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NET DEFERRED TAX ASSETS AND THE LONG-RUN PERFORMANCE OF INITIAL PUBLIC OFFERINGS

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Abstract

On average, firms' going public severely underperform compared to the market, a phenomenon which is widely known in the literature as IPO underperformance. Though there is no generally accepted theory on the reasons, information asymmetries and the scarcity of information on the issuers is generally considered to contribute to the phenomenon. Accounting data provided by issuers in the offering prospectuses is mostly backward-looking information that is of limited use in forming expectations of future performance. This problem becomes even more pressing, given the increasing fraction of loss firms among IPOs.

Net deferred tax assets (NDTA), however, are a balance sheet item that can be expected to include forward-looking information on future earnings. Reporting under IFRS, firms may recognize NDTA only to the extent, that positive income will be available in future periods. We, therefore, expect NDTA to be positively associated with the long-run performance of IPOs. Investigating a sample of firms going public in Germany between 2005 and 2015, we find that NDTA are positively associated with long-run stock price performance. The association is particularly strong among loss firms.

Our findings are relevant especially to investors, who regularly have difficulties valuing loss firms. We show that firms which recognized NDTA perform much better in the aftermarket than those that do not have NDTA on the balance sheet. The most important lesson to be learned is that IPO firms that did not recognize NDTA will likely be very poor investments.

Keywords: Initial Public Offering, IPO, Underperformance, Deferred Taxes, Deferred Tax Assets

Authors' individual contribution: Conceptualization – J.K.; Methodology – J.K.; Formal Analysis – J.K.; Resources – P.V.; Writing – J.K. and P.V.; Supervision – P.V.

1. INTRODUCTION

Newly public firms show a number of anomalies after getting listed on the stock exchange for the first time. One among these anomalies, which has a long-standing in the literature on Initial Public Offerings (IPO), is the phenomenon of IPO underperformance, i.e. the inability of IPO firms' stock prices to compete with the market, is consistently documented across different markets and time periods (Loughran & Ritter, 1995; Brav & Gompers, 1997; Teoh et al., 1998; Carter et al., 1998; Guo et al., 2006; Bessler & Thies, 2007). Many IPO firms fail completely (Demers & Joos, 2007) or badly disappoint investors as the recent example of Snap Inc. shows, whose share price dropped by about 26% in the first twelve months after going public.

Therefore, it is a conventional sense notion among both research and practice that IPO firms tend to be risky stocks (Ritter & Welch, 2002). Valuing IPO firms is a difficult endeavor (Kim & Ritter, 1999) because there are no historical stock prices available and there rarely is any media coverage on the firms in the years prior to the IPO (Rao, 1993). To obtain information on the firm,

investors have to rely heavily on the offering prospectus which usually contains financial statements of only up to three years (Teoh et al., 1998). Making this scarcity of information even more pressing is the widely held suspicion that the earnings reported in the prospectus may be artificially inflated by the firm's management in order to obtain higher valuations and to justify higher offer prices (Aharony et al., 1993; Friedlan, 1994; Lee & Masulis, 2011). Investigating this issue, a number of studies found that many firms increase their earnings prior to their IPO by both accruals (Aharony et al., 1993; Friedlan, 1994; Teoh et al., 1998; Rosenboom et al., 2003; Morsfield & Tan, 2006; Gounopoulos & Pham, 2017) and real earnings management (Darrough & Rangan, 2005; Wongsunwei, 2013; Alhadab et al., 2016). Nevertheless, some studies also report the contrary, namely that IPO firms report more conservatively than other firms (Ball & Shivakumar, 2008; Cecchini et al., 2012).

Whether managed or not, a central problem of using accounting information for valuation purposes is that most items are largely past-oriented and do not allow extrapolation of future earnings without making – often shaky – assumptions. An important exception in this regard may be the net deferred tax asset (NDTA). NDTA account for the amount of income taxes recoverable in future periods that result from deductible temporary differences and which exceed the amount of deferred tax liabilities (Chludek, 2011). Tax-loss carry-forwards which are expected to be utilized in future periods can be a further source of NDTA. However, IAS 12.24 limits the recognition of net deferred tax assets "to the extent that it is probable that taxable profit will be available against which the deductible temporary difference can be utilized". Hence, the recognition of NDTA can possibly convey information on the future availability of positive income.

In the context of IPOs, this information may be highly useful to investors, given that a substantial percentage of IPOs are actually launched by loss firms (Carpentier et al., 2017)[1] and valuing loss firms is even more challenging than valuing profitable firms. Potentially, the recognition of NDTA may serve IPO firms' managers as a means of signaling their projections of future profitability to investors, which should allow forming expectations on long-run performance based on NDTA. On the other hand, however, recognizing NDTA increases income and therefore managers might opportunistically recognize NDTA. Numerous studies found income-increasing earnings management by making use of the discretion offered by accounting for income taxes (Dhaliwal et al., 2004; Frank & Rego, 2006; Herbohn et al., 2010; Kasipillai & Mahenthiran, 2013). It therefore remains an empirical question whether NDTA are associated to the long-run performance of newly public firms.

Using a sample of 80 firms that went public in Germany between 2005 and 2015 and were reporting under IFRS, this study investigates whether NDTA convey relevant and decision-useful information for making investment decisions in the IPO market. We explicitly choose a sample of firms reporting under IFRS, because, whereas the value relevance of NDTA under US-GAAP can be considered as established (Amir et al., 1997, Amir et al., 2001, Kumar & Visvanathan, 2003), there is a dearth of studies on NDTA under IFRS (Chludek, 2011, Flagmeier, 2017). Furthermore, the value relevance of NDTA under IFRS as compared to US-GAAP has been challenged recently (Bauman & Shaw, 2016). Controlling for a number of variables that have been identified by prior research to influence IPO long-run performance, we find that the recognition of NDTA is predictive of IPO performance and conclude that NDTA under IFRS do convey decision-useful information to capital market participants. In an additional analysis, we show that this finding is particularly pronounced among firms that went public making substantial losses.

This study proceeds as follows. Section 2 briefly reviews the literature on IPO underperformance and earnings management around initial public offerings. In Section 3, two research hypotheses are developed. Section 4 sets out the data and model applied to investigate the hypotheses. In Section 5 and 6, results are presented and discussed respectively; Section 7 concludes.

2. PRIOR LITERATURE

2.1. IPO underperformance

The phenomenon of IPO underperformance has been described in the literature extensively. The reasons, however, are subject to debate and various theoretical explanations – partly complementary – have been suggested. Ritter (1991) suggests that IPO underperformance is caused by irrational investor behavior. According to this explanation, investors are simply overoptimistic about the prospects of IPO firms and therefore the firms receive inappropriately high valuations so that IPO firms are sold at offer prices higher than their market values (Ritter & Welch, 2002). This explanation is supported through recent findings by Carpentier et al. (2017), who document that loss firms receive higher valuations and are sold at higher offer prices but show worse long-run performance than IPO firms which were not making losses.

A complementary theoretical explanation which is rather rooted in classical agency theory proposes that insiders – the managers and selling shareholders of the firm – take advantage of the information asymmetry between themselves and potential investors by efficiently timing their exit from the firm (Ritter & Welch, 2002). Due to their superior inside information on the firm, they are able to sell their equity around the time the firm enters a more mature phase in its life-cycle when the high-growth phase that characterized the start-up years comes to an end. Outsiders, however, who are lacking this information, expect the high growth to continue and therefore accept high offer prices. Pagano et al. (1998) find that profitability decreases in the years after the IPO, which supports that timing plays an important role in the decision to go public. Timing effects as a reason of underperformance is further supported by Loughran and Ritter (1995) who suggest that firms which are older and larger, i.e., more mature firms, show significantly less underperformance than younger and smaller firms.

[1] In 2017, actually 76% of all firms going public in the U.S. were loss firms, cf. The New York Times, May 16, 2018.

However, if insiders were not optimistic about their firm's future growth, they would have a strong incentive to sell as much of their equity as possible – preferably all of it. If they, on the other hand, expect past growth to continue or to increase, they would have an incentive to retain equity and sell later at a higher price (Loughran & Ritter, 1995; Ritter & Welch, 2002). According to Grinblatt and Hwang (1989), the fraction of equity retained by the selling shareholders is positively related to post-IPO performance. Hence, underperformance is less severe if only a small fraction of equity is sold.

As the above findings show, the incentives to the selling shareholders are central in explaining IPO underperformance. One very special type of selling shareholders is *Venture Capital firms (VCs).* VCs do not only provide access to finance and fulfill advisory functions to the firm, e.g. by serving on the firm's board, they also stay on the board after the firm goes public (Brav & Gompers, 1997) and often retain substantial equity stakes for many periods after the IPO (Morsfield & Tan, 2006; Hochberg, 2012). Holding equity after the IPO gives VCs an incentive to continue fulfilling their advisory and monitoring function. Therefore, venture-backed IPO firms are regularly found to perform better than non-venture-backed firms (Megginson & Weiss, 1991; Brav & Gompers, 1997; Nahata, 2008; Hochberg et al., 2012; Bessler & Seim, 2012; Klein et al., 2016). Furthermore, reputational concerns of the VC firm may explain the superior long-run performance of venture-backed IPOs, since venture capitalists repeatedly bring firms public and therefore do not want to be associated to poorly performing firms (Brav & Gompers, 1997, Tian et al., 2016).

Another party involved in the IPO process is *underwriting investment banks*. The investment bank taking a firm public plays a central role in setting the offer price and allocating shares to investors (Ritter & Welch, 2002). Reputational capital is of crucial importance for investment banks (Carter & Manaster, 1990). Like venture capitalists, underwriters are therefore expected to refrain from taking public poor quality firms. Carter et al. (1998) and Demers and Joos (2007) document that the underperformance of firms taken public by more prestigious underwriters is less severe than the underperformance of those firms taken public by less prestigious investment banks. Hence, prestigious underwriters fulfill a third-party certification function on the quality of issuers in the primary market. Similarly, auditors can also be expected to decline high-risk clients for reputational reasons. Michaely & Shaw (1995) find that long-run performance is positively related to the prestige of the auditor.

Selling shareholders have an interest in selling their equity at prices as high as possible to maximize the proceeds from the IPO. The information asymmetry between themselves and potential investors, along with investors' reliance on the prospectus as their primary source of information, provides a strong incentive and an opportunity to influence the offer price through *accounting policies* (Aharony et al., 1993). Income increasing earnings management in the years preceding the IPO has been found by Aharony et al. (1993), Friedlan (1994), Teoh et al. (1998), Darrough and Rangan (2005), Fan (2007), Shette et al. (2014) and Alhadab et al. (2016), among others. Since earnings management effectively means shifting income from the future to the current period and expense from the current period to the future, earnings inflation is typically followed by poor earnings in subsequent years. Hence, earnings management in the years prior to the IPO may contribute to IPO underperformance. Jain and Kini (1994) find that operating performance (i.e. accounting performance) deteriorates in the years following an IPO. A direct negative association between earnings management and IPO market performance has been documented by Teoh et al. (1998) and DuCharme et al. (2001). Venture capitalists and underwriting investment banks may want to limit IPO-firms' earnings management, in order to preserve their reputation. As Tian et al. (2016) show, failing to monitor their investees' accounting practices can have severe consequences for VC firms. A number of studies has also shown that VC firms have a constraining effect on earnings management (Morsfield & Tan, 2006; Agarwal & Cooper, 2010; Hochberg, 2012; Lee & Masulis, 2011; Wongsunwai, 2013); some evidence in this regard was also found for underwriters (Agarwal & Cooper, 2010; Lee & Masulis, 2011).

Contrary to the above findings, Ball and Shivakumar (2008), Venkataraman et al. (2008) and Cecchini et al. (2012) present evidence that IPO firms were reporting more conservatively than other firms. A possible explanation for such findings may be that conservative accounting allows firms to set up "cookie jar-reserves" which can be dissolved in the years following the IPO to increase earnings and stock price. This idea receives support by Venkataraman et al. (2008), who find some evidence of earnings management in the years *after* the IPO.

2.2. Accounting for income taxes

According to IAS 12 *Accounting for Income Taxes*, deferred tax assets have to be recognized for deductible temporary book-tax differences which are likely to reverse in future periods. Deductible temporary book-tax differences can arise either from: 1) the tax base of an asset being larger than its book value or 2) from the tax base of a liability being smaller than its book value, resulting in a deferred tax benefit. A further source of deferred tax assets can be 3) tax-loss carry-forwards from prior periods which are expected to be usable in future periods (IAS 12.5). However, IAS 12.24 limits the recognition of net deferred tax assets to the extent that taxable income will be available in future periods from which deductible differences or the carry-forwards can be deducted. This means that a forecast of future income has to be made when management decides whether and to which amount a deferred tax asset has to be recognized. When a firm, however, has a history of repeated losses, the availability of future positive income has to be questioned (IAS 12.35). Particularly, NDTA resulting from tax-loss carry-forwards are considered indicative of taxable income being available in future periods (IAS 12.31, 12.35). Therefore, IAS 12.35 requires convincing evidence for the expectation that positive income will be available in the future. NDTA, hence have a forward-looking character and it may be conjectured that the recognition of a net deferred tax asset is predictive of future positive income and the item may be used by management to signal private

information to external parties (Herbohn et al., 2010).

Nevertheless, the accounting treatment of deferred taxes opens wide discretion to management and the estimates of future income are hardly verifiable for capital market participants (Amir & Sougiannis, 1999). Therefore, management might be tempted to arbitrarily optimistic estimates and recognize NDTA though temporary differences or carry-forwards might not be usable in future periods. Furthermore, since the recognition of deferred tax assets is income increasing, an opportunity for earnings management arises. Accordingly, a large number of studies have investigated whether accounting for income taxes is done in an opportunistic manner. It should be noted, however, that most of these studies used data based on US-GAAP and many of them concentrated on the Valuation Allowance, which under SFAS 109 is the amount that the gross DTA is reduced by management estimate to the net amount finally shown on the balance sheet. Whereas Burgstahler et al. (2002), Dhaliwal et al. (2004), Bauman & Das (2004), Frank & Rego (2006), Cook et al. (2008), Lynn et al. (2008), Herbohn et al. (2010), Kasipillai and Mahenthiran (2013) and Gleason et al. (2017) find evidence supportive of firms using the tax accounts for earnings management purposes, Miller & Skinner (1998), Visvanathan (1998), Bauman et al. (2001) and Christensen et al. (2008) fail to do so; Schrand and Wong (2003) and Weber (2009) produce rather inconclusive evidence.

Due to the possible susceptibility of deferred taxes to earnings management, their value relevance has been generally challenged (Sansing, 1998; Guenther and Sansing, 2000). Findings by Beaver and Dukes (1972), Daley (1995), Amir et al. (1997), Ayers (1998), Amir et al. (2001) Kumar and Visvanathan (2003) and Bauman and Shaw (2016) are nevertheless confirmative of the value relevance of deferred taxes. Dhaliwal et al. (2013) find that deferred taxes are informative about future income, Laux (2013) finds that deferred taxes are weakly predictive of future tax payments and Edwards (2018) provides evidence that deferred taxes also show an association with credit ratings. Amir and Sougiannis (1999) however, find that deferred tax assets on carry-forwards cause analysts' earnings forecasts to be less precise and positively biased.

Summarizing the above findings, evidence on whether deferred taxes convey decision-useful information and are value relevant or whether they are opportunistically managed is not entirely unambiguous. All studies cited so far, examined firms reporting under US-GAAP, UK-GAAP or Australian GAAP. The only published study on the value relevance of deferred taxes under IFRS is Chludek (2011). In her study on the value relevance of deferred taxes reported by German firms under IFRS, she finds that investors generally do not consider deferred taxes to convey relevant information, the exception being large NDTA (Chludek, 2011). The reason for this finding may be that NDTA include tax-loss carry-forwards which can be expected to translate into reduced tax payments, whereas deferred tax assets and deferred tax liabilities resulting from temporary differences might be recurring items, i.e. reversing differences being replaced by new differences (Chludek, 2011). Evidence on a positive association between NDTA and future operating performance was presented by Flagmeier (2017).

As the above overview has shown, whether NDTA under IFRS are value relevant or whether they are used for earnings management is largely underexplored. Since there are incentives to manage earnings during an IPO process, the IPO context offers an interesting setting for investigating whether managers use NDTA to signal private information to capital market participants, or whether they exploit their discretion as an opportunity for earnings management.

3. HYPOTHESES

An IPO is a situation in the firm's life-cycle where the incentives for earnings management are particularly strong (Teoh et al., 1998). Selling shareholders may want to justify higher offer prices in order to maximize their proceeds from the IPO. It can hence be expected, that firms take advantage of the discretion offered by accounting for income taxes and manage their earnings by recognizing NDTA without expecting positive income in the near future. On the other hand, according to IAS 12.24, NDTA may only be recognized to the extent that it is probable, that future taxable income will be available. To fulfill this requirement, management has to project future earnings and NDTA are therefore considered to include forward-looking information, which is supported by the value relevance literature (Amir et al., 1997; Amir et al., 2001; Kumar & Visvanathan, 2003; Chludek, 2011). Furthermore, NDTA are balance sheet items and as such are part of audited financial statements. Items reported in the financial statements enjoy higher credibility, possibly because auditors are less lenient with regard to reported information as compared to disclosed information (Schipper, 2007). Hence, it can be expected that the decision to recognize NDTA conveys private information to capital market participants. Hypothesis *H1* is stated as follows:

H1: The amount of NDTA recognized is positively associated with post-IPO long-run performance.

Since there is not much information available on IPO firms, investing in an IPO is a decision taken under uncertainty. This uncertainty is even greater for loss firms, which are generally considered to be more difficult to value (Joos & Plesko, 2005). Nevertheless, Joos and Pleko (2005) report that investors do not consider losses to be homogeneous, but differentiate between temporary and permanent losses. If a firm recognizes NDTA, this may be considered as a signal to investors, that losses will only be temporary, because IAS 12.31 requires firms with a history of losses to provide convincing evidence about the availability of future positive income for recognizing NDTA. Furthermore, NDTA by loss firms can be expected to result partly from tax-loss carry-forwards which were found to translate more timely into cash flows than DTA from deductible differences (Chludek, 2011). Hence, hypothesis *H2* is stated as follows:

H2: The amount of NDTA recognized is more positively associated with post-IPO long-run performance for loss firms.

Opposed to loss firms, firms with a history of strong operating performance (and especially those with smooth earnings) can be valued using their fundamentals. Therefore, NDTA cannot be expected

to convey incremental information for these firms and an association between NDTA and post-IPO performance does not seem likely for firms with strong operating performance. Furthermore, the strong operating performance may justify an offer price as high as desired by the selling shareholders so that firms with strong operating performance may not have any incentive to manage their earnings with NDTA. Hence, hypothesis *H3* is stated as follows:

H3: The amount of NDTA recognized is not associated with post-IPO long-run performance for firms with strong pre-IPO operating performance.

The above hypotheses will be tested using the models presented in the following section, whereby *H1* will be tested by Model 1, *H2* will be tested by Model 2 and *H3* will be tested by Model 3.

4. MODEL AND DATA

4.1. Sample selection

We choose Germany as the setting for this study due to two reasons. First of all, the only published study that investigates the value relevance of deferred taxes under IFRS (Chludek, 2011) uses a sample of firms listed in Germany. By choosing Germany as our research setting, we can assure that our results will be interpretable in light of prior research. Furthermore, Germany is a country with a particularly restrictive attitude towards the recognition of deferred tax assets (Flagmeier, 2017). Accordingly, choosing Germany as the setting for our study assures that our estimates will be conservative in nature. We obtain a list of IPOs from the primary market statistics on the website of Deutsche Börse. The initial sample encompasses 207 firms that went public in 2005-2015. We restricted the sample period to these years for the following reasons: Regulation (EC) No. 1606/2002 mandates the application of IFRS for the consolidated accounts of firms listed on stock exchanges in the European Union for fiscal years beginning on or after January 1st 2005. In the time before applying IFRS became mandatory, listed firms were still allowed to use local GAAP, which was widely done. Therefore, we have to restrict the sample to firms going public in 2005 and later. Calculating long-run performance requires 36 months of stock price data being available. Hence, the sample period has to end in 2015. Because long-run performance varies across years with performance being worse for firms having issued in high-volume years (Loughran & Ritter, 1995), it is important to have a long sample period comprising at least one full IPO-cycle. By setting the time-frame 2005-2015, we include the bull markets of 2005-2006, the financial crisis of 2007-2009 and the years of recovery 2010-2015.

We obtain the prospectuses of the firms. For 12 firms, the prospectus cannot be found, which therefore have to be dropped from the sample. We exclude all financial and real estate firms from the sample (SIC codes 6000-6999), which reduces the sample by 33 firms. We inspect the prospectuses of the remaining firms and find, that 53 firms applied German GAAP in the financial statements that are in the prospectuses. Doing so was permissible because the firms were still private at the time the financial statements were prepared. Because accounting for income taxes strongly differs between IFRS and German GAAP (Chludek, 2011; Flagmeier, 2017) those firms have to be excluded. Further 29 firms have to be dropped because data to calculate variables are missing, which is either missing stock return data or insufficient data to calculate discretionary accruals. This procedure results in a final sample of 80 firms. Table 1 gives an overview of the sample selection process.

Table 1. Sample selection process

Initial sample	207
Prospectus not available	-12
Financial and real estate firms	-33
No IFRS	-53
Missing data	-29
Final sample	80

Our final sample is small compared to the samples of U.S. studies. This, however, is owed to the small size of the equity capital market in Germany and that "continental Europe's IPO market has been dwarfed by the US IPO market" (Ritter, 2003). Though being small in absolute terms, the sample covers a substantial fraction of the German primary market.

4.2. Model 1

4.2.1. Dependent variable: IPO long-run performance

The dependent variable in this study is *post-IPO long-run performance*. Extant studies use a variety of different metrics to measure the long-run performance of IPO firms because estimates of long-run underperformance are sensitive to the choice of econometric methodology (Ritter & Welch, 2002). Following the literature, we use three alternative metrics that are common in IPO research, namely *abnormal buy-and-hold returns (ABHR)*, the *wealth relative (WR)* and *cumulative abnormal returns (CAR)*.

Abnormal buy-and-hold returns compare the return of buying and holding a specific firm to buying and holding a broad market portfolio as a benchmark over the same period. Abnormal buy-and-hold returns are calculated as follows:

$$ABHR_{iT} = \left(\Pi_{t=1}^{T}(1 + R_{it})\right) - \left(\Pi_{t=1}^{T}(1 + R_{Mt})\right) \quad (1)$$

whereby R_{it} stands for the return of IPO-firm i in period t and R_{Mt} stands for the return of the market M in period t. The return can either be measured on a daily, weekly or monthly basis. In this study, we use the monthly stock return. *ABHR* are typically calculated over a total period of 36 months, like we also do in this study. Following Loughran and Ritter (1995), the measures of performance begin with the first complete month of available stock returns and thus do not include the partial first month in which the firm went public. Thereby, we can make sure that first-day returns are not included in our measures of long-run performance.[2]

The wealth relative (*WR*) proposed by Ritter

[2] First-day returns should not be included in measuring long-run performance because they reflect the phenomenon of IPO underpricing. Including first-day returns therefore would result in a distorted measurement of long-run performance. Empirically, there is no reliable relationship between IPO underpricing and IPO underperformance (Ritter & Welch, 2002). Discussing IPO underpricing in detail is beyond the scope of this study.

(1991) and used in subsequent studies (Brav & Gompers, 1997; Dang & Jolly, 2017) is closely related to *ABHR* but it is a more easily interpretable measure. Intuitively, the wealth relative calculates the ratio of the buy-and-hold return of investing in an IPO firm to the buy-and-hold return of investing in non-IPO firms (the benchmark) over the same period. The wealth relative is calculated as follows:

$$WR_{iT} = \frac{1 + R_{iT}}{1 + R_{MT}} \quad (2)$$

When the wealth relative of a specific IPO firm takes on values of greater than 1.00, the firm outperformed the benchmark, whereas values of smaller than 1.00 indicate that the firm underperformed (Ritter, 1991).

The third metric to estimate the performance of IPO firms relative to the market is cumulative abnormal returns (*CAR*). Hereby, the abnormal return is first calculated on a per-period basis (i.e. per month) and then summed up over the total period of 36 months. The cumulative abnormal return for firm i is calculated as follows:

$$CAR_{iT} = \sum_{t=1}^{T} R_{iT} - R_{Mt} \quad (3)$$

Opposed to *ABHR* and *WR* which compound the returns, *CAR* does not compound them and therefore takes the volatility of returns into account (Barber & Lyon, 1997).

Estimating *ABHR*, *WR* and *CAR* requires a benchmark for normal returns. We use several indices as benchmark performance: DAX, MDAX, SDAX, and CDAX which results in twelve model specifications. We chose to use these indices as reference markets for the following reasons: DAX, which represents the 30 firms with the highest market capitalization in Germany, is the most visible index in financial media and will, therefore, serve as a benchmark for many investors, especially for the less sophisticated ones. However, since newly public firms are usually small in size (Ritter & Welch, 2002), DAX might be a rather inappropriate benchmark. We, therefore, also use MDAX and SDAX, representing respectively 60 midcaps and 70 smallcaps that should be more comparable to IPO firms. We further use CDAX which encompasses all firms listed in Frankfurt and hence covers almost the complete German stock market. The number of firms included in CDAX fluctuates over the sample period around 400 firms. It should be noted, however, that CDAX also includes the IPO firms and therefore the performance measures using CDAX as the benchmark might be slightly biased towards the performance of the IPO firms. However, this is a regular problem throughout the IPO literature. Stock price data are drawn from Thomson Reuters Datastream.

4.2.2. Independent and control variables

The *independent* variable used in this study is NDTA as recognized in the balance sheet. To take different firm sizes into account, we use the natural logarithm of NDTA in our analyses. We *control* for variables which have been found by prior research to affect long-run IPO performance. The first control variable that we use in this study is *return on assets (ROA),* to capture the IPO firms' past operating performance. Fundamental data can be found in the prospectus, which, for many investors is likely the most cost-efficient means of obtaining information about an IPO (Friedlan, 1994). According to Brau and Fawcett (2006), who surveyed 336 chief financial officers on IPO practice, historical earnings are among the most important positive signals. We, therefore, expect a positive association between ROA and long-run performance.

Earnings, however, can be managed upward in order to improve figures like *ROA*. As outlined above, IPO firms are faced with the suspicion of earnings management. A number of studies has concluded that IPO firms' accruals are inflated (Aharony et al., 1993; Friedlan, 1994; Teoh et al., 1998; Darrough & Rangan, 2005; Fan, 2007; Shette et al., 2014; Alhadab et al., 2016), whereas others find that IPO firms report more conservatively (Ball & Shivakumar, 2008; Cecchini et al., 2012). Furthermore, a negative association between earnings management and long-run performance has been documented (Teoh et al., 1998; DuCharme et al., 2001). We, therefore, include *discretionary accruals (DiscAcc)* as a control variable. Discretionary accruals are estimated using the modified cross-sectional Jones model (Dechow et al., 1995) because this model requires only two years of consecutive data, which is usually fulfilled by the offering prospectus. We estimate discretionary accruals across the whole sample and not per year and industry as in Dechow et al. (1995), because the number of observations is insufficient for doing so. Financial statement data on deferred tax assets, earnings and accruals are collected manually from the prospectuses.

Following prior research (Guo et al., 2006; Demers & Joos, 2007), we include the natural logarithm of proceeds from the IPO (including greenshoe) to control for *issue size (ISSUE).* Controlling for issue size may be necessary, because some studies like Ritter (1991), Loughran and Ritter (1995) or Klein et al. (2016) report that underperformance is more severe for small issues. However, other studies do not find such an association (Bessler & Thies, 2007). A reason to believe that larger issues were performing better than smaller ones might be more information being available on large issues, e.g. due to higher media coverage. The amount of proceeds raised in the IPOs is taken from the primary market statistics published on the website of Deutsche Börse.

Underwriters (i.e. investment banks bringing firms public) are considered to have a certification function with regard to the quality of IPOs. Because prestigious underwriters have a reputation to lose and therefore do not want to be associated with poorly performing IPOs, more reputable investment banks will likely refrain from taking low-quality firms public. To measure *underwriter reputation (UNDWR),* we use the proceeds-adjusted reputation score from the European Underwriter ranking by Migliorati and Vismara (2014). We do not use the Carter-Manaster scores (Carter & Manaster 1990) used in U.S.-based studies since their scores are not available for most European investment banks and the reputation of a specific underwriter may vary across different markets (Migliorati & Vismara, 2014). When firms are taken public by a syndicate, we use the score of the firm with the highest reputation.

Venture capital funding has been consistently documented to have a strong positive effect on long-run performance (Megginson & Weiss, 1991; Brav & Gompers, 1997; Nahata, 2008; Hochberg et al., 2012; Bessler & Seim, 2012; Klein et al., 2016). Hence, we include a binary variable *venture capital (VC)* set for one if there is at least one venture capital or private equity firm among the selling shareholders. Adapting the method used by Bessler and Seim (2012), selling shareholders are considered to be venture capital or private equity firms if they are members of either the European or national venture capital and private equity association or if they state to be venture capital or private equity firms on their websites. Information on the underwriters and on selling shareholders is manually collected from the prospectuses.

We also control for *firm age (AGE)*, because it can be expected that more information is available on older firms. Furthermore, the risk that IPOs may be timed opportunistically (cf. Section 2) should be less distinct among older firms, which is reinforced by Loughran and Ritter (1995), who show a positive association between post-IPO performance and firm age. We obtain data on the IPO firms' history from the prospectuses and calculate firm age as the number of years between the first incorporation of the firm and the year of going public, as described in Loughran and Ritter (2004). In case the firm reincorporated right before the IPO or used a shelf corporation, the founding date of the predecessor is used (Carpentier et al., 2017).

We also include year and industry dummies, because primary markets are highly cyclical with "hot" and "cold" years, resulting in substantial variation in performance year-to-year and across industries, whereby firms going public in high-volume years are performing worse (Ritter, 1991; Loughran & Ritter, 1995). Due to the small sample size (see further below), we use one-digit SIC codes for constructing the industry dummies. Calculation of the variables and data sources are presented in Table 2.

Table 2. Variable definitions and data sources

Variables (Abbreviation)	*Definition*	*Source of data*
Abnormal Buy-and-Returns (ABHR)	see Equation (1)	Thomson Reuters Datastream
Wealth Relative (WR)	see Equation (2)	Thomson Reuters Datastream
Cumulative Abnormal Returns (CAR)	see Equation (3)	Thomson Reuters Datastream
Net Deferred Tax Assets (log_NDTA)	log(Net Deferred Tax Assets)	Offering prospectuses
Return on Assets (ROA)	Net Income / Total Assets	Offering prospectuses
Large Loss (LLOSS)	Binary variable =1 if a firm is in the lowest quartile of ROA	Offering prospectuses
Stong operating performance (STRONGOP)	Binary variable =1 if a firm is in the highest quartile of ROA	Offering prospectuses
Discretionary Accruals (DiscAcc)	Modified Jones Model per Dechow et al. (1995)	Offering prospectuses
Issue size (ISSUE)	Log(Proceeds from IPO, incl. Greenshoe)	Deutsche Börse Primary Market Statistics
Underwriter reputation	Proceeds-adjusted score per Migliorati & Vismara (2014)	Deutsche Börse Primary Market Statistics, Appendix of Migliorati & Vismara (2014)
Venture Capital financing (VC)	Binary variable =1 if VC firm among selling shareholders	Offering prospectuses
Firm age (AGE)	Age in years	Offering prospectuses
Year (YEAR)	Year of IPO	Deutsche Börse Primary Market Statistics
Industry (IND)	One-digit SIC-Code	Thomson Reuters Datastream

In order to check *H1*, we estimate the following Model 1, using pooled OLS with standard errors clustered by year.

$$PERF = \beta_0 + \beta_1 NDTA + \beta_2 ROA + \beta_3 DiscAcc + \beta_4 ISSUE + \beta_5 UNDWR + \beta_6 VC + \beta_7 AGE + \beta_8 YEAR + \beta_9 IND + \varepsilon \quad (4)$$

Hereby, the dependent variable *PERF* is either *ABHR*, *WR* or *CAR* calculated based on DAX, SDAX, MDAX or CDAX. Results are presented in Section 5.2.

4.3. Model 2

Loss firms make up a substantial part of firms going public and are particularly hard to value. Carpentier et al. (2017) show that investors regularly overvalue loss firms as a result of irrational sentiment. Temporarily, loss firms tend to receive even higher valuations than profit firms (Darrough & Ye, 2007; Joos & Zhdanov, 2008). Their survival rates, however, are low (Demers & Joos, 2007; Carpentier & Suret, 2011), which makes identifying the (probably many) lemons among loss IPO firms an important task. Given *H2*, we add an *indicator variable* for firms with *large losses (LLOSS)* and an interaction term between the variable for NDTA and large losses (NDTA×LLOSS). The indicator variable LLOSS is set for one if the firm is in the lowest quartile of return on assets. Model 2 is estimated as follows:

$$PERF = \beta_0 + \beta_1 NDTA + \beta_2 LLOSS + \beta_3 DTA \times LLOSS + \beta_4 DiscAcc + \beta_5 ISSUE + \beta_6 UNDWR + \beta_7 VC + \beta_8 AGE + \beta_9 YEAR + \beta_{10} IND + \varepsilon \quad (5)$$

Variable definitions remain unchanged. Results are presented in Section 5.3.

4.4. Model 3

Practitioners consider pre-IPO operating performance to be a particularly strong signal for IPO firm quality (Brau & Fawcett, 2006). When firms have strong pre-IPO operating performance, the availability of future positive income and continuing strong performance is less questionable than for loss firms. Hence, it can be expected that deferred tax assets do not convey incremental information additional to other fundamentals for firms with strong pre-IPO operating performance (see *H3*). To

test hypothesis 3, we modify Model 2 by replacing the indicator variable for large losses (LLOSS) with an *indicator variable* for *strong pre-IPO operating performance (STRONGOP)* and an interaction term between the variable for deferred tax assets and strong operating performance (NDTA×STRONGOP). The indicator variable STRONGOP is set for one if the firm is in the highest quartile of return on assets. Model 3 is estimated as follows:

$$PERF = \beta_0 + \beta_1 NDTA + \beta_2 STRONGOP + \beta_3 DTA \times STRONGOP + \beta_4 DiscAcc + \beta_5 ISSUE + \beta_6 UNDWR + \beta_7 VC + \beta_8 AGE + \beta_9 YEAR + \beta_{10} IND + \varepsilon \quad (6)$$

Variable definitions remain unchanged. Results are presented in Section 5.4.

5. RESULTS

5.1. Descriptive statistics

Table 3 presents equally weighted descriptive statistics on the measures for long-run performance. Mean and median values for *ABHR* and *CAR* based on all four benchmarks are negative and the mean and median values for the WR are smaller than one, indicating that IPO firms did severely underperform. The *WR* shows similar values as reported in other studies using this metric (Ritter, 1991; Loughran & Ritter, 1995; Brav & Gompers, 1997). To some extent, the underperformance depends on the benchmark index used. IPO firms underperformed more severely compared to DAX and MDAX and less severely, compared to CDAX and SDAX. The reason for this pattern may be that IPO firms themselves are included in CDAX and some may (at least temporarily) have been included in SDAX, which depresses the performance of these indices somewhat towards the performance of the IPO firms. Minimum and maximum values of the stock price performance variables show that some firms' stock price fell close to zero, but that there also are firms in the sample whose stock price more than tripled.

Table 3. Summary statistics on measures for long-run underperformance

Variable	*n*	*Mean*	*S.D.*	*Min*	*0.25*	*Mdn*	*0.75*	*Max*
ABHR_cdax	80	-0.1946	0.9109	-1.809	-0.6955	-0.3598	0.1552	3.3756
ABHR_dax	80	-0.1858	0.9096	-1.7852	-0.7198	-0.3704	0.1816	3.3566
ABHR_mdax	80	-0.2451	0.929	-1.9133	-0.6767	-0.3623	0.1593	3.443
ABHR_sdax	80	-0.0987	0.9086	-1.6774	-0.5338	-0.1739	0.2027	3.597
CAR_cdax	80	-0.1921	0.9681	-2.8649	-0.6494	-0.1767	0.3613	1.9094
CAR_dax	80	-0.2857	0.964	-2.8838	-0.7811	-0.2814	0.2597	1.7792
CAR_mdax	80	-0.3236	0.9765	-2.9971	-0.8157	-0.3111	0.2864	1.8273
CAR_sdax	80	-0.1498	0.988	-2.9272	-0.5802	-0.0755	0.4709	2.1238
WR_cdax	80	0.9321	0.919	0.0043	0.2942	0.6735	1.2208	5.5629
WR_dax	80	0.8519	0.8362	0.0042	0.257	0.6105	1.1669	4.886
WR_mdax	80	0.8364	0.8559	0.0038	0.2573	0.5848	1.1429	5.429
WR_sdax	80	0.9861	1.0436	0.0041	0.3227	0.7075	1.2284	6.7701
WR_sdax	80	0.9861	1.0436	0.0041	0.3227	0.7075	1.2284	6.7701

Note: This table shows long-run underperformance of the 80 IPO-firms relative to the indexes CDAX, DAX, MDAX, and SDAX. ABHR, CAR, and WR stand for "abnormal buy-and-hold return", "cumulative abnormal return" and "wealth relative", respectively. For definitions see Sub-section 4.2.1.

Table 4 presents descriptive statistics on the sample firms. All variables are winsorized at one percentage. NDTA were on average 3.0% of the firms' total assets. Some firms did not report NDTA at all, whereas the maximum value is 37.3%. To contain the influence of these extreme observations, the natural logarithm is used for NDTA. Mean and median ROA are both close to zero, indicating that firms were having poor operating performance before going public. Some firms were suffering from extreme losses. Mean and median discretionary accruals are negative which seems rather counterintuitive at first glance. However, some studies reported that IPO firms were reporting conservatively pre-IPO (Ball & Shivakumar, 2008; Venkataraman et al., 2008; Cecchini et al., 2012). Furthermore, German firms are considered to report rather conservatively under IFRS (Van Tendeloo & Vanstraelen, 2005). This may be attributed to the finding by Kvaal and Nobes (2012) that traditional national accounting practices, like the prudence principle that dominates German GAAP, tend to persist, also when firms apply IFRS.

Table 4. Summary statistics on IPO firms

Variable	*n*	*Mean*	*S.D.*	*Min.*	*0.25*	*Median*	*0.75*	*Max.*
NDTA_t_sc	80	0.0305	0.0675	0	0	0.0071	0.0275	0.3732
log_NDTA_t	80	5.9606	4.1505	0	1.4452	6.8308	9.2575	13.0281
ROA	80	-0.0066	0.5064	-4.1315	-0.0122	0.0507	0.1184	0.477
DiscAcc	80	-1.5384	0.2857	-2.4208	-1.6556	-1.4576	-1.2889	-1.2152
Issue size (€)	80	280,000,000	360,000,000	72,000	41,000,000	150,000,000	370,000,000	1,500,000,000
ISSUE	80	18.4807	1.7359	11.1826	17.5214	18.8077	19.7192	21.1287
UNDWR	80	0.4347	0.4157	0.0000	0.0180	0.2940	0.8910	1.0000
VC	80	0.325	0.4713	0	0	0	1	1
AGE	80	34.4875	39.3733	0	8	17	47.5	168
Firm size (Total assets (€))	80	1,219,692,000	2,633,993,000	343,000	30,407,000	136,723,000	1,035,745,000	13,015,348,000

Note: This table shows summary statistics on various characteristics of the sample firms. Variables NDTA_t_sc, Issue size, and Firm size are reported for informative purposes, only.

Issue size was ranging between a minimum of 72,000 Euros to a maximum of 2,012,200,000 Euros in proceeds from the IPO; on average roughly 325 million Euros were raised. Due to the high spread, we use the natural logarithm (denoted ISSUE). Underwriter prestige, ranging from zero to one is slightly skewed to the right as can be seen by the full upper quartile of firms being taken public by the most prestigious underwriters. Roughly 35% of the firms received venture capital funding. The average firm has an age of 32 years when going public; the median age was 16 years. This is consistent with the statement made by Ritter (2003) that European IPO firms' age is much higher than American IPO firms' age, whose median age is around seven years (Ritter, 2003; Ljungqvist & Wilhelm, 2003). Finally, Table 4 presents the size of the sample firms, given in total assets. Firm size ranges from as small as 343,000 € up to 13,015,348,000 €; the mean firm size being 1,219,692,000 € and the median being 136,723,000 €. Note, that these values are not winsorized as they do not enter into the multivariate models but are reported here to give a more complete picture of the sample. As it is common in the IPO literature, issue size, i. e. the amount of money raised in the IPO (see above) is used to account for different firm sizes. Table 5 presents the industry distribution of sample firms.

Table 5. Sample firms per sector

	n	***Percentage***
Mining and Construction	5	6.25%
Manufacturing	38	47.50%
Transportation, Communication, Utilities	8	10.00%
Wholesale and Retail Trade	11	13.75%
Services	18	22.50%
Total	80	

About half (47.5%) of the 80 IPO firms are from the manufacturing sector, which is reflective of the importance of manufacturing to the German economy. The remaining half is composed of firms from the Services sector (22.5%), Trade (13.75%), and Transportation, Communication and Utilities (10.0%), whereas Mining and Construction (6.25%) are of only minor significance.

Table 6. Pearson correlations

	log_NDTA	***ROA***	***DiscAcc***	***ISSUE***	***UNDWR***	***VC***	***AGE***
log_NDTA_t	1.0000						
ROA	0.1513	1.0000					
	(0.1803)						
DiscAcc	-0.1498	-0.0001	1.0000				
	(0.1849)	(0.9992)					
ISSUE	0.4247	-0.0315	-0.3071	1.0000			
	(0.0001)	(0.7818)	(0.0056)				
UNDWR	0.2216	-0.0039	-0.2532	0.5545	1.0000		
	(0.0482)	(0.9724)	(0.0234)	(0.0000)			
VC	-0.2478	-0.2707	0.2576	0.1133	0.2116	1.0000	
	(0.0267)	(0.0152)	(0.0211)	(0.3171)	(0.0595)		
AGE	0.5037	0.0568	-0.3025	0.3778	0.3038	-0.0844	1.0000
	(0.0000)	(0.6170)	(0.0064)	(0.0005)	(0.0062)	(0.4569)	

Note: This table shows Pearson correlation coefficients for independent variables entering the regressions. P-values are given in parentheses.

Table 6 presents Pearson correlations on the independent variables. It is noteworthy that NDTA are negatively correlated with discretionary accruals, which provides preliminary evidence that recognizing NDTA is not associated with earnings management. NDTA are positively correlated with AGE, which can be explained by future earnings being estimated more reliably when there is a longer history of accounting data. Among the variables, it is noteworthy that discretionary accruals are negatively correlated with UNDWR, which reinforces that underwriters fulfill an external certification function (Carter et al., 1998). To assure that there is no multicollinearity involved, we calculate variance inflation factors (VIF). VIFs are below three for all of the above variables, so that there is no concern about multicollinearity.

5.2. Multivariate statistics – Model 1

Table 7 shows the multivariate results for Model 1. In specifications 1 through 12, the coefficients of log_NDTA are positive and statistically significant, which means that recognized NDTA are strongly predictive of superior post-IPO long-run performance. The coefficients across all specifications range between approximately 0.06 and 0.08 which can also be considered economically significant. Hence, *H1* is confirmed.

ROA is also positively associated with long-run performance, however, only in specifications with ABHR and WR as the dependent variable. In specifications using CAR as the dependent variable, ROA remains slightly insignificant. This can be explained by ROA being a performance indicator that is calculated on an annual, i.e. long-run basis, whereas CAR take short-term fluctuations into account which will likely not be associated to annual figures like ROA. Discretionary accruals are negatively associated with long-run performance, consistent with findings by Teoh et al. (1998) and DuCharme et al. (2001). The issue size is apparently unrelated to long-run performance, as is underwriter prestige. As can be seen in Table 3, a substantial proportion of firms is taken public by the most prestigious underwriters. Hence, there is only a limited variation in this variable. Furthermore, the underwriter rankings by Migliorati and Vismara (2014) basically measure market share and therefore it might be that those investment banks that received higher scores were not very picky in selecting firms to take public. As expected, venture capital funding is positively associated with long-run performance, however only weakly significant, consistent with Elston and Yang (2010), who report a comparatively weak role for venture capitalists in Germany. The coefficients on firm age do not show any association with long-run performance.

Table 7. Regression results for Model 1

	Abnormal buy-and-hold returns (ABHR)				*Cumulative abnormal returns (CAR)*				*Wealth relative (WR)*			
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
	CDAX	***DAX***	***SDAX***	***MDAX***	***CDAX***	***DAX***	***SDAX***	***MDAX***	***CDAX***	***DAX***	***SDAX***	***MDAX***
log_NDTA_t	0.0756**	0.0752**	0.0798**	0.0782**	0.0757***	0.0753***	0.0781***	0.0774***	0.0759*	0.0686*	0.0860*	0.0725*
	(0.021)	(0.021)	(0.013)	(0.019)	(0.009)	(0.008)	(0.009)	(0.008)	(0.059)	(0.053)	(0.091)	(0.070)
ROA	0.181**	0.178**	0.186**	0.201**	0.209	0.204	0.232*	0.238*	0.199*	0.180*	0.265*	0.210*
	(0.024)	(0.026)	(0.021)	(0.014)	(0.149)	(0.156)	(0.095)	(0.099)	(0.066)	(0.065)	(0.067)	(0.053)
DiscAcc	-0.616*	-0.618*	-0.553	-0.617*	-0.765**	-0.760**	-0.726**	-0.761**	-0.526	-0.490	-0.512*	-0.475*
	(0.076)	(0.074)	(0.123)	(0.076)	(0.018)	(0.019)	(0.021)	(0.018)	(0.106)	(0.115)	(0.077)	(0.072)
ISSUE	0.0126	0.0144	-0.00316	0.00614	0.0797	0.0811	0.0726	0.0781	-0.0180	-0.00869	-0.0571	-0.0303
	(0.868)	(0.849)	(0.967)	(0.936)	(0.456)	(0.450)	(0.486)	(0.457)	(0.843)	(0.916)	(0.585)	(0.722)
UNDWR	-0.201	-0.204	-0.128	-0.184	-0.121	-0.125	-0.0754	-0.110	-0.154	-0.151	-0.0768	-0.103
	(0.485)	(0.474)	(0.679)	(0.546)	(0.706)	(0.697)	(0.812)	(0.726)	(0.515)	(0.499)	(0.763)	(0.632)
VC	0.634**	0.635**	0.619*	0.629*	0.630*	0.635*	0.608*	0.627*	0.662**	0.609**	0.688**	0.585**
	(0.050)	(0.049)	(0.052)	(0.054)	(0.061)	(0.058)	(0.069)	(0.062)	(0.021)	(0.021)	(0.028)	(0.024)
AGE	-0.000	-0.000	-0.000	-0.000	-0.001	-0.001	-0.001	-0.001	-0.000	-0.000	-0.000	-0.000
	(0.880)	(0.886)	(0.836)	(0.805)	(0.666)	(0.680)	(0.604)	(0.583)	(0.976)	(0.957)	(0.841)	(0.744)
_cons	-2.312	-2.354	-1.726	-2.185	-3.453*	-3.559*	-3.119*	-3.476*	-0.516	-0.619	0.366	-0.119
	(0.118)	(0.112)	(0.248)	(0.141)	(0.075)	(0.069)	(0.100)	(0.071)	(0.733)	(0.660)	(0.809)	(0.928)
Year	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Industry	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
N	80	80	80	80	80	80	80	80	80	80	80	80
R-sq	0.411	0.412	0.403	0.425	0.477	0.476	0.494	0.491	0.303	0.315	0.265	0.282

*Note: This table shows the results for pooled OLS-regressions for Model 1. P-values are given in parentheses. ***, **, * are significance levels at 1, 5 and 10 percent, respectively.*

5.3. Multivariate statistics – Model 2

Table 8 shows multivariate results for Model 2 that uses an interaction term between log_NDTA and LLOSS, an indicator variable for large losses. Here, the coefficients for log_NDTA and LLOSS have the expected signs, but remain insignificant, which implies that deferred tax assets are not predictive of future performance for those firms that are not in the large loss category. The indicator variable LLOSS itself is also insignificant. Large losses not being predictive of future performance is nevertheless not a surprising result, because losses reduce the ability of reported earnings to provide information about the earning power of a firm's asset (Joos & Plesko, 2005). Furthermore, according to Joos and Plesko (2005), investors do not consider losses to be homogenous so that there is no clear association to future stock prices. The interaction term between large losses and recognized deferred tax assets, however, is positive and highly significant, with coefficients between 0.10 and 0.12 which shows that the effect is substantially stronger than in Model 1. Hence, deferred tax assets are particularly predictive of post-IPO long-run performance for firms with large losses. *H2* can thus be confirmed.

5.4. Multivariate statistics – Model 3

Table 9 shows multivariate results for Model 3 which uses an interaction term between log_NDTA and STRONGOP, an indicator variable for strong operating performance. Whereas log_NDTA is positive and significant, both STRONGOP and the interaction term are insignificant. Since we control for discretionary accruals, which show the expected negative association with long-run performance, the insignificance of STRONGOP might be seen as an indication for earnings management by at least some of those firms. The interaction term being insignificant shows that NDTA do not convey incremental information about future stock prices for firms with strong operating performance. Hence, *H3* is confirmed.

6. DISCUSSION

The above analyses provide evidence that NDTA recognized under IFRS in the year prior to an IPO are predictive of future stock price performance. Thus, it can be concluded that NDTA convey decision-useful information to investors. Our results add to prior studies that were largely confirmative of deferred taxes being value relevant (Amir et al., 1997; Amir et al., 2001; Kumar & Visvanathan, 2003). However, to the best of our knowledge, the only study on the value relevance of deferred taxes under IFRS is Chludek (2011), who finds that investors generally do not consider deferred taxes under IFRS to be value relevant, the only exception being large NDTA. Thus, our result that NDTA are predictive of future stock price performance is in line with the evidence presented by Chludek (2011). Results are comparable in the regard that Chludek (2011) also used a sample of German public firms.

Our study is different from prior studies because we examine the value relevance of deferred taxes in the context of IPO. The IPO context provides a particularly interesting setting for the study of the decision-usefulness of accounting information, because moral hazard problems may be a serious issue at the time of an IPO (Hochberg, 2012). The IPO process brings incentives and opportunity for issuers to manage earnings in order to justify higher offer prices, which can also be done by inflating NDTA. Since NDTA are considered to include forward-looking information on future income (Dhaliwal et al., 2013; Flagmeier, 2017), these items provide opportunities for signaling, but also for earnings management (Herbohn et al., 2010). Our findings tie together the strand of literature on earnings management with tax accounts and earnings management around IPOs and suggest that managers of IPO firms do not use undue discretion in recognizing NDTA, but that these accounting figures send a credible signal to investors about future performance.

These findings are relevant for IPO investors because a large and growing fraction of IPO is loss firms (Carpentier et al., 2017). Loss firms are particularly difficult to value because losses reduce the ability of reported earnings to provide information about the earnings power of a firm's assets (Joos & Plesko, 2005). In this study, we find that NDTA recognized in accordance with IAS 12 are strongly predictive of the future performance of firms incurring large losses in the year before going public, but not of firms with high positive earnings. This result is in line with Joos and Pleko (2005), who report that investors do not consider losses to be homogeneous but differentiate between temporary and permanent losses. Recognized NDTA signal that losses will be temporary so that investors place a higher valuation on the loss firm with a deferred tax asset on its balance sheet.

7. LIMITATIONS

This study is subject to several limitations. First of all, the sample size is relatively small compared to studies on IPOs in North America which often include more than a thousand observations. This shortcoming is owed to the size of the primary market under investigation. To overcome this limitation, a multinational sample of IPOs from countries using IFRS would be desirable. However, this path was not taken, since manually collecting data from the offering prospectuses is a highly time-consuming endeavor.

A further limitation lies in the measurement of IPO underperformance. On the one hand, measuring IPO underperformance by comparing the performance of IPO firms to the performance of an index implies portfolio rebalancing, whereby firms with poor performance are dropped from the portfolio and replaced by better-performing ones. This may result in slightly overstating IPO underperformance. On the other hand, comparing the performance of IPO firms to a broad index (like CDAX) which includes the IPO firms themselves, may slightly understate underperformance, since the index performance may be negatively affected by the presence of the IPO firms. Due to these two issues, it would be more accurate to compare IPO firms to all non-IPO firms. Nevertheless, the two issues described above work in opposite directions and the composition of the indices chosen in this study is quite stable, so that the issues attached to the measurement should be negligible in this context.

Table 8. Regression results for Model 2

	Abnormal buy-and-hold returns (ABHR)				*Cumulative abnormal returns (CAR)*				*Wealth relative (WR)*			
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
	CDAX	***DAX***	***SDAX***	***MDAX***	***CDAX***	***DAX***	***SDAX***	***MDAX***	***CDAX***	***DAX***	***SDAX***	***MDAX***
log_NDTA_t	0.0460	0.0458	0.0481	0.0475	0.0457*	0.0455*	0.0459	0.0462*	0.0458	0.0400	0.0567	0.0449
	(0.130)	(0.128)	(0.131)	(0.140)	(0.088)	(0.087)	(0.103)	(0.089)	(0.179)	(0.189)	(0.186)	(0.178)
LLOSS	-0.116	-0.109	-0.163	-0.145	-0.358	-0.355	-0.407	-0.397	-0.0733	-0.0870	-0.0536	-0.0849
	(0.796)	(0.808)	(0.719)	(0.746)	(0.350)	(0.354)	(0.283)	(0.297)	(0.884)	(0.848)	(0.923)	(0.851)
LLOSS × log_NDTA_t	0.115**	0.114**	0.121**	0.118**	0.104**	0.103**	0.110**	0.107**	0.120***	0.112***	0.120***	0.110***
	(0.017)	(0.017)	(0.018)	(0.016)	(0.035)	(0.035)	(0.029)	(0.030)	(0.007)	(0.010)	(0.003)	(0.004)
DiscAcc	-0.405	-0.407	-0.337	-0.403	-0.610*	-0.606*	-0.565*	-0.604*	-0.297	-0.279	-0.276	-0.266
	(0.257)	(0.251)	(0.356)	(0.267)	(0.081)	(0.081)	(0.100)	(0.085)	(0.384)	(0.377)	(0.422)	(0.364)
ISSUE	0.0459	0.0476	0.0326	0.0400	0.110	0.112	0.105	0.109	0.0158	0.0235	-0.0267	-0.000545
	(0.608)	(0.593)	(0.723)	(0.664)	(0.349)	(0.344)	(0.370)	(0.353)	(0.866)	(0.785)	(0.793)	(0.995)
UNDWR	-0.140	-0.143	-0.0581	-0.115	-0.0253	-0.0304	0.0312	-0.00462	-0.0953	-0.0941	-0.0141	-0.0435
	(0.576)	(0.559)	(0.830)	(0.662)	(0.928)	(0.913)	(0.912)	(0.987)	(0.634)	(0.615)	(0.952)	(0.816)
VC	0.334	0.335	0.315	0.323	0.416	0.424	0.386	0.409	0.333	0.307	0.337	0.281
	(0.261)	(0.259)	(0.279)	(0.282)	(0.197)	(0.187)	(0.227)	(0.207)	(0.198)	(0.205)	(0.214)	(0.211)
AGE	-0.0013	-0.0013	-0.0015	-0.0016	-0.0017	-0.0016	-0.0019	-0.0020	-0.0012	-0.0011	-0.0016	-0.0015
	(0.567)	(0.569)	(0.540)	(0.516)	(0.334)	(0.339)	(0.288)	(0.267)	(0.543)	(0.534)	(0.463)	(0.395)
_cons	-2.299	-2.340	-1.740	-2.170	-3.535*	-3.643*	-3.209*	-3.552*	-0.465	-0.588	0.498	-0.0528
	(0.132)	(0.124)	(0.254)	(0.157)	(0.074)	(0.068)	(0.098)	(0.072)	(0.748)	(0.665)	(0.728)	(0.967)
Year	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Industry	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
N	80	80	80	80	80	80	80	80	80	80	80	80
R-sq	0.482	0.483	0.476	0.493	0.505	0.505	0.523	0.518	0.385	0.400	0.328	0.357

*Note: This table shows results for pooled OLS-regressions for Model 2. P-values are given in parentheses. ***, **, * are significance levels at 1, 5 and 10 percent, respectively.*

Table 9. Regression results for Model 3

	Abnormal buy-and-hold returns (ABHR)				*Cumulative abnormal returns (CAR)*				*Wealth relative (WR)*			
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
	CDAX	***DAX***	***SDAX***	***MDAX***	***CDAX***	***DAX***	***SDAX***	***MDAX***	***CDAX***	***DAX***	***SDAX***	***MDAX***
log_NDTA_t	0.0724**	0.0719**	0.0776**	0.0754**	0.0756**	0.0750**	0.0787**	0.0778**	0.0742**	0.0671**	0.0832*	0.0712**
	(0.019)	(0.019)	(0.013)	(0.019)	(0.013)	(0.012)	(0.013)	(0.012)	(0.033)	(0.029)	(0.063)	(0.043)
STRONGOP	-0.363	-0.364	-0.316	-0.350	-0.271	-0.281	-0.251	-0.264	-0.322	-0.281	-0.443	-0.301
	(0.453)	(0.451)	(0.529)	(0.475)	(0.513)	(0.497)	(0.554)	(0.530)	(0.578)	(0.595)	(0.482)	(0.563)
STRONGOP × log_NDTA_t	-0.00346	-0.00320	-0.0102	-0.00590	-0.0332	-0.0328	-0.0383	-0.0354	-0.0177	-0.0152	-0.0187	-0.0192
	(0.950)	(0.954)	(0.859)	(0.917)	(0.662)	(0.666)	(0.612)	(0.639)	(0.740)	(0.757)	(0.732)	(0.683)
DiscAcc	-0.598*	-0.600*	-0.534	-0.598*	-0.739**	-0.735**	-0.697**	-0.733**	-0.504	-0.470	-0.484*	-0.452*
	(0.076)	(0.074)	(0.122)	(0.074)	(0.022)	(0.023)	(0.024)	(0.022)	(0.114)	(0.124)	(0.087)	(0.082)
ISSUE	-0.0247	-0.0228	-0.0373	-0.0313	0.0468	0.0477	0.0400	0.0443	-0.0537	-0.0401	-0.106	-0.0649
	(0.773)	(0.790)	(0.665)	(0.715)	(0.634)	(0.628)	(0.677)	(0.646)	(0.619)	(0.681)	(0.378)	(0.513)
UNDWR	-0.228	-0.230	-0.154	-0.209	-0.157	-0.163	-0.111	-0.144	-0.185	-0.178	-0.116	-0.131
	(0.445)	(0.433)	(0.632)	(0.507)	(0.519)	(0.502)	(0.655)	(0.549)	(0.465)	(0.457)	(0.683)	(0.577)
VC	0.547*	0.550*	0.528*	0.536*	0.511	0.518	0.480	0.500	0.559*	0.518*	0.554*	0.479*
	(0.080)	(0.078)	(0.089)	(0.091)	(0.112)	(0.106)	(0.136)	(0.120)	(0.058)	(0.055)	(0.087)	(0.073)
AGE	-0.0007	-0.0007	-0.0009	-0.0010	-0.0015	-0.0014	-0.00168	-0.00173	-0.000663	-0.000612	-0.00114	-0.00110
	(0.632)	(0.638)	(0.576)	(0.567)	(0.375)	(0.385)	(0.302)	(0.309)	(0.638)	(0.625)	(0.554)	(0.465)
_cons	-1.361	-1.406	-0.843	-1.231	-2.556	-2.647	-2.221	-2.556	0.420	0.204	1.625	0.791
	(0.427)	(0.412)	(0.629)	(0.472)	(0.166)	(0.152)	(0.222)	(0.163)	(0.827)	(0.910)	(0.394)	(0.639)
Year	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Industry	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
N	80	80	80	80	80	80	80	80	80	80	80	80
R-sq	0.422	0.423	0.412	0.434	0.490	0.490	0.506	0.503	0.315	0.326	0.280	0.294

*Note: This table shows results for pooled OLS-regressions for Model 3. P-values are given in parentheses. ***, **, * are significance levels at 1, 5 and 10 percent, respectively.*

8. CONCLUSION

It is conventional wisdom that IPO firms are risky stocks (Ritter & Welch, 2002) and that they are – on average – terrible investments due to severe stock market underperformance in the first years after going public. The IPO process is characterized by information asymmetries and moral hazard, which contribute to the high level of uncertainty about the future performance of an IPO firm. Nevertheless, investors hope to find a big winner (Loughran & Ritter, 1995). Separating the wheat from the chaff is, therefore, an essential problem for IPO investors, which is even more challenging in the presence of a high proportion of loss firms among the issuers. We present evidence that NDTA convey forward-looking information on the future development of earnings since IAS 12.24 requires that future positive income will be available for the recognition of net deferred tax assets. We thus hypothesize and find that net deferred tax assets in the last year before an IPO are positively associated with subsequent long-run performance. NDTA are especially predictive of future performance for firms having incurred large losses prior to their IPO.

Our findings have implications for research, practice and regulation, alike. We add to the academic discussion about earnings management around initial public offerings and our findings show that firms going public on the German stock exchange between 2005 and 2015 do not use NDTA for earnings management purposes. It should be noted, however, that this finding may be limited to settings with a conservative financial reporting tradition even under IFRS (Van Tendeloo & Vanstraelen, 2005) and comparatively strong enforcement institutions. Therefore, it is left for future research, whether results can be replicated in other settings, which are characterized by less accounting conservatism or weaker enforcement.

Implications for practice are straightforward. Our findings show, that firms recognizing NDTA on their balance sheets in the years preceding their IPO are more promising investments than those firms that do not recognize NDTA. This result applies most strongly to loss firms, whose rising fraction among IPO firms (Carpentier et al., 2017) underlines the practical relevance of our findings. Finally, our results are relevant to regulators, like the IASB. IAS 12 has been criticized for being outdated, leaving too much reporting discretion and therefore being in need of reform (Colley et al., 2012). Our findings, however, indicate that this is not the case.

REFERENCES

1. Agrawal, A. and Cooper, T. (2010). Accounting scandals in IPO firms: Do underwriters and VCs help? *Journal of Economics & Management Strategy, 19(4),* 1117-1181. https://doi.org/10.1111/j.1530-9134.2010.00279.x
2. Aharony, J., Lin, C.-J. and Loeb, M. P. (1993). Initial public offerings, accounting choices, and earnings management. *Contemporary Accounting Research, 10(1),* 61-81. https://doi.org/10.1111/j.1911-3846.1993.tb00382.x
3. Alhadab, M., Clacher, I., & Keasey, K. (2016). A comparative analysis of real and accruals earnings management around initial public offerings under different regulatory environments. *Journal of Business Finance & Accounting, 43(7-8),* 849-871. https://doi.org/10.1111/jbfa.12201
4. Amir, E., Kirschenheiter, M., & Willard, L. (1997). The valuation of deferred taxes. *Contemporary Accounting Research, 14(4),* 597-622. https://doi.org/10.1111/j.1911-3846.1997.tb00543.x
5. Amir, E., Kirschenheiter, M., & Willard, K. (2001). The aggregation and valuation of deferred taxes. *Review of Accounting Studies, 6(2-3),* 275-297. https://doi.org/10.1023/A:1011619010143
6. Amir, E., & Sougiannis, T. (1999). Analysts' interpretation and investors' valuation of tax carryforwards. *Contemporary Accounting Research, 16(1),* 1-33. https://doi.org/10.1111/j.1911-3846.1999.tb00572.x
7. Ayers, B. C. (1998). Deferred tax accounting under SFAS No. 109: An empirical investigation of its incremental value-relevance to APB No. 11. *The Accounting Review, 73(2),* 203-220. https://www.jstor.org/stable/248465
8. Ball, R., & Shivakumar, L. (2008). Earnings quality at initial public offerings. *Journal of Accounting and Economics, 45(2-3),* 324-349. https://doi.org/10.1016/j.jacceco.2007.12.001
9. Barber, B. M., & Lyon, J. D. (1997). Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial Economics, 43(3),* 341-372. https://doi.org/10.1016/S0304-405X(96)00890-2
10. Bauman, C. C., Bauman, M. P., & Halsey, R. F. (2001). Do firms use the deferred tax asset valuation allowance to manage earnings? *The Journal of the American Taxation Association, 23(1),* 27-48. https://doi.org/10.2308/jata.2001.23.s-1.27
11. Bauman, M. P., & Das, S. (2004). Stock market valuation of deferred tax assets: Evidence from internet firms. *Journal of Business Finance and Accounting, 31(9-10),* 1223-1260. https://doi.org/10.1111/j.0306-686X.2004.00573.x
12. Bauman, M. P., & Shaw, K. W. (2016). Balance sheet classification and the valuation of deferred taxes. *Research in Accounting Regulation, 28(2),* 77-85. https://doi.org/10.1016/j.racreg.2016.09.004
13. Beaver, W. H., & Dukes, R. E. (1972). Interperiod tax allocation, earnings expectations, and the behavior of security prices. *The Accounting Review, 47(2),* 320-332. https://www.jstor.org/stable/244755
14. Bessler, W., & Thies, S. (2007). The long-run performance of initial public offerings in Germany. *Managerial Finance, 33(6),* 420-441. https://doi.org/10.1108/03074350710748768
15. Bessler, W., & Seim, M. (2012). The performance of venture-backed IPOs in Europe. *Venture Capital: An International Journal of Entrepreneurial Finance, 14(4),* 215-239. https://doi.org/10.1080/13691066.2012.702447
16. Brau, J. C., & Fawcett, S. (2006). Initial public offerings: An analysis of theory and practice. *The Journal of Finance, 61(1),* 399-436. https://doi.org/10.1111/j.1540-6261.2006.00840.x
17. Brav, A., & Gompers, P. A. (1997). Myth or reality? The long-run underperformance of initial public offerings: Evidence from venture and nonventure capital-backed companies. *The Journal of Finance, 52(5),* 1791-1821. https://doi.org/10.1111/j.1540-6261.1997.tb02742.x

18. Burgstahler, D., Elliott, W. B., & Hanlon, M. (2002). *How firms avoid losses: Evidence of the use of the net deferred tax asset account* (Working Paper, University of Washington). https://doi.org/10.2139/ssrn.355780
19. Carpentier, C., Romon, F., & Suret, J.-M. (2017). Are investors rational when valuing loss firms? *Journal of Behavioral Finance*. https://doi.org/10.2139/ssrn.2867607
20. Carpentier, C., & Suret, J.-M. (2011). The survival and success of Canadian penny stock IPOs. *Small Business Economics, 36(1),* 101-121. https://doi.org/10.1007/s11187-009-9190-x
21. Carter, R. B., Dark, F. H., & Singh, A. K. (1998). Underwriter reputation, initial returns, and the long-run performance of IPO stocks. *The Journal of Finance, 53(1),* 285-311. https://doi.org/10.1111/0022-1082.104624
22. Carter, R., & Manaster, S. (1990). Initial public offerings and underwriter reputation. *The Journal of Finance, 45(4),* 1045-1067. https://doi.org/10.1111/j.1540-6261.1990.tb02426.x
23. Chludek, A. (2011). Perceived versus actual cash flow implications of deferred taxes-an analysis of value relevance and reversal under IFRS. *Journal of International Accounting Research, 10(1),* 1-25. https://doi.org/10.2308/jiar.2011.10.1.1
24. Christensen, T. E., Paik, G. H., & Stice, E. K. (2008). Creating a bigger bath using the deferred tax asset valuation allowance. *Journal of Business Finance and Accounting, 35(5-6),* 601-625. https://doi.org/10.1111/j.1468-5957.2008.02092.x
25. Cecchini, M., Jackson, S. B., & Liu, X. (2012). Do initial public offering firms manage accruals? Evidence from individual accounts. *Review of Accounting Studies, 17(1),* 22-40. https://doi.org/10.1007/s11142-011-9160-9
26. Colley, R., Rue, J., Valencia, A., & Volkan, A. (2012). Accounting for deferred taxes: Time for a change. *Journal of Business & Economics Research, 10(3),* 149-156. https://doi.org/10.19030/jber.v10i3.6873
27. Cook, K. A., Huston, G. R., & Omer, T. C. (2008). Earnings management through effective tax rates: The effects of tax-planning investment and the Sarbanes-Oxley Act of 2002. *Contemporary Accounting Research, 25(2),* 447-471. https://doi.org/10.1506/car.25.2.6
28. Daley, M. (1995). *The impact of deferred tax allocation on earnings as a measure of firm performance* (Dissertation, University of Rochester). Retrieved from https://EconPapers.repec.org/RePEc:fth:robuph:72
29. Dang, H. D., & Jolly, M. (2017). Red flags for IPO downfalls in New Zealand. *Managerial Finance, 43(9),* 1034-1051. https://doi.org/10.1108/MF-05-2017-0197
30. Darrough, M., & Rangan, S. (2005). Do insiders manipulate earnings when they sell their shares in an initial public offering? *Journal of Accounting Research, 43(1),* 1-33. https://doi.org/10.1111/j.1475-679x.2004.00161.x
31. Darrough, M., & Ye, J. (2007). Valuation of loss firms in a knowledge-based economy. *Review of Accounting Studies, 12(1),* 61-93. https://doi.org/10.1007/s11142-006-9022-z
32. Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *The Accounting Review, 70(2),* 193-225. https://www.jstor.org/stable/248303
33. Demers, E., & Joos, P. (2007). IPO failure risk. *Journal of Accounting Research, 45(2),* 333-372. https://doi.org/10.1111/j.1475-679X.2007.00236.x
34. Dhaliwal, D. S., Gleason, C. A., & Mills, L. F. (2004). Last-chance earnings management: Using the tax expense to meet analysts' forecasts. *Contemporary Accounting Research, 21(2),* 431-459. https://doi.org/10.1506/TFVV-UYT1-NNYT-1YFH
35. Dhaliwal, D. S., Kaplan, S. E., Laux, R. C., & Weisbrod, E. (2013). The information content of tax expense for firms reporting losses. *Journal of Accounting Research, 51(1),* 135-164. https://doi.org/10.1111/j.1475-679X.2012.00466.x
36. DuCharme, L. L., Malatesta, P. H., & Sefcik, S. E. (2001). Earnings management: IPO valuation and subsequent performance. *Journal of Accounting, Auditing & Finance, 16(4),* 369-396. https://doi.org/10.1177/0148558X0101600409
37. Edwards, A. (2018). The deferred tax asset valuation allowance and firm creditworthiness. *The Journal of the American Taxation Association, 40(1),* 57-80. https://doi.org/10.2308/atax-51846
38. Elston, J. A., & Yang, J. J. (2010). Venture capital, ownership structure, accounting standards and IPO underpricing: Evidence from Germany. *Journal of Economics and Business, 62(6),* 517-536. https://doi.org/10.1016/j.jeconbus.2010.08.003
39. Fan, Q. (2007). Earnings management and ownership retention for initial public offering firms: Theory and evidence. *The Accounting Review, 82(1),* 27-64. https://doi.org/10.2308/accr.2007.82.1.27
40. Flagmaier, V. (2017). *The information content of tax loss carryforwards – IAS 12 vs. valuation allowance* (Arqus Discussion Paper No. 216). Retrieved from https://www.econstor.eu/handle/10419/157656
41. Frank, M. M., & Rego, S. O. (2006). Do managers use the valuation allowance account to manage earnings around certain earnings targets? *The Journal of the American Taxation Association, 28(1),* 43-65. https://doi.org/10.2308/jata.2006.28.1.43
42. Friedlan, J. M. (1994). Accounting choices of issuers of initial public offerings. *Contemporary Accounting Research, 11(1),* 1-31. https://doi.org/10.1111/j.1911-3846.1994.tb00434.x
43. Gleason, C. A., Pincus, M., & Rego, S. O. (2017). Material weaknesses in tax-related internal controls and last chance earnings management. *The Journal of the American Taxation Association, 39(1),* 25-44. https://doi.org/10.2308/atax-51511
44. Gounopoulos, D., & Pham, H. (2017). Credit ratings and earnings management around IPOs. *Journal of Business Finance & Accounting, 44(1-2),* 154-195. https://doi.org/10.1111/jbfa.12228
45. Grinblatt, M., & Hwang, C. (1989). Signalling and the pricing of new issues. *The Journal of Finance, 44(2),* 393-420. https://doi.org/10.1111/j.1540-6261.1989.tb05063.x
46. Guenther, D. A., & Sansing, R. C. (2000). Valuation of the firm in the presence of temporary book-tax differences: The role of deferred tax assets and liabilities. *The Accounting Review, 75(1),* 1-12. https://doi.org/10.2308/accr.2000.75.1.1
47. Guo, R.-J., Lev, B., & Shi, C. (2006). Explaining the short- and long-term IPO anomalies in the US by R&D. *Journal of Business Finance & Accounting, 33(3-4),* 550-579. https://doi.org/10.1111/j.1468-5957.2006.00610.x
48. Herbohn, K., Tutticci, I., & Khor, P. S. (2010). Changes in unrecognised deferred tax accruals from carry-forward losses: Earnings management or signalling? *Journal of Business Finance and Accounting, 37(7-8),* 763-791. https://doi.org/10.1111/j.1468-5957.2010.02207.x

49. Hochberg, Y. V. (2012). Venture capital and corporate governance in the newly public firm. *Review of Finance, 16(2),* 429-480. https://doi.org/10.1093/rof/rfr035
50. Jain, B. A., & Kini, O. (1994). The post-issue operating performance of IPO firms. *The Journal of Finance, 49(5),* 1699-1726. https://doi.org/10.1111/j.1540-6261.1994.tb04778.x
51. Joos, P., & Plesko, G. A. (2005). Valuing loss firms. *The Accounting Review, 80(3),* 847-870. https://doi.org/10.2308/accr.2005.80.3.847
52. Joos, P., & Zhdanov, A. (2008). Earnings and equity valuation in the biotech industry: Theory and evidence. *Financial Management, 37(3),* 431-460. https://doi.org/10.1111/j.1755-053X.2008.00020.x
53. Kasipillai, J., & Mahenthiran, S. (2013). Deferred taxes, earnings management, and corporate governance: Malaysian evidence. *Journal of Contemporary Accounting & Economics, 9(1),* 1-18. https://doi.org/10.1016/j.jcae.2013.03.001
54. Kim, M., & Ritter, J. R. (1999). Valuing IPOs. *Journal of Financial Economics, 53(3),* 409-437. https://doi.org/10.1016/S0304-405X(99)00027-6
55. Klein, P. G., Wuebker, R., & Zoeller, K. (2016). Relationship banking and conflicts of interest: Evidence from German initial public offerings. *Journal of Corporate Finance, 39,* 210-221. https://doi.org/10.1016/j.jcorpfin.2016.03.010
56. Kumar, K. R., & Visvanathan, G. (2003). The information content of the deferred tax valuation allowance. *The Accounting Review, 78(2),* 471-490. https://doi.org/10.2308/accr.2003.78.2.471
57. Kvaal, E., & Nobes, C. (2012). IFRS policy changes and the continuation of national patterns of IFRS practice. *European Accounting Review, 21(2),* 343-371. https://doi.org/10.1080/09638180.2011.611236
58. Laux, R. C. (2013). The association between deferred tax assets and liabilities and future tax payments. *The Accounting Review, 88(4),* 1357-1383. https://doi.org/10.2308/accr-50417
59. Lee, G., & Masulis, R. W. (2011). Do more reputable financial institutions reduce earnings management by IPO issuers? *Journal of Corporate Finance, 17(4),* 982-1000. https://doi.org/10.1016/j.jcorpfin.2011.04.012
60. Ljungqvist, A., & Wilhelm, W. (2003). IPO pricing in the dot-com bubble. *The Journal of Finance, 58(2),* 723-752. https://doi.org/10.1111/1540-6261.00543
61. Loughran, T., & Ritter, J. R. (1995). The new issues puzzle. *The Journal of Finance, 50(1),* 23-51. https://doi.org/10.1111/j.1540-6261.1995.tb05166.x
62. Loughran, T., & Ritter, J. (2004). Why has IPO underpricing changed over time? *Financial Management, 33(3),* 5-37. https://www.jstor.org/stable/3666262
63. Lynn, S. G., Seethamraju, C., & Seetharaman, A. (2008). Incremental value relevance of unrecognized deferred taxes: Evidence from the United Kingdom. *The Journal of the American Taxation Association, 30(2),* 107-130. https://doi.org/10.2308/jata.2008.30.2.107
64. Megginson, W. L., & Weiss, K. A. (1991). Venture capitalist certification in initial public offerings. *The Journal of Finance, 46(3),* 879-903. https://doi.org/10.1111/j.1540-6261.1991.tb03770.x
65. Michaely, R., & Shaw, W. H. (1995). Does the choice of auditor convey quality in an initial public offering? *Financial Management, 24(4),* 15-30. Retrieved from https://pdfs.semanticscholar.org/a8fe/8c90f50ed5491a42eb5154741dd1a95f7f47.pdf
66. Migliorati, K., & Vismara, S. (2014). Ranking underwriters of European IPOs. *European Financial Management, 20(5),* 891-925. https://doi.org/10.1111/eufm.12049
67. Miller, G., & Skinner, D. (1998). Determinants of the valuation allowance for deferred tax assets under SFAS No. 109. *The Accounting Review, 73(2),* 213-233. https://www.jstor.org/stable/248466
68. Morsfield, S. G., & Tan, C. E. L. (2006). Do venture capitalists influence the decision to manage earnings in initial public offerings? *The Accounting Review, 81(5),* 1119-1150. https://doi.org/10.2308/accr.2006.81.5.1119
69. Nahata, R. (2008). Venture capital reputation and investment performance. *Journal of Financial Economics, 90(2),* 127-151. https://doi.org/10.1016/j.jfineco.2007.11.008
70. Pagano, M., Panetta, F., & Zingales, L. (1998). Why do companies go public? An empirical analysis. *The Journal of Finance, 53(1),* 27-64. https://doi.org/10.1111/0022-1082.25448
71. Rao, G. R. (1993). *The relation between stock returns and earnings: A study of newly-public firms* (Working Paper, Kidder Peabody and Co., New York).
72. Ritter, J. (1991). The long-run performance of initial public offerings. *The Journal of Finance, 46(1),* 3-27. https://doi.org/10.1111/j.1540-6261.1991.tb03743.x
73. Ritter, J., & Welch, I. (2002). A review of IPO activity, pricing and allocations. *The Journal of Finance, 57(4),* 1795-1828. https://doi.org/10.1111/1540-6261.00478
74. Ritter, J. (2003). Differences between European and American IPO markets. *European Financial Management, 9(4),* 421-434. https://doi.org/10.1111/1468-036X.00230
75. Roose, K. (2018, May 16). The entire economy is moviepass now. Enjoy it while you can. *The New York Times.* Retrieved from https://www.nytimes.com/2018/05/16/technology/moviepass-economy-startups.html
76. Roosenboom, P., van der Goot, T., & Mertens, G. (2003). Earnings management and IPOs: Evidence from the Netherlands. *The International Journal of Accounting, 38(3),* 243-266. https://doi.org/10.1016/S0020-7063(03)00048-7
77. Sansing, R. (1998). Valuing the deferred tax liability. *Journal of Accounting Research, 36(2),* 357-364. http://doi.org/10.2307/2491482
78. Schipper, K. (2007). Required disclosures in financial reports. *The Accounting Review, 82(2),* 301-326. https://doi.org/10.2308/accr.2007.82.2.301
79. Schrand, C., & Wong, F. (2003). Earnings management using the valuation allowance for deferred tax assets under SFAS 109. *Contemporary Accounting Research, 20(3),* 579-611. https://doi.org/10.1506/480D-098U-607R-5D9W
80. Shette, R., Kuntluru, S., & Korivi, S. R. (2016). Opportunistic earnings management during initial public offerings: Evidence from India. *Review of Accounting and Finance, 15(3),* 352-371. https://doi.org/10.1108/RAF-03-2015-0048
81. Teoh, S. H., Wong, T. J., & Rao, G. R. (1998). Are accruals during initial public offerings opportunistic? *Review of Accounting Studies, 3(1-2),* 175-208. https://doi.org/10.1023/A:1009688619882

82. Teoh, S. H., Welch, I., & Wong, T. J. (1998). Earnings management and the long-run market performance of initial public offerings. *The Journal of Finance, 53(6),* 1935-1974. https://doi.org/10.1111/0022-1082.00079
83. Tian, X., Udell, G. F., & Yu, X. (2016). Disciplining delegated monitors: When venture capitalists fail to prevent fraud by their IPO firms. *Journal of Accounting and Economics, 61(2-3),* 526-544. https://doi.org/10.1016/j.jacceco.2015.09.004
84. Van Tendeloo, B., & Vanstraelen, A. (2005). Earnings management under German GAAP versus IFRS. *European Accounting Review, 14(1),* 155-180. https://doi.org/10.1080/0963818042000338988
85. Venkataraman, R., Weber, J. P., & Willenborg, M. (2008). Litigation risk, audit quality and audit fees: Evidence from initial public offerings. *The Accounting Review*, *83(5),* 1315-1345. https://doi.org/10.2308/accr.2008.83.5.1315
86. Visvanathan, G. (1998). Deferred tax valuation allowances and earnings management. *Journal of Financial Statement Analysis, 3,* 6-15. Retrieved from http://web.b.ebscohost.com/ehost/detail/detail?vid=0&sid=775a242b-7d5d-44ad-8503-17cd5a2ede86%40pdc-v-sessmgr02&bdata=Jmxhbmc9ZGUmc2l0ZT1laG9zdC1saXZl#AN=940415&db=bth
87. Weber, D. P. (2009). Do analysts and investors fully appreciate the implications of book-tax differences for future earnings? *Contemporary Accounting Research, 26(4),* 1175-1206. https://doi.org/10.1506/car.26.4.7
88. Wongsunwai, W. (2013). The effect of external monitoring on accrual-based and real earnings management: Evidence from venture-backed initial public offerings. *Contemporary Accounting Research, 30(1),* 296-324. https://doi.org/10.1111/j.1911-3846.2011.01155.x.