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The Effect of the Adoption of International Accounting Standards No. 12 (IAS No. 12) for Firms Reporting Losses: Evidence from Korea

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Abstract: This study examines the effects of the adoption of International Accounting Standards No. 12, Income Taxes (IAS No. 12) on the incremental information about future profitability for firms reporting losses compared to Korean Generally Accepted Accounting No. 16, Accounting for Income Taxes (K-GAAP No. 16). Specifically, this paper shows that whether the IAS No. 12 affects the information of deferred tax assets (DTAs) regarding loss persistence which implies the ability to predict earnings sustainability. Using a sample of 2,905 observations from Korean listed firms that reported a loss between 2007 and 2014, we divide loss firm-years into categories of ‘good news’ (GN) or ‘bad news’ (BN) based on whether management appears to report an increase in DTAs. We find that our tax categories have incremental information about the probability of loss reversal under K-GAAP No. 16, but under IAS No. 12 the incremental effects of a deferred tax balance disappear. Also, we find that investors underweight the informativeness of DTAs under K-GAAP, and after the adoption of IAS No. 12, investors cannot obtain buy-and-hold returns by buying GN firm-years and selling BN firms-years. However, this is not because investors understand the information of DTAs, but because the informativeness of DTAs deteriorates after the relaxation in the recognition threshold of DTAs.

Keywords: International Financial Reporting Standards (IFRS); deferred tax assets; loss reversal; loss persistence; earnings sustainability

1. Introduction

This paper presents evidence on how managers have responded to the provisions of International Accounting Standards No. 12 (IAS No. 12), Income Taxes, issued by International Accounting Standards Committee in Korea. One controversial aspect of the statement is that, unlike previous requirements, it requires that deferred tax assets (hereafter DTAs) should be recognized when it is probable that positive taxable income will be available for which the DTAs can be used. Previously from the Korean Generally Accepted Accounting Principles No. 16 (K-GAAP No. 16), Accounting for Income Taxes, the requirement was that companies to recognize DTAs only when it is highly probable that positive taxable income will be available. Because the decision regarding the recognition of DTAs depends on managers’ expectations about future taxable income, this change into ‘highly probable’ allows managers to exercise considerable discretion in making decisions about setting deferred tax assets.

This change has similar aspects to the changes the United States (US) experienced previously when the Accounting Principles Board Opinion No. 11 Accounting for Income Taxes (APB No. 11) was superseded by Statement of Financial Accounting Standards No. 109 Accounting for Income Taxes (SFAS 109). Prior research found that SFAS No. 109 introduces additional subjectivity in the

recognition of DTAs. SFAS No. 109 requires a firm to record all tax benefits if it is more likely than not (i.e., a likelihood of more than 50 percent) that such DTAs will be realized. In contrast, APB No. 11, the previous standard, did not allow recognition of DTAs unless their realization was assured beyond a reasonable doubt [1]. The previous studies suggest that the SFAS No. 109 standard provides value-relevant information above and beyond the APB No. 11 standard. However, there was inconclusive evidence in the study around the subjectivity of managerial decision regarding DTAs recognition. Because the primary change called for with SFAS No. 109 is that it shifted the methods of measuring deferred taxes.

We expect that the adoption of IAS No. 12 in Korea will have differing implications regarding accounting quality and investors' pricing compared to those previously studies in the US. In Korea, specifically, management could set DTAs only if it could expect tax benefits to be realized by a probability of 80% or more, but after the introduction of the IAS No. 12, the feasibility of tax benefits for recognizing DTAs was mitigated to 50% or more. However, the methods for recognizing DTAs or DTLs are the same before and after IFRS adoption in Korea (Korean firms have been using the 'asset and liability' approach to measure deferred tax assets and liabilities since Korea formally introduced accounting for income taxes in 1998). In US, on the other hand, the adoption of SFAS No. 109 contend the change of measuring DTAs and DTLs method as well as recognition conditions. Our study suggests that Korean evidence shows the effect of the subjectivity of DTAs recognition on the accounting quality. Ayer (1998) [1] examines why SFAS No. 109 provides value relevant information and suggests that separate recognition of deferred tax assets, the existence of valuation allowances, and the adjustments for tax law changes are all associated with firm value. Korea formally introduced accounting for income taxes (K-GAAP No. 16) in 1998, and under K-GAAP No. 16, the income tax accounting is based on the 'asset and liability' approach.

Prior research reported that tax fundamentals provide information regarding earnings quality for firms with a profit [2,3]. We focus on firms with a loss because recent research suggests that firms at a loss are not homogenous [4,5], it is important to identify information about loss persistence [6].

We study the impact of new accounting standards on tax accounting due to the conservative nature of income-tax accounting. When a firm has a history of losses, it is unlikely that it would fully recognize all expected tax benefits. Furthermore, the related asset (DTA) shall be recognized if it is highly probable that taxable profits will be available under K-GAAP. However, if IAS No. 12 allows managers greater flexibility to recognize tax assets, we expect that the usefulness of DTAs information decreases after IFRS adoption. Even though the global accounting standards provide beneficial information to users of financial statements, specific information contents could deteriorate due to increasing managerial flexibility [7]. Dhaliwal et al. (2013) [6] investigated management's decisions on the recognition of the DTAs to provide incremental information about the persistence of those losses. They found that managers of firms reporting losses use private forward-looking information about the persistence of losses which implies earnings sustainability. In this paper, we extend the literature on the tax accounting by examining whether the relaxation of the DTAs recognition threshold exhibits less quality of deferred tax accounting and less value relevance than previous tax accounting statement standards.

Using a sample of 2,905 observations from Korean listed firms with losses between 2007 and 2014, we divide loss firm-years for the years into a 'good news' (GN) group or a 'bad news' (BN) group based on whether management appears to have recognized a material change in the DTAs according to Dhaliwal et al. (2013) [6]. The results show that deferred tax accounting has little information on future probability of loss reversal or loss persistency after conversion to IAS No. 12. Despite this the tax balance provided forward-looking information under K-GAAP No. 16, consistent with Dhaliwal et al. (2013) [6]. We also examine whether investors efficiently price the predictive information about loss reversal or loss persistency. The results show that investors cannot obtain buy-and-hold returns by buying GN firm-years and selling BN firms-years. However, this is not because investors understand the

information the reporting of DTAs provides, but because the information DTAs provides deteriorates and decreases in its usefulness under IAS No. 12.

The prior literature discusses that IFRSs improve comparability of financial statements and provide more value-related information [8–10]. However, we argue that management decision for a firm's long-term performance provides less information after the adoption of IFRS in terms of tax accounting. In other words, to assess whether global accounting standards reflect the sustainability of corporate performance is our main question. Further, Penman and Zhang (2002) [11] report that applying accounting policy consistently through period lead to more sustainable earnings. The IAS/IFRS rely on a principles-based system to set accounting standards, and this system provides more flexibility than a rule-based standard. Under this view, we expect that the adoption of IFRS will result in less information as a good indicator of future earnings relative to that under K-GAAP.

The remainder of the paper is as follows. Section 2 describes the regulatory background in this study. Section 3 presents our hypotheses development, and Section 4 presents our research design. Section 5 provides the results of our hypotheses analysis. Section 6 proposes our conclusion.

2. Regulatory Background

In 2007, Korea announced its roadmap for IFRS adoption and decided to fully adopt IFRS beginning in 2011. In October 2008, the Korea Accounting Institution (hereafter KAI) issued “Analysis of the Main Differences and Effects of the K-GAAP and IFRS” to help investors, businesses, external auditors, and regulators effectively adopt international accounting standards.

According to KAI (2008), the main difference of the IFRS adoption in tax accounting is that the criteria for recognizing deferred income tax assets have been eased. K-GAAP No. 16 requires that DTAs should be recognized when it is highly probable that taxable profits will be available against which the deferred tax asset can be used. As a result of the revision of the criteria for determining deferred income tax from ‘highly more likely than not’ (a likelihood of more than 80 percent) to ‘more likely than not’ (a likelihood of more than 50 percent), the DTAs recognition amount was expected to increase.

Other effects of the IAS No. 12 are the measurement issues that applied tax rates change from marginal tax rates to average effective tax rates. DTAs and deferred tax liabilities (hereafter DTLs) shall be measured at the tax rates that are expected to apply to the period when the asset is realized or the liability is settled, based on tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period. Under the K-GAAP, because of the progressive tax rate in Korea, applicable tax rate is the marginal tax rate (K-GAAP 16, Appendix 15). However, following IAS No. 12, when different tax rates apply to different levels of taxable income, DTAs and DTLs are measured using the average rates that are expected to apply to the taxable profit (tax loss) of the periods where the temporary differences are expected to reverse.

Also, under IFRS additional disclosure requirements for the footnotes are required regarding deferred tax balance increases such as changes in the effective tax rate, tax consequences of dividends, tax-related contingent liabilities, and contingent assets.

The temporary differences that are components of deferred tax balances are quite different between IFRS and K-GAAP. Temporary differences are differences between the amounts of the tax base of an asset or liability and the carrying amount used in the financial reporting might differ. This may be in part because IFRS are perceived as more principle-based standards relative to K-GAAP or local GAAP, which are perceived as more rules-based and IAS No. 12 operates in relatively principle-based standards. The K-GAAP framework defines income, revenue, and expense as essential elements of income statements and separates revenue from gains, and expenses from losses. However, the IFRS framework defines comprehensive income as the measurement of management performance using the capital maintenance concept.

In summary, because the adoption of IFRS allows managers more discretion in preparing financial statements, this could affect the amount of book-tax differences (BTD). Also, IAS No. 12 eased deferred

tax asset recognition requirements. Therefore, we expected the IFRS to have effects on the information and subject matters of tax accounting.

3. Hypotheses Development

In the context of valuation, previous literature excludes loss-reporting firms from their analysis as a loss reduces the ability of reported earnings to provide information about the earning power of a firm's assets. Hayn (1995) [12] and Collins et al. (1999) [13] suggest the weak association between share price and earnings diminishes for loss firms because losses are less useful than profits. Recently, the increased frequency of firms reporting losses poses an important challenge for financial reporting. Joos and Plesko (2005) [4] and Darrough and Ye (2007) [5] identify multiple determinants that may be linked to the probability of loss reversal or persistence. Based on previous research, we identify one of the tax items that predict loss reversal or persistence.

We focus on the deferred tax related information due to the conservative nature of income tax accounting for firms that have a loss. It is unlikely that the firms with a loss would recognize a full expected tax benefit, since the US GAAP and IFRS require a firm to recognize a tax benefit only if the firm generates sufficient future taxable income as well as K-GAAP.

While Lev and Nissim (2004) [2] and Hanlon (2005) [3] suggest that income tax accounting provides information about earnings quality for profitable firms, they exclude the firms operating at a loss from their samples. Dhaliwal et al. (2013) [6] investigated the persistence of accounting losses and focused on the VA for DTAs because they argue in measuring and disclosing this information each year, management uses private forward-looking information. The results of this study suggest that these items disclosed as tax information contain information about the persistence of accounting losses and investors evaluate the price accordingly. We extend the Dhaliwal et al. (2013) [6] approach to examine whether the application of different accounting standards is associated with different levels of available information content on this subject.

Global acceptance of IFRS has generated considerable debate on tax information as well as financial reporting quality and earnings quality. Proponents suggest that IFRS will enhance the comparability of financial reports across countries and will bring greater efficiency to firms reporting across multiple jurisdictions [14–17]. Opponents suggest that adopting IFRS will be costly and that the benefits of comparability may not be realized because of disparities in the application of IFRS among countries [18–23]. However, limited prior literature exists on the IFRS' effects on the changes of information content related to treatment of deferred taxes. For the new standards, IFRS, DTLs shall be recognized for all deductible temporary differences if it is probable that taxable profits will be available that the deductible temporary difference can be used; unless the DTAs arise from certain transactions. Managers of firms reporting losses have information about the firm's current financial state and future probability of profitability. They should consider the firm's ability to generate future profitability and also to recognize the DTA.

As discussed above, there are fundamental reasons that the adoption of IFRS affects deferred tax accounting. Before adoption of IFRS, KAI, and Korean firms interpreted 'probable' to mean it is 'highly more likely than not' (a likelihood of more than 80 percent). IFRS (IAS No. 12) and US GAAP (SFAS No. 109) propose that 'probable' mean that it is 'more likely than not' (a likelihood of more than 50 percent). This meaning changes to 'probable' may have the consequence that any amount that will not be realized and distinguished 'probable' from 'highly probable'. Korea adopted IFRS recognition threshold and that caused changes in the criteria for DTAs recognition.

This change was similar to that experienced in the United States (US), when an APB No. 11 Accounting for Income Taxes was replaced by a SFAS No. 109 Accounting for Income Taxes. According to Legoria and Sellers (2005), SFAS No. 109 also allows a firm greater flexibility in recognizing DTAs to a standard that is more consistent with SFAC No. 6 (FASB 1985) and presumably also the market's definition of an asset. SFAC No. 6 defines "assets" as probable future economic benefits. In SFAC No. 6, the term "probable" refers to that "which can reasonably be expected or

believed on the basis of available evidence or logic but is neither certain or proved". A firm records tax effects at 100 percent of their value to the extent that it is more likely than not (a likelihood of more than 50 percent) that such DTAs will be realized.

SFAS No. 109 is not without its critics, for example Chaney and Jeter (1994) [24] argue that SFAS No. 109 received greater acceptance than earlier standards. Petree, Gregory, and Vitray (1995) [25] suggest that under SFAS No. 109, the measurement and evaluation of DFA is more subjective because of SFAS No. 109's "more likely or not" standard. Despite the flexibility of SFAS No. 109 and despite the above critics, prior literature finds that SFAS No. 109 provided incremental value-relevant information and useful information to predict future cash flows [1,26,27]. The results show that main aspects of SFAS No. 109 such as introducing a balance sheet approach to replace the income statement approach offset concern about the flexibility of the "more likely than not" standard. However, Korean firms have been using the "asset and liability" approach to measure deferred tax assets and liabilities since Korea formally introduced accounting for income taxes in 1998. While the findings of prior research are mainly influenced by the changes in measuring methods, but our study suggests the effect of a modified recognition threshold of DTAs.

We also expect the adoption of IFRS may influence temporary differences that are differences between the tax base of an asset or liability and its carrying amount in the statements of financial position.

Principles-based systems issue generic accounting standards as opposed to rules-based systems. Accounting standards of the principle-based systems do not address every controversial issue at hand. They keep considerable ambiguity about such major processes as record-keeping and measurement. Although there are few consistent results in the study of IFRS adoption, analytical research provides some interesting insights into the debate on rules-based (rigid) standards versus principles-based (flexible) standards. Dye and Sridhar (2008) [28] show that flexible standard regimes perform best when there are high costs of manipulating accounting reporting.

Some empirical research shows that the conversion toward principles-based standards influences temporary differences. Chan et al. (2013) [29] suggest that China is not alone in attempting to move away from a tax-based accounting system because the adoption of IFRS will cause financial reporting to diverge further from tax reporting. In other words, the divergence between book and tax reporting means that there is increased managerial discretion over accounting method choice. Prior studies examine whether the mandatory shift from domestic standard to IFRS affect accounting quality, but have produced mixed results. Cussatt et al. (2018) [30] find no evidence for German firms that the change in accounting quality proxies are significantly different between the newly IFRS adopting firms and IFRS reporting samples for the entire period. Beisland and Knivsfla (2015) [31] examine value relevance after the adoption of IFRS in Norway. They find that IFRS is less conservative than the domestic accounting standard. It was found that expanded fair value accounting increases the value relevance of book values and decreases the value relevance of earnings.

If managers use the increased reporting flexibility under IFRS to convey private information, the scope of temporary differences under IFRS may be more encompassing than the scope of temporary differences under K-GAAP. However, if managers use their discretion to report their financial statements optimistically or opportunistically, the temporary differences under IFRS may contain less information associated with future loss reversal probability than under K-GAAP.

Overall, due to the increasing flexibility of deferred tax accounting and discretion to report, financial statement DTAs contain little information about future loss reversal for firms reporting losses relative to K-GAAP; the adoption of IFRS affects the information content of deferred tax accounting.

We hypothesize that the accounting for income taxes under IFRS contains information about probability of loss reversal, and also is informative about whether the deferred tax accounting provides information useful for investors. We expect that the adoption of IFRS will have less information of deferred tax balances relative to that under the K-GAAP and also expect differing investor perceptions of deferred tax accounting.

The hypotheses for these tests are as follows:

Hypothesis 1 (H1). *The information about future profitability contained in the DTAs for firms reporting losses decreases after the adoption of IFRS.*

Hypothesis 2 (H1). *Investors underweight the information about future profitability contained in the DTAs for firms reporting losses, after the adoption of IFRS.*

4. Research Design

4.1. Sample Selection

Our sample includes firms listed on Korea Stock Exchange and Korea Securities Dealers Automated Quotations (KOSDAQ) from 2007 to 2014. By the Corporate Tax Act in Korea, tax loss can be carried forward for the following 10 years. If a firm with tax losses expects sufficient taxable income within the following 10 years, then it will recognize DTAs against the tax loss in the current year. Therefore, we selected a large enough sample period. However, because we need same sample period before and after IAS 12 adoption, our sample period ends in 2014. We conduct additional analyses using the sample period extended by 2017 as a robustness test, and the results are still consistent. We obtained financial data from the TS2000 database and extracted stock return data from the Korea Information Service Value database (KISvalue). For each year, we select firm-year observations that satisfy the following standards.

- (1) Reported continuing income before income taxes is negative.
- (2) Non-financial firms only.
- (3) Fiscal year-end is December.
- (4) Audit opinion is unqualified.
- (5) The book value of net assets (equity) is positive.
- (6) Financial and stock return data used for computing variables is available and also earnings for at least one-year-ahead are available.
- (7) Firms' first year of IFRS adoption is 2011.

We exclude financial firms because their business activities are different from those of non-financial firms. We also delete firm-years which fiscal year-end is not December because if the fiscal year-end is different, the taxation policy or structure may be different. We exclude firm-years which audit opinion is qualified, because in that case their financial statements are not reliable. If the book value of net assets is negative, book-to-market ratio may have errors, so we also exclude firm-years with negative net assets.

By this process, we obtained a final sample of 2905 firm-year observations between 2007 and 2014. Table 1 shows the detail of our sample selection procedure.

Table 1. Sample selection procedure.

All Firm-Years with Negative Continuing Income before Income Tax	5202
Less:	
(1) Firm-years in financial industry	(674)
(2) Firm-years which year-end is not December	(148)
(3) Firm-years which audit opinion is not unqualified	(317)
(4) Firm-years which book value of net assets (equity) is negative	(138)
(5) Firm-years without sufficient data to compute variable	(889)
(6) Firms which adopted IFRS before 2011	(131)
Final sample	2905

We divide the full sample into two subsamples, one whether firms decrease net DTL (increase DTA) and one where they do not. Out of the full sample about 32% (944 observations) have decreased

net DTL (increased DTA). While about 68% (1961 observations) have the same or increased net DTL compared to that of year before. Table 2 presents a detailed frequency of each subsample by year.

Table 2. Detailed distribution of each subsample.

Panel A: Distribution by tax expense					
Deferred Tax Expenses	Subsample	Current Tax Expenses			Total
		Negative	Zero	Positive	
Negative	GN	354 (12.19%)	43 (1.48%)	547 (18.83%)	944 (32.50%)
Zero	BN	228 (7.85%)	697 (23.99%)	256 (8.81%)	1181 (40.65%)
Positive	BN	537 (18.69%)	33 (1.14%)	204 (7.02%)	780 (26.85%)
Total		1125 (38.73%)	773 (26.61%)	1007 (34.66%)	2905 (100.00%)
Panel B: Distribution by year					
Year	IFRS	Subsample		Total	Total
		BN	GN	Loss Firms	Firms
2007	Pre	215	113	328	1236
2008	Pre	294	170	464	1289
2009	Pre	236	124	360	1358
2010	Pre	210	106	316	1420
2011	Post	307	75	382	1503
2012	Post	183	141	324	1203
2013	Post	254	111	365	1237
2014	Post	262	104	366	1257
Total		1961	944	2905	10,503
Panel C: Distribution by the number of consecutive loss years					
Number of consecutive loss years	Subsample				
	BN		GN		
1		646		579	
2		432		219	
3		291		73	
4		192		33	
5		117		20	
More than 5		283		20	
Total		1961		944	
Panel D: Distribution by ratio of loss to assets					
Ratio of loss to assets	Subsample				
	BN		GN		
(−3%, 0]		373		298	
(−8%, −3%]		475		290	
(−15%, −8%]		414		187	
(−25%, −15%]		303		98	
(−50%, −25%]		256		57	
≤−50%		119		15	
Total		1940		945	

We divide loss firm-years into two categories in order to examine the information content of the DTAs for loss firms. The first category is loss firm-years that are likely to substantially increase their net DTL, which represents the bad news (BN) group. Second, we have loss firm-years that are not likely to report a substantial increase of net DTL which represents the ‘good news’ (GN) group.

Firms belong to these two categories based on the direction (positive or negative) of deferred tax expenses. If a firm at a loss has either: (1) non-deductible expenses (expenses included in its book income prior to taxable income) or (2) a loss carry-forward and recognizes DTAs against them, it would report a negative deferred tax expense. Such a firm-year is classified into the GN group. Meanwhile, deferred tax expenses will be zero or positive if the firm at a loss or the year does not recognize DTAs, or offsets the current increase in DTAs by DTLs. We classify firms at a loss for the year with zero or positive deferred tax expenses into the BN group. In this paper, we have a conservative assumption according to Hanlon (2003) [32] and Dhaliwal et al. (2013) [6]. The assumption is that a loss firm-year might report positive taxable income if its current tax expense is positive, and it might have a net operating loss (NOL) carryforwards if its current tax expense is zero or negative. The GN category represents loss firm-years with a NOL in the current period or with positive current taxable income without a substantial increase in DTLs. In accordance with Dhaliwal et al. (2013) [6], if a firm reports zero or positive deferred tax expense, we assume the firm substantially increased its DTLs. For instance, if a firm has a NOL (net operating loss for tax purposes) for the current period, then the firm would report an increase in its DTAs and negative deferred tax expenses (i.e., deferred tax benefits). However, if the firm recorded DTLs that offset the current increase in DTAs, or DTAs recognized in the past, then deferred tax expenses will be zero or positive.

Each panel of Table 2 presents detailed distributions of our subsamples, BN and GN, by the characteristics of tax expenses, year, number of consecutive loss years, and ratio of loss to total assets. Among firm-years in BN, about 76.5% (1501) report current tax expenses of zero or negative. This means most of BN firm-years report tax losses in current period or reported a loss carry-forward. While about 57.9% (547) of these GN firm-years report positive current tax expenses, which implies they record positive taxable income despite the presence of negative book income.

When characterized by year we have about 250 firm-years in BN and about 100 firm-years in GN. However, in 2008 our sample has more firm-years than any other year. This implies that due to the global financial crisis in 2008, more firms reported loss in 2008. Almost two-thirds of our sample firm-years (1876) report loss in one or two consecutive years. While 303 firm-year observations record losses in more than 5 years consecutively. By panel D of Table 2, about half of our sample (1438) report losses of less than 8% of total assets. This panel shows that BN firm-years experience relatively heavier losses than GN firm-years, which is consistent with [6].

4.2. Determinant of the Tax Categories of a Firm Sample Selection

In accordance with prior loss reversal research [4,5], we analyze a model of the determinants of a firm's tax category. We expect that firm characteristics that are associated with the reversal of losses may affect our tax categories. We use the following logistic regression to analyze the relationship between our tax categories and firm characteristics that prior research identifies as predicting loss reversal:

$$\begin{aligned}
 GN_t = & \alpha_0 + \alpha_1 Earn_t + \alpha_2 CFO_t + \alpha_3 EarnCHG_t + \alpha_4 NEGNOP_t + \alpha_5 SG_t + \alpha_6 AGE_t \\
 & + \alpha_7 RD_t + \alpha_8 FLoss_t + \alpha_9 Losseq_t + \alpha_{10} BLoss_t + \alpha_{11} Size_t \\
 & + \alpha_{12} DDiv_t + \alpha_{13} DivStop_t + Industry Dummy + Year Dummy \\
 & + \varepsilon_t
 \end{aligned} \tag{1}$$

The dependent variable, GN represents a dummy variable that equals 0 if the firm at a loss for the year belongs to the BN sample group and 1 if it belongs to the GN sample group. The explanatory variables include current earnings and five categories of variables including measures of: (1) earnings quality, (2) transitory items, (3) the firm's growth, (4) the frequency of losses, and (5) financial stability. The definition of our explanatory variables can be found in the Appendix A.

Joos and Plesko (2005) [4] provide evidence that the current profitability is positively associated with the probability of returning to profitability. Thus, we expect a positive α_1 , implying that the likelihood that the firm recognizes DTAs increases as the current profitability is higher. We include

CFO because the difference between loss in the income statement and operating cash flows proxies the earnings quality. Prior research [6] find that large earning changes are likely to easily reverse, so we include EarnCHG which is the absolute value of the change of income before tax expenses.

We include NEGNOP, which has the value of 1 if non-operating income is negative, because current losses with negative non-operating income may be less persistent [5,11]. Growing firms may record current losses; however, this may not mean future persistent loss [12]. So as the proxy for growing firms, we include SG which is the growth of sales, AGE which equals 1 if the year of the observation minus the first year the firm has data on TS2000 equals 1 or 2, and RD which equals 1 if research and development expenses are greater than 0. Joos and Plesko (2005) [4] provide evidence that firms with the first loss in a sequence are more likely to reverse to positive income, and firms with more successive losses are less likely to reverse to positive income. To reflect this, we include *FLoss* which has the value of 1 if Earn is negative in the current year and positive in the previous year. We also include *Losseq* which has the number of successive losses prior to and including the current loss. Following Dhaliwal et al. (2013) [6], to consider the possibility firms with big losses are more likely to record successive losses, we also include *BLoss* which equals 1 if Earn is less than −0.5, and 0 otherwise. To control the effect of firm size on the results, we include *Size* which is the natural log of market value of equity at fiscal year-end. Finally, firms' financial loss may affect the policy of dividends [4,6], to control these effects we include two dummy variables, *DDiv* which has the value of 1 if dividends are paid, and *DivStop* which has the value of 1 if the firm stopped paying dividends in the current year.

4.3. Prediction of Future Earnings

We use two models to test whether information of deferred tax expenses on future earnings changed after IFRS adoption. First, we estimate using a logistic regression model to determine whether incremental information on the loss reversal of the GN group changes after IFRS adoption. Joos and Plesko (2005) [4] develop a model to estimate the annual loss reversal probability. We follow Joos and Plesko (2005) [4] to test our Hypothesis 1 which posits that the usefulness of information of firms operating at a loss DTAs decreases after IFRS adoption.

$$\begin{aligned} Reverse_{t+1, 2, 3} = & \beta_0 + \beta_1 GN_t + \beta_2 IFRS_t + \beta_3 GN_t \times IFRS_t + \beta_4 CFO_t + \beta_5 EarnCHG_t \\ & + \beta_6 NEGNOP_t + \beta_7 SG_t + \beta_8 AGE_t + \beta_9 RD_t + \beta_{10} FLoss_t \\ & + \beta_{11} Losseq_t + \beta_{12} BLoss_t + \beta_{13} Size_t + \beta_{14} DDiv_t + \beta_{15} DivStop_t \\ & + Industry Dummy + Year Dummy + \varepsilon_t \end{aligned} \quad (2)$$

The dependent variable $Reverse_{t+1, 2, 3}$ is a dummy variable which has value of 1 if a firm records positive income before taxes one, two, and three years later respectively. In accordance with prior literature, we expect a positive β_1 . This implies that firms at a loss that recognize negative deferred tax expenses (DTAs) are more likely to escape from loss than those which record zero or positive tax expenses. The coefficient of $GN \times IFRS$, β_3 , implies the incremental effect of IAS 12 adoption on the possibility of loss reversal for loss firms recognizing negative deferred tax expenses. So we expect a negative β_3 , which implies that the informativeness of DTAs deteriorates. More than that, if the usefulness of DTAs information decreases after IAS 12 adoption, the likelihood of recording a positive income before taxes may not be different between firms at a loss with negative deferred tax expenses and those with zero or positive deferred tax expenses. Therefore, we expect that $\beta_1 + \beta_3$ is statistically insignificant.

Second, we estimate following regression model to determine whether earnings persistence of GN changes after IFRS adoption. Dhaliwal et al. (2013) [6] forecast firms at a loss' future earnings (continuous variable) by using the model of earnings persistence. We also use the model of earnings

persistence to test our Hypothesis 1, which posits that the usefulness of the information of loss firms' DTAs decreases after IFRS adoption.

$$\begin{aligned} Earn_{t+1, 2,3} = & \beta_0 + \beta_1 Earn_t + \beta_2 GN_t + \beta_3 IFRS_t + \beta_4 Earn_t \times GN_t + \beta_5 Earn_t \times IFRS_t \\ & + \beta_6 GN_t \times IFRS_t + \beta_7 Earn_t \times GN_t \times IFRS_t + \beta_8 CFO_t \\ & + \beta_9 EarnCHG_t + \beta_{10} NEGNOP_t + \beta_{11} SG_t + \beta_{12} AGE_t + \beta_{13} RD_t \\ & + \beta_{14} FLoss_t + \beta_{15} Losseq_t + \beta_{16} BLoss_t + \beta_{17} Size_t + \beta_{18} DDiv_t \\ & + \beta_{19} DivStop_t + Industry Dummy + Year Dummy + \varepsilon_t \end{aligned} \quad (3)$$

In Equation (3), β_1 implies the earnings persistence, which indicates the relationship between current earnings and future earnings. To be consistent with prior research, we expect a positive β_1 . Dhaliwal et al. (2013) [6] reported that firms at a loss that recognize negative deferred tax expenses show lower earnings persistence than firms at a loss recognizing zero or positive deferred tax expenses. Therefore, we expect β_4 would be negative. The coefficient of $Earn \times GN \times IFRS$, β_7 , implies the incremental effect of IAS 12 adoption on the loss persistence for loss firms recognizing negative deferred tax expenses. So we expect a positive β_7 , which implies that the informativeness of DTAs deteriorates. More than that, if the informativeness of DTAs disappears after IAS 12 adoption, then the joint significance of $\beta_4 + \beta_7$ would be statistically insignificant.

4.4. Future Stock Returns

We use the following regression model to test whether investors effectively price the information of deferred tax expenses before and after IFRS adoption.

$$\begin{aligned} SAR_{t+1} = & \beta_0 + \beta_1 GN_t + \beta_2 IFRS_t + \beta_3 GN_t \times IFRS_t + \beta_4 qBeta_t + \beta_5 qSize_t + \beta_6 qBTM_t \\ & + \beta_7 qEP_t + \beta_8 qACC_t + \beta_9 qMOM_t + \beta_{10} qEarn_t + \beta_{11} qSUE_t \\ & + Industry Dummy + Year Dummy + \varepsilon_t \end{aligned} \quad (4)$$

The dependent variable, SAR_{t+1} , is the buy-and-hold return which is annually adjusted by the size. We compute it as the raw buy-and-hold return minus the average buy-and-hold return of firm-years on the corresponding size decile in the same industry. The period of return accumulation is one year from three months after the end of the fiscal year. The coefficients on the GN group indicate the return from a trading strategy buying GN firm-years and short selling BN firm-years. If investors underweight the information contained in deferred tax expenses, β_1 will be positive as prior research reported. However, if investors still underweight the information in deferred tax expenses even after IAS 12 adoption, then the trading strategy will not be effective because future earnings characteristics are not different between GN firm-years and BN firm-years as our Hypothesis 1 expects. So we expect that β_3 is negative, which implies that the informativeness of DTAs decreased after IAS 12 adoption. Also, we expect that the joint significance of $\beta_1 + \beta_3$ is statistically insignificant.

5. Results

5.1. Descriptive Statistics and Correlation Matrix

Table 3 shows the descriptive statistics of variables used in this study. Panel A of Table 3 presents descriptive statistics of the full sample of data. Mean *Reverse* ($t + 1$) is 0.370, indicating about 37% among firms reporting current losses report positive earnings in the next year. However, mean (median) *Earn* ($t + 1$) and *SAR* ($t + 1$) are -0.093 (-0.041) and -0.045 (-0.201), respectively. This implies overall firms with a tax loss in the current year reported negative earnings again in the next year, and investors react negatively against firms at a loss.

Table 3. Descriptive statistics of main variables.

Panel A: Full Sample							
Variables (n = 2885)	Mean	Std. Dev	Min	Median	Max		
Reverse (t + 1)	0.370	0.483	0.000	0.000	1.000		
Earn	−0.140	0.175	−1.056	−0.081	−0.001		
Earn (t + 1)	−0.093	0.192	−0.971	−0.041	0.242		
SAR (t + 1)	−0.045	0.912	−1.797	−0.201	16.230		
CFO	−0.024	0.113	−0.582	−0.009	0.226		
EarnCHG	0.149	0.196	0.001	0.090	1.352		
NEGNOP	0.876	0.330	0.000	1.000	1.000		
SG	−0.098	0.559	−1.000	0.000	2.787		
AGE	0.076	0.265	0.000	0.000	1.000		
RD	0.596	0.491	0.000	0.001	1.000		
Floss	0.422	0.494	0.000	0.000	1.000		
LossEQ	2.586	2.110	1.000	2.000	10.000		
BLoss	0.047	0.211	0.000	0.000	1.000		
Size	17.656	1.200	15.603	17.486	21.950		
DDIV	0.262	0.440	0.000	0.000	1.000		
DIVStop	0.085	0.278	0.000	0.000	1.000		
Panel B: Tax Categories before IFRS Adoption							
Variables	BN (n = 941)			GN (n = 513)			t-Test
	Mean	Median	Std. Dev	Mean	Median	Std. Dev	
Reverse (t + 1)	0.321	0.000	0.467	0.511	1.000	0.500	0.189 ***
Earn	−0.208	−0.128	0.227	−0.112	−0.065	0.145	0.096 ***
Earn (t + 1)	−0.143	−0.081	0.237	−0.041	0.003	0.170	0.102 ***
SAR (t + 1)	0.017	−0.264	1.966	0.017	−0.137	0.821	−0.001
CFO	−0.049	−0.026	0.134	−0.004	0.004	0.112	0.045 ***
EarnCHG	0.197	0.112	0.257	0.161	0.109	0.183	−0.036 ***
NEGNOP	0.892	1.000	0.310	0.887	1.000	0.317	−0.005
SG	0.081	−0.011	0.618	0.078	−0.008	0.555	−0.004
AGE	0.057	0.000	0.225	0.164	0.000	0.370	0.107 ***
RD	0.586	1.000	0.024	0.659	1.000	0.475	0.072 ***
Floss	0.284	0.000	0.451	0.661	1.000	0.474	0.377 ***
LossEQ	3.209	3.000	2.266	1.579	1.000	1.117	−1.63 ***
BLoss	0.099	0.000	0.299	0.029	0.000	0.169	−0.07 ***
Size	17.345	17.239	1.081	17.665	17.460	1.212	0.320 ***
DDIV	0.142	0.000	0.350	0.472	0.000	0.500	0.329 ***
DIVStop	0.075	0.000	0.264	0.097	0.000	0.297	0.022
Panel C: Tax Categories after IFRS Adoption							
Variables	BN			GN			t-Test
	Mean	Median	Std. Dev	Mean	Median	Std. Dev	
Reverse (t + 1)	0.330	0.000	0.470	0.401	0.000	0.491	0.071 **
Earn	−0.118	−0.073	0.139	−0.073	−0.045	0.080	0.045 ***
Earn (t + 1)	−0.086	−0.042	0.164	−0.059	−0.022	0.129	0.028 ***
SAR (t + 1)	−0.025	−0.209	0.975	0.034	−0.151	1.580	0.059
CFO	−0.022	−0.007	0.103	0.004	0.004	0.066	0.026 ***
EarnCHG	0.119	0.075	0.148	0.095	0.064	0.100	−0.024 ***
NEGNOP	0.863	1.000	0.344	0.856	1.000	0.351	−0.007
SG	−0.325	0.000	0.469	−0.176	0.000	0.382	0.149 ***
AGE	0.051	0.000	0.205	0.072	0.000	0.259	0.021
RD	0.589	1.000	0.026	0.559	1.000	0.497	−0.030
Floss	0.373	0.000	0.484	0.557	1.000	0.497	0.184 ***
LossEQ	2.815	2.000	2.319	1.865	1.000	1.383	−0.950 ***
BLoss	0.026	0.000	0.159	0.000	0.000	0.000	−0.026 ***
Size	17.740	17.541	1.172	18.139	17.909	1.308	0.398 ***
DDIV	0.199	0.000	0.399	0.422	0.000	0.494	0.223 ***
DIVStop	0.072	0.000	0.258	0.121	0.000	0.326	0.049 ***

¹ See Appendix A for variable definitions. ² *, **, *** represent significant at the 10%, 5%, 1% levels, respectively.

Panel B and panel C of Table 3 present descriptive statistics of variables for firm-years by tax categories before and after IFRS adoption, respectively. Both before and after IFRS adoption, firms at a loss show years with significantly different characteristics by tax categories. For instance, GN firm-years show significantly higher mean *Reverse* ($t + 1$), *Earn*, *Earn* ($t + 1$), *CFO*, *Floss*, *Size*, and *DIV* compared to BN firm-years. Meanwhile GN firm-years show significantly lower mean *LossEQ* and *BLoss*. However, the difference for these two variables is smaller after IFRS adoption than before IFRS adoption. Mean *SAR* ($t+1$) is significantly higher for GN firm-years before IFRS adoption while mean *SAR* ($t+1$) is not significantly different between GN firm-years and BN firm-years after IFRS adoption. Table 3 indicates that the reporting of information of deferred tax expenses might be different between before and after IFRS adoption.

Table 4 presents the Pearson correlation among the variables used in this study. *Reverse* ($t + 1$) and *Earn* ($t + 1$) are positively correlated with *GN* at the 1% significance level. *SAR* ($t + 1$) is also positively associated with *GN* at the 5% significance level. This suggests overall firms reporting losses for the years recognize DTAs (or negative deferred tax expenses) in the current year and report better performance in the next year compared to BN firms at a loss for the years.

Since these univariate results do not control for other variables that might influence firms' future performance, we need to perform multivariate regression analysis.

5.2. Determinant of the Tax Categories

Table 5 presents the logistic regression results of Equation (1). Most of the results are consistent with prior research [6] and our expectations. Firms at a loss for the year with higher *Earn*, *CFO*, *SG*, *Size*, and *DIV* show higher probability of being classified as GN firm-years. Firms at a loss for the year with shorter listed years and lower *LossEQ* show higher probability of being classified as GN firm-years. However, *DIVStop* shows a significantly positive relationship with *GN*, which is not consistent with our expectations. However, R&D expenses, first time losses, and the scale of loss are not significantly related with tax categories.

Table 4. Correlation matrix.

Variables	GN	Reverse (t + 1)	Earn	Earn (t + 1)	SAR (t + 1)	CFO	EarnCHG	NEGNOP	SG	AGE	RD	Floss	LossEq	BLoss	Size	DDiv
<i>Reverse (t + 1)</i>	0.131 ***															
<i>Earn</i>	0.181 ***	0.145 ***														
<i>Earn (t + 1)</i>	0.159 ***	0.577 ***	0.327 ***													
<i>SAR (t + 1)</i>	0.044 **	0.228 ***	0.089 ***	0.252 ***												
<i>CFO</i>	0.145 ***	0.164 ***	0.406 ***	0.297 ***	0.085 ***											
<i>EarnCHG</i>	−0.062 ***	−0.083 ***	−0.618 ***	−0.224 ***	−0.072 ***	−0.246 ***										
<i>NEGNOP</i>	−0.006	−0.055 ***	−0.159 ***	−0.040 **	0.014	0.016	0.050 ***									
<i>SG</i>	0.074 ***	0.047 **	−0.142 ***	0.011	−0.023	−0.005	0.108 ***	0.086 ***								
<i>AGE</i>	0.121 ***	0.015	0.022	0.040 **	0.003	0.014	0.078 ***	−0.054 ***	−0.004							
<i>RD</i>	0.024	0.016	−0.001	−0.032 *	0.044 **	−0.006	0.002	0.005	−0.005	0.069 ***						
<i>Floss</i>	0.269 ***	0.147 ***	0.257 ***	0.180 ***	−0.002	0.178 ***	0.000	−0.046 **	−0.074 ***	0.132 ***	0.008					
<i>LossEQ</i>	−0.288 ***	−0.166 ***	−0.324 ***	−0.238 ***	−0.007	−0.241 ***	0.111 ***	0.070 ***	0.074 ***	−0.135 ***	−0.030	−0.642 ***				
<i>BLoss</i>	−0.102 ***	−0.048 ***	−0.778 ***	−0.173 ***	−0.003	−0.289 ***	0.506 ***	0.074 ***	0.132 ***	−0.014	−0.020	−0.133 ***	0.199 ***			
<i>Size</i>	0.130 ***	0.044 **	0.188 ***	0.129 ***	−0.027	0.096 ***	−0.100 ***	0.012	0.009	−0.042 **	0.057 ***	0.143 ***	−0.136 ***	−0.089 ***		
<i>DDIV</i>	0.296 ***	0.211 ***	0.235 ***	0.239 ***	−0.014	0.156 ***	−0.084 ***	−0.068 ***	−0.040 **	0.055 ***	−0.015	0.445 ***	−0.365 ***	−0.099 ***	0.212 ***	
<i>DIVstop</i>	0.058 ***	0.056 ***	0.066 ***	0.074 ***	0.023	0.069 ***	−0.064 ***	−0.009	0.002	0.030	0.039 **	−0.062 ***	−0.109 ***	−0.044 **	−0.001	−0.181 ***

¹ Above table reports the Pearson correlations. ² *, **, *** represent significant at the 10%, 5%, 1% levels, respectively. ³ See Appendix A for variable definitions.

Table 5. Determinant of the tax categories.

Dependent Variable	GN
	Coef. (Wald)
<i>Intercept</i>	−2.169 (−1.518)
<i>Earn</i>	1.491 *** (2.611)
<i>CFO</i>	1.088 ** (2.275)
<i>EarnCHG</i>	0.350 (1.034)
<i>NEGNOP</i>	0.176 (1.291)
<i>SG</i>	0.324 *** (3.002)
<i>Age</i>	0.642 *** (4.114)
<i>RD</i>	0.022 (0.232)
<i>FLoss</i>	0.116 (0.881)
<i>LossEQ</i>	−0.267 *** (−5.953)
<i>Bloss</i>	−0.089 (−0.206)
<i>Size</i>	0.104 *** (2.612)
<i>DDiv</i>	0.910 *** (8.314)
<i>DivStop</i>	0.495 *** (3.230)
Year fixed effects	YES
Industry fixed effects	YES
Number of Obs.	2905
Pseudo R-squared	0.155

¹ See Appendix A for variable definitions. ² *, **, *** represent significant at the 10%, 5%, 1% levels, respectively.

5.3. Prediction of Future Earnings

Panel A of Table 6 presents the regression results of Equation (2), and panel B of Table 6 shows the joint significance of $\beta_1 + \beta_3$ for Equation (2), which tests whether incremental information about loss reversal of GN changes after IFRS adoption. Each column uses one, two, and three years ahead of loss reversal, respectively. The coefficients of GN are significantly positive for all three models even though the significance decreases as the terms get longer. This is consistent with prior research and means that firms at a loss that recognize DTAs (negative deferred tax expenses) are more likely to report positive earnings for the years following the loss before IFRS adoption. However, all the coefficients of $GN \times IFRS$ are significantly negative as we expected, this implies that the tendency of loss reversal for the loss firms recognizing DTAs has decreased after IAS 12 adoption. The joint significances of $\beta_1 + \beta_3$ are not statistically significant except for two-years ahead of loss reversal. For two-years to loss reversal, $\beta_1 + \beta_3$ is significantly negative. This means that the usefulness of the information of DTAs (or negative deferred tax expenses) decreases and the probability of loss reversal is indifferent to whether firms at a loss recognize DTAs or not after IAS 12 adoption. This result of Table 6 supports our Hypothesis 1. For the control variables, the probability of loss reversal is higher for firms with higher CFO, SG, DIV, DIVStop, and lower LossEQ.

Table 6. Loss reversal.

Panel A: Logit Regression Results			
Dependent Variable	Reverse (t + 1)	Reverse (t + 2)	Reverse (t + 3)
	Coef. (Wald)	Coef. (Wald)	Coef. (Wald)
<i>Intercept</i>	−1.064 (−0.933)	−0.188 (−0.174)	0.718 (0.663)
<i>GN</i>	0.412 *** (3.250)	0.277 ** (2.193)	0.221 * (1.733)
<i>IFRS</i>	0.626 *** (3.338)	−0.010 (−0.055)	−0.120 (−0.684)
<i>GN * IFRS</i>	−0.421 ** (−2.398)	−0.432 ** (−2.488)	−0.480 *** (−2.749)
<i>CFO</i>	2.549 *** (5.857)	1.774 *** (4.242)	2.483 *** (5.760)
<i>EarnCHG</i>	−0.872 *** (−2.950)	−0.445 * (−1.662)	−0.277 (−1.006)
<i>NEGNOP</i>	−0.327 *** (−2.638)	−0.133 (−1.077)	−0.063 (−0.505)
<i>SG</i>	0.320 *** (3.280)	0.164 * (1.725)	0.051 (0.517)
<i>Age</i>	−0.190 (−1.212)	−0.090 (−0.580)	−0.118 (−0.758)
<i>RD</i>	0.043 (0.490)	−0.093 (−1.079)	−0.149 * (−1.711)
<i>FLoss</i>	0.101 (0.869)	0.020 (0.172)	0.093 (0.809)
<i>LossEQ</i>	−0.061 ** (−2.033)	−0.069 ** (−2.388)	−0.059 ** (−2.050)
<i>Bloss</i>	0.533** (2.060)	−0.486* (−1.850)	−0.484 * (−1.745)
<i>Size</i>	−0.032 (−0.873)	−0.006 (−0.171)	−0.020 (−0.552)
<i>DDiv</i>	0.659 *** (6.107)	0.792 *** (7.298)	0.645 *** (5.933)
<i>DivStop</i>	0.461 *** (3.114)	0.470 *** (3.169)	0.609 *** (4.022)
Year fixed effects	YES	YES	YES
Industry fixed effects	YES	YES	YES
Number of Obs.	2905	2798	2692
Pseudo R-squared	0.088	0.080	0.066
Panel B: Joint Significance			
Dependent Variable	Reverse (t + 1)	Reverse (t + 2)	Reverse (t + 3)
	Coef. (Wald)	Coef. (Wald)	Coef. (Wald)
$\beta_1 + \beta_3$	−0.009 (0.00)	−0.155 (1.48)	−0.259 ** (4.09)

¹ See Appendix A for variable definitions. ² *, **, *** represent significant at the 10%, 5%, 1% levels, respectively.

³ The variables and coefficients in bold are of our interest.

Panel A of Table 7 presents the regression results of Equation (3), and panel B of Table 7 shows the joint significance of $\beta_4 + \beta_7$ for Equation (3), which examines whether earnings persistence of the GN group changes after IFRS adoption. Each column uses one, two and three-years ahead *Earn*, respectively. The coefficients of *Earn* are significantly positive for all three models, indicating that losses are persistent. Meanwhile, the coefficients of *Earn* × *GN* are significantly negative for all three models. This is consistent with prior research and means that the loss persistence of GN firm years is lower than BN firm years.

Table 7. Loss persistence.

Panel A: Regression Results			
Dependent Variable	<i>Earn (t + 1)</i>	<i>Earn (t + 2)</i>	<i>Earn (t + 3)</i>
	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)
<i>Intercept</i>	−0.145 (−1.312)	−0.070 (−0.656)	−0.018 (−0.174)
<i>Earn</i>	0.336 *** (8.131)	0.230 *** (6.810)	0.224 *** (6.587)
<i>GN</i>	0.017 (1.338)	0.013 (1.025)	−0.010 (−0.850)
<i>IFRS</i>	0.089 *** (5.675)	−0.001 (−0.073)	−0.009 (−0.569)
<i>Earn * GN</i>	−0.180 *** (−3.084)	−0.127 ** (−2.141)	−0.218 *** (−3.693)
<i>Earn * IFRS</i>	−0.036 (−0.765)	−0.021 (−0.435)	−0.064 (−1.314)
<i>GN * IFRS</i>	−0.027 (−1.503)	−0.024 (−1.339)	−0.001 (−0.050)
<i>Earn * GN * IFRS</i>	0.214 * (1.712)	0.136 (1.100)	0.086 (0.697)
<i>CFO</i>	0.252 *** (8.042)	0.158 *** (5.051)	0.173 *** (5.635)
<i>EarnCHG</i>	−0.065 *** (−3.042)	−0.013 (−0.593)	−0.051 ** (−2.378)
<i>NEGNOP</i>	−0.002 (−0.237)	0.010 (1.030)	−0.013 (−1.313)
<i>SG</i>	0.023 *** (3.169)	0.009 (1.259)	0.018 ** (2.450)
<i>Age</i>	0.011 (0.853)	−0.004 (−0.306)	−0.000 (−0.009)
<i>RD</i>	−0.114 (−0.854)	−0.062 (−0.470)	−0.029 (−0.225)
<i>FLoss</i>	−0.011 (−1.192)	−0.012 (−1.389)	−0.010 (−1.151)
<i>LossEQ</i>	−0.007 *** (−3.322)	−0.006 *** (−2.871)	−0.007 *** (−3.307)
<i>Bloss</i>	0.155 *** (6.124)	0.165 *** (4.096)	0.070 * (1.723)
<i>Size</i>	0.006 * (1.929)	0.006 ** (2.083)	0.005 * (1.736)
<i>DDiv</i>	0.049 *** (5.576)	0.054 *** (6.412)	0.039 *** (4.690)
<i>DivStop</i>	0.030 ** (2.528)	0.020 * (1.674)	0.021 * (1.858)
Year fixed effects	YES	YES	YES
Industry fixed effects	YES	YES	YES
Number of Obs.	2905	2798	2692
Adj. R-squared	0.219	0.134	0.144
Panel B: Joint Significance			
Dependent Variable	<i>Reverse (t + 1)</i>	<i>Reverse (t + 2)</i>	<i>Reverse (t + 3)</i>
	Coef. (Wald)	Coef. (Wald)	Coef. (Wald)
$\beta_4 + \beta_7$	0.034 (0.09)	0.009 (0.01)	−0.132 (1.48)

¹ See Appendix A for variable definitions. ² *, **, *** represent significant at the 10%, 5%, 1% levels, respectively.

³ The variables and coefficients in bold are of our interest.

The coefficients of $Earn \times GN \times IFRS$ are positive for all three models, however statistically significant only for one-year ahead model, and not significant for two and three-year ahead models. This implies that the tendency of lower loss persistence of GN firm years deteriorates after IAS 12 adoption at least for one-year ahead, which is largely consistent with our expectation.

The joint significances of $\beta_4 + \beta_7$ are not statistically significant except for the three-year ahead *Earn*. This implies that after IAS 12 adoption the usefulness of the information of DTAs (or negative

deferred tax expenses) decreases and loss persistence is indifferent to whether loss firms recognize DTAs or not. Even though for three-years ahead $Earn$, $\beta_4 + \beta_7$ is significantly negative which is different than our expectations, the results of Table 7 are largely consistent with Hypothesis 1.

5.4. Future Stock Returns

Panel A of Table 8 presents the regression results of Equation (4), and panel B of Table 8 shows the joint significance $\beta_1 + \beta_3$ for Equation (4), which examines whether investors effectively price the information of deferred tax expenses before and after IFRS adoption. The coefficient of GN is significantly positive at the 1% significance level indicating that before IFRS adoption investors underweight the information of DTAs (or negative tax expenses).

Table 8. Future Stock Return.

Panel A: Regression Results			
Dependent Variable	SAR (t + 1) Quartile	SAR (t + 1) Quintile	SAR (t + 1) Continuous
Control Variables	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)
<i>Intercept</i>	−0.501 (−1.086)	−0.543 (−1.174)	0.053 (0.097)
GN	0.139 *** (2.597)	0.135 ** (2.526)	0.101 * (1.901)
<i>IFRS</i>	0.238 *** (3.221)	0.236 *** (3.193)	0.190 ** (2.523)
GN * IFRS	−0.176 ** (−2.337)	−0.172 ** (−2.295)	−0.132 * (−1.758)
<i>Beta</i>	−0.030 (−0.593)	0.008 (0.171)	−0.005 (−0.148)
<i>Size</i>	0.044 (0.777)	0.016 (0.290)	−0.024 (−1.389)
<i>BTM</i>	0.121 * (1.847)	0.143 ** (2.351)	0.014 (0.714)
<i>EP</i>	0.018 (0.197)	0.070 (0.868)	0.065 (1.574)
<i>ACC</i>	−0.022 (−0.361)	−0.022 (−0.392)	−0.310 * (−1.898)
<i>MOM</i>	−0.018 (−0.349)	−0.006 (−0.122)	−0.004 (−0.113)
<i>Earn</i>	0.078 (0.848)	0.041 (0.512)	0.606 *** (3.609)
<i>SUE</i>	0.006 (0.365)	−0.006 (−0.112)	−0.093 *** (−2.608)
Year fixed effects	YES	YES	YES
Industry fixed effects	YES	YES	YES
Number of Obs.	2808	2808	2808
Adj. R-squared	0.010	0.011	0.017
Panel B: Joint Significance			
Dependent Variable	Reverse (t + 1)	Reverse (t + 2)	Reverse (t + 3)
	Coef. (Wald)	Coef. (Wald)	Coef. (Wald)
$\beta_1 + \beta_3$	−0.037 (0.43)	−0.037 (0.45)	−0.031 (0.32)

¹ See Appendix A for variable definitions. ² *, **, *** represent significant at the 10%, 5%, 1% levels, respectively.

³ The variables and coefficients in bold are of our interest.

Meanwhile, the coefficients of $GN \times IFRS$ are significantly negative, which means that after IAS 12 adoption the informativeness of DTAs decreased. The joint significance of $\beta_1 + \beta_3$ is not statistically significant. This implies that after IAS 12 adoption, investors may not gain buy-and-hold returns by buying GN firm-years and selling BN firms-years. However, this is not because investors understand the information of DTAs, but because the usefulness of the information of DTAs reported deteriorates after IAS 12 adoption. This result is consistent with our expectations and supports Hypothesis 2.

5.5. Additional Analysis

5.5.1. Corporate Governance

Prior studies report that earnings quality is positively associated with good corporate governance. Recognizing DTAs requires firms' judgment whether they may record positive enough earnings to use deductible temporary differences. When firms at a loss decide to recognize DTAs or not, corporate governance oversight might affect firms' accounting policies. In this view, a re-estimate of Equation (2) is performed for subsamples divided by variables used as proxies for corporate governance. We use holdings of the largest shareholders, and holdings of foreigners as the proxies for corporate governance. Following Table 9 shows the results of Equation (2) for subsamples.

Table 9. Subsamples by corporate governance.

Panel A: Regression Results				
Variable	Holdings of the largest shareholders		Holdings of foreigners	
	Bad CG Coef. (Wald)	Good CG Coef. (Wald)	Bad CG Coef. (Wald)	Good CG Coef. (Wald)
<i>Intercept</i>	−0.070 (−0.081)	−1.370 (−1.341)	−0.644 (−0.511)	−0.824 (−0.937)
GN	0.343 ** (2.074)	0.454 ** (2.319)	0.250 (1.372)	0.540 *** (3.033)
<i>IFRS</i>	0.759 *** (2.968)	0.358 (1.269)	0.424 (1.628)	0.818 *** (2.959)
GN * IFRS	−0.725 *** (−3.160)	0.079 (0.285)	−0.298 (−1.176)	−0.457 * (−1.868)
<i>CFO</i>	1.805 *** (2.923)	3.279 *** (4.982)	2.342 *** (4.064)	2.781 *** (4.146)
<i>EarnCHG</i>	−0.370 (−0.968)	−1.851 *** (−3.887)	−0.463 (−1.265)	−1.706*** (−3.443)
<i>NEGNOP</i>	−0.235 (−1.466)	−0.365 * (−1.870)	−0.183 (−1.054)	−0.444 ** (−2.483)
<i>SG</i>	0.223 * (1.804)	0.325 ** (2.449)	0.265 ** (2.209)	0.257 * (1.856)
<i>Age</i>	−0.182 (−0.865)	0.068 (0.256)	−0.154 (−0.660)	0.021 (0.090)
<i>RD</i>	1.257 (0.509)	0.684 (0.276)	1.121 (0.467)	0.771 (0.306)
<i>FLoss</i>	0.156 (0.974)	0.101 (0.581)	0.293 * (1.777)	−0.059 (−0.352)
<i>LossEQ</i>	−0.037 (−0.762)	−0.071 * (−1.773)	−0.008 (−0.215)	−0.153 *** (−3.094)
<i>Bloss</i>	0.738 (1.340)	0.736 (1.172)	0.634 (1.257)	0.992 (1.506)
<i>Size</i>	−0.054 (−1.138)	0.052 (0.924)	−0.018 (−0.246)	0.015 (0.326)
<i>Div</i>	0.761 *** (5.530)	0.517 *** (2.911)	0.873 *** (5.424)	0.525 *** (3.602)
<i>DivStop</i>	0.425 ** (2.195)	0.502 ** (2.128)	0.492 ** (2.329)	0.422 ** (2.015)
Year fixed effects	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES
Number of Obs.	1464	1415	1423	1461
Pseudo R-squared	0.062	0.112	0.070	0.108
Panel B: Joint Significance				
Variable	Holdings of the largest shareholders		Holdings of foreigners	
	Bad CG Coef. (Wald)	Good CG Coef. (Wald)	Bad CG Coef. (Wald)	Good CG Coef. (Wald)
$\beta_1 + \beta_3$	−0.382 ** (5.15)	0.533 *** (6.64)	−0.048 (0.07)	0.083 (0.22)

¹ See Appendix A for variable definitions. ² *, **, *** represent significant at the 10%, 5%, 1% levels, respectively.

³ The variables and coefficients in bold are of our interest.

The first and second columns are the results for subsamples divided by holdings of the largest shareholders. The third and fourth columns show the results for subsamples divided by holding of foreigners. We divide the full sample by median holdings of the largest shareholders and median holdings of foreigners in each year in each industry, respectively. Lower holdings of the largest shareholders mean better corporate governance, while higher holdings of foreigners mean better corporate governance [32,33].

Before IFRS adoption, the probability of loss reversal was higher for GN firm-years regardless of holdings of the largest shareholders. However, after IFRS adoption the probability of loss reversal is lower for GN firm-years in higher holdings of the largest shareholders sample. It is still higher for GN firm-years in lower holding of the largest shareholders sample. This implies the usefulness of the information of DTAs decreases after IFRS adoption.

In the analysis of subsamples by holdings of foreigners, before IFRS adoption the probability of loss reversal is indifferent to lower holdings of foreigners in the sample, while it is higher for GN firm-years in higher holdings of foreigners in the sample. However, after IFRS adoption, the probability of loss reversal is indifferent between GN firm-years and BN firm-years regardless of holdings of foreigners. This result also suggests that the usefulness of the information of DTAs decreases after IFRS adoption.

5.5.2. Earnings Quality

If a firm recognized DTAs discretionally, then it reduces tax expenses so that earnings increase. In this case, the quality of earnings may deteriorate. DTAs can be recognized on the basis of deducting current temporary differences from future taxable income, so as to reduce future cash outflow. However, if DTAs are recognized under management's discretion then the association between earnings and cash flows might be worse. With this in mind we will re-estimate Equation (2) for subsamples divided by proxies for earnings quality. For the proxy for earnings quality, we use the standard deviation of past five-year's discretionary accruals measured from the model suggested by Dechow and Dichev (2002) [34]. We divide the full sample by median earnings quality in each year and each industry, respectively. Following Table 10 shows the results of Equation (2) for subsamples.

Table 10. Subsamples by earnings quality.

Panel A: Regression Results		
Variable	Bad EQ	Good EQ
	Coef. (Wald)	Coef. (Wald)
<i>Intercept</i>	−1.237 (−1.203)	0.000 (0.000)
GN	0.323 * (1.687)	0.433 ** (2.523)
<i>IFRS</i>	0.865 *** (3.150)	0.358 (1.375)
GN * IFRS	−0.479 * (−1.810)	−0.277 (−1.164)
<i>CFO</i>	2.497 *** (4.624)	2.766 *** (3.651)
<i>EarnCHG</i>	−0.502 (−1.582)	−1.962 ** (−2.160)
<i>NEGNOP</i>	−0.476 ** (−2.523)	−0.134 (−0.816)
<i>SG</i>	0.276 *** (2.630)	0.294 (1.626)
<i>Age</i>	0.176 (0.798)	−0.329 (−1.316)

Table 10. Cont.

Panel A: Regression Results		
Variable	Bad EQ	Good EQ
	Coef. (Wald)	Coef. (Wald)
<i>RD</i>	2.298 (1.027)	−1.927 (−0.689)
<i>FLoss</i>	0.216 (1.268)	0.077 (0.459)
<i>LossEQ</i>	−0.056 (−1.516)	−0.042 (−0.802)
<i>Bloss</i>	0.663 (1.619)	
<i>Size</i>	0.022 (0.393)	−0.045 (−0.939)
<i>Div</i>	0.751 *** (4.228)	0.635 *** (4.593)
<i>DivStop</i>	0.248 (1.099)	0.587 *** (2.893)
Year fixed effects	YES	YES
Industry fixed effects	YES	YES
Number of Obs.	1468	1416
Pseudo R-squared	0.082	0.076
Panel B: Joint Significance		
Variable	Bad EQ	Good EQ
	Coef. (Wald)	Coef. (Wald)
$\beta_1 + \beta_3$	−0.156 (0.60)	0.156 (0.81)

¹ See Appendix A for variable definitions. ² *, **, *** represent significant at the 10%, 5%, 1% levels, respectively.

³ The variables and coefficients in bold are of our interest.

Before IFRS adoption, the probability of loss reversal is higher for GN firm-years regardless of earnings quality. However, after IFRS adoption, the probability of loss reversal is indifferent between GN firm-years and BN firm-years regardless of earnings quality. This result suggests that the usefulness of the information of DTAs decreases after IFRS adoption and is consistent with Hypothesis 1.

5.5.3. Robustness Tests

Even though we find the informativeness of DTAs for loss firms deteriorates after IAS 12 (IFRS) adoption in Korea. The regression model we used in main analyses is pooled regression models. However, the structure of our sample is unbalanced and with time-gap panel. Therefore, we should consider the proper model for our sample structure. So, we conducted robustness tests for loss reversal and loss persistence by using the fixed effect model, and the results are consistent as the first and second column of Table 11 shows.

For loss persistence, the explanatory variable Earn has the lagged value for the dependent variable $Earn_{t+1}$ in this case, the dynamic panel model should be considered. Therefore, we conducted a robustness test for loss persistence by using the generalized method-of-moments (GMM) model. The result is still consistent as the third column of Table 11 shows.

Before testing our Hypotheses 1 and 2, following Dhaliwal et al. (2013) [7], we conducted logit regression on GN by firms' financial characteristics. Most of the characteristics are significantly associated with GN. In this case, our model may have the problem of endogeneity. To solve the possible problem of endogeneity, we conducted two stage least-squares analysis (2SLS) by using an instrument variable. In Korea, all the listed firms maintain the same auditor at least three fiscal years after the first audit contract. As the instrument variable, we used Big4 which has the value of 1 if the auditor is one

of big 4 accounting firms, otherwise 0. In the first stage we predict GN by testing model (1) including Big4. In the second stage, we conducted robustness tests for loss reversal and loss persistence by using predicted GN. The results are still consistent as Table 12 shows.

Table 11. Subsamples by earnings quality.

Dependent Variable	Loss Reversal Using the Fixed Effect Model	Loss Persistence Using the Fixed Effect Model	Loss Persistence Using GMM Model
	Reverse (t + 1)	Earn (t + 1)	Earn (t + 1)
<i>Earn</i>		−0.170 *** (−3.858)	−0.194 * (−1.830)
<i>GN</i>	0.079 ** (2.416)	0.027 * (1.669)	−0.019 (−0.528)
<i>IFRS</i>	0.129 *** (2.922)	0.013 (0.991)	−0.008 (−0.214)
<i>Earn * GN</i>		−0.006 (−0.081)	−0.425 ** (−2.160)
<i>Earn * IFRS</i>		0.029 (0.542)	−0.327 ** (−2.048)
<i>GN * IFRS</i>	−0.357 ** (−2.347)	−0.017 (−0.743)	0.023 (0.478)
<i>Earn * GN * IFRS</i>		0.299 ** (1.980)	0.547 * (1.657)
Control Variables	Included	Included	Included
Year fixed effects	YES	YES	YES
Industry fixed effects	YES	YES	YES
Number of Obs.	2905	2905	696
Number of Groups	1019	1019	330

¹ See Appendix A for variable definitions. ² *, **, *** represent significant at the 10%, 5%, 1% levels, respectively.

³ The variables and coefficients in bold are of our interest.

Table 12. Loss reversal and loss persistence using 2SLS models.

Dependent Variable	Reverse (t + 1)	Earn (t + 1)
<i>Earn</i>		0.413 *** (8.82)
<i>GN</i>	1.299 *** (3.28)	−0.172 ** (−2.46)
<i>IFRS</i>	0.124 *** (2.67)	0.015 (1.01)
<i>Earn * GN</i>		−0.210 *** (−4.43)
<i>Earn * IFRS</i>		−0.056 (−1.23)
<i>GN * IFRS</i>	−0.190 ** (−2.00)	−0.008 (−0.57)
<i>Earn * GN * IFRS</i>		0.270 ** (2.23)
Control Variables	Included	Included
Year fixed effects	YES	YES
Industry fixed effects	YES	YES
Number of Obs.	2905	2,905
Pseudo R-squared	0.101	
Adj. R-squared		0.221

¹ See Appendix A for variable definitions. ² *, **, *** represent significant at the 10%, 5%, 1% levels, respectively.

³ The variables and coefficients in bold are of our interest.

6. Conclusions

As acknowledged by the Commission of the European Communities (2007, 18), “accounting for deferred taxes ... is very burdensome for companies in general,” whereas “it has been confirmed by

preparers and users, e.g., credit institutions and rating agencies, that deferred tax information (whether recognized in the balance sheet or provided in the notes) often is not considered a relevant input for the decisions to be taken”.

We examine the incremental effect of IFRS relative to the usefulness of information content of deferred tax balance for loss reporting firms using evidence from Korea. We expect that if IFRS adoption allows a firm greater flexibility in recognizing as deferred tax balance, then deferred tax disclosures will provide little information about the potential earnings sustainability.

We develop a classification scheme that uses deferred tax expense according to Dhaliwal et al. (2013) [6]. We also first examine whether IFRS adoption affects the information about loss reversal or loss persistency, including multiple determinants of tax categories, and their control variables. Both the loss reversal model and the loss persistence model results show that tax categories provide incremental information before IFRS, but after IFRS information about loss reversal or loss persistency disappears in its usefulness.

Finally, we extended previous research on the pricing of tax information. Our results suggest that investors generally underweight their deferred tax balance before IFRS, but after IFRS adoption, investors cannot obtain buy-and-hold returns by buying GN firm-years and selling BN firm-years. However, this is not because investors understand the information of DTAs, but because the usefulness of the information of DTAs deteriorates after IFRS adoption.

Our study has two important limitations. First, although we try to control the various effects associated with adopting IFRS, our research is probably not free of endogeneity issues. Second, our tests are based on only 4 years of post-adoption data. The information effect we suggest may not persist in the long period as user’s familiarity with the implementation of standards increases and/or the quality of financial reporting improves due to the monitoring effect of users of financial information.

We believe our findings have implications for the application of IFRS. First, although existing research analyzes the overall impact of introducing IFRS, our research focuses on specific issues related to tax accounting. Specifically, this study shows that the flexible interpretation of accounting standards related to tax accounting can reduce the quality of information.

We use a unique setting because, under IAS No. 12, only the recognition criteria related to the tax information were relaxed in Korea, while the estimation method for deferred taxes remains unchanged. We suggest that our setting provides evidence regarding the inherent flexibility of IFRS.

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Appendix A

Table A1. Variable Definitions.

Variable	Variable Description
<i>GN</i>	Equals 1 if a firm recognizes negative deferred tax expenses, and 0 otherwise
<i>Reverse</i>	Equals 1 if a firm report positive income before extraordinary items and tax expenses, and 0 otherwise
<i>IFRS</i>	Equals 1 if the year belongs to between 2011 and 2014, and 0 otherwise
<i>Earn</i>	Income before extraordinary items and tax expenses scaled by beginning total assets.
<i>SAR</i>	The buy-and-hold return which is annually size-adjusted
Earnings Quality	
<i>CFO</i>	Operating cash flow scaled by beginning total assets.
<i>EarnCHG</i>	Absolute value of $Earn_t - Earn_{t-1}$.

Table A1. Cont.

Transitory Items	
<i>NEGNOP</i>	Equals 1 if non-operating income is less than 0, and 0 otherwise
Growth Prospects	
<i>SG</i>	$Sales_t - Sales_{t-1} / Sales_{t-1}$. Set to 0 when $Sales_{t-1}$ is 0.
<i>AGE</i>	Equals 1 if the year of the observation minus the first year the firm has data on TS2000 equals 1 or 2, and 0 otherwise
<i>RD</i>	Equals 1 if research and development expenses are positive, and 0 otherwise.
Frequency of Losses	
<i>FLoss</i>	Equals 1 if the current <i>Earn</i> are negative, but the previous <i>Earn</i> are positive, and 0 otherwise.
<i>Losseq</i>	Number of successive losses including the current loss.
<i>BLoss</i>	Equals 1 if <i>EARNINGS</i> are less than -0.5^* , and 0 otherwise
Financial Stability	
<i>Size</i>	Natural log of market value of equity at fiscal year end
<i>DDiv</i>	Equals 1 if dividends are positive, and 0 otherwise.
<i>DivStop</i>	Equals 1 if the firm stopped paying dividends in the current year, and 0 otherwise
Risk Factors	
<i>Beta</i>	Beta obtained from Kis Value data
<i>BTM</i>	Common equity divided by market value of equity at fiscal year end
<i>EP</i>	Income before tax expenses scaled by market value of equity at fiscal year end
<i>ACC</i>	Income before tax expenses less operating cash flows, scaled by beginning total assets
<i>MOM</i>	Cumulative return over the 11-month period starting 8 months prior to fiscal year end
<i>SUE</i>	$EARN_{(t)} - EARN_{(t-1)}$ scaled by market value of equity at fiscal year end

* Following the Dhaliwal et al. (2013) [6], when we use -0.8 for the *Bloss* measure, the results are consistent.

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