0,67689189	1,410524844
Company n. 77	-0,111256395	-0,380947479	-0,859496164	1,492090779
Company n. 78	0,099662666	0,01135816	0,02860812	1,123653773
Company n. 79	0,08601777	0,018461773	0,090733682	1,51656522
Company n. 80	0,738754579	-0,021482244	0,059640317	3,324942037
Company n. 81	0,53305153	0,006096773	0,018514116	3,427375157
Company n. 82	0,132484215	0,027741514	0,023585942	1,743168981
Company n. 83	0,179018034	0,04831026	0,060716394	1,289833989
Company n. 84	0,014138598	-0,061344911	-0,219182442	1,387408885
Company n. 85	0,094018811	-0,00690092	-0,002182518	3,495434549
Company n. 86	0,302820411	0,013842566	0,066684766	1,503126411
Company n. 87	0,133290061	0,037159223	0,135216209	1,600360057
Company n. 88	0,178385334	0,052803282	0,171691824	2,048496183
Company n. 89	0,266119509	-0,079843826	-0,02848173	1,202153063
Company n. 90	0,057321601	-0,19236463	0,156491029	1,273198937
Company n. 91	0,29680948	0,100224748	0,438272101	1,324068225
Company n. 92	0,051618411	-0,464113328	-1,037979321	1,31700857
Company n. 93	0,05441237	-0,012537071	-0,040442551	1,018487979
Company n. 94	0,080230027	-0,007758685	-0,002196393	0,980895312
Company n. 95	-0,012981469	-1,084863261	1,335347414	1,211595587
Company n. 96	0,235215813	0,268377802	0,274410586	2,51603965
Company n. 97	0,086599122	-0,178198713	-1,022805557	1,812731831
Company n. 98	0,066687355	-0,012152329	0,014434806	2,438293867
Company n. 99	0,361767336	-0,004908153	-0,001185201	1,237838221
Company n. 100	0,038811925	0,099920431	-0,408644271	1,643098742
Company n. 101	0,104477498	-0,282212626	-31,5301487	1,747516827
Company n. 102	0,082043071	-0,017823028	-0,078193153	4,331537092
Company n. 103	0,229098457	0,397612092	0,392915873	1,62061977
Company n. 104	-0,801389745	-0,101959716	0,094605976	1,493308747
Company n. 105	0,556937239	-0,006558837	0,008263331	2,156727696
Company n. 106	0,353574291	0,047837595	0,089555544	2,775835123
Company n. 107	0,953664178	0,766917672	1,002882845	2,36224713
Company n. 108	0,33733265	-0,000661053	-0,009716899	1,712577401
Company n. 109	0,210021358	0,24670143	0,926395901	2,314812906
Company n. 110	0,207506789	2,202458819	5,964312193	2,411589233
Company n. 111	1,232656123	2,291883026	2,693678677	8,685672775
Company n. 112	0,056820714	0,037439004	0,082457876	1,916613903
Company n. 113	0,202319091	1,034121657	2,316342052	2,33997663

	Accounting Beta - ROE	Accounting Beta - Net Income	Accounting Beta - Operating Income	Total Beta
Company n. 114	0,22582134	-4,9823E-05	-0,419813033	1,145256585
Company n. 115	0,158580812	5,080318346	2,568551756	1,217872612
Company n. 116	0,186653393	2,545461945	3,870171705	3,658523479
Company n. 117	0,023991886	0,029652666	0,005063878	3,608974566
Company n. 118	0,158559223	25,42202831	74,01622808	1,047639051
Company n. 119	0,18936376	0,905873478	0,595295724	1,541133249
Company n. 120	0,395722079	2,064772182	1,952442982	1,900507408
Company n. 121	0,106889683	-0,592788234	-1,927319516	0,968008425
Company n. 122	-0,058814974	-0,259943859	-0,398878969	1,519425593
Company n. 123	0,369382409	0,062137527	-0,159786248	1,598322231
Company n. 124	0,55440333	0,481614805	1,142610414	1,986674263
Company n. 125	0,264139431	-0,027396747	0,529844587	1,9307734
Company n. 126	-0,254653574	-0,073957758	-0,040990848	1,158873242
Company n. 127	0,235169417	0,052316494	0,210630018	2,842971248
Company n. 128	0,090376535	0,008234997	-0,007857243	1,528056637
Company n. 129	0,095871147	-0,036882861	-0,011874128	3,150352712
Company n. 130	0,03066564	-0,25443412	-0,709837415	1,223288508
Company n. 131	155,2773656	1,588541359	0,8180505	2,890768135
Company n. 132	-0,096537616	-0,002666207	0,019323165	1,205339371
Company n. 133	0,224674331	0,130496483	0,02597025	1,905127839
Company n. 134	1,21258527	-0,090875786	-0,166377334	3,439215763
Company n. 135	0,10474867	0,805733203	-0,191509435	1,738578934
Company n. 136	0,102882952	0,149130359	-0,206180903	2,005229389
Company n. 137	-0,043299107	-0,090511693	-0,139750854	1,370066276
Company n. 138	-1,875870565	-0,054361663	-0,047122744	2,306670103
Company n. 139	0,130681341	0,018550586	0,070102304	1,201042736
Company n. 140	0,28543892	0,065030802	0,081150129	1,421475153
Company n. 141	-0,358108912	-0,014347434	-0,03617553	2,388161942
Company n. 142	-1,275455459	-0,032472593	-0,019004979	2,938585516
Company n. 143	0,047907755	0,002059321	-0,021512444	1,568697726
Company n. 144	0,597577494	0,017047584	0,013466231	1,527836453
Company n. 145	-0,103217717	-0,102357911	-0,262607126	2,146145445
Company n. 146	-0,112458	-0,006850918	-0,01361947	1,48950843
Company n. 147	0,193896812	-0,00607671	-0,029112446	1,516458827
Company n. 148	-0,443969901	0,036174882	0,03186258	2,642466142
Company n. 149	-0,175470818	0,027507673	0,042717216	2,759185561
Company n. 150	0,139766499	0,000526109	0,000474191	1,376484819
Company n. 151	0,232611778	0,087171575	0,238129511	2,347461263
Company n. 152	0,073354743	-0,100947341	-0,248748605	1,082681557
Company n. 153	0,16170664	0,032120703	0,138920158	1,765260781
Company n. 154	-0,037716554	-0,042739795	-0,83026282	2,256178801
Company n. 155	0,215604267	0,045762898	0,096792962	2,115053454
Company n. 156	0,212199101	0,242399004	1,583297493	1,541455363
Company n. 157	0,829517972	0,251347943	0,27658882	2,500926356

The next step is the comparison between accounting beta and total beta in order to check the stability of the alternatives. The following column represents the difference between accounting beta and total beta.

Table 2: differences between Accounting Beta and Total Beta

	Accounting Beta ROE – Total Beta	Accounting Beta Net Income – Total Beta	Accounting Beta Operating Income – Total Beta
Company n. 1	-1,89606	7,529493	1,513338
Company n. 2	-3,08644	-2,60629	-2,6106
Company n. 3	-1,62693	-1,89994	-2,02902
Company n. 4	-1,26703	-1,26696	-0,9687
Company n. 5	-1,27311	-1,68918	-1,66286
Company n. 6	-3,26548	-2,54831	-2,64425
Company n. 7	-2,27801	-2,26959	-2,1951
Company n. 8	-2,12863	0,151817	-6,35837
Company n. 9	-1,56809	-1,37948	-1,48447
Company n. 10	-1,39889	0,946775	3,869609
Company n. 11	-1,12007	-1,01303	-0,68795
Company n. 12	-2,22917	4,027428	3,800987
Company n. 13	-1,96352	-1,10693	2,269291
Company n. 14	-1,94231	-1,73925	-0,91701
Company n. 15	-3,03879	-0,57629	0,336257
Company n. 16	-2,44961	20,31928	24,6389
Company n. 17	-2,00431	-2,03695	-1,88584
Company n. 18	-2,49175	7,24865	10,36198
Company n. 19	-2,02109	59,07856	73,65363
Company n. 20	-1,66445	33,38099	25,86886
Company n. 21	-1,66251	-1,89547	-1,62468
Company n. 22	-1,81433	-1,51509	-0,28121
Company n. 23	-0,99461	-1,19483	-1,76786
Company n. 24	-1,39526	-1,43356	-1,44058
Company n. 25	-1,08448	-1,14177	-1,22011
Company n. 26	-1,86281	-2,02208	-2,3449
Company n. 27	-1,55241	-1,70027	-1,50876
Company n. 28	-1,33988	-1,08783	-0,27617
Company n. 29	-0,68251	-0,80647	-0,76365
Company n. 30	-1,8054	-1,85683	-1,78847
Company n. 31	-0,72532	-0,83975	-0,89385
Company n. 32	-1,71011	-1,78656	-1,70536
Company n. 33	-2,40236	-0,24161	2,90603
Company n. 34	-1,69022	-1,45343	-0,94803
Company n. 35	-1,36625	0,096152	2,200155
Company n. 36	-2,14202	-0,83522	3,287739
Company n. 37	-1,93875	-2,50788	-2,31728
Company n. 38	-1,18971	-1,19512	-1,20746
Company n. 39	-1,70724	-1,6398	-2,0692
Company n. 40	-3,53182	-2,16259	-2,18491
Company n. 41	-1,23604	4,751302	-16,7779
Company n. 42	-0,90591	-1,26675	-2,7525
Company n. 43	-1,40733	-1,32701	-2,54264
Company n. 44	-1,74767	0,128312	-1,52448
Company n. 45	-1,3665	-1,6253	-1,38895
Company n. 46	-1,54489	-1,74758	-1,6941
Company n. 47	-1,10734	-1,16873	-1,14121
Company n. 48	-1,40027	-1,77118	-1,7089
Company n. 49	-1,14797	-1,27384	-1,26603
Company n. 50	-1,22034	-1,30823	-1,28034
Company n. 51	-1,2978	-1,54588	-1,47905
Company n. 52	-1,08092	-1,19185	-1,03296
Company n. 53	-0,8838	-0,97924	-0,86224
Company n. 54	-1,69451	-1,9867	-2,21884
Company n. 55	-1,71096	-1,94344	-2,50261
Company n. 56	-2,02987	-1,91501	-1,35553

	Accounting Beta ROE – Total Beta	Accounting Beta Net Income – Total Beta	Accounting Beta Operating Income – Total Beta
Company n. 57	-1,08917	-1,08912	-1,01051
Company n. 58	-0,45811	-1,48744	-1,48425
Company n. 59	-1,61439	-4,65389	-33,8665
Company n. 60	-6,44307	-6,94031	-6,93567
Company n. 61	-2,13816	-2,12479	-2,15266
Company n. 62	-1,28652	23,95443	10,01247
Company n. 63	-1,27126	-1,33057	-1,29844
Company n. 64	-1,08652	0,173847	-1,35913
Company n. 65	-1,88451	-1,92898	-1,92371
Company n. 66	-0,83492	-2,57684	-8,25609
Company n. 67	-2,14041	-1,86597	-1,97529
Company n. 68	-1,13501	-1,34519	-0,58359
Company n. 69	-1,59218	-1,58809	-1,57568
Company n. 70	-1,20898	3,246267	-0,76019
Company n. 71	-0,86344	-0,99197	-0,93628
Company n. 72	-2,04367	-2,03243	-1,94411
Company n. 73	-1,15759	-0,64784	2,290543
Company n. 74	-0,93198	-1,2839	-1,16423
Company n. 75	-0,9752	-1,1054	-1,23403
Company n. 76	-1,42208	-1,7183	-2,08742
Company n. 77	-1,60335	-1,87304	-2,35159
Company n. 78	-1,02399	-1,1123	-1,09505
Company n. 79	-1,43055	-1,4981	-1,42583
Company n. 80	-2,58619	-3,34642	-3,2653
Company n. 81	-2,89432	-3,42128	-3,40886
Company n. 82	-1,61068	-1,71543	-1,71958
Company n. 83	-1,11082	-1,24152	-1,22912
Company n. 84	-1,37327	-1,44875	-1,60659
Company n. 85	-3,40142	-3,50234	-3,49762
Company n. 86	-1,20031	-1,48928	-1,43644
Company n. 87	-1,46707	-1,5632	-1,46514
Company n. 88	-1,87011	-1,99569	-1,8768
Company n. 89	-0,93603	-1,282	-1,23063
Company n. 90	-1,21588	-1,46556	-1,11671
Company n. 91	-1,02726	-1,22384	-0,8858
Company n. 92	-1,26539	-1,78112	-2,35499
Company n. 93	-0,96408	-1,03103	-1,05893
Company n. 94	-0,90067	-0,98865	-0,98309
Company n. 95	-1,22458	-2,29646	0,123752
Company n. 96	-2,28082	-2,24766	-2,24163
Company n. 97	-1,72613	-1,99093	-2,83554
Company n. 98	-2,37161	-2,45045	-2,42386
Company n. 99	-0,87607	-1,24275	-1,23902
Company n. 100	-1,60429	-1,54318	-2,05174
Company n. 101	-1,64304	-2,02973	-33,2777
Company n. 102	-4,24949	-4,34936	-4,40973
Company n. 103	-1,39152	-1,22301	-1,2277
Company n. 104	-2,2947	-1,59527	-1,3987
Company n. 105	-1,59979	-2,16329	-2,14846
Company n. 106	-2,42226	-2,728	-2,68628
Company n. 107	-1,40858	-1,59533	-1,35936
Company n. 108	-1,37524	-1,71324	-1,72229
Company n. 109	-2,10479	-2,06811	-1,38842
Company n. 110	-2,20408	-0,20913	3,552723
Company n. 111	-7,45302	-6,39379	-5,99199
Company n. 112	-1,85979	-1,87917	-1,83416
Company n. 113	-2,13766	-1,30585	-0,02363

	Accounting Beta ROE – Total Beta	Accounting Beta Net Income – Total Beta	Accounting Beta Operating Income – Total Beta
Company n. 114	-0,91944	-1,14531	-1,56507
Company n. 115	-1,05929	3,862446	1,350679
Company n. 116	-3,47187	-1,11306	0,211648
Company n. 117	-3,58498	-3,57932	-3,60391
Company n. 118	-0,88908	24,37439	72,96859
Company n. 119	-1,35177	-0,63526	-0,94584
Company n. 120	-1,50479	0,164265	0,051936
Company n. 121	-0,86112	-1,5608	-2,89533
Company n. 122	-1,57824	-1,77937	-1,9183
Company n. 123	-1,22894	-1,53618	-1,75811
Company n. 124	-1,43227	-1,50506	-0,84406
Company n. 125	-1,66663	-1,95817	-1,40093
Company n. 126	-1,41353	-1,23283	-1,19986
Company n. 127	-2,6078	-2,79065	-2,63234
Company n. 128	-1,43768	-1,51982	-1,53591
Company n. 129	-3,05448	-3,18724	-3,16223
Company n. 130	-1,19262	-1,47772	-1,93313
Company n. 131	152,3866	-1,30223	-2,07272
Company n. 132	-1,30188	-1,20801	-1,18602
Company n. 133	-1,68045	-1,77463	-1,87916
Company n. 134	-2,22663	-3,53009	-3,60559
Company n. 135	-1,63383	-0,93285	-1,93009
Company n. 136	-1,90235	-1,8561	-2,21141
Company n. 137	-1,41337	-1,46058	-1,50982
Company n. 138	-4,18254	-2,36103	-2,35379
Company n. 139	-1,07036	-1,18249	-1,13094
Company n. 140	-1,13604	-1,35644	-1,34033
Company n. 141	-2,74627	-2,40251	-2,42434
Company n. 142	-4,21404	-2,97106	-2,95759
Company n. 143	-1,52079	-1,56664	-1,59021
Company n. 144	-0,93026	-1,51079	-1,51437
Company n. 145	-2,24936	-2,2485	-2,40875
Company n. 146	-1,60197	-1,49636	-1,50313
Company n. 147	-1,32256	-1,52254	-1,54557
Company n. 148	-3,08644	-2,60629	-2,6106
Company n. 149	-2,93466	-2,73168	-2,71647
Company n. 150	-1,23672	-1,37596	-1,37601
Company n. 151	-2,11485	-2,26029	-2,10933
Company n. 152	-1,00933	-1,18363	-1,33143
Company n. 153	-1,60355	-1,73314	-1,62634
Company n. 154	-2,2939	-2,29892	-3,08644
Company n. 155	-1,89945	-2,06929	-2,01826
Company n. 156	-1,32926	-1,29906	0,041842
Company n. 157	-1,67141	-2,24958	-2,22434
Average	-0,78955	-0,37128	-0,58903

This comparison analysis shows that accounting beta – net income has the lower average difference in absolute value (0,37). Differently from Intrisano, Palomba, Di Nallo, Calce (2017) where the measure with a lower value is ROE (with an absolute value of 0,17).

Another level of analysis is about the study of the sign of the difference between accounting beta and total beta in order to identify any trend.

Table 3: trend of differences between Accounting Beta and Total Beta

	Accounting Beta ROE – Total Beta	Accounting Beta Net Income – Total Beta	Accounting Beta Operating Income – Total Beta
Positive difference	1%	11%	13%
Negative difference	99%	89%	87%

Table shows that in most case the difference is negative. This means that very often total beta is higher than accounting beta. If we consider accounting beta ROE, we see that 99% of companies have total beta higher than

accounting beta. All the results confirm average value. In fact table about comparisons highlight that all the accounting betas have a negative average value (ROE -0,79; Net Income -0,37; Operating Income -0,59) and this is confirmed by the last table.

5. Conclusions

From literature review, we find that there are not model specially designed for unlisted companies. On one hand we have accounting beta model that it can be used for unlisted companies because it does not require price information, on the other hand we have total beta that also considers specific risk, that is characteristic in investors of unlisted companies. So the aim of the paper is to investigate relationship among accounting beta and total beta.

Accounting beta model seems to replicate better CAPM beta than total beta. This is confirmed by results about differences between total beta/CAPM beta and accounting beta. In fact in Intrisano, Palomba, Di Nallo, Calce (2017) accounting beta – ROE shows an average difference respect to CAPM beta equal to -0,17, while in this study the lower difference is done by accounting beta – Net Income (respect to total beta) with a value of -0,37. This represents a better performance of accounting beta-CAPM beta. Also the analysis about the sign confirm these findings. In our analysis we find that in most cases accounting beta leads to an underestimation respect to total beta, while in Intrisano, Palomba, Di Nallo, Calce (2017) we have heterogeneous results that imply an higher stability.

So accounting beta model is more suitable as control method for CAPM beta than a method thought for unlisted companies because results show a better stability for CAPM beta.

Ascertained that accounting beta seems to replicate better CAPM beta than total beta, concerning the question “Which accounting measure is the best?” in this paper we find a difference with Intrisano, Palomba, Di Nallo, Calce (2017). In fact in the previous work the best measure is represented by ROE, instead now the best measure is net income. The results show that the three accounting beta (ROE, net income and operating income) have different characteristic. Particularly net income has an average difference respect to total beta equal to -0,37, operating income -0,59, ROE -0,79. ROE now is the worst measure useful to reply total beta.

Definitely accounting beta does not seem useful to repeat total beta, moreover this model demonstrates some critical issues already cited in Intrisano, Palomba, Di Nallo, Calce (2017): accounting measures are often influenced by budgetary policies; they need of a greater number of observations, in fact we use 10 observations, because increasing the observations number we have the problem of considering a time horizon that is too long. This can lead to a not right valuation. One solution is represented by the use of quarterly accounting measure, but often this information are not available for all companies. Further levels of future analysis could be represented by the reply of this study on USA market, in order to investigate if different markets have same characteristics. In addition to this, also a systematic study about the relation between fundamental beta, the other significant approach, and total beta could represent a central theme.

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