On the use of aggregate book-to-market ratios

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Abstract: In the financial and market-based accounting research, the analysis of the consequences on the findings of using the arithmetic mean to summarize ratios has received little attention. In this paper we show how the use of this wrong procedure can lead to infer mistaken conclusions from the empirical results achieved. To do it, we conduct a market-based accounting research that uses aggregate ratios by country. The analysis of the evolution of balance-sheet accounting conservatism, using aggregate measures of the firm-specific Book-to-Market ratios, allows us to show the different patterns that alternative specifications of the aggregate measure have. Additionally, the analysis of the effect of mandatory first application of the International Financial Reporting Standards on the balance-sheet conservatism allows us to show how the use of the arithmetic mean to summarize Book-to-Market ratios can result in misleading conclusions.

Key-Words: Arithmetic mean of ratios; balance-sheet conservatism; financial research; IFRS adoption; market-based accounting research; ratio of the arithmetic means; unconditional conservatism.

1 Introduction

Sometimes, to answer both financial and market-based accounting research questions requires summarizing firm-specific ratios with a single country-specific number, and usually it is done computing the arithmetic mean of firm-specific ratios. Contrarily to other disciplines, in financial and market-based accounting research, the analysis of the consequences on the findings of using the arithmetic mean to summarize ratios has received little attention. Despite the fact that the arithmetic means of both variables that define a ratio have some meaning, the arithmetic mean has the undesirable property of that the meaningful ratio of arithmetic means is not equal to the arithmetic mean of the ratios that becomes meaningless.

To avoid this problem, some authors, as Fleming and Wallace (1986), recommend the use of the geometric mean to average normalized numbers. In fact, it is straightforward to show using a logarithmic transformation of the arithmetic mean of ratios that the geometric mean of the ratios equals to the ratio of the geometric means. However, Smith (1988) point out that the general solution to arithmetic mean uselessness is not to use geometric mean but to always normalize results after the appropriate aggregate measure(s) is (are) calculated, not before. Fleming and Wallace (1986) make of the same point their "third rule" that advocates using the sum (or the arithmetic mean) of raw (unnormalized) values of the variables whenever this "total" has some meaning.

In this context, the main objective of this paper is to alert about the mistaken conclusions than can be inferred from the results achieved by using the arithmetic mean of firm-specific ratios as a country-specific ratio. To this end, we conduct a market-based accounting research that uses country-specific ratios. Concretely, we analyse the country evolution of the balance sheet accounting conservatism using the ratio Book-to-Market (BtM) as a measure. This

analysis allows determining whether changes in accounting principles, such as the mandatory first application of the International Financial Reporting Standards (IFRS), affect the country level of balance sheet conservatism.

The rest of this paper is structured as follows. In Section 2, we introduce country-specific balance-sheet conservatism, reviewing previous literature and focusing on the BtM use as a measure. In Section 3 we analyse the data we use in our empirical research. In Section 4 we construct in different ways the country-specific BtM ratio and show their dynamics along the sample period. In Section 5 we use the country-specific BtM temporal evolution to analyse the effect of first application of IFRS on the country-level balance-sheet conservatism and discuss results. In Section 6 we expose the main conclusions derived of our analysis.

2 The time evolution of country-specific balance-sheet conservatism

Givoly and Hayn (2000) paper is pioneering in the analysis of time evolution of country-specific accounting conservatism. Using a set of accounting conservatism measures, they conclude that conservative financial reporting increases in US over time in their sample period. Following Stober (1998) and based on Feltham and Ohlson (1995) valuation model, one of the measures that they use in their time-series analyses is the market-to-book ratio, the inverse of BtM. Whether investors equity valuation is based on the present value of future cash flows, the market-to-book ratio would tend to be higher when accounting measurement is more conservative. Thus, whether a ratio greater than one indicates conservative accounting, *ceteris paribus*, an increase in the ratio over time suggests an increase in the degree of reporting conservatism.

Concretely, Givoly and Hyan (2000) use in their empirical analysis the ratio of the aggregate market value of firms to their aggregate book value, and refer to as "the aggregate M/B ratio". In this way the authors avoid the use of the simple average ratio across individual companies suggesting that the uselessness of the latter is due to its cross-sectional variance dependence. This variance dependence is a direct consequence of the characterization of the cross-sectional underlying probability function. But, in fact, the raw data used by Givoly and Hyan (2000) to compute the sums that define their "aggregate M/B ratio" also have probability functions that do not avoid this dependence on variance. On the other hand, the variance dependence does not ultimate cause the meaningless of the simple average ratio across individual companies.

Several papers follow Givoly and Hyan (2000) methodology to analyse the time evolution of balance-sheet conservatism in different countries. And many of them use this methodology to analyse the effect of IFRS adoption on balance-sheet conservatism. However, there are also many of these papers that do not use the "the aggregate M/B ratio", or use it questionably. Without attempting to be exhaustive, below we discuss some of these papers focusing our attention principally in the BtM use.

García and Mora (2004) examine the level of accounting conservatism across eight European countries (United Kingdom, Germany, France, Switzerland, the Netherlands, Italy, Spain and Belgium) and test the differences among them. Among others, they also use the Feltham and Ohlson (1995) definition of conservatism, which implies a persistent understatement of the book value of shareholders' equity, i.e., balance-sheet conservatism. As Givoly and Hayn (2000) and without adding any comment, they analyse the evolution of the market-to-book ratio computed by aggregating the market value of all firms in the sample (per year, at the balance sheet date) and the book value of shareholders' equity at year-end (per year), obtaining then the value of the market-to-book ratio of the country for each year.

Ferreira, García and Gonçalves (2007) examine the existence of conservative practices in the Portuguese accounting system. They examine whether the book value can be understated due to conservative practices to protect creditors' interests, i.e., balance-sheet conservatism. Following Givoly and Hayn (2000) they use the aggregate market-to-book ratio, computed as the aggregate market value of all firms in the sample divided by their aggregate book value at year-end. They reproduce the Givoly and Hayn (2000) argument of cross-sectional variance dependence analysed above. However, as they wish to compare the ratio across countries, they argue that the use of the simple average ratio is unavoidable, and finally they use the two specifications expecting to find no differences between them. Interestingly, their results show clear different patterns between these measure specifications.

Iñiguez, Poveda and Vázquez (2013) analyze the effect of the application of IFRS on the balance-sheet conservatism in Spain. The authors, following basically García and Mora (2004) paper, also analyze the balance-sheet conservatism through the evolution of the BtM. But surprisingly these authors, contrary to García and Mora (2004), do not use the Givoly and Hyan (2000) methodology to compute the aggregate BtM year ratio. Without additional justification, they use the arithmetic mean and the median value of the firm-specific ratios in the year in order to test the equality of these measures between the sample subperiods defined by the IFRS mandatory adoption in the European countries.

Lai, Lu and Shan (2013) examines whether Australian financial reporting became more conservative over time and also the impact of mandatory IFRS adoption on accounting conservatism in Australia. They use as measure of conservatism the market-to-book ratio among others, where a higher ending market-to-book ratio would generally be consistent with a higher level of balance-sheet conservatism. Concretely they compute the (arithmetic) mean, median and aggregate level of market-to-book ratio, where aggregate market-to-book ratio is the aggregate market capitalizations of the sample firms over the aggregate book value of equity in a particular year. They results show different patterns for each of the three measures of country-specific market-to-book ratios, differences that authors do not justify. Moreover, their conclusions about the effect of IFRS adoption on balance-sheet conservatism are based on the arithmetic mean of firm-specific ratios.

More recently, Khalifa, Othman and Hussainey (2016) examine the time-series extent and shift of accounting conservatism in forty-eight emerging countries. The authors follow Givoly and Hayn (2000) and use the market-to-book ratio as a measure of conservatism. Specifically, they compute the mean and median of market-to-book firm ratios but do not use the "aggregate M/B ratio" proposed by Givoly and Hayn (2000).

3 Data

As Table 1 summarize, we use all book value (BV) and market value (MV) corresponding to the 150 firms listed in Spanish Stock Market in the period 2000-2009 that are available from Compustat Global Vantage database. Concretely, we have 1,274 observations for BV and 1,030 for MV. From this initial sample, then we select the specific samples and subsamples of firm-year data to use for subsequent analysis. In Table 1 we also summarize the selection process.

The minimum requirement to be included in the initial sample is to have available positive data for both variables, BV and MV, at the same time. This requirement limits the sample size to 1,019 firm-year observations. The different samples defined below are divided into two periods: 2000-2004, that we call pre-IFRS (adoption), and 2005-2009, which we call post-IFRS (adoption). So, the sum of the two complementary subsamples of data is necessarily equal to the number of data of the full sample that contains them. The first sample we use has all the 1,019 data, divided between the two periods, 445 observations in pre-IFRS, and 574 observations in post-IFRS. In Table 2-Panel A we can observe their descriptive statistics.

In the market-based accounting literature in general and specifically in that dedicated to the analysis of conservatism, is usual the exclusion of financial companies for their idiosyncratic characteristics. In the following empirical sections, where the effects of a change in accounting standards are analyzed, it should also be repaired in that companies in this sector apply specific accounting standards dictated by the financial supervisory authorities, so their exclusion becomes even more justified. Therefore, our second sample is made from the first excluding those observations concerning financial sector companies. Their main statistics are showed in Table 2- Panel B.

On the other hand, in order to avoid bias introduced by changes in the composition of the group of companies in the pre-IFRS and post-IFRS periods, beyond those in the subsamples sectorial composition, we use a constant sample of firms as in Givoly and Hayn (2000). In this sense, we eliminate all those companies for which available firm-year observations are not full, i.e., ten years. The group of companies that accomplish this criterion includes 75 firms, so the total number of observations is 750, which are divided equally between the pre-IFRS period and post-IFRS. Their summary statistics can be seen in Table 2-Panel C. The drawback of using constant samples, beyond the reduction in the number of observations, is the possibility to introduce a survival bias. But it is also true that such bias may be offset by the bias introduced by no consider companies that during the sample period

get their inclusion in the stock market, thus the significance of the total bias and its sign become a purely empirical question.

The fourth sample that we use combines the characteristic of the two previous samples. Thereby, from the third sample we exclude observations concerning financial companies remaining a total of 600 firm-year observations corresponding to 60 non-financial companies for which ten year-firm observation are available. The descriptive statistics of this sample, and its subsamples, appear in Table 2-Panel D.

4 Measuring the country-specific Book-to-Market

As we discuss above the correct specification of BtM ratio to be used as a proxy of country-specific balance-sheet conservatism is the variable aggregate BtM (BtMa) defined as the ratio between the sum of the all book value firms (BVa) and the sum of the all market value firms (MVa) as Givoly and Hayn (2000) propose. Note that it is equal to the ratio of the arithmetic means of the variables since the number of firms involved in both means are necessary the same. This definition coincides with the "third rule" of Fleming and Wallace (1986) and the recommendation made by Smith (1988).

In Table 3 we report the computed values for each sample and year of the BtMa and its two components, BVa and MVa. In Figure 1 we represent the year-end values of this BtMa for the overall sample (right scale) along with the evolution of its components, the MVa and the BVa (left scale). We can see as BVa evolves along time smoothly, while the variability observed in the ratio BtMa is largely determined by the variability of the MVa, drawing both variables an almost exactly symmetrical behavior.

To carry out our comparative analysis, we also compute the other alternative measures used in the literature reviewed above. Concretely, we compute the simple average of the firm ratios and their median value. In Figure 2 we represent again the year-end values of the BtMa ratio for the overall sample, but now along with the year-end values of the (arithmetic) mean and the median value computed from BtM firm-year ratios. As we can see the values of these three variables draw significant different patterns both in their year-end values and in their yearly evolution. The highest differences are located in pre-IFRS period resulting in an increased incidence in the analysis between subsamples. This fact justifies, also empirically, the relevance of the choice of the variable used in this analysis.

Finally, in Figure 3, we have represented the BtMa ratio of each of the four samples defines above. For the four samples a similar temporal behavior is observed, although samples that include financial companies (1 and 3) and those that exclude them (2 and 4) result in BtMa ratios nearly identical, so the hypothesis of no-constant sample bias is empirically rejected. On the other hand, we can observe that samples including financial firms (1 and 3) result in ratios BtMa significantly different from those samples that exclude them (2 and 4), which corroborates the relevance of their exclusion, such as recommended by the empirical accounting literature.

5 Analyzing the effect of the IFRS first application

In the analysis of the differences between pre-IFRS and post-IFRS periods we use the usual parametric test of mean differences and, due to the small number of annual data in the periods, a nonparametric test for rank sum differences. Specifically, for the parametric test, we used the t-test on the equality of means depending on the equality or not of variance of subsamples, so previously we perform a test of equality of variance. Although the previous analysis suggests working with the non-financial constant sample, in this section we perform all tests on the four samples defined as a robustness analysis of the results for the non-financial constant sample.

To test variance equality between subsamples we have used the Brown-Forsythe test. This test allows not assume normality in the subsamples. The tests of variance equality do not allow rejecting the hypothesis of equal variance in the four samples. Table 4 shows the results for the t-test of equality of means for sub-samples with equal variances. In those cases that the statistic is closet to reject (between 15% and 10% of significance) the null hypothesis of equal variances we also use t-test no assuming equality of variance of subsample to test mean equality, checking that the results reported in Table 4 do not change.

We can see that the hypothesis of equality of means between periods cannot be rejected at the

significance level of 10% in constant sample of non-financial companies (sample 4), but also not in any of the other samples. Moreover, the Mann-Whitney non-parametric rank-sum test, whose results appear in the last column of Table 4, confirms the results obtained with the parametric test, since in no case we can reject the null hypothesis of equal medians. Note that as we can also see in Table 4, the significance level is higher in those samples in which financial companies are not included (2 and 4), confirming the motivation for their exclusion: financial industry alters noticeably the composition of the sample due to the idiosyncrasy of its companies.

Our analyses show evidence supporting that mandatory first adoption of IFRS by the Spanish listed firms has not modified the country-specific balance-sheet conservatism. Results corroborate previous evidence found in Callao, Jarne and Laínez (2007), Callao, Ferrer, Jarne and Laínez (2010), Garrido and Vázquez (2011) using alternative methodologies to the one we have used. However, interestingly, althought Iñíguez, Poveda and Vázquez (2013) use the same methodology follows by us, but using as country-specific balance-sheet conservatism measure the arithmetic mean of the year-end BtM ratios of firms, their results are contrary to ours. This fact confirms the relevance of using country-specific measures correctly computed from firm-specific financial ratios.

6 Conclusions

With the aim of alerting about the mistaken conclusions than can be inferred from the results achieved by using the arithmetic mean of firm-specific ratios as a country-specific ratio, we analyse the country evolution of the balance sheet accounting conservatism using for its measure the ratio Book-to-Market (BtM) but computed in different ways. Concretely, we compute the aggregate BtM *a la Givoly and Hayn*, the simple average of the firms' ratio and their median value. Our results show that the values of these three variables draw significant different patterns both in their year-end values and in their yearly evolution. Moreover, these differences are not regular distributed along the sample period. This fact confirms empirically that they are not interchangeable measures.

A further analysis allows us determining the effect of mandatory first application of the International Financial Reporting Standards (IFRS) on the country level of balance sheet conservatism using correct computed country-specific BtM ratios. Different test, parametric and nonparametric, have been conducted and their results do not allow concluding that balance-sheet conservatism has changed due to the implementation of IFRS in Spain. Comparing this evidence with the previous one obtained by using the same methodology but building country-specific BtM ratios without a statistical basis, we found that they are contrary. This fact confirms empirically that the alternative use of these BtM specifications can influence results enough to change conclusions.

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References:

[1] CALLAO, S., JARNE, J.I. and LAÍNEZ, J.A. (2007). Adoption of IFRS in Spain: effect on the comparability and relevance of financial reporting". *Journal of International Accounting, Auditing and Taxation*, *16*, 148-178.

[2] CALLAO, S., FERRER, C., JARNE, J.I. and LAÍNEZ, J.A. (2010). IFRS adoption in Spain and the United Kingdom: Effects on accounting numbers and relevance. *Advances in Accounting*, *26*(2), 304-313.

[3] FELTHAM, G.A. and OHLSON, J.A. (1995). Valuation and clean surplus accounting for operating and financial activities *Contemporary accounting research*, *11*(2), 689-731.

[4] FERREIRA, L., GARCÍA, J.M. and GONÇALVES, T. (2007). Accounting conservatism in Portugal: Similarities and differences facing Germany and the United Kingdom. *Revista de Administração Contemporânea, 11*(SPE2), 163-188.

[5] FLEMING, P.J. and WALLACE, J.J. (1986). How not to lie with statistics: the correct way to summarize benchmark results. *Communications of the ACM*, *29*(3), 218-221.

[6] GARCIA, J.M. and MORA, A. (2004). Balance Sheet versus Earnings Conservatism in Europe. *European Accounting Review, 13*(2), 261–292.
[7] GARRIDO, P. and VAZQUEZ, P.J. (2011). The transition to international financial reporting standards in Spain: relevance and timeliness of adjustments. *International Journal of Accounting, Auditing and Performance Evaluation, 7*(4), 287-302.
[8] GIVOLY, D. and HAYN, C. (2000). The changing time-series properties of earnings, cash flows and accruals: Has financial reporting become more conservative? *Journal of Accounting and Economics, 29*, 287-320.
[9] ÍÑIGUEZ, R., POVEDA, F. and VÁZQUEZ, P.J. (2013). The effect of IFRS adoption on balance-sheet conservatism: the Spanish case. *Spanish Journal of Finance and Accounting, 42*(160), 453-486.
[10] KHALIFA, M., OTHMAN, H.B. and HUSSAINEY, K. (2016). Temporal variation and cross-sectional differences of accounting conservatism in emerging countries. *International Journal of Accounting, Auditing and Performance Evaluation*, *12*(1), 45-69.
[11] LAI, C., LU, M., and SHAN, Y. (2013). Has Australian financial reporting become more conservative over time? *Accounting & Finance*, *53*(3), 731-761.
[12] SMITH, J.E. (1988). Characterizing computer performance with a single number. *Communications of the ACM, 31*(10), 1202-1206.
[13] STOBER, T. (1998). Do Prices Behave as if Accounting is Conservative?: Cross Sectional Evidence from the Feltham and Ohlson Valuation Model. *Working paper, University of Notre Dame.* South Bend, IN.

Table 1. Summary of firm sample selection and financial variables data sources

Panel A.	Firms by samples	
	Full sample	150
	Full sample excluding financial companies	107
	Firm with positive data all years	75
	Firm with positive data all years excluding financial companies	60
Panel B.	Firm-year data	
	Book values	1274
	Market values	1030
	Positive Book Values and Market Values	1019
Panel C.	Firm-year data excluding financial companies	
	Book values	913
	Market values	794
	Positive Book Values and Market Values	788

Sample from Compustat Global Vantage for Spanish listed companies in Madrid Stock Exchange for 2000-2009 sample period.

Table 2. Summary statistics for Spanish listed companies

Panel A. Full sample

2000-2009	Obs	Mean	Std. Dev.	Min	Max
MV	1.019	4.016,93	11.558,91	4,24	104.634,40
BV	1.019	1.840,34	5.576,62	0,13	68.666,56
2000-2004	Obs	Mean	Std. Dev.	Min	Max
MV	445	3.303,88	9.725,33	4,24	76.396,48
BV	445	1.527,83	4.287,73	0,13	38.603,00
2005-2009	Obs	Mean	Std. Dev.	Min	Max
MV	574	4.569,74	12.782,05	7,34	104.634,40
BV	574	2.082,61	6.392,98	10,19	68.666,56

Panel B. Full sample excluding financial companies

2000-2009	Obs	Mean	Std. Dev.	Min	Max
MV	788	3.342,62	9.703,56	4,76	104.634,40
BV	788	1.341,32	3.553,38	0,13	26.636,53
2000-2004	Obs	Mean	Std. Dev.	Min	Max
MV	349	2.678,71	8.364,26	4,76	76.396,48
BV	349	1.194,67	3.243,77	0,13	25.865,57
2005-2009	Obs	Mean	Std. Dev.	Min	Max
MV	439	3.870,42	10.628,72	7,34	104634,40
BV	439	1.457,90	3.781,09	10,19	26.636,53

Panel C. Sample constant

2000-2009	Obs	Mean	Std. Dev.	Min	Max
MV	750	5.019,96	13.266,89	4,76	104.634,4
BV	750	2.296,39	6.364,18	4,98	68.666,56
2000-2004	Obs	Mean	Std. Dev.	Min	Max
MV	375	3.808,15	10.507,91	4,76	76.396,47
BV	375	1.756,89	4.627,48	4,98	38.603,00
2005-2009	Obs	Mean	Std. Dev.	Min	Max
MV	375	6.231,77	15.463,85	15,49	104.634,40
BV	375	2.835,89	7.688,75	10,85	68.666,56

Panel D. Sample constant excluding financial companies

2000-2009	Obs	Mean	Std. Dev.	Min	Max
MV	600	4.063,89	10.984,59	4,76	104.634,40
BV	600	1.658,29	4.005,42	4,98	26.636,53
2000-2004	Obs	Mean	Std. Dev.	Min	Max
MV	300	3.028,37	8.966,39	4,76	76.396,47
BV	300	1.357,63	3.469,79	4,98	25.865,57
2005-2009	Obs	Mean	Std. Dev.	Min	Max
MV	300	5.099,40	12.616,58	23,54	104.634,40
BV	300	1.958,94	4.463,15	11,28	26.636,53

MV: Market Value, BV: Book Value.

Table 3. Summary statistics for aggregated variables

Panel A. Full sample

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
MVa	311.641	291.733	218.482	286.893	361.477	432.230	600.863	658.421	408.016	523.500
BVa	127.990	132.087	121.243	135.607	162.957	167.601	199.310	266.304	261.748	300.457
BtMa	0,4107	0,4528	0,5549	0,4727	0,4508	0,3878	0,3317	0,4045	0,6415	0,5739

Panel B. Full sample excluding financial companies

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
MVa	193.764	184.999	139.985	183.875	232.247	275.525	382.173	427.653	279.471	334.293
BVa	85.309	83.156	75.448	82.971	90.057	94.389	109.333	138.832	139.613	157.850
BtMa	0,4403	0,4495	0,5390	0,4512	0,3878	0,3426	0,2861	0,3246	0,4996	0,4722

Panel C. Sample constant

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
MVa	311.007	287.895	213.250	277.046	338.857	400.462	538.349	576.007	357.510	464.584
BVa	127.520	128.792	117.361	130.755	154.406	158.436	183.597	229.998	228.774	262.655
BtMa	0,4100	0,4474	0,5503	0,4720	0,4557	0,3956	0,3410	0,3993	0,6399	0,5654

Panel D. Sample constant excluding financial companies

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
MVa	193.151	184.306	137.748	177.933	215.372	252.051	347.251	385.714	249.167	295.639
BVa	84.872	82.530	74.027	80.775	85.087	89.195	101.828	129.015	126.200	141.445
BtMa	0,4394	0,4478	0,5374	0,4540	0,3951	0,3539	0,2932	0,3345	0,5065	0,4784

MVa: Aggregate Market Value, BVa: Aggregate Book Value, BtMa: Aggregate Book-to-market ratio

Table 4. Results equality means and medians test

BtMa	Mean Pre NIIF	Mean Post NIIF	Difference	t-test	Rank-test
Sample 1	0,468	0,467	-0,001	0,9939	0,6015
Sample 2	0,454	0,384	-0,070	0,1886	0,3457
Sample 3	0,466	0,468	0,001	0.9848	0.6015
Sample 4	0,454	0,393	-0,061	0,2476	0,3472

***; **; and *, denote significant at 1%, 5% and 10% level.
BtMa: Aggregate Book-to-Market ratio. Results for t-test conditioned to equality variance test of Brown-Forsythe. Rank-test show results of Mann-Whitney non-parametric test.

Figure 1. Aggregates Market Value, Book Value and Book-to-market ratio

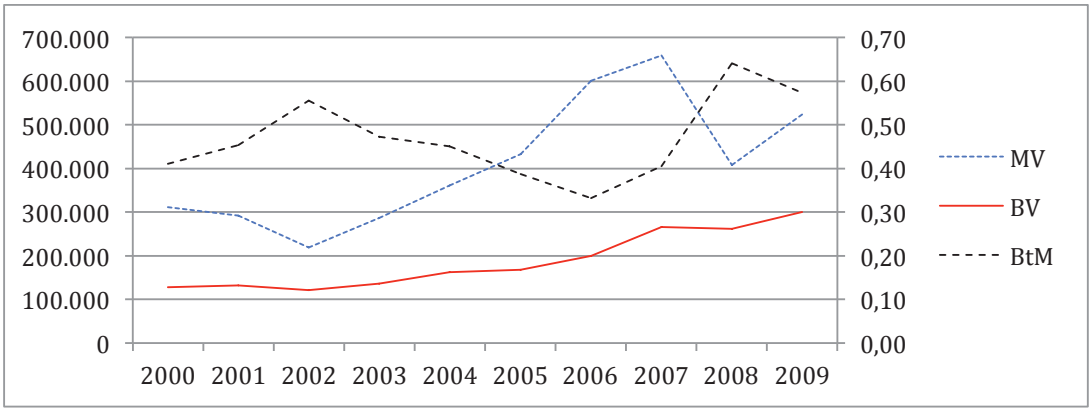


Figure 2. Aggregate Book-to-market ratio, mean and median of firm-specific BtM ratios

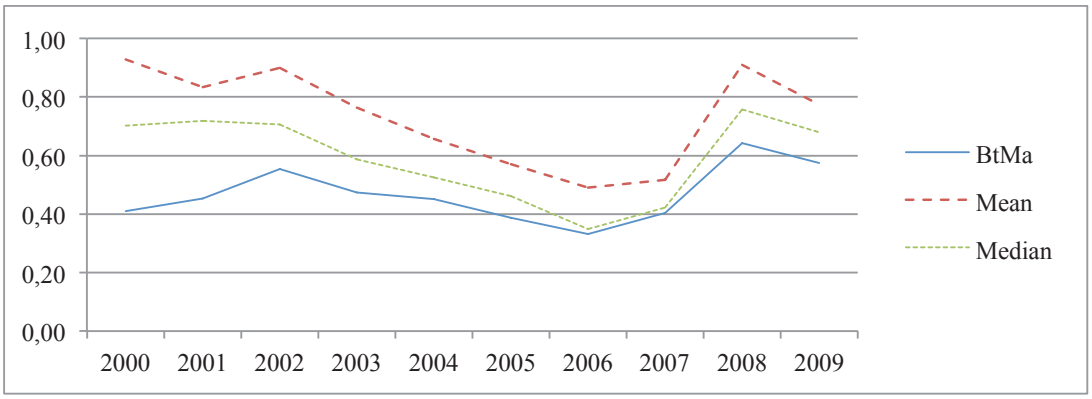
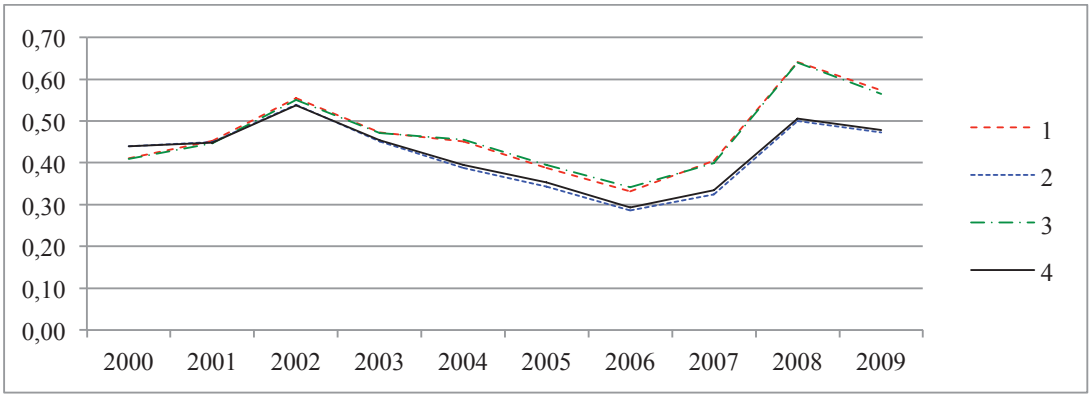


Figure 3. Aggregate Book-to-Market ratio



1: Full sample. 2: Full sample excluding financial companies. 3: Constant sample. 4: Constant sample excluding financial companies.