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Value Relevance of Inflation-adjusted Equity and Income

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Abstract

This paper investigates the role incremental information content of inflation-adjusted data plays in explaining the market value of equity and stock returns on the Istanbul Stock Exchange (ISE). We show the effect of inflation accounting application on basic financial ratios, and we test the value relevance of inflation-adjusted and historical cost-based book value and earnings. The findings show that inflation adjustment affects financial ratios significantly, which may create different risk assessments for the selected firms. Furthermore, the results indicate that both inflation-adjusted and historical cost-based earnings and book values are significantly value relevant. The two sets of data are not to be used as substitutes, but, rather, they are complementary. For this reason, inflation-adjusted data should be required as supplementary data to the historical cost information rather than in place of historical cost data.

JEL classification: M41; G14
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1. Introduction

When inflation is present, conventional, i.e., historical cost accounting misrepresents a corporation′s real financial position. Thies and Sturrock (1987) show that historical cost

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accounting overstates profitability during a period of rising prices, and misrepresents the relative financial strengths of firms. The concern is that analysts and investors cannot make informed financial decisions without understanding the impact of inflation on financial information.

Although the information content of inflation-adjusted accounting numbers has been studied previously, the research results on the topic have been inconclusive. While the findings presented in the studies of Bublitz, Frecka, and McKeown (1985) show that inflation-adjusted earnings generate more relevant and reliable measurement than those of historical cost earnings, the findings of Beaver, Griffin, and Landsman (1982) and Beaver and Landsman (1983) show contrasting results. This can be attributed to the need for inflation adjustment and the years relevant to the study. Furthermore, some studies use supplemental information required by financial accounting standards, such as McDonald and Morris (1984), and Sami, Curatola and Trapnell (1989), on U.S. data according to SFAS 33 requirements, and Brayshaw and Miro (1985) on U.K. data according to SSAP 16 requirements. Limited use of supplementary information by financial-statement users and the application of SFAS 33 only to large firms may be reasons for mixed results in these studies. The mixed results of some other studies estimated the inflation-adjusted numbers such as Matolcsy (1984) on U.S. data, and Davidson and Weil (1975) on Australian data may be due to the estimation of inflation-adjusted numbers. Additionally, the focus of these studies is the information content of earnings numbers.

Developed countries do not usually experience persistent high inflation. In emerging markets during hyperinflationary periods, it is important to examine the value relevance of inflation-adjusted data regarding the market equity value. Turkey is one of the few countries that has adopted inflation accounting in recent years and thus provides a unique setting for our study of the incremental information content of both historical and inflation-adjusted data as it relates to the market value of equity. The Turkish economy had been under hyperinflationary pressure for the two decades preceding the application of inflation accounting in 2004. Years of high, double-digit inflation distorted the accounting information provided to the public. In 2004, general price level inflation accounting was applied to the financial statements of all listed companies as required by the Capital Markets Board of Turkey (CMBT). For that one-year period, companies were required to prepare and report 2003 financial statements in terms of inflation accounting as well as historical cost for the purpose of comparison. These two sets of reported financial statements for 2003 provide a unique opportunity to compare the inflation-adjusted and historical cost accounting information.

There is limited empirical research about the value relevance of earnings and book value in Turkey. With the exception of the recent study by Anandarajan, Hasan, Isık, and McCarthy (2006), there is no study focusing on the drivers of equity values. In their study, Anandarajan et al. (2006) examine the factors associated with equity valuation from 1992 through 2001. During their sample period, inflation accounting was not applicable. Therefore, they adjusted all values for inflation and found that both inflation-adjusted earnings and book value are important determinants of equity values in Turkey. In this study, we also examine the value relevance of inflation-adjusted earnings and book value and add a comparison between the value relevance of inflation-adjusted data with historical cost data. Unlike the previous studies, this study does not attempt to remove the inflation

effect and adjust the financial statements using the Consumer Price Index (CPI). The current study uses the reported inflation-adjusted financial statements as provided for in inflation accounting practices. Consistent with the findings of Anandarajan et al. (2006), inflation-adjusted earnings and book value have information content and they are relevant in predicting equity values. The new finding in this study is fact that historical cost information has incremental information content beyond inflation-adjusted information.

The present work contributes to an understanding of the issue in two ways. First, it examines differences between reported inflation-adjusted financial ratios in comparison with historical cost financial ratios. This is done to reveal the distortion that inflation causes in accounting information. The financial ratios for net sales, total liabilities, fixed assets, accounts receivables, inventory, earnings per share, and book value per share are computed for inflation-adjusted and historical cost data. The results show that the financial ratios are generally higher for historical cost data than they are for the inflation-adjusted data. The only exceptions are book value per share and fixed-assets-to-total-assets ratio. The inflation-adjusted book value and fixed assets are higher than those of historical cost. The current paper attempts to draw attention to the significant difference between the inflation-adjusted financial ratios and historical cost financial ratios. The findings of this study support the policy makers′ requirement of inflation-adjusted data in hyperinflationary economy as a supplement to historical-cost data rather than a replacement. However, International Accounting Standard 29 requires replacement of historical cost financial statements by inflation-adjusted information.[2]

The remainder of this paper is organized as follows. Section 2 provides a literature review on inflation accounting. Section 3 outlines the Turkish reporting environment and inflation accounting application in Turkey. Section 4 presents the data and research methodology. Section 5 shows empirical results. Section 6 provides concluding comments on the implications of our study.

2. Literature on Inflation Accounting

Inflation is one of the factors that affect the accounting system in a country. Archambault and Archambault (1999) show that rate of inflation is the dominant factor in applying inflation accounting. Countries with higher inflation rates choose to use price-level adjustment rather than historical cost with some revaluations.

Regardless of which inflation-adjustment index is chosen within an accounting system, the use of inflation-adjusted accounting numbers by decision makers is the main concern. The FASB (1980, p.21) states that "Useful information must be capable of making a difference in a decision by helping users form predictions about outcomes of past, present and future events or to confirm or correct expectations." Prior studies in the field used estimated inflation-adjusted numbers to show the inflation-adjustment effects.

The reporting of inflation-related information as a result of SFAS 33, "Financial Reporting and Changing Prices" in the United States, provided an opportunity to test the information content of inflation-adjusted accounting numbers. When the requirement was in effect, the statement was applied to large enterprises and required supplementary disclosure of information that measures the impact of changing prices on the enterprise.

[2] IAS 29: Financial Reporting in Hyperinflationary Economies, prg 7.

Most previous studies used data resulting from applying SFAS33 in the United States. Among them, Bublitz et al. (1985) find significant, incremental explanatory power in inflation-adjusted variables beyond that provided by historical-cost variables. Bildersee and Ronen (1987) show that current-cost data have incremental explanatory power on stock prices. Sami et al. (1989) find that predictive ability of inflation-adjusted earnings measures outperforms the historic cost earnings on changes in stock prices. In contrast, McDonald and Morris (1984) find no significant relationship between SFAS 33 disclosures and stock returns, while Matolcsy (1984) shows that inflation-adjusted accounting income has no marginal information content. These latter results are consistent with Beaver et al. (1982), and Ro (1980).

In the United Kingdom, Brayshaw and Miro (1985) find no evidence of a stock market response to the disclosure of current-cost adjustments as required by SSAP 16. Barniv (1999) examines the value relevance of inflation-adjusted and historical-cost-based earnings in Israel and shows that the explanatory powers of the inflation-adjusted regressions are statistically higher than those of the historical-cost regressions. Davis-Friday and Rivera (2000) use a sample of Mexican firms that are listed in the U.S. to analyze how inflation accounting affects the relationship between accounting information and the market value of the firms. Their findings show that the accounting information as produced by both the Mexican inflation-accounting model and the U.S. GAAP model are value relevant.

The current study extends the inflation- accounting literature and provides the comparison for value relevance of inflation-adjusted and historical cost of earnings and book value in Turkey. Our sample continues 140 publicly traded nonfinancial firms and our findings suggest that the two sets of data include information essential to investors in the Turkish stock market. In particular, the regression results reveal that the historical-cost information is more value relevant than the inflation-adjusted information. Overall, the two data sets complement each other.

3. The Turkish Reporting Environment and Inflation-accounting Application

The Istanbul Stock Exchange (ISE) began operations in 1986 following the establishment of a Capital Markets Board of Turkey (CMBT) in 1982. The ISE is one of the fast growing emerging markets in the world. The number of listed firms in the ISE in January 1986 was 42 and it increased to 304 in 2005. There are four different markets on the ISE: the National Market, the Regional Market, the New Companies Market and the Watch-list Companies Market.

The CMBT is responsible for the enforcement of proper financial reports according to accounting standards for companies listed on the ISE. Listed companies are required to file their financial statements on a quarterly basis. Annual and semi-annual statements must be audited by CMBT-certified independent auditors. The list of CMBT-certified auditors ranges from international firms to small, local companies.

The Turkish Uniform Accounting System has been applied to all firms except those in the financial sector since January 1, 1994. This system is designed to produce dependable and comparable financial information that is prepared according to Generally Accepted Accounting Principles (GAAP). Unfortunately, since 1994, The Turkish economy has been

Table 1
WPI-and CPI- based Inflation Ratios from 1994 through 2004.
Source: State Institute of Statistics.

YEAR	WPI	CPI	YEAR	WPI	CPI
1994	100%	99%	2000	51%	54%
1995	86%	89%	2001	61%	54%
1996	75%	80%	2002	50%	44%
1997	81%	85%	2003	25%	25%
1998	71%	84%	2004	11%	10%
1999	53%	64%			

The inflation rates are calculated according to Wholesale Price Index (WPI) and Consumer Price Index (CPI). The annual average WPI and CPI are calculated and then the percentage changes of average annual WPI and CPI from previous years are found.

under high inflationary pressures, which distorted the financial reports of companies before inflation accounting was applied. In Table 1, the annual inflation rates are reported according to the Wholesale Price Index (WPI) and the Consumer Price Index (CPI), which are calculated as of December of each year. Also the percentage change of average WPI and CPI from the previous years are reported. The range of inflation provides us with insights into the importance of taking inflation into consideration.

To address the distortion of financial statements caused by high inflation, a "Communiqué on Principles Regarding Financial Reporting in Hyperinflationary Periods" was published by the CMBT on November 28, 2001. The Communiqué set forth rules, effective from 2004, publicly held corporations were to follow in preparing financial statements in hyperinflationary periods. Companies were required to restate and report their 2003 financial statements for comparative purposes in 2004. The Communiqué defined a high-inflation period as follows: starting with the annual accounting period, if at the date of the balance sheet the cumulative price index over the preceding three years more than doubled, that is considered a high-inflation period. Further, it has to be a period in which the price index at the annual balance sheet date showed a rise of 10% or more with respect to the beginning of the year.

The Communiqué distinguishes between monetary and nonmonetary items in the inflation adjustment of the balance sheet. Monetary items are defined as those in which nominal values are preserved but the purchasing power changes due to inflation. Moreover, according to the requirements of this Communiqué, monetary assets and liabilities are not restated on the balance sheet since their values are already reflect inflation. However, companies that maintained more monetary assets than monetary liabilities would have purchasing-power loss in inflationary periods. The gain or loss of monetary items caused by inflation is calculated and reported in the statement of income. The netting process proceeds as follows: If "Ending Net Monetary Position" is higher than the balance sheet "Net Monetary Position." then a gain on the "Net Monetary Position" is reported. If "Ending Net Monetary Position" is lower than the balance sheet "Net Monetary Position," then a loss on "Net Monetary Position" is reported. The net monetary position resulting from the difference of monetary assets and liabilities is disclosed in the income statement as a separate line item called net monetary gain/loss.

Nonmonetary items are expressed at current value in the balance sheet, at the date of the balance sheet, and are restated (using the Wholesale Price Index announced by the State Institute of Statistics) at the date of transaction. Transactions before 1970 were assumed to have occurred in 1970. Nonmonetary assets were restated with reference to the first entry date recording the purchase. At the first use of depreciable assets, previously added cost components such as financing cost, exchange-rate difference, and revaluation were deducted from overall cost before affecting inflation adjustment. Additionally, depreciation should be allocated from the restated value over both previous life and remaining life.

Equity items are presented at historical costs in financial statements. The differences from restatements are reported under an equity restatement differences account. All income-statement accounts are restated by applying the change in price index from the dates when the items are recorded. However, if these items are distributed in a regular manner over the entire period, restatement could be done by simply applying an average inflation adjustment.[3]

At the beginning of the first restatement period, the differences between restated assets and restated liabilities and equities are shown as a past years′ gain or loss account to adjust the balance sheet.

4. Data and Methodology

4.1. Data

We collected stock prices and fundamental accounting information for firms listed on the ISE from 2003 financial reports. Restated 2003 financial information was taken from 2004 financial reports. We used the ISE CD Rom to get the balance sheet and income statement information for the firms. Firms were selected based on the availability of data. To be included in our sample for a given year, a firm must have all values for net income and stockholders′ equity, both as inflation-adjusted and historical cost-based financial information for the year 2003. The number of listed firms on the ISE for the year 2003 is 265. Financial institutions (83) were excluded from the sample due to different reporting requirements. Furthermore, 35 listed firms that had already started to prepare their reports according to International Financial Reporting Standards (IFRS) by 2003 were also discarded. The final sample of 140 firms includes all the remaining non-financial companies, except seven firms that had missing data. The sample is concentrated in the education (2), manufacturing (118), construction (2), technology (7), and retail-wholesale (11) sectors.

4.2. Methodology

Our analysis is based on the valuation model developed by Ohlson (1995), which derives the value of a firm by using a function of the firm′s earnings and the book value per share. It has been widely used in literature for testing the differences in the value relevance

[3] The restatement factor is calculated by dividing the balance-sheet date price by the average price index for the period.

of accounting information under different reporting requirements (Sami and Zhou, 2004; Davis-Friday and Rivera, 2000; Jermakowicz, Prather-Kinsey, and Wulf, 2007).

To examine the effect of inflation-adjusted accounting on the value relevance of accounting information, following the Davis-Friday and Rivera (2000) methodology, we run the following regressions.

$$MVE_{it} = \beta + EPS_{it}^{no\ inf} + BV_{it}^{no\ inf} + \varepsilon_{it} \quad (1)$$

$$MVE_{it} = \beta + EPS_{it}^{no\ inf} + BV_{it}^{no\ inf} + \Delta\ IEPS_{it} + \Delta IBV_{it} + \varepsilon_{it} \quad (2)$$

$$MVE_{it} = \beta + EPS_{it}^{inf} + BV_{it}^{inf} + \varepsilon_{it} \quad (3)$$

$$MVE_{it} = \beta + EPS_{it}^{inf} + BV_{it}^{inf} + \Delta HEPS_{it} + \Delta HBV_{it} + \varepsilon_{it} \quad (4)$$

Furthermore, returns-earnings regressions are run to investigate the information content of inflation-adjusted and historical-cost earnings levels. Easton and Harris (1991) show that both earnings level and changes in earnings have explanatory power in a regression of annual returns. The following regression models are used for returns-earnings analysis:

$$R_{it} = \beta + EPS_{it}^{no\ inf} + \varepsilon_{it} \quad (5)$$

$$R_{it} = \beta + EPS_{it}^{no\ inf} + \Delta\ IEPS_{it} + \varepsilon_{it} \quad (6)$$

$$R_{it} = \beta + EPS_{it}^{inf} + \varepsilon_{it} \quad (7)$$

$$R_{it} = \beta + EPS_{it}^{inf} + \Delta HEPS_{it} + \varepsilon_{it} \quad (8)$$

MVE_{it} represents market value of equity and is calculated as price per share at the end of the third month after fiscal year t.

R_{it} is the 12-month excess stock return of firm i, where the excess return is determined by subtracting the return on the market ($r_{m,t}$) from the return of firm i ($r_{i,t}$) during the month t. The information is published in the financial statements within three months after fiscal year end. Thus, the return calculation starts with the fourth month of the fiscal year.

$EPS^{no\ inf}$ is the earnings per share found in the 2003 financial reports. These are historical cost-based data.

EPS^{inf} is the earnings per share from the restated 2003 accounting information taken from 2004 financial reports, which are inflation-adjusted. Inflation-adjusted information for 2003 was not reported until the 2004 financial statements were made public. However, it is assumed that the market was estimating the inflation adjustment by using price index and thus incorporated it into their decision making.

$BV^{no\ inf}$ is the book value per share from 2003 financial reports which are historical cost-based data.

BV^{inf} is the book value per share from the restated 2003 accounting information taken from 2004 financial reports which are inflation-adjusted.

$\Delta IEPS$ is the change in earnings and is calculated as the difference between EPS^{inf} and $EPS^{no\ inf}$ and

ΔIBV is the change in book value and is calculated as the difference between BV^{inf} and $BV^{no\ inf}$.

$\Delta HEPS$ is the change in earnings and is calculated as the difference between $EPS^{no\ inf}$ and EPS^{inf} and

ΔHBV is the change in book value and is calculated as the difference between $BV^{no\ inf}$ and BV^{inf}.

4.3. Variables in Regression Analyses

It is important to note that ΔIEPS and ΔIBV variables are used for Model 2. They show the difference between the inflation-adjusted values and historical cost values. In Model 4, we use the variables ΔHEPS and ΔHBV to make reverse calculations to measure the change in earnings per share and book value per share.[4]

4.4. Variables in Descriptive Analyses

In order to show the impact of inflation accounting on basic financial statements, we present relevant balance sheet and income statement items in a standardized format.

NSTA is net sales standardized by total assets for inflation-adjusted and historical cost-based figures for 2003.

TLTA is total liabilities standardized by total assets for inflation-adjusted and historical cost-based figures for 2003.

INTA is inventory as standardized by total assets for inflation-adjusted and historical cost-based figures for 2003.

FATA is fixed assets standardized by total assets for inflation-adjusted and historical cost-based figures for 2003.

ARTA is accounts receivables standardized by total assets for inflation-adjusted historical cost-based figures for 2003.

5. Empirical Results

5.1. Descriptive Statistics

To show the changes caused by inflation in reporting accounting information, t-test analyses of inflation-adjusted and historical cost-based accounting information are conducted. The analyses are done for earnings per share, book value of equity, net sales, total debt, inventory, fixed assets and for accounts receivable. The results of the analyses are reported in Table 2.

[4] We thank the anonymous referee for pointing this out.

Table 2
Descriptive Statistics before and after Inflation Adjustment.

	Before Inflation Adjustment				After Inflation Adjustment				
	Mean	Median	Min	Max	Mean	Median	Min	Max	t- statistics
EPS	-1.62	0.17	-272.12	12.55	-1.86	0.12	-309.44	13.66	-0.71
BV	1.42	2.02	-274.27	68.71	6.13	3.72	-312.22	187.85	-4.16***
NSTA	1.17	0.95	0.03	14.19	0.90	0.80	0.00	3.02	2.80***
TLTA	0.72	0.49	0.02	17.52	0.02	0.39	0.01	18.11	5.07***
INTA	0.17	0.15	0.00	0.60	0.16	0.14	0.00	0.53	3.97***
FATA	0.45	0.52	0.00	0.98	0.52	0.44	0.00	0.98	7.37***
ARTA	0.21	0.19	0.00	0.79	0.17	0.16	0.00	0.72	8.02***

EPS is the earnings per share; *BV* is book value per share; *NSTA* is the net sales standardized by total assets; *TLTA* is the total liabilities standardized by total assets; *INTA* is the inventory standardized by total assets; *FATA* is the fixed assets standardized by total assets; *ARTA* is the accounts receivables standardized by total assets.
*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.01 level.

Table 2 shows the mean values and t-statistics for 2003 inflation-adjusted and historical cost-based balance sheet and income statement items normalized by total assets. The results provide evidence on how inflation-accounting application affected reported financial results in Turkey.

There are significant differences between inflation-adjusted and historical cost-based financial ratios. Overall, the historical cost-based financial ratios are higher than inflation-adjusted financial ratios. The exceptions are book value per share and fixed-assets-to-total assets ratio. The higher inflation-adjusted fixed-assets-to-total assets ratio is an expected result because the magnitude of adjustment on long-term assets is expected to be higher than for other assets. The high inflation-adjusted book value per share may imply that inflation adjustment increases the book values that are closer to economic value. Furthermore, the findings show that the ratios for net sales to total assets, inventory to total assets, and accounts receivables to total assets decreased after the inflation adjustment. In particular, monetary items such as total liabilities seem to be high before inflation adjustment. Values are inflated and debt ratio decreases significantly after inflation adjustment, as expected.

Results for earnings-per-share analysis show a decrease, but this decrease is not significant. Since both expense and revenue items are restated at the income statement, this result shows that, on average an increase in revenue items and monetary-holding gains compensates for an increase in expense items and monetary losses at the income statement. This outcome might be due to the fact that Turkish firms were operating in a hyper-inflationary environment for a long time and they learned how to manage their monetary assets and liabilities in that environment.

Our results are parallel with those of Thies and Sturrock (1987). They show that historical-cost ratios are biased for a sample of 50 large manufacturing companies which may lead to incorrect decisions and stock analyses.

Table 3 shows the correlation variables used in regression analysis. A Correlation Matrix permits the measurement of the strength of the linear relationship between the variables as used in Table 4. The correlations between book value, earnings and stock prices are positive

Table 3
Correlation Matrix of Variables.

	MVE_{it}	R_{it}	$EPS_{it}^{no\ inf}$	$BV_{it}^{no\ inf}$	EPS_{it}^{inf}	BV_{it}^{inf}	$\Delta IEPS_{it}$	ΔIBV_{it}	$\Delta HEPS_{it}$	ΔHBV_{it}
MVE_{it}	-	0.102	0.810***	0.848***	0.564***	0.806***	-0.204**	0.518***	0.204**	-0.518***
R_{it}		-	0.180**	0.132	0.183**	0.184**	-0.018	0.178**	0.018	-0.178**
$EPS_{it}^{no\ inf}$			-	0.956***	0.998***	0.920***	0.901***	0.506***	-0.901***	-0.506***
$BV_{it}^{no\ inf}$				-	0.946***	0.980***	0.797***	0.602***	-0.797***	-0.602***
EPS_{it}^{inf}					-	0.912***	0.924***	0.506***	-0.924***	-0.506***
BV_{it}^{inf}						-	0.778***	0.748***	-0.778***	-0.748***
$\Delta IEPS_{it}$							-	0.465**	-1.000***	-0.465**
ΔIBV_{it}								-	-0.465**	1.000***
$\Delta HEPS_{it}$									-	0.465**
ΔHBV_{it}										-

MVE_{it} is the market value of equity; R_{it} is the 12-month excess stock return of firm i. The return calculation starts with the fourth month after the beginning of the fiscal year; $EPS_{it}^{no\ inf}$ is the historical earnings per share; $BV_{it}^{no\ inf}$ is the historical book value per share; EPS_{it}^{inf} is the inflation-adjusted earnings per share; BV_{it}^{inf} is the inflation-adjusted book value per share; $\Delta IEPS_{it}$ is the difference between EPS_{it}^{inf} and $EPS_{it}^{no\ inf}$; ΔIBV_{it} is the difference between BV_{it}^{inf} and $BV_{it}^{no\ inf}$. We made a reverse calculation for the changes between historical cost and inflation-adjusted data. $\Delta HEPS_{it}$ is the difference between $EPS_{it}^{no\ inf}$ and EPS_{it}^{inf}; ΔHBV_{it} is the difference between $BV_{it}^{no\ inf}$ and BV_{it}^{inf}.
***: Correlation is significant at the 0.01 level (2-tailed).
**: Correlation is significant at the 0.05 level (2-tailed).

Table 4
Regression Results for Value Relevance of Inflation-adjusted Data and Historical-cost Data.

Panel A: Regression Results for Models (1) and (2)
$MVE_{it} = \beta + EPS_{it}^{no\ inf} + BV_{it}^{no\ inf} + \varepsilon_{it}$
$MVE_{it} = \beta + EPS_{it}^{no\ inf} + BV_{it}^{no\ inf} + \Delta IEPS_{it} + \Delta IBV_{it} + \varepsilon_{it}$
Panel A: Historical-cost Results

Model Specifications				Coefficient Estimates of Variables			
R^2	F	Sign.	N	$EPS_{it}^{no\ inf}$	$BV_{it}^{no\ inf}$	$\Delta IEPS_{it}$	ΔIBV_{it}
0.86	381.592	0.000***	140	0.549* (11.35)	0.450*** (9.30)		
0.88	235.331	0.000***	140	0.427*** (9.60)	0.656*** (12.31)	0.183*** (5.07)	−0.029 (-0.76)

MVE_{it} is the market value of equity at the end of the third month after fiscal year t. $EPS_{it}^{no\ inf}$ is the historical earnings per share; $BV_{it}^{no\ inf}$ is the historical book value per share; $\Delta IEPS_{it}$ is the difference between EPS_{it}^{inf} and $EPS_{it}^{no\ inf}$; ΔIBV_{it} is the difference between BV_{it}^{inf} and $BV_{it}^{no\ inf}$.
*** Significant at the 0.01 level
** Significant at the 0.05 level
* Significant at the 0.1 level

Panel B: Regression Results for Model (3) and Model (4)
$MVE_{it} = \beta + EPS_{it}^{inf} + BV_{it}^{inf} + \varepsilon_{it}$
$MVE_{it} = \beta + EPS_{it}^{inf} + BV_{it}^{inf} + \Delta HEPS_{it} + \Delta HBV_{it} + \varepsilon_{it}$
Panel B: Inflation-Adjusted Results

Model Specifications				Coefficient Estimates of Variables			
R^2	F	Sign.	N	EPS_{it}^{inf}	BV_{it}^{inf}	$\Delta HEPS_{it}$	ΔHBV_{it}
0.75	193.822	0.000***	140	0.679*** (13.91)	0.325*** (6.66)		
0.88	235.331	0.000***	140	0.482*** (9.60)	1.000*** (12.31)	0.160*** (3.02)	0.518*** (7.75)

MVE_{it} is the market value of equity at the end of the third month after fiscal year t. EPS_{it}^{inf} is the inflation-adjusted earnings per share; BV_{it}^{inf} is the inflation-adjusted book value per share. It is important to note that we made reverse calculations for the change in EPS and change in BV variables. Therefore, $\Delta HEPS_{it}$ is the difference between $EPS_{it}^{no\ inf}$ and EPS_{it}^{inf}; ΔHBV_{it} is the difference between $BV_{it}^{no\ inf}$ and BV_{it}^{inf}.
*** Significant at the 0.01 level
** Significant at the 0.05 level
* Significant at the 0.1 level

as expected. Both inflation-adjusted and historical cost-based figures are positively and significantly related to stock prices (1% level). The price correlation with earnings and book value is higher for historical cost-based figures than for inflation-adjusted figures. The findings show that there is a negative and significant relationship between change in earnings *(ΔIEPS)* and market value of equity at the 5% significance level. The results report a positive and significant relationship for the reverse calculation of change in earnings *(ΔHEPS)* and market value of equity.

Furthermore, the results show that the correlations between stock returns and inflation-adjusted and historical-cost earnings are positive and significant at the 5% level. The significance level is not as strong as it is for the market value of equity. No significant correlation is reported between change in earnings and stock returns.

Panel A in Table 4 shows the coefficient estimates and R^2 values from the estimation of the cross-sectional regressions of price on historical cost-based variables, whereas panel B shows the regression results for inflation-adjusted variables in the year 2003.

In panel A, Model 1 measures the information content of historical-cost data. The historical cost-based regression results indicate that both earnings and book value are statistically significant at the 1% level. The adjusted R^2 of the model is 86%. This finding shows that both earnings and book value are significantly associated with stock price. Model 2 measures the information content of inflation adjusted data beyond those of historical-cost data, which shows that inflation-adjusted earnings have significant incremental explanatory power over and above historical-cost earnings and book value. In the second model, the difference in earnings due to inflation adjustment is also found to be significant at the 1% level, but change in book value due to inflation is not significant. Further, the adjusted R^2 is 88%.

In panel B, Model 3 measures the information content of the inflation-adjusted data. The findings show that both inflation-adjusted earnings and book value are statistically significant at the 1% level. However, the adjusted R^2 of the model is reduced to 75%. The variables in a model with a greater R^2 are is described as being more value relevant. Since the explanatory power of Model 1 is greater than Model 3, the historical-cost information is more value relevant than inflation-adjusted data.

In Model 4, inflation-adjustment differences in book value and in earnings are both significant and the adjusted R^2 increase to 88%. This finding indicates that inflation-adjustment changes to both book value and earnings are value relevant. This implies that the market adjusted itself, in response to financial information for inflation, by using the price index and by incorporating it into pricing decision. Overall, the results indicate that historical cost and inflation-adjusted information complement each other rather than replace each other.

In Table 5, the dependent variable is stock return. Inflation-adjusted and historical-cost earnings are used to capture the information in predicting the stock returns.[5] The findings show that both inflation-adjusted and historical-cost earnings are value relevant. The coefficients are significant at the 5% level. However, the results report no significant coefficients for the differences in the earnings. Furthermore, the adjusted R^2 values and the coefficient significance levels are similar for both inflation-adjusted and historical cost findings. The explanatory powers of adjusted R^2 values for Models 5, 6, 7, and 8 are low. In returns-earnings analysis, the low adjusted R^2 is common. For example; Barniv (1999) compares the association between stock returns and historical-cost earnings to the association between stock returns and inflation-adjusted earnings in Israel. His findings also show low and even negative adjusted R^2.

6. Conclusion

The debate about inflation accounting has been ongoing for many years. In this study, we try to shift attention to inflation accounting application and test the value relevance of accounting information for the Turkish firms listed on the ISE. The Turkish inflation accounting reporting system provides both historical cost and inflation-adjusted financial statements only for the year 2003. This provides a unique opportunity to compare the value relevance of inflation-adjusted data versus historical-cost data.

[5] We thank the editor and an anonymous referee for pointing this out.

Table 5
Regression Results for Returns-earnings Analysis of Inflation-adjusted and Historical- Cost Data.

Panel A: Regression Results for Models (5) and (6)
$R_{it} = \beta + EPS_{it}^{no\ inf} + \varepsilon_{it}$
$R_{it} = \beta + EPS_{it}^{no\ inf} + \Delta\ IEPS_{it} + \varepsilon_{it}$
Panel A: Historical Cost Results

Model Specifications				Coefficient Estimates of Variables	
R^2	F	Sign.	N	$EPS_{it}^{no\ inf}$	$\Delta IEPS_{it}$
0.024	4.183	0.043**	140	0.052** (2.05)	
0.023	2.525	0.084*	140	0.066** (2.23)	0.034 (0.94)

R_{it} is the 12- month excess stock returns of firm i. The return calculation starts with the fourth month after the beginning of the fiscal year; $EPS_{it}^{no\ inf}$ is the historical earnings per share; $\Delta IEPS_{it}$ is the difference between EPS_{it}^{inf} and $EPS_{it}^{no\ inf}$.
*** Significant at the 0.01 level
** Significant at the 0.05 level
* Significant at the 0.1 level

Panel B: Regression Results for Model (7) and Model (8)
$Return_{it} = \beta + EPS_{it}^{inf} + \varepsilon_{it}$
$Return_{it} = \beta + EPS_{it}^{inf} + \Delta\ HEPS_{it} + \varepsilon_{it}$
Panel B: Inflation-adjusted Results

Model Specifications				Coefficient Estimates of Variables	
R^2	F	Sign.	N	EPS_{it}^{inf}	$\Delta\ HEPS_{it}$
0.024	4.138	0.044**	140	0.057** (2.03)	
0.023	2.525	0.084*	140	0.066** (2.23)	0.032 (0.96)

R_{it} is the 12- month excess stock returns of firm i. The return calculation starts with the fourth month after the beginning of the fiscal year; EPS_{it}^{inf} is the inflation-adjusted earnings per share; $\Delta HEPS_{it}$ is the difference between $EPS_{it}^{no\ inf}$ *and* EPS_{it}^{inf}.
*** Significant at the 0.01 level
** Significant at the 0.05 level
* Significant at the 0.1 level

In general, the results show that historical-cost data overstate the relative financial strengths of firms. The historical cost-based financial ratios for net sales, inventory, and accounts receivables are higher than those of inflation-adjusted. The differences are statistically significant. However, the results document higher book value per share and fixed-assets-to-total assets ratio for the inflation-adjusted data.

The findings of this paper suggest that both historical-cost and inflation-adjusted data of earnings and book value are value relevant. The explanatory power of market value of equity regression results reveal the fact that historical-cost information is more value relevant than inflation-adjusted information. When we measured the information content of inflation-adjusted data beyond those of historical-cost data which showed that inflation-adjusted earnings had significant incremental explanatory power over and above the historical-cost earnings and book value. When we measured the information content of historical-cost data beyond those of inflation-adjusted data, the results indicated that historical cost data (both earnings and book value) had incremental information content beyond those of inflation-adjusted data. Furthermore, returns-earnings analysis supports the fact that both historical-cost

and inflation-adjusted earnings are value relevant and they have similar explanatory power in predicting stock returns. Overall, the results show that the two sets of data are not substitutes but, rather, they are complementary. Because of these complementarities, policy makers should require inflation-adjusted data as supplementary data to historical-cost information rather than in place of historical-cost data.

One constraint on this study was the length of the period for which data were available. This construction did not allow us to provide time-series results. In spite of this limitation, the findings of this paper have several important implications. The evidence presented here suggests a direction for future studies on the net monetary position of firms during times of inflation and the use of fundamental accounting signals by creditors. We hope that this study will help academics and practitioners to interpret the real-life problems in inflationary economic environments.

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