Chapter Seven

Analysis of the Effects of Accounting Harmonization

In this chapter, the focus is on the relationship between sender and content (see main model in Section 1.3). The issues relating to this relationship are operationalized in Section 1.3 as the second specific research issue. Thus, it has to do with senders' choices on content, and what effects that has. As pointed out in Section 3.2.3, there has been a recent change in content in the Swedish accounting system, following attempts at international harmonization of accounting.

This chapter provides results and analysis of the statistical studies, both an evaluation of the quality of the data used, and substantive results pertaining to the research issue. Quality issues include treatment of outlying observations, window lengths used, the influence of uncontrolled factors on results, and statistical issues such as, for example, the normality of the data. It should further be noted that the return model provides a possible measure of the concept of actual accounting risk (noted in Section 1.3).

Descriptive statistics of the sample used in the statistical studies are given in Section 5.3. As noted in Section 3.2.3, two models are used in the statistical studies, the return model (discussed in Section 7.1) and the price model (discussed in Section 7.2). Results from both models are discussed in Section 7.3.

7.1. The Return Model

The return model is tested with two different window lengths[73], 12- and 15-month windows. The 12-month windows end at the accounting year-end, and the 15-month windows end three months after year-end. Both windows begin at the start of the accounting year.

[73] The window length refers to the time period used for measuring stock returns, i.e. the dependent variable.

It is difficult to specify which of the two window lengths is more 'theoretically correct' in the return model. With 12-month windows, the accounting return and stock return variables cover the same period, whereas the stock return variable covers three more months than the accounting return variable when 15-month windows are used. The advantage with 15-month windows is that they cover the time period when the accounting information is made public, so that the effect of the information on the stock return is assumed to be included in the model. A potential problem with using 15-month

Table 7.1. Number of observations before and after adjustment for outliers

PANEL A: Observations by year

Year	Including outliers	Excluding outliers	Percent excluded
1995	110	109	0.9%
1994	99	96	3.0
1993	95	85	10.5
1992	102	94	7.8
1991	108	105	2.8
1990	112	111	0.9
1989	123	123	0.0
1988	128	128	0.0
1987	142	142	0.0
1986	141	140	0.7
1985	149	149	0.0
1984	141	140	0.7
1983	137	134	2.2
Total	1587	1556	2.0

PANEL B: Observations by industry

Industry	Including outliers	Excluding outliers	Percent excluded
Banking	97	94	3.1%
Construction	85	79	7.1
Industrial	883	876	0.8
Insurance	39	39	0.0
Investment companies	126	126	0.0
Real estate mgmt.	131	127	3.1
Retail/trading	98	94	4.1
Transportation	102	95	6.9
Utilities	26	26	0.0
Total	1587	1556	2.0

PANEL C: Observations stratified into pre- and post-harmonization

Sample	Including outliers	Excluding outliers	Percent excluded
Pre-harmonization	1087	1080	0.6%
Post-harmonization	500	476	4.8
Total	1587	1556	2.0

windows is that serial correlation may result, since windows overlap. Because of the weak theoretical basis for using either of the two window lengths, and because prior literature has used both lengths (for example Easton and Harris, 1991), both window lengths are used here.

A separate issue is the treatment of outlying observations. Following Easton and Harris (1991), such observations are defined as those where either of the independent variables (A_{jt}/P_{jt-1} or $(A_{jt}- A_{jt-1})/P_{jt-1}$) are removed from the mean by more than 3.0 standard deviations. This resulted in the removal of 31 observations, as shown in Table 7.1. As with window lengths, it is difficult to give a theoretical basis for whether to include or exclude outlying observations. They should be included, since they do constitute valid observations. On the other hand, they may garble the underlying structures in the data that we are primarily interested in. Therefore, results based on both including and excluding outlying observations are presented here.

As Table 7.1 shows, the years 1992 and 1993 are especially problematic, in that they have a high percentage of outliers. This also leads to a higher percentage of outliers in the post-harmonization sample (to which all 1992 and 1993 observations belong), than in the pre-harmonization sample. Table 5.7, Panel B, does provide an explanation, as it shows some extreme numbers for 1992 and 1993. In both years, the average EPS-variable was negative, while the ΔEPS variable was extremely high in 1993. These extreme income-related numbers should be seen in the context of Sweden experiencing its most severe economic downturn since the 1930's during the 1991-1993 period[74].

The overall result of 2% outliers should be seen in the context of previous studies. Easton and Harris (1991), had less than 1% outliers using US data. In addition, they used a stricter definition of outliers, based on a deviation of 1.5 standard deviations rather than the 3.0 used here. This could be interpreted as a higher variability in the Swedish market than in the US, but is more likely attributable to the unusual economic setting in Sweden in 1992 and 1993.

Return model results from using pooled cross-sectional and time-series data (i.e. the entire sample) is provided in Table 7.2. Results are shown using both 12- and 15-month windows, and both including and excluding outliers. Table

[74] Note, however, that even though the high number of outliers is explained by the economic downturn, this explanation does not provide a theoretical justification for the removal of outliers.

7.3 shows the same data, stratified into pre- and post-harmonization samples. In the latter table, Z-statistics are used to compare R^2's between the two sub-samples. The Z-statistics are calculated based on a formula used in Harris et al (1994), and derived from Cramer (1987). Z-statistics[75] are computed as[76]:

$$\frac{R_1^2 - R_2^2}{\sqrt{\sigma^2\left(R_1^2\right) + \sigma^2\left(R_2^2\right)}} \qquad \textbf{(3)}$$

In the tables, t-statistics are shown in parenthesis under the α-coefficients, and F-statistics are shown under the R^2-values[77].

Table 7.2. Return model, full sample

$$\frac{P_{jt} + d_{jt} - P_{jt-1}}{P_{jt-1}} = \alpha_{0t} + \alpha_{1t}\frac{A_{jt}}{P_{jt-1}} + \alpha_{2t}\frac{A_{jt} - A_{jt-1}}{P_{jt-1}} + \eta_{jt}$$

Specification	α_{0t}	α_{1t}	α_{2t}	Adjusted R^2	N
12-month window, including outliers	.265**** (15.890)	-.070 (-.969)	.409**** (9.028)	.053**** (45.512)	1587
15-month window, including outliers	.363**** (19.490)	-.055 (-.682)	.446**** (8.816)	.052**** (44.316)	1587
12-month window, excluding outliers	.174**** (10.359)	.997**** (6.311)	.812**** (5.857)	.132**** (119.478)	1556
15-month window, excluding outliers	.270**** (13.889)	1.020**** (5.606)	.959**** (6.008)	.122**** (108.847)	1556

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

Table 7.2 shows that the return model is significant regardless of window-length and whether outliers are included or excluded. Consequently, there is a significant association between stock and accounting returns for the overall sample. However, the coefficient for the EPS variable (α_1) is clearly affected by the inclusion of outliers, since it is not significantly different from zero when outliers are included. This is noteworthy, since in previous studies (such as Easton and Harris, 1991; Ohlson and Shroff, 1992; Harris et al, 1994), the EPS variable is the variable with the highest explanatory power of the two independent variables. The explanation appears to be related to multicollinearity. When a simple regression model was run, including only the

[75] The significance levels of Z-statistics are obtained from Kmietowicz and Yannoulis (1988).
[76] Where estimated R^2's and estimated standard deviations of R^2's (σ^2) are used.
[77] As a reminder to the reader, P = stock price per share, and A = accounting earnings per share.

EPS variable, on the sample including outliers (results are not reported here), the coefficient was significant using both 12- and 15-month windows[78].

Table 7.3. Return model, full sample stratified into pre- and post-harmonization

$$\frac{P_{jt} + d_{jt} - P_{jt-1}}{P_{jt-1}} = \alpha_{0t} + \alpha_{1t}\frac{A_{jt}}{P_{jt-1}} + \alpha_{2t}\frac{A_{jt} - A_{jt-1}}{P_{jt-1}} + \eta_{jt}$$

Specification	α_{0t}	α_{1t}	α_{2t}	Adj. R^2	N	Z-statistic
12-month window, including outliers, pre-harmonization	.210**** (10.836)	.950**** (6.333)	-.220* (-2.276)	.037**** (22.033)	1087	-2.799**
Post-harmonization	.245**** (6.777)	-.253* (-2.546)	.513**** (8.241)	.117**** (34.169)	500	
15-month window, including outliers, pre-harmonization	.309**** (13.539)	1.061**** (5.998)	-.183 (-1.600)	.036**** (21.331)	1087	-2.952**
Post-harmonization	.325**** (8.521)	-.271** (-2.591)	.550**** (8.400)	.121**** (35.472)	500	
12-month window, excluding outliers, pre-harmonization	.173**** (7.319)	1.330**** (5.023)	.145 (.600)	.077**** (37.110)	1080	-5.045****
Post-harmonization	.148**** (5.298)	.897*** (4.355))	1.156**** (6.601)	.257**** (83.195)	476	
15-month window, excluding outliers, pre-harmonization	.281**** (10.147)	1.225**** (3.939)	.633* (2.235)	.070**** (51.911)	1080	-4.166****
Post-harmonization	.225**** (7.210)	.900**** (3.908)	1.145**** (5.847)	.215**** (65.923)	476	

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

Table 7.3 shows that the hypothesis stated in Section 3.2.3 is supported, i.e. that accounting earnings are more value relevant (defined as the level of R^2) when deferred taxes are used (the post-harmonization sample) than when tax reserves are used (the pre-harmonization sample). To the extent that the change from tax reserves to deferred taxes is the result of international harmonization, we can then make the statement that harmonization of Swedish accounting has lead to the higher value relevance of accounting earnings.

The null hypothesis of no differences in R^2's can be rejected with a probability exceeding the 1% level. This conclusion is independent of whether 12- or 15-month windows are used, as well as of whether outliers are included or

[78] Multicollinearity for the sample excluding outliers is further discussed below.

excluded[79]. Thus, the substantive results are not sensitive to choices made regarding windows or outliers.

In the rest of the return study we will use 15-month windows, and exclude outliers. The results are virtually similar between 12- and 15-month windows, which indicates that serial correlation is not a problem for the 15-month windows. This is further corroborated by a Durbin-Watson statistic (see Pindyck and Rubinfeld, 1981, pp. 158-161), which is almost identical with the use of 12- and 15-month windows, respectively. With no detectable serial correlation present, the choice is made to focus on 15-month windows, since they replicate windows used in previous studies, primarily in Easton and Harris (1991) and Harris et al (1994).

Outliers are excluded in the rest of the return study, since the substantive results are similar whether they are included or not (apart from the problem with multicollinearity with the EPS variable, as discussed above). The reason for excluding outliers is that existing structures in the data may then be more easily discovered.

The results in Table 7.3 could be affected by several other issues. A potential fundamental problem with the research method is that structural changes in the stock market can occur, which will garble the results (see Section 3.2.3). Table 5.6, Panel B gives an indication that there are no systematic structural changes occurring (apart from the change in accounting treatment).

Further evidence on the issue is given by annual tests using the return model. Results from the annual tests, based on 15-month windows, and excluding outliers, are shown in Table 7.4. Focusing first on the R^2's, there does not seem to be any systematic changes over time. There is a tendency for higher R^2's in the later years, as predicted by the harmonization of accounting, but no other systematic changes in R^2's over time are apparent from the table.

Next we focus on the α_1 and the α_2 coefficients. Based on the existence of conservatism in accounting, we would expect the α_1 coefficient to be larger than one, since value creation measured by accounting lags value creation as measured by stock returns. In addition, we would expect this coefficient to be larger in the pre-harmonization than in the post-harmonization sample, since the use of tax reserves increases the level of conservatism in accounting. In agreement with these expectations, coefficients are generally higher than

[79] Although the significance level is higher when outliers are excluded.

one, and they tend to be higher in earlier than in later years (at least when the focus is on only those years for which the α_1 coefficient is significant).

Table 7.4. Return model, sample stratified by year

$$\frac{P_{jt} + d_{jt} - P_{jt-1}}{P_{jt-1}} = \alpha_{0t} + \alpha_{1t}\frac{A_{jt}}{P_{jt-1}} + \alpha_{2t}\frac{A_{jt} - A_{jt-1}}{P_{jt-1}} + \eta_{jt}$$

Year	α_{0t}	α_{1t}	α_{2t}	Adjusted R^2	N
1995	.021 (.285)	1.983** (3.109)	-.114 (-.251)	.089** (6.271)	109
1994	-.032 (-.074)	1.646**** (4.550)	.201 (.638)	.273**** (18.835)	96
1993	.881**** (7.978)	1.443** (2.655)	1.136* (2.591)	.219**** (12.786)	85
1992	.064 (1.675)	.992**** (4.007)	.295 (1.368)	.354**** (26.484)	94
1991	-.107 (-1.853)	1.132* (2.401)	-.595 (-1.264)	.048* (3.598)	105
1990	-.304**** (-9.177)	1.459**** (3.739)	-.482 (-1.108)	.197**** (14.479)	111
1989	.077 (1.477)	.925 (1.530)	-.403 (-.751)	.004 (1.221)	123
1988	.478**** (7.305)	2.146** (3.239)	-1.073 (-1.476)	.070** (5.779)	128
1987	.151*** (3.363)	1.111 (1.779)	-.211 (-.391)	.024 (2.757)	142
1986	.737**** (10.888)	.453 (.533)	.707 (.845)	.023 (2.647)	140
1985	.227**** (4.032)	2.136*** (3.472)	.032 (.066)	.133**** (12.383)	149
1984	-.102** (-3.037)	.732 (1.794)	.049 (.153)	.042* (4.058)	140
1983	1.077**** (11.003)	-.352 (-.408)	2.660*** (3.427)	.114**** (9.597)	134

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

Regarding the α_2 coefficient it is less clear what is to be expected. However, based on Table 7.4 it is obvious that the strong significance of this coefficient in the time series regressions (Tables 7.2 and 7.3) is primarily driven by one year (1983). For the remainder of the years, the coefficient is around zero. To summarize, based on indications from the α_1 and α_2 coefficients, and R^2's,

we can conclude that the assumption of no structural changes over time in the stock market seems to hold.

As a further test whether results are driven by structural changes or not, the return model was run using a limited number of years, focusing on the years when the shift from tax reserves to deferred tax accounting occurred. The results are provided in Table 7.5. As shown, there is still a significant difference between R^2's for the pre- and post-harmonization samples, even with the shorter time period used. Thus, it is not likely that the results in Table 7.3 are driven by structural changes in the stock market.

Table 7.5. Return model, sample for 1989-93

$$\frac{P_{jt} + d_{jt} - P_{jt-1}}{P_{jt-1}} = \alpha_{0t} + \alpha_{1t}\frac{A_{jt}}{P_{jt-1}} + \alpha_{2t}\frac{A_{jt} - A_{jt-1}}{P_{jt-1}} + \eta_{jt}$$

Specification	α_{0t}	α_{1t}	α_{2t}	Adjusted R^2	N	Z-statistic
Full sample	.146**** (4.943)	.508* (2.147)	1.354**** (6.547)	.195**** (63.502)	518	
Pre-harmonization	-.141**** (-4.302)	1.484**** (3.835)	-.529 (-1.396)	.099**** (14.809)	252	-3.177***
Post-harmonization	.351**** (7.645)	.924** (3.037)	1.390**** (5.437)	.276**** (51.600)	266	

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

Results in Table 7.3 may also be affected by data quality problems, such as measurement errors, the data not being normally distributed, or multicollinearity. Each of these issues are discussed below.

Measurement errors in the accounting data in the independent variables is minimized by the fact that the data is collected directly from annual reports, rather than from a database. The stock market data, however, could be affected by measurement errors due to the fact that stock prices are not always quoted daily. In other words, prices do not always reflect an actual clearing price on the specific day of interest[80]. In order to test the integrity of the stock market data, the return model was run with stock return data collected from two independent sources. One is a database with stock return figures from Göteborg University, the other is based on newspaper stock quotes, as

[80] This may not be a problem, given the assumption that market participants would react if they were faced with a stock price that they considered too high or low. Thus, even if no one is trading on a specific day, market actors may still watch the price, and see it as a reasonable valuation.

previously noted. No substantive differences were found between the two data sets.

Plotting of the data indicates that it is close to normally distributed, possibly with a slight skewness. Table 5.7 shows that for three of the variables (Return 12, Return 15, and ΔEPS) the mean is higher than the median, which is an indication of positive skewness. Measures of normality, based on comparison of actual with normally distributed data, using the Kendall coefficient of concordance, indicates that the assumption of normal distribution is appropriate. The variables are normally distributed both before and after adjustment for outliers. Thus, the skewness detected should not present problems in the return study.

Table 7.6. Return model, separate independent variables

PANEL A: EPS variable: $\frac{P_{jt} + d_{jt} - P_{jt-1}}{P_{jt-1}} = \alpha_{0t} + \alpha_{1t} \frac{A_{jt}}{P_{jt-1}} + \eta_{jt}$

Specification	α_{0t}	α_{1t}	Adjusted R^2	N	Z-statistic
Full sample	.233**** (12.507)	1.774**** (13.326)	.102**** (177.592)	1556	-
Pre-harmonization	.251**** (10.313)	1.760**** (8.851)	.067**** (78.343)	1080	-2.828**
Post-harmonization	.196**** (6.133)	1.757**** (9.553)	.160**** (91.264)	476	

PANEL B: ΔEPS: $\frac{P_{jt} + d_{jt} - P_{jt-1}}{P_{jt-1}} = \alpha_{0t} + \alpha_{2t} \frac{A_{jt} - A_{jt-1}}{P_{jt-1}} + \eta_{jt}$

Specification	α_{0t}	α_{2t}	Adjusted R^2	N	Z-statistic
Full sample	.331**** (20.380)	1.577**** (13.516)	.105**** (182.687)	1556	-
Pre-harmonization	.359**** (18.497)	1.493**** (8.198)	.058**** (67.204)	1080	-3.949****
Post-harmonization	.268**** (9.049)	1.632**** (10.638)	.191**** (113.164)	476	

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

The existence of multicollinearity is tested for by running separate regressions with each of the two independent variables. The results are shown in Table 7.6. The results in that table should be compared to the 15-month results excluding outliers in Tables 7.2 and 7.3. The higher t- and F-

values in Table 7.6 indicate the existence of multicollinearity in the multiple regression. The lower R^2's in the simple regression indicate that both independent variables add explanatory power to the model. It should be noted that the results in Table 7.3 are not driven by multicollinearity since the R^2's in the pre- and post-harmonization samples are significantly different even when the two independent variables are used in separate models. Thus, the conclusion regarding hypothesis one is unaffected by multicollinearity.

The issue of structural changes in the stock market was discussed above, and did not appear to be a problem in this study. There are, however, potentially other uncontrolled factors that could be driving the results. One way of studying such effects is to investigate the sample by industry. This is based on the assumption that uncontrolled factors are correlated with industry. Two conditions must be fulfilled for industries to have an impact on results. First, the relative weight of different industries must be different in the pre- and post-harmonization samples. Second, observations from different industries must behave differently in the return model regression. The percentage of observations in different industries is shown in Table 7.7., and return model results by industry are shown in Table 7.8.

Table 7.7. Percentages of observations in different industries

Industry	Pre-harmonization	Post-harmonization	Total sample
Banking	7.1%	3.6%	6.0%
Construction	4.8	5.7	5.1
Industrial	54.5	60.3	56.3
Insurance	2.2	3.2	2.5
Investment co.	9.7	4.4	8.1
Real estate mgmt.	8.7	6.9	8.2
Retail/trading	6.2	5.7	6.0
Transportation	5.0	8.6	6.1
Utilities	1.7	1.7	1.7

What could be a problem for the results is if industries that are over-represented in the pre-harmonization sample have low R^2's, or those over-represented in the post-harmonization sample have high R^2's. Then, industry-related factors rather than accounting harmonization could be driving results. The two industries that are over-represented in the pre-harmonization sample (banking and investment companies) do not have unusually low R^2's. Neither do the industries that are over-represented in the post-harmonization sample (transportation, industrial, and construction) have unusually high R^2's. Thus, there are no apparent uncontrolled factors related to industry that drive the results of the study.

Table 7.8. Return model, results stratified by industry

$$\frac{P_{jt} + d_{jt} - P_{jt-1}}{P_{jt-1}} = \alpha_{0t} + \alpha_{1t}\frac{A_{jt}}{P_{jt-1}} + \alpha_{2t}\frac{A_{jt} - A_{jt-1}}{P_{jt-1}} + \eta_{jt}$$

Industry	α_{0t}	α_{1t}	α_{2t}	Adjusted R^2	N
Banking	.284***	1.047	.434	.079**	94
	(3.415)	(1.391)	(.772)	(4.965)	
Construction	.222**	.882	.956	.171****	79
	(3.052)	(1.016)	(1.057)	(9.070)	
Industrial	.340****	.386	1.499****	.109****	876
	(11.377)	(1.291)	(5.842)	(54.467)	
Insurance	.136	1.543	.005	.080	39
	(1.673)	(1.144)	(.007)	(2.653)	
Investment companies	.160*	1.463*	.356	.109****	126
	(2.052)	(2.518)	(.637)	(8.626)	
Real estate management	.244****	1.084*	1.221**	.130****	127
	(4.349)	(2.223)	(2.923)	(10.454)	
Retail/trading	.104	2.414***	.124	.212****	94
	(1.428)	(3.404)	(-170)	(13.536)	
Transportation	.242**	1.915**	1.191	.169****	95
	(2.808)	(2.639)	(1.916)	(10.563)	
Utilities	.323*	-.444	1.528	-.080	26
	(2.539)	(-.174)	(.372)	(.071)	

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

An issue that must be considered when analyzing the actual impact of harmonization is how financial statements are used in practice, i.e. which accounting income number users actually focus on. In this study, reported net income numbers have so far been used, in line with international practice. Domestic Swedish financial statement users, however, have tended to, and still tend to, use pre-tax income. In the pre-harmonization period, the income numbers are not only pre-tax, but also pre-appropriations[81]. An additional adjustment that is possible to make is to exclude extraordinary items. This latter adjustment has less of an empirical basis in the Swedish system, in that such an adjustment is not as common in practice. The effects of these ad-

[81] Pre-appropriations indicates that it is income before appropriations to untaxed reserves that is used. The reason for using this number is that effects relating to the tax system are assumedly excluded.

justments are shown in Tables 7.9 and 7.10. The numbers in Table 7.10 are both pre-tax and pre-appropriations, and are adjusted for extraordinary items.

Table 7.9. Return model, pre-tax and pre-appropriations income numbers

$$\frac{P_{jt} + d_{jt} - P_{jt-1}}{P_{jt-1}} = \alpha_{0t} + \alpha_{1t}\frac{A_{jt}}{P_{jt-1}} + \alpha_{2t}\frac{A_{jt} - A_{jt-1}}{P_{jt-1}} + \eta_{jt}$$

Specification	α_{0t}	α_{1t}	α_{2t}	Adjusted R^2	N	Z-statistic
All observations	.212**** (10.352)	.709**** (6.605)	.903**** (8.987)	.214**** (212.806)	1556	-
Pre-harmonization	.194**** (6.929)	.814**** (5.769)	.762**** (5.757)	.202**** (137.861)	1080	-.643
Post-harmonization	.228**** (7.190)	.645*** (3.401)	1.063**** (6.551)	.228**** (71.148)	476	

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

Table 7.10. Return model, pre-tax and pre-appropriations income numbers, adjusted for extraordinary items

$$\frac{P_{jt} + d_{jt} - P_{jt-1}}{P_{jt-1}} = \alpha_{0t} + \alpha_{1t}\frac{A_{jt}}{P_{jt-1}} + \alpha_{2t}\frac{A_{jt} - A_{jt-1}}{P_{jt-1}} + \eta_{jt}$$

Specification	α_{0t}	α_{1t}	α_{2t}	Adjusted R^2	N	Z-statistic
All observations	.205**** (9.670)	.737**** (5.941)	1.186**** (9.878)	.231**** (234.190)	1556	-
Pre-harmonization	.199**** (6.774)	.784**** (4.487)	1.117**** (6.301)	.217**** (150.556)	1080	-.770
Post-harmonization	.207**** (6.308)	.716*** (3.504)	1.241**** (7.202)	.245**** (78.045)	476	

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

Adjusting for extraordinary items does not add much to the quality of the data for the return model, so in the rest of the analysis we focus on Table 7.9. When comparing Table 7.9 with Tables 7.2 and 7.3, it is obvious that the adjustment for taxes and appropriations increases the quality of the data for the entire sample. The R^2 is increased by making the adjustment, as are t- and F-values. It is also clear, that the improvement is driven by the pre-harmonization sample. The adjustment causes virtually no change in the post-harmonization sample. These results are expected. That is exactly the reason why Swedish users did adjust for taxes and appropriations in the pre-harmonization period. Another expected result is that the α_1 and the α_2 coef-

ficients are lower when pre-tax income is used, since this adjustment increases the accounting return figures.

What is especially important in Table 7.9, however, is that when the adjustment is made there is no longer a significant difference in R^2's between the pre- and post-harmonization samples. Thus, it was possible for users to adjust reported Swedish income numbers when untaxed reserves were used. By making this adjustment, users could obtain income numbers with the same value relevance as is found for the post-harmonization sample.

Conclusions from the return model can be based on two different types of users. First, there are users that are familiar with Swedish accounting. These users did make adjustments for appropriations in the pre-harmonization period. Second, there may be users that are not familiar with Swedish accounting, and these tend to use reported net income numbers. The first type of users did not necessarily benefit from the Swedish harmonization (as expressed by the Z-statistic in Table 7.9). The second type of users benefited greatly from harmonization (as expressed by the Z-statistics in Table 7.3). This is consistent with the main argument put forward by Swedish multinational companies for abolishing appropriations, namely that it is difficult to explain to foreign users. Those users also have the potential for the greatest benefits from harmonization.

The last point to be discussed for the return model, is how the results relate to the existing literature. Some results indicate unusually high R^2's. In studies based on US data, R^2's for the return model with one-year windows are generally in the 5-10% range (see, for example, Easton and Harris, 1991). Here, results for the entire sample, and including outliers, would fall in that range. However, results excluding outliers are higher, especially in the post-harmonization sample, where we obtain an R^2 of 21.5%. The high R^2's are even more pronounced when adjustments are made for taxes and appropriations. There, it is 21.4% for the entire sample. Such high R^2's are only obtained with longer windows (somewhere in the range 2-5 years in Easton et al, 1992) for US data.

The high R^2's could indicate a high value relevance for Swedish accounting, but there are also other potential explanations. First, this study includes a variety of industries, whereas US studies have focused on only industrial companies. As indicated in Table 7.8, this factor could provide part of the explanation, since the Swedish results could be driven by observations in the

industries of real estate management, retail/trading, transportation, and construction.

Second, a number of adjustments have been made to the data in this study. It may be possible to adjust US data in such a way as to obtain higher R^2's than currently done. For example, as noted in the discussion on Table 7.1, the data used in this study has a higher percentage of outliers than the corresponding U.S studies. This could be caused by wider swings in both independent and dependent variables in the Swedish setting. It is unclear at this point what the econometric effects of varying the cutoff point are.

Third, a higher level of conservatism in Sweden may cause stronger results than in the US setting. The multiple regression model in this study, when adjusted for outliers have both an α_1 coefficient, and an α_2 coefficient of 1.0. This should be compared to the coefficients for the same model in Easton and Harris (1991, p. 30), which are 0.7 and 0.2, respectively. This difference may be caused by a generally lower level of earnings in Sweden than in the US. This causes especially the ΔEPS variable to have a higher coefficient. The same tendency is seen in Harris et al (1994, p. 200), who show that the ΔEPS coefficient is higher in Germany (with a low earnings level) than in the US (with a high earnings level).

Fourth, primary annual report data was collected for this study, where US studies generally have used secondary database data. Thus, the quality of the accounting data may be higher here. It may be possible to achieve higher R^2's in a US setting by directly collecting data from annual reports. This is probably what is driving the differences between this study and Alford et al (1993, p. 216). They got very low value-relevance for the Swedish data, most likely because the data is obtained from a US database. Alford et al (1993) used Global Vantage to obtain accounting data on Sweden. One apparent problem is that they obtained relatively few observations. For the 1983-90 period they identified 170 observations for industrial companies, compared to 601 in the sample used in this dissertation. However, it is highly unlikely that the quality of the databases is poor when it comes to US accounting data, so this is an unlikely explanation for the R^2 differences.

Fifth, the size of the stock market could have a positive effect on the Swedish data. Because there are few companies (varying between 90 and 150 in each year), the likelihood of any one company being 'overlooked', and thus mispriced, by the market may be small in Sweden. In the US, with several thousands of listed companies, there may be substantial mispricing going on. This

is especially a problem in this type of study, where no weighting of observations by size (such as market capitalization) is done. Thus, a highly liquid company such as General Electric, has as much impact on the results as a small company with no analyst following. This factor is offset by the large number of analysts and investors that are active on the US stock market compared to the Swedish market.

To conclude, the most likely explanations for the high R^2's in this study are the industries included, and the level of conservatism in Swedish accounting. Possible additional explanations include number of outliers removed, and the number of listed companies on the stock markets.

7.2. The Price Model

The variables in the price model are absolute values, as compared to ratios in the return model. Thus, the issue of outlying observations, in the way that they are defined in the return model, is not meaningful for the former model. Neither do any window issues arise in this model. Results based on all observations, as well as stratified into pre- and post-harmonization samples, are given in Table 7.11[82].

Table 7.11. Price model, entire sample

$$P_{jt} = \varphi_{0t} + \varphi_{1t} A_{jt} + \varphi_{2t} B_{jt} + \varepsilon_{jt}$$

Specification	φ_{0t}	φ_{1t}	φ_{2t}	R^2	N
Entire sample	22.753*** (3.475)	1.687**** (6.562)	1.720**** (26.314)	.434**** (609.174)	1587
Pre-harmonization sample	19.109* (2.277)	.244 (.718)	2.330**** (26.276)	.496**** (535.478)	1087
Post-harmonization sample	39.234**** (7.032)	2.051**** (9.126)	.783**** (15.320)	.479**** (230.643)	500

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

In the analysis of results based on the price models, the focus is on the independent variable coefficients, rather than on R^2's. The reason is that R^2's reflect two separate items in this model. First, they measure the scale of the stock price, indicating that companies with high stock prices tend to have high earnings and equity per share. Second, they measure how well accounting numbers reflect stock market movements. Since we are only

[82] As a reminder to the reader, P = price per share, A = earnings per share, and B = equity per share.

interested in the second measure, and since it is not possible to separate the two items, the analysis is focused on the φ_1 and φ_2 coefficients.

Conceptually, the following is expected regarding the φ_1 and φ_2 coefficients (as noted briefly in Section 3.2.3). φ_1 indicates a (monetary) unit increase in earnings in relation to a unit increase in stock price. We would expect this coefficient to correspond to the inverse of required return on the stock market. Assuming each unit of earnings will continue indefinitely, and assuming there is no conservatism in accounting, the value of that unit is the inverse of the required rate of return. The assumption that each unit of earnings is expected to continue indefinitely is reasonable on an aggregate level. Consequently, assuming a 15% required return on the stock market, φ_1 is expected to be approximately 6.7 (1/0.15). The expected value of this coefficient will increase with the level of conservatism in accounting. φ_2 indicates a unit increase in equity in relation to a unit increase in stock price. In essence, it is a measure of the level of conservatism in accounting. If there is no conservatism, we would expect this coefficient to equal 1, while a value higher than 1 indicates the existence of conservatism.

In Table 7.11, we can see that the φ_1 coefficient is substantially higher in the post-harmonization sample than in the pre-harmonization one, while the opposite is true for the φ_2 coefficient. Based on estimated standard deviations of the coefficients (not reported here) the difference between the φ_1 coefficients is significant on the 0.1% level, while the significance is 0.01% for the φ_2 coefficients. Thus, the differences between pre- and post-harmonization samples as measured by the price model are significant. Further, the usefulness of the earnings number is clearly higher in the post-harmonization sample than in the pre-harmonization (in the latter the φ_1 coefficient is not even significantly different from zero). The lower φ_2 coefficient in the post-harmonization sample is interpreted as a decrease in the level of conservatism in Swedish accounting.

There is a potential problem with multicollinearity among the independent variables, which might explain the unexpectedly low φ_1 coefficient in the pre-harmonization sample. To study the impact of multicollinearity, results are shown by independent variable in Table 7.12.

The results are stronger when the model is separated into the two independent variables, i.e. coefficients and models are more significant. It is especially the

Table 7.12. Price model, separated by independent variables

PANEL A: EPS variable: $P_{jt} = \varphi_{0t} + \varphi_{1t} A_{jt} + \varepsilon_{jt}$

Specification	φ_{0t}	φ_{1t}	R^2	N
Entire sample	131.136**** (21.503)	5.094**** (19.136)	.187**** (366.174)	1587
Pre-harmonization	147.340**** (16.862)	5.406**** (15.254)	.176**** (232.685)	1087
Post-harmonization	99.701**** (20.858)	3.192**** (12.419)	.235**** (154.220)	500

PANEL B: BPS variable: $P_{jt} = \varphi_{0t} + \varphi_{2t} B_{jt} + \varepsilon_{jt}$

Specification	φ_{0t}	φ_{2t}	R^2	N
Entire sample	22.827*** (3.441)	1.936**** (33.836)	.419**** (1144.908)	1587
Pre-harmonization	19.167* (2.284)	2.367**** (32.725)	.496**** (1070.917)	1087
Post-harmonization	39.305**** (6.526)	.937**** (18.011)	.393**** (324.405)	500

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

results for the EPS variable that are stronger in the simple regression. The φ_2 coefficient is still significantly smaller (at the 0.01% level) in the post-harmonization sample. Regarding the φ_1 coefficient, however, results in the simple regression are the opposite to those in the multiple regression, in that the coefficient is smaller in the post-harmonization sample. The difference is significant at the 0.1% level. It is possible that it is a reflection of the lower level of conservatism in the post-harmonization sample. To conclude, both the multiple and simple regression shows significant differences between the pre- and post-harmonization samples. It is not clear, however, whether the post-harmonization sample indicates a higher usefulness of accounting for stock market valuation. What the results do seem to indicate, is that the level of conservatism is lower in the post-harmonization sample. Of course, one could argue that a lower level of conservatism is tantamount to increased usefulness of accounting for stock market users.

The data used in the price model is tested for potential statistical problems. The tests show a tendency towards positive skewness, but also a high probability that the data is normally distributed. No significant serial correlation is present in the data. Plotting of the residuals did indicate some tendency towards heteroscedasticity, although not a strong tendency. Thus, the integrity of the data seems to be acceptable for this study. Note that issues related to

the potential existence of uncontrolled factors driving the results were discussed, and tested for, in Section 7.1. These issues include structural changes over time in the stock market, and potential industry-related factors. An additional test for structural changes is done here, by applying the price model to the 1989-93 period, i.e. a shorter period than is used for the main study. The results are shown in Table 7.13.

Table 7.13. Price model, 1989-93 sample

$$P_{jt} = \varphi_{0t} + \varphi_{1t} A_{jt} + \varphi_{2t} B_{jt} + \varepsilon_{jt}$$

Specification	φ_{0t}	φ_{1t}	φ_{2t}	R^2	N
Entire sample	59.315**** (9.820)	2.138**** (8.961)	.739**** (12.508)	.375**** (162.751)	540
Pre-harmonization sample	60.806**** (6.372)	1.065* (2.146)	1.168**** (7.475)	.334**** (64.340)	254
Post-harmonization sample	43.002**** (5.302)	1.997**** (6.999)	.758**** (11.566)	.448**** (116.805)	286

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

As shown in Table 7.13, the φ_1 coefficient is higher in the post-harmonization sample, while the φ_2 coefficient is lower, which is according to expectations, and agrees with results in Table 7.11. The differences are not significant, however. The lack of significance can be interpreted either as the existence of uncontrolled factors (as discussed above), or as the sample being too small for an effective application of the price model. The latter point can be considered, since the reason the differences are not significant is that the estimated standard deviations of the coefficients are much larger than when the full sample is used, which could be caused by the relative sizes of the samples.

A separate issue that is tested here, is the impact of using adjusted income and equity numbers. As noted in Section 7.1, Swedish users often use pre-tax and pre-appropriations income numbers. Similarly, equity numbers are often adjusted for untaxed reserves. Since no such reserves exist in the post-harmonization sample, unadjusted and adjusted equity numbers are the same in this sub-group. Income numbers adjusted for extraordinary items are also used, even though they were found not to yield results that significantly differ from pre-tax numbers for the return model. Table 7.14 shows results based on income adjusted for taxes and appropriations, and equity adjusted for untaxed reserves, and Table 7.15 shows results based on adjustments for extraordinary items.

Table 7.14. Price model, based on adjusted accounting data

$$P_{jt} = \varphi_{0t} + \varphi_{1t} A_{jt} + \varphi_{2t} B_{jt} + \varepsilon_{jt}$$

Specification	φ_{0t}	φ_{1t}	φ_{2t}	R^2	N
Entire sample	41.567**** (6.434)	.921**** (5.007)	.885**** (18.287)	.403**** (537.118)	1587
Pre-harmonization sample	45.482 (4.863)	.565* (2.270)	.950**** (14.836)	.374**** (325.742)	1087
Post-harmonization sample	38.488**** (7.197)	2.006**** (11.590)	.723**** (14.540)	.522**** (273.517)	500

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

Table 7.15. Price model, accounting data adjusted for extraordinary items

$$P_{jt} = \varphi_{0t} + \varphi_{1t} A_{jt} + \varphi_{2t} B_{jt} + \varepsilon_{jt}$$

Specification	φ_{0t}	φ_{1t}	φ_{2t}	R^2	N
Entire sample	39.216**** (6.101)	1.251**** (6.169)	.860**** (18.521)	.408**** (547.842)	1587
Pre-harmonization sample	43.443**** (4.645)	.909*** (3.281)	.912**** (14.834)	.377**** (330.212)	1087
Post-harmonization sample	35.617**** (6.710)	2.168**** (12.076)	.722**** (14.709)	.531**** (283.017)	500

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

Even though the adjustment for extraordinary items does make a difference (especially regarding the φ_1 coefficient in the pre-harmonization sample), the discussion is focused on Table 7.14 here, since the substance of the results in Tables 7.14 and 7.15 are similar.

Table 7.14 shows that when adjusted numbers are used, there is a significant (at the 0.1% level) increase in the φ_1 coefficient in the post-harmonization sample, indicating an increase in the usefulness of the earnings number. The increase is unlikely to be affected by a change in the level of conservatism, since the numbers are unaffected by tax effects in both of these two sub-samples.

For the φ_2 coefficient there is a decrease in the post-harmonization sample which is significant at the 1% level. This indicates a slight decrease in the usefulness of the equity number in the post-harmonization sample.

We also use adjusted numbers in a simple regression model, in order to test the effect of making the adjustment for each independent variable. The results are shown in Table 7.16

Table 7.16 Price model, separated by independent variable, adjusted data

PANEL A: EPS variable: $P_{jt} = \varphi_{0t} + \varphi_{1t} A_{jt} + \varepsilon_{jt}$				
Specification	φ_{0t}	φ_{1t}	R^2	N
Entire sample	102.100**** (16.727)	3.391**** (24.723)	.278**** (611.250)	1587
Pre-harmonization	109.456**** (12.031)	3.364**** (18.945)	.248**** (358.905)	1087
Post-harmonization	92.342**** (20.069)	2.942**** (15.361)	.320**** (235.950)	500
PANEL B: BPS variable: $P_{jt} = \varphi_{0t} + \varphi_{2t} B_{jt} + \varepsilon_{jt}$				
Specification	φ_{0t}	φ_{2t}	R^2	N
Entire sample	39.922**** (6.141)	1.063**** (32.148)	.394**** (1033.471)	1587
Pre-harmonization	45.693**** (4.877)	1.061**** (25.374)	.372**** (643.865)	1087
Post-harmonization	39.152**** (6.502)	.938**** (18.043)	.394**** (325.538)	500
PANEL C: EO-adjusted EPS variable: $P_{jt} = \varphi_{0t} + \varphi_{1t} A_{jt} + \varepsilon_{jt}$				
Specification	φ_{0t}	φ_{1t}	R^2	N
Entire sample	96.492**** (15.531)	3.916**** (24.881)	.280**** (619.049)	1587
Pre-harmonization	103.329**** (11.172)	3.935**** (19.142)	.252**** (366.408)	1087
Post-harmonization	88.562**** (18.968)	3.127**** (15.624)	.328**** (244.107)	500

* Significant at 5% level. ** Significant at 1% level. *** Significant at 0.1% level. ****Significant at 0.01% level

Results in Table 7.16 show, again, that the substance of the results is the same for the EPS and the EO-adjusted EPS variables, and we therefore focus on the former. Regarding the EPS coefficient, there is no significant difference between the pre- and post-harmonization samples. This lack of significant differences also applies to the BPS variable. Thus, it is possible that the differ-

ences found for pre-tax accounting numbers in the multiple regression (Table 7.14) are caused by multicollinearity problems.

To summarize, two separate aspects of the analysis based on the price model can be discussed. First, one can focus on the extent to which there are significant differences in the coefficients between the pre- and post-harmonization samples. Second, the implications of the size of the coefficients can be emphasized.

Beginning with significant differences between the pre- and post-harmonization samples, results for the price model are similar to results for the return model. Using reported income and equity numbers there are significant differences between the two samples, while the results are less clear when adjusted (pre-tax) numbers are used. With adjusted numbers, differences are found in the multiple regression, but the simple regression suggests that this may be due to statistical problems.

Regarding the size of the coefficients, results are less clear. Some findings go in the expected directions, while other do not. This is probably caused by confounding effects, since the size of the coefficients are influenced by two separate factors. One factor is the level of conservatism in accounting, and it is primarily a scaling factor. The other factor is the association between movements in accounting measures and stock prices, ignoring the scale of the variables. Consequently, it is possible that higher associations in the post-harmonization sample are offset by a lower level of conservatism.

7.3. Conclusion

Both the return and price models indicate the existence of significant differences between the pre- and post-harmonization samples. Results are robust, in that they are not driven by window-lengths used or outliers removed, and neither do they appear to be driven by statistical problems. In the return model especially, it is clear that the association between accounting and stock market measures increased after the accounting harmonization occurred. Price model results can also be interpreted as suggesting an increase in the association, after effects from a decrease in accounting conservatism is considered.

These results indicate that the usefulness of Swedish accounting has increased with accounting harmonization [83]. This is in agreement with expectations, as stated in Hypothesis 1, given in Section 3.2.3. The hypothesis suggests that the increase in usefulness is driven by the switch from a tax reserve model to a deferred tax model. This is reasonable, given that deferred tax accounting involves forward-looking elements that are not present in the tax reserve model. Such elements are assumed to be reflected on the stock market.

It should be noted, however, that the switch in tax reporting model coincides with some other changes, which could also drive results. One such change is the increased standardization of goodwill treatment in Swedish accounting. It should be noted, however, that this standardization is a type of accounting harmonization. Thus, if it plays a role, it does not diminish the total effect of harmonization on the usefulness of accounting for stock market users. Another, potentially more problematic, change is the remaking of the Swedish corporate tax system in 1991. Both nominal tax rates, and the possibility to make tax deductions, were lowered, resulting in basically unchanged de facto tax rates. It is unclear what the effects are, if any, on the results of this study.

Another point is that accounting harmonization is a continuous process. While one (important) harmonizing effort was used in this study, there are other efforts both preceding and following it. The continuous process nature of harmonization is made evident by the separate regressions made for the 1989-93 period. Since they cover a shorter period, fewer harmonization attempts have been made, and the results should be weaker than they are for the 1983-95 period. This is exactly what happens in the study. Interview results also support the results from the statistical study. As noted in Section 8.1.2, the non-Swedish analyst that has followed a Swedish company the longest, notices the biggest change over time in Swedish accounting. As noted in Section 6.3, interviewees at Swedish companies see the change in the tax reporting model as an important step in the harmonization with the rest of the World.

It seems fair to conclude that there are actual differences in stock market usefulness of Swedish accounting before and after the change in the tax reporting model. However, as noted previously, users in Sweden have tended to use pre-tax accounting numbers, thereby adjusting for tax effects in the financial statements. When making these adjustments, there is no difference between the pre- and post-harmonization in the return model. There is a difference

[83] Given that 'usefulness' is defined as a high association between accounting and stock market measures.

noted with the price model, but it is possible that the difference is driven by multicollinearity problems. An additional finding is that when pre-tax numbers are used, associations between accounting and stock market measures is higher than when reported numbers are used. This is not the case in the post-harmonization sample, however. Consequently, one can conclude that it was relevant for users to use pre-tax numbers before harmonization occurred, but that currently reported numbers are as useful.

These results have some implications for the Swedish accounting system. First, the objective with the pre-harmonization model was to combine tax reporting with financial statements that are useful for other users. This appears to have been successful, since a simple adjustment is enough to obtain as high a value relevance as for the post-harmonization sample. The problem was rather its uniqueness in the world, leading to potential misunderstanding on the part of non-Swedish users. The other point is that the currently used deferred tax model gives tax expense numbers that do not lower the value relevance of pre-tax numbers. Thus, it is no longer necessary to focus on pre-tax numbers for Swedish companies.

Relating to the overall research issues of the dissertation, a few points can be made. The answer to specific issue number 2 in Section 1.3 is clearly yes, i.e. senders' choices on content do affect the relevance of accounting for company valuation (as defined in the statistical models). The more general issues in Section 1.1 are focused on the impact on capital market activity. In order to make statements about such an impact based on the results in this chapter, it is necessary to make assumptions about how accounting is used by stock market participants. To the extent that analysts and investors use accounting in a way consistent with the statistical models applied, results in this chapter make it likely that research issue number 2 in Section 1.1 can be answered by yes, i.e. that international accounting diversity does have an impact. Issue number 4, about what form the impact takes, is also answered in that one form of impact is defined by the statistical models. Further, the impact is quantifiable to some extent, which is related to issue number 5.

Findings in this chapter can also be related to the research aims of the dissertation, as stated in Section 1.2. So far, the discussion has focused on how aim number 3 has been fulfilled. This chapter also has implications for aim numbers 1 and 2, however, which cover methodological development and contributions of the dissertation.

Aim number 1 is partly met by the application of the two statistical models. The models per se constitute a structure for the usage of accounting on stock markets.

With regards to research aim number 2, it was noted in Section 3.2.3 that an issue with the statistical models used here is their applicability to small capital market settings. In the existing literature, the models have primarily been used in a US (i.e. large capital market) setting. This chapter shows that, at least for the return model, results are actually stronger than for comparable US studies. Thus, the return model is useful in a small capital market setting. Regarding the price model, it is more difficult to interpret the implications of the findings, even though the model does give highly significant results.