Conference Paper:

Corporate tax aggressiveness in the financial crisis environment

ABSTRACT

Corporate taxation is an integral part of any country's tax regime. Studies of corporate tax aggressiveness can assist policymakers and tax authorities in addressing companies' illegal tax schemes and taxing businesses more equitably in the sense that every entity pays their fair share of taxes. Following this theme, my research contributes to the existing body of literature in corporate taxation by studying tax aggressive activities by companies in the context of a financial crisis environment where companies are exposed to various business risks.

My study reviews corporate tax avoidance proxies employed by researchers up to date and proposes to construct an index measure of corporate tax aggressiveness based on the currently available proxies using principal component analysis. Furthermore, my research also explores the potential to use dividend franking level as a proxy for company's tax aggressive planning under a dividend imputation tax system such as Australia. Specifically, my study documents strong evidence of a positive and statistically significant association between ETR – the most commonly used tax avoidance proxy – and franking level of dividends paid by Australian companies, on both annual basis and long-run basis (i.e. over a five-year period).

My research proceeds to examine tax aggressive strategies by companies operating in a financial crisis environment as opposed to operating during a non-crisis time using the index measure of tax aggressiveness constructed in the first chapter of my study. The analysis is to be carried out for two countries, Australia and the US. It is believed that during an economic crisis, more firms encounter cash flow problems, experience financial distresses and subsequently become bankrupt. My study is therefore concerned with examining the relationship between corporate failure and tax aggressiveness in an economic crisis environment. Regression analysis is conducted to test this relationship under normal economic conditions as well as under impacts of a crisis such as the GFC or the European sovereign debt crisis. My research also performs a comparative analysis to understand if there are any differences between Australia and the US in respect of the relation between tax avoidance and corporate failure, especially when this relationship is placed under an economic downturn.

I. INTRODUCTION

I.1. Background and rationale of the research

Tax revenue collected from a country's residents is a major source of revenue used by the government to finance public expenditures. However, it is inevitable to most, if not all, countries that certain citizens attempt to evade or avoid paying taxes. Not only a portion of individual citizens but certain corporate citizens also engage in tax aggressive activities in order to reduce their overall tax liabilities. According to a study by the Organisation of Economic Co-operation and Development (OECD) (2013), some multi-national companies are found to "pay as little as 5% in corporate taxes" whereas the corresponding average tax rate for smaller firms is 30%. This signals potential problems for countries in collecting sufficient funds to ensure a good provision of social welfare programs.

The impacts of tax aggressiveness by corporate sector may further worsen when the economy experiences financial crises such as the recent global financial crisis (GFC) in 2008 and the European sovereign debt crisis in 2010, which have seen severe effects on most economies worldwide. The GFC is described in the research by Chor and Kalina (2012) conduct a study of international trade during the GFC period:

> "While nervousness over the exposure of financial institutions to the subprime mortgage market had been building up steadily since the end of 2007, two events in September 2008 – the collapse of Lehman Brothers and the government bailout of AIG – brought credit activity to a virtual standstill and raised the prospect of a financial sector meltdown in the US. The Dow Jones Industrial Average Index subsequently plunged almost 20% during a single week in mid-October 2008, dragging down investor and consumer sentiment substantially."

The GFC starting in 2008 led to a sharp decline in the United States' (US) GDP which are reported to have significantly dropped in the fourth quarter of 2008 and the first quarter of 2009 at annual rates of -5.4% and -6.4% respectively (Mishkin 2011). By October 2009, the unemployment rate in the US went above 10% as a result of the GFC (Mishkin 2011). Immediately after the GFC, the global economy came to face with the European debt crisis, either directly or indirectly and at various magnitude of impact, since the beginning of 2010. The European sovereign debt crisis originated from Greece, the indebted country which found itself unable to afford paying its sovereign bonds and had to be rescued by loans from other countries in the Euro zone and the International Monetary Fund (Missio and Watzka 2011). The contagious effects of the crisis quickly spread to other European countries (Constancio 2012). Other countries which have international dealings with the European economies were also affected to a certain extent. As a large economy with extensive connections with other developed economies in the world, the US can also be impacted by the European crisis either through international trade or through losses in the banking system when US banks not only lent money to Greece, Portugal and Spain (equivalent to 3% of overseas lending) but also held European bank notes (US Weekly 2010). 2010 is a special year since it is immediately after the 2008-2009 GFC and also when the European sovereign debt crisis starts escalating. As Bullard (2012) suggests, the European crisis was the most pressing factor contributing to the slowdown in the US economy in the medium term.

Besides the US, Australia, in spite of its good performance and lower net debt to GDP level compared to other well-developed economies, including the Group of 7 (G7) countries and the European Union, has begun experiencing budget deficit and interest rates cuts since 2008, as pointed out in Carmignani's (2013) review of the Australian economy. According to Kolb (2010), Australia witnessed significant drop in the stock market and bankruptcy of some large companies in the 2008 and 2009 years, including Babcock and Brown, Timbercorp and Great Southern. As a result of the recent financial crises, many Australian firms have become insolvent. According to a report by the Australian Securities & Investment Commission (ASIC), 10,632 companies collapsed in 2012, representing an increase of 12% compared to the corresponding figure for 2009 (Klan 2013).

In such difficult macro-economic conditions presented by the financial crises, a relevant question to be asked is whether or not pressure in maintaining sufficient cash flows and solvency position is linked to firms' tax aggressive schemes. Therefore, the purpose of my research study is to examine company tax aggressiveness and its relationship with corporate bankruptcy not only during stable economic conditions but also when the economy experiences a financial crisis. My research will be carried out using company data in the US and Australia. Regression analysis is conducted to test this relationship under normal economic conditions as well as under impacts of a crisis such as the GFC or the European sovereign debt crisis. My research also performs a comparative analysis to understand if there are any differences between Australia and the US in respect of the relation between tax avoidance and corporate failure, especially when this relationship is placed under an economic downturn.

I.2. Research objectives

My research examines Australian and US companies engaging in tax aggressive activities in the context of a financial crisis environment. In the first part of my research, I review corporate tax avoidance literature to examine the proxies previously used for corporate tax aggressiveness. Following a review of the company tax aggressiveness proxies, my study will conduct principal component analysis in order to construct an index measure of corporate tax aggressiveness. In addition, the second part of my study explores the potential to use dividend franking level as a proxy for company's tax aggressive planning under a dividend imputation tax system such as Australia.

My research will proceed to examine tax aggressive strategies by companies operating in both crisis and non-crisis periods of the economy using the index measure of tax aggressiveness constructed in the first chapter of my study. Furthermore, the study will empirically test the relationship between company tax aggressiveness and corporate failure in Australia and the US under the impacts of the 2008-2009 GFC and the 2010 European sovereign debt crisis. My research defines the crisis period from 2008 to 2010 on the basis that there are two financial crises during this period, the GFC in 2008 – 2009 and the European sovereign debt crisis in 2010 (Lane 2012; Popov and Horen 2013).

In summary, my research examines the following:

i.   Developing an index measure of corporate tax aggressiveness based on the existing proxies used in prior literature;
ii. The relationship between dividend franking level and effective tax rate and using dividend franking level as a proxy for corporate tax aggressiveness in Australia;
iii. Tax aggressive activities by Australian companies in the financial crisis context and the relationship between tax aggressiveness and corporate failure in Australia under both stable economic conditions and impacts of a financial crisis;
iv. Tax aggressive activities by US companies in the financial crisis context and the relationship between tax aggressiveness and corporate failure in the US under both stable economic conditions and impacts of a financial crisis;
v.   Comparative analysis for the relationship between company tax aggressiveness and corporate failure between Australia and the US.

II. CORPORATE TAX AGGRESSIVENESS MEASURES

II.1. Corporate tax aggressive activities

Tax aggressiveness takes various forms and techniques which also vary from one jurisdiction to another. In a US study, Graham and Tucker (2006) lists different types of tax aggressiveness of the 44 successfully identified tax shelter cases for the period from 1975 to 2000 along with descriptions of their mechanics. Developed based on Graham and Tucker's (2006) sample, Wilson's (2007) sample of study includes additional observations of tax aggressive firms, making a total number of 51 cases in his sample, which are categorised by their tax aggressive strategies. In addition, Wilson (2007) also demonstrates the difficulties of detecting tax sheltering merely from analysis of financial statements. Since corporate tax aggressiveness is not directly observable or easily detected even through detailed analysis of publicly available financial reports, previous studies in this area have adopted a number of proxies for tax aggressive activities carried out by companies. As such, before diving into performing an empirical research of corporate tax aggressiveness, it is necessary to review the tax aggressiveness measures used in prior literature along with their usefulness and limitations.

II.1.a. Effective tax rate measure

Effective tax rate (ETR) has been widely used in taxation literature as a proxy for corporate tax aggressiveness. The support for using ETR measure could be found in the Rego's 2003 study, which suggests ETR as a measure of tax planning effectiveness and refers to the results by Levenson (1999) who stated that certain tax strategies could "help companies reduce their effective tax rates from the typical 35 to 40 percent to as low as 10 percent". In the same study, Rego (2003) shows that firms with greater pre-tax income have lower ETR after controlling for size of the companies studied. Rego (2003) contrasts his result with the findings of a positive relation between ETR and pre-tax income by Wilkie and Limberg (1993) who did not control for the size factor.

Rego (2003) proposes that ETR is impacted by tax aggressiveness in at least two ways: through creating temporary and permanent differences between accounting and tax income, and through utilisation of

foreign operations to reduce overall tax liabilities. Furthermore, Dyreng, Hanlon and Maydew (2008) also use ETR to examine long-run tax sheltering activities and find that while the mean long-run cash ETR of the sample is 30%, it is remarkable that a quarter of the firms in the sample could maintain their cash ETR below 20% for the period $1995 - 2004$, and more interestingly 9% of the firms with the rates even below 10%. Thus, there appears to exist a strong link between ETR and tax aggressiveness.

However, it should be noted that definitions of ETR vary amongst the research using it as a proxy for corporate tax aggressiveness. Richardson and Lanis (2007) have reviewed the ETR's used in previous literature and discussed the computation of the numerator and denominator for ETR. According to this review, the numerator is normally the tax expense obtained from the financial statements and is sometimes adjusted for the deferred tax expense portion, whereas the denominator can take any of the three forms: taxable income, book income and operating cash flows (Richardson and Lanis 2007).

The Australian empirical studies conducted by Richardson and Lanis (2007; 2011) test two versions of ETR in each of the studies: one ETR being the ratio of tax expense payable to book income, and the other ETR being the ratio of tax expense to operating cash flows. Nonetheless, Dyreng, Hanlon and Maydew (2008) in their research of US long-run tax sheltering by corporations suppose that cash tax paid is a better alternative for the ETR's numerator rather than accounting tax expense because cash ETR is not affected by changes in accounting estimates such as valuation allowance and "tax cushion". Last but not least, with regards to the validity of the ETR measure, pertaining to Richardson and Lanis (2007), there are also certain restrictions in calculating the ETR figures due to the unavailability of tax return data and as a result the entire reliance on data from financial statements and disclosures is inevitable.

II.1.b. Measures derived from book-tax difference

As an attempt to develop a measure of corporate tax aggressiveness, academicians in this area have been paying much attention to the difference between book income and reported taxable income. Many past empirical studies have found evidences that link the book-tax difference (BTD) to corporate tax sheltering. For instance, Manzon and Plesko (2002) report increasing BTD of the US firms in 1998 $-$ 1999 and contend that financial statements did not represent well for the increases in BTD. Similarly, for a sample of US companies in 1998, Desai's (2003) results show that only less than half of the BTD could be explained by the traditional drivers of BTD, which include international operations, depreciation methods and employee stock options. Besides, Hanlon (2005) finds that firms with large positive temporary BTD normally possess less persistent earnings and large BTD is often an indicator of low quality earnings in the eyes of investors. In another study, Plesko (2004) points out that large and increasing BTD was also used as a tool to identify tax sheltering by the US Department of the Treasury (1999).

There are different approaches to calculation of BTD and they may produce different results owing to the varying sources of data obtained. Desai (2003) discusses three main sources of information: the economy's aggregate national income, tax returns with disclosed book income and financial statements with estimated reportable tax income. Due to the difficulties in computing BTD from national income data and the unavailability of tax return data, many researchers have used financial reports to calculate the taxable profits and control for the accounting accruals component of the BTD

in order to measure the component reflecting only tax aggressiveness. For example, Desai and Dharmapala (2006) apply total accruals method in an attempt to isolate the element attributable to earnings management rather than tax aggressiveness in US organisations, whereas Lim (2010) uses performance-matched discretionary accruals in identifying the tax avoidance element in the BTD of Korean firms.

However, there are certain limitations of the BTD-based tax aggressiveness measure that could lead to biases in the results. Since simulating taxable income using financial statements is unlikely to produce precise figures for tax purposes, Desai and Dharmapala (2005, 2006) concede that there are many factors that may result in mismeasurement such as future tax liabilities, tax credits unobservable from financial reports and consolidation process including repatriation of income from overseas.

II.1.c. Other proxies for corporate tax aggressiveness

Besides BTD and ETR measures, some previous studies also employ marginal tax rate (MTR) in their company tax avoidance research. The lower MTR a firm has, the more successful it is considered in respect of aggressive tax planning. For instance, Shevlin (1990) and Graham (1996) simulate MTR for US companies through application of tax calculations for these firms. In a research that uses tax return data to simulate company MTR, Graham and Mills (2008) make suggestions of specific MTR measures for corporate tax planning studies conducted on both domestic scope and international scope.

In addition, other previous studies also use actual tax shelter cases to examine the characteristics of those tax-avoiding firms. A study in the US carried out by Graham and Tucker (2006) analyse 44 actual tax shelters in order to examine the under-leverage puzzle observed in tax aggressive companies. Wilson (2009) develops a larger sample based on the tax shelters examined in Graham and Tucker (2006) by adding additional tax avoiders to that sample. While such studies can be certain of the company's tax avoidance status, which is a remarkably more accurate measure of tax aggressiveness compared to the above-mentioned proxies, the sample size is normally small (Graham and Tucker 2006; Wilson 2009) and consequently results in lower generalisation power of the reported findings.

Furthermore, recent US studies explore the ability to infer corporate tax avoidance status from firms' financial reporting in accordance with the Financial Accounting Standards Board Interpretation No. 48, often referred to as 'FIN48' disclosure. Compliance with 'FIN48' disclosure requires US companies to report the amount of a contingent reserve maintained for any uncertain tax positions should the firms be audited. An association between the FIN48 tax reserve and company tax sheltering activities is reported in Lisowsky's 2010 study. Nonetheless, researchers may need to be cautious when employing FIN48 as a proxy for tax avoidance because not all tax aggressive activities are included or reflected in the FIN48 reserve (Hanlon and Heitzman 2010). However, the FIN48 tax aggressiveness proxy is only available for US companies due to the disclosure requirement imposed in the US and as such not applicable to other countries like Australia where there is no similar requirement for maintaining and reporting a reserve for contingent tax obligations.

II.2. Principal component analysis

As discussed in Section II.1, prior studies employ various proxies for corporate tax aggressiveness since it is not directly observable. Following a review of the literature in this area, my research attempts to construct an index measure of corporate tax aggressiveness based on the proxies currently available. This index measure will be constructed using principal component analysis, a well-established multivariate technique with its history dating back to Pearson (1901) (according to Abdi and Williams 2010). As stated by Abdi and Williams (2010), principal component analysis is employed when the researcher's goal is "to extract the important information from the data table and to express this information as a set of new orthogonal variables called principal components". Furthermore, this method is also used for construction of an index measure (Abeyasekera 2005) whereby the original set of variables can be reduced into a smaller set of variables whilst still retaining most of the information available in the original dataset.

Principal component analysis has been widely used in many diverse research areas such as economics, public health, chemistry and geology (Khatun 2009; Vyas, and Kumaranayake 2006; Vincent and Sutherland 2013; Bro and Smilde 2014; Page et al 2012). Provided that principal component analysis is a popular and established method, my study will perform an analysis using this technique to construct an index measure for corporate tax aggressiveness. More specifically, my research will examine datasets in both Australia and the US, and carry out principal component analysis on the following measures of corporate tax aggressiveness (Hanlon and Heitzman 2010) for each of the two countries:

1. Accounting Current ETR: calculated as Current income tax expense / Pre-tax profit
2. Cash ETR: calculated as Cash tax paid / Pre-tax profit
3. ETR differential: calculated as Statutory ETR – GAAP ETR;
   where GAAP ETR = Total income tax expense / Pre-tax profit
4. Total BTD: calculated as Pre-tax profit – Total income tax expense / Statutory ETR
5. Abnormal BTD being the residual from the regression of:
   BTD / Total Accruals = Total Accruals + Control variables + e
6. FIN48 measure (available for US companies only): being the disclosed amount of provision of unrecognized tax benefits.

Following a number of researchers who adopted principal component analysis technique for index measure construction, it is envisaged that my study will develop an index of corporate tax aggressiveness applying the index weights generated from the first principal component of the analysis. This approach is based on the premise that the first principal component explains the maximum amount of variation in the original dataset (Abeyasekera 2005). As an example, Salmond and Crampton (2002) allocate the weights for the variables included in the 2001 index of deprivation for social health research in New Zealand on the basis of the first principal component generated from their principal component analysis. In the US, a standardized neighbourhood deprivation index is developed by Messer et al (2006) with the index weights also based on the first principal component of the same technique.

While the index measure of corporate tax aggressiveness for the US companies will be developed using six proxies employed in previous research, the index measure constructed using the Australian company data is only based on five out of six proxies since the FIN48 tax aggressiveness measure is not available for Australian firms. At the same time, as part of the principal component analysis, it is

also possible that the original proxies might be reduced to a smaller set of variables which account for most of the variance in the original dataset (Keho 2012). The results of this part of my research will hopefully be able to contribute an index measure for corporate tax aggressiveness, which incorporates the existing proxies which all have their very own strengths and weaknesses.

III. DIVIDEND FRANKING LEVEL AND EFFECTIVE TAX RATES IN AUSTRALIA

III.1. Dividend franking level under a dividend imputation tax system

In a classical tax system, dividends distributed out of a company's after-tax profits to shareholders are taxed at the respective shareholder's personal income tax rate. In other words, the dividend income received in the hands of the shareholder has been taxed twice, first at corporate level and second at personal level; therefore, the classical tax system is also referred to as the double taxation system. Some countries provide a relief to the dividend recipients by exempting taxation of dividends (Estonia and Slovak Republic), taxing dividends at a lower rate compared to other sources of personal income such as interest (e.g. United States and Japan), or giving the shareholders a tax credit at a rate lower than the company tax rate (United Kingdom and South Korea) (*Re:think Tax Discussion Paper* 2015, p. 85). Some other countries on the other hand adopt a dividend imputation tax system, in which the shareholders are entitled to receive a tax credit for the entire taxes paid by the company on its corporate profits. Until 2014, Australia is among a few OECD countries that still have the imputation tax system in effect; besides Australia, other countries using the imputation system are New Zealand, Chile, Mexico and Canada (*Re:think Tax Discussion Paper* 2015, p. 85). Under the imputation system, the dividend received by a shareholder is grossed up to be equal to the pre-tax profit, and the tax to that shareholder is calculated on the pre-tax profit distributed (which is the dividend amount after grossing up) at the applicable personal tax rate. The tax liability of that shareholder is then reduced by a tax credit, which is equal to the actual tax amount previously paid by the company to the tax office. A detailed example to illustrate how taxation on dividends under the imputation system works can be found in Twite's study (2001).

In Australia, the dividend imputation tax system replaces the classical tax system from 1 July 1987 (Twite 2001). With nearly 30 years of employing the imputation tax system, Australia is an appropriate setting for examination of the corporate tax payments and its relationship with the franking level of dividends paid by companies. In this study, we analyse the franking levels of dividends paid by Australian publicly listed companies and examine the relationship between the dividend franking level and the firms' effective tax rates, which are commonly used in literature as a measure of corporate tax aggressiveness.[1]

We hypothesize that the franking level of dividends paid by a company operating under a dividend imputation tax system is significantly related to that company's tax aggressive activities. Indeed, the regression results provide strong evidence showing that companies with lower ETRs are more likely to have lower long-run DFLs over a five-year period. Furthermore, lower ETRs are also associated with

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[1] The limitations of using effective tax rates as a measure of corporate tax aggressiveness are discussed in Hanlon and Heitzman (2010).

lower annual DFLs for the current year and for each of the following five years. The main significant contribution of this article is that we find a significant positive relationship between company ETR and the franking levels of dividends paid, both on annual and long-term basis when DFLs are calculated over a five-year period.

Since the ETR is a strong proxy for corporate tax avoidance which has commonly been used in prior research due to the straightforward interpretation of the ETR (i.e. a lower ETR compared to the corporate statutory tax rate indicating a company has engaged in successful tax planning), a statistically significant and positive relationship between the ETR and DFLs, both on an annual and long-run basis, would indicate that DFLs may be used as a proxy for corporate tax aggressiveness. Based on the reported findings, this study explores potential usage of the DFL as a new proxy for company tax aggressive strategies when companies operate in a dividend imputation environment. This proxy is more readily useable compared to other company tax avoidance proxies previously examined in the tax literature; it is, however, only applicable to dividend-paying companies in jurisdictions with a dividend imputation tax system. Similar to other corporate tax aggressiveness proxies such as the ETR, the DFL has its own advantages and limitations.

III.2. Research hypotheses

In Australia, when a firm distributes its after-tax profits in the form of dividend to shareholders, the franking credits attached to the dividend depends on the balance in the franking account. The dividends can be declared as fully franked (franking level being 100%), partially franked (franking level less than 100% but greater than 0%), or unfranked (franking level being 0%). A study by Coulton, Ruddock and Taylor (2014) examines the levels of tax credits attached to dividend payments but their research focuses on earnings persistence in company and shows that firms paying fully franked dividends have more persistent earnings than their counterparts who pay unfranked dividends. Such findings demonstrate that there are certain differences between firms that pay fully franked, partially franked and unfranked dividends.

Under the Australian dividend imputation system, if a company has consistently paid sufficient taxes (assumed to be at statutory corporate tax rate), any dividends declared out of the firm's retained earnings (after-tax profits) would be fully franked dividends and any associated franking credits will be passed on to the eligible shareholders. On the contrary, if a company has not paid enough its 'fair share of tax'[2], dividends paid to shareholders from the company's retained earnings would be either unfranked or partially franked due to insufficient franking credits contained in the company's franking account. In other words, under ideal conditions where a firm is not subject to a special tax treatment such as research and development tax rebates, payment of unfranked or partially franked dividends may indicate that the firm has not paid previously sufficient taxes at statutory corporate tax rate of 30%. Since the dividend franking level is dependent upon the balance remained in the franking account, it is hypothesised that corporate tax aggressiveness, which is measured in this study by using company effective tax rates, is directly positively associated with the franking level of dividends paid by a company. Evidences supporting the significant positive relationship between company effective tax rates and the dividend franking level may suggest that dividend franking level can also be used as

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[2] For the purpose of this study, the terms 'fair share of tax' generally refers to company tax payments at statutory corporate tax rate. The existing company tax rate in Australia as of 2015 is 30%.

a proxy for corporate tax aggressiveness under a dividend imputation tax system, just like effective tax rates.

Furthermore, Ikin and Tran (2013) who study the corporate tax strategies find that under the dividend imputation system companies making franked dividends are likely to be more conservative in their planning compared to firms that are not. Our study makes a significant contribution by extending the findings reported in Ikin and Tran (2013) in four aspects. First, the sample of companies used for the research by Ikin and Tran (2013) contains data for the five-year period from 1999 to 2003 whereas our study uses company data from 2006 to 2013, and there is a difference between the two study periods in respect of management discretion in deciding allocation of franking percentage for dividends. For most of the period in Ikin and Tran (2013) study, companies are required to apply the maximum level of franking credits available to any dividends paid. Only until 1 July 2002, under the tax simplification rules, corporate tax entities can allocate franking credits attached to dividends with some discretion but only up to the allowable maximum franking credits, i.e. depending on the balance in the company franking account (Coulton, Ruddock and Taylor 2014). Thus, in our later period of study, there is a possibility that unfranked or partially franked dividends are not a result of having insufficient credits in the franking account but instead a management decision; nonetheless, this possibility needs to be considered bearing in mind that unfranked or even partially franked dividends are not favoured by resident shareholders who can claim tax credits from franked dividends received. Second, Ikin and Tran (2013) use the interaction terms of franking percentage of dividends and dividend payout ratio and interpretation of such interaction terms can be complicated. A low value of the dividend interaction terms can result from either low franking percentage or low dividend payout ratio, or a combination of both. In our study, we focus our attention on the direct relationship between ETR and the franking percentage of dividends by itself. Third, the research in Ikin and Tran (2013) only examine the current franking level for the year in which ETR is calculated whereas our research studies: (a) long-run franking level over a period of five years, and (b) the annual franking levels for the current year and the next five years individually. The fourth contribution, which is also the original motivation of our research into the relationship between effective tax rates and dividend franking level, is our suggestion to use dividend franking level as a potential proxy, besides effective tax rates, for corporate tax aggressiveness under an imputation tax system.

Since company management can select the level of franking percentage allocated to dividend payments up to the allowable maximum franking credits following the regulation change in 2002, as discussed above it is possible that managers decide to pay unfranked or partially franked dividends even though the credits available in company franking account are sufficient to make such dividends fully franked (or franking level of 100%). However, as a matter of fact, payment of fully franked is always preferred for certain reasons. Under Australian imputation tax system, resident shareholders are entitled to claim tax credits (franking credits) associated with the dividend income received. A number of investors including superannuation funds in fact actively seek for franking credits because they can redeem franking credits for cash tax refund since tax law changes in 2000 (Minney 2010). Management is not only under pressure to meet the demand for fully franked dividends from shareholders but also needs to consider its competitiveness relative to its rivals in the same industry. Should its competitors pay fully franked dividends, the company operating in that competition environment is also expected to make any dividends declared fully franked. Indeed, the market incorporates a company's franking credit information into its share price (Truong and Partington 2008;

Ainsworth, Partington and Warren 2016). Since franking credits are valued by the capital market, existing shareholders and potential investors, the ideal decision is to make any dividends paid fully franked if there is sufficient credit in the franking account. Is there any situation where managers decide to not utilise all the franking credits available and dividends become unfranked or partially franked instead of fully franked? One potential situation we can think of is when the franking credits available in the franking account may be sufficient for the existing year but the balance is running out for subsequent years. After preparation of projected financial positions for subsequent years including planning for capital expenditure required and tax strategies, the managers may determine to spread the available franking credits across a number of years in order to have a consistent level of franking percentage (despite being lower than 100%) for yearly dividends, as opposed to having fully franked dividend in the existing year but a sudden drop to very low franking level, or even unfranked, for the near-future dividends. This is because a sudden change from fully franked dividend from one year to dividend that is either partially franked at very low level dividend or unfranked in the next year would send a negative signal to the share market and investors.

In order to address the possibility that companies may not always distribute franking levels at the maximum level allowed by the available balance in the franking account but instead may choose to spread the available franking credits across a number of years, a long-run measure of franking level of dividends paid is examined in this study. The authors are of the opinion that a long-run measure as such would necessarily capture the pattern of franking credits attached to dividends and therefore reflect more precisely a history of tax payments via the availability of franking credits in the franking account over a long term. In our first hypothesis, we predict that firms that engage in tax aggressive activities have lower dividend franking level measured over a period of five years due to insufficient franking credits in the franking account. This five-year period used to calculate the long-run dividend franking level starts from the current year where company financial information is observed.

> **H1:** Companies engaging in tax aggressive activities have lower dividend franking level measured over a five-year period.

Hypothesis H1 addresses the relation between corporate tax aggressiveness and long-run dividend franking level. In addition, we also examine how corporate tax aggressiveness is associated with annual dividend franking level. The balance in company franking account is a cumulative balance of taxes paid up to date after accounting for franking credits previously distributed. If a firm only recently starts engaging in tax avoidance, the reduction in tax payments for the current year may not necessarily translate immediately into lower franking level in the same year owing to excess amount of franking credits still remained in the franking account. The consequence of tax avoidance activities in terms of franking credits for dividend payments only comes to light when company still has undistributed retained earnings (after-tax profits) but the franking account has already exhausted. It may take a number of years to see such consequence of tax avoidance, in the form of dividend that is either partially franked at low level or unfranked. Hence, our study analyses the annual dividend franking level not only for the current year but also for each of the following five years. We expect that firms engaging in tax aggressiveness have lower annual dividend franking level at one stage but our prediction cannot specifically identify at which stage the relationship is statistically significant. This leads to hypothesis H2.

H2: Companies engaging in tax aggressive activities have lower annual dividend franking level for the current year and each of the following five years.

III.3. Regression models

The regression models for testing the relation between corporate tax aggressiveness and dividend franking level in this study are developed based on the model adopted in the Australian research by Taylor and Richardson (2014) who examine the incentives for companies to engage in tax avoidance activities.

Testing hypothesis H1

$$TA_t = \alpha + \beta_1 * FRANK(5YRS) + \beta_2 * AGE + \beta_3 * SIZE + \beta_4 * LEV + \beta_5 * RD + \beta_6 * CAPINT + \beta_7 * INV + \beta_8 * GROWTH + \beta_{9-17} GICS + \beta_{18-21} YEAR + \varepsilon \quad (1)$$

Testing hypothesis H2

$$TA_t = \alpha + \beta_1 * FRANK(t) + \beta_2 * AGE + \beta_3 * SIZE + \beta_4 * LEV + \beta_5 * RD + \beta_6 * CAPINT + \beta_7 * INV + \beta_8 * GROWTH + \beta_{9-17} GICS + \beta_{18-20} YEAR + \varepsilon \quad (2)$$

$$TA_t = \alpha + \beta_1 * FRANK(t+1) + \beta_2 * AGE + \beta_3 * SIZE + \beta_4 * LEV + \beta_5 * RD + \beta_6 * CAPINT + \beta_7 * INV + \beta_8 * GROWTH + \beta_{9-17} GICS + \beta_{18-20} YEAR + \varepsilon \quad (3)$$

$$TA_t = \alpha + \beta_1 * FRANK(t+2) + \beta_2 * AGE + \beta_3 * SIZE + \beta_4 * LEV + \beta_5 * RD + \beta_6 * CAPINT + \beta_7 * INV + \beta_8 * GROWTH + \beta_{9-17} GICS + \beta_{18-20} YEAR + \varepsilon \quad (4)$$

$$TA_t = \alpha + \beta_1 * FRANK(t+3) + \beta_2 * AGE + \beta_3 * SIZE + \beta_4 * LEV + \beta_5 * RD + \beta_6 * CAPINT + \beta_7 * INV + \beta_8 * GROWTH + \beta_{9-17} GICS + \beta_{18-20} YEAR + \varepsilon \quad (5)$$

$$TA_t = \alpha + \beta_1 * FRANK(t+4) + \beta_2 * AGE + \beta_3 * SIZE + \beta_4 * LEV + \beta_5 * RD + \beta_6 * CAPINT + \beta_7 * INV + \beta_8 * GROWTH + \beta_{9-17} GICS + \beta_{18-20} YEAR + \varepsilon \quad (6)$$

$$TA_t = \alpha + \beta_1 * FRANK(t+5) + \beta_2 * AGE + \beta_3 * SIZE + \beta_4 * LEV + \beta_5 * RD + \beta_6 * CAPINT + \beta_7 * INV + \beta_8 * GROWTH + \beta_{9-17} GICS + \beta_{18-20} YEAR + \varepsilon \quad (7)$$

The variables used in the regression models are described as follows: TA_t = corporate tax aggressiveness in year t; FRANK(5YRS) = dividend franking level over a five-year period starting from the existing year of observation; FRANK(t+i) = dividend franking level in the relevant year with i value ranges from 0 to 5 representing the current year and each of the next five years; AGE = firm age measured as number of years since first listed on the ASX; SIZE = firm size measured as the natural log of total assets; LEV = firm leverage measured as the ratio of non-current liabilities to total assets; R&D = research and development (R&D) activity measured by R&D expenditure divided by total assets; CAPINT = capital intensity measured as fixed assets divided by total assets; INV = inventory intensity measured as inventory divided by total assets; GROWTH = firm growth measured as the ratio of market value to book value of firm equity; GICS = a dummy variable taking value of 1 if the company belongs to a specific GICS sector and value of 0 otherwise; YEAR = a dummy variable taking value of 1 if for a specific year and value of 0 otherwise.

IV. CORPORATE TAX AGGRESSIVENESS AND CORPORATE FAILURE

IV.1. Research hypotheses

During downturns of the economy, businesses encounter several challenges including harsh competition and decrease in sales due to reduction in consumers' spending, more stringent borrowing requirements and more difficulty in raising equity from the stock market. All the challenges ultimately result in reduction in net profit (or even net loss) from operations and cash flow risks. Under such conditions, it is of my interest to examine whether the tax aggressive activities employed by companies may change significantly during the crisis time. On one hand, due to lower net profit earned, liquidity problems and difficulty in accessing funds either in the form of debt or equity, there is a higher incentive for corporations to engage tax aggressive schemes in order to save on the cash taxes paid, which in turn eases the cash flow requirements by the firms. On the other hand, when businesses are severely impacted by macroeconomic conditions to the extent that the net profit is reduced remarkably or turns into negative, such incentive to engage in tax planning may disappear because tax sheltering activities are costly (Crocker and Slemrod 2005). However, it should be noted here that the tax losses incurred by firms during those years of financial crisis constitute loss carry-forwards, which itself is a form of tax shields (DeAngelo and Masulis 1980; Dhaliwal, Trezevent and Wang 1992). Tax loss carry-forwards create tax planning opportunities which can be utilised by businesses through restructuring activities or simply by offsetting against taxable income expected in the following years. Therefore, it is an empirical question to test whether company tax aggressiveness during the financial crisis is statistically different from tax aggressiveness levels observed before and after the crisis periods.

> **H3:** Corporate tax aggressiveness level during the financial crisis period is different from tax aggressiveness level before and after the crisis period.

It is noted here that this research will be limited in examining only publicly listed firms in Australia and the US owing to the unavailability of information for unlisted Australian and US companies.

Furthermore, my study will conduct a research of the relationship between tax aggressive activities and probability of bankruptcy for companies under normal business conditions (i.e. during non-crisis period). It is recognised here that involvement in tax sheltering does not come at no cost. In deed, previous literature reports that tax aggressiveness may lead to significant costs for companies, in addition to the actual resources required to organise and implement tax aggressive schemes (Chen and Chu 2005). These costs include reputation cost (Hanlon and Slemrod 2009), decrease in firm value (Kim, Li and Zhang 2011), and penalties imposed by the relevant tax authorities upon uncovering of tax avoidance activities. Those costs, in isolation or combination, will most likely cause an increase in the probability of a firm going bankrupt; in order word, tax aggressiveness may have positively impact on corporate failure. Nevertheless, the relation between these two variables may not be one-sided. Company's financial distress may also cause and increase the incentive for a firm to engage in tax sheltering. This could possibly happen because the more distressed a firm is, the more important the tax savings becomes to that firm. And when a firm gets close to the point of financial failure, the managers and/or directors in their attempt to save the firm may choose to ignore potential reputation cost, share price risk and penalties if discovered, simply because there is not so much left for the

company to lose. Again, it is also worth noting that tax planning activities require a certain amount of committed resources but the level of this cost depends on the type of tax strategies being utilised. From my discussion, it is predicted that under stable macroeconomic conditions, the relationship between tax aggressiveness and bankruptcy probability is likely to be positive although this association can be bi-directional.

H4: Corporate tax aggressiveness is positively associated with corporate failure under stable economic conditions (both before and after a financial crisis).

Since general wisdom suggests that company's bankruptcy probability increases when the economy experiences a financial crisis, difficult macroeconomic environment is an interesting setting to study the relationship between tax aggressive planning and corporate failure. The recent GFC and European debt crisis provide an opportunity to examine this relationship (Popov and Horen 2013). I expect that the relation between tax sheltering and corporate bankruptcy remains positive during the crisis time because tax avoidance schemes carry with them significant costs upon detection as discussed above. In addition, the proposition that corporate distress may give a firm higher incentive to engage in tax fraudulent activities remains the same in the context of a financial crisis. The only counter-argument that I can come up with is that successful tax aggressive activities which are not detected may provide tax savings that are sufficient to ease the cash flow problems and therefore affect positively on the company's liquidity position. However, this argument is weak because most often the firms encountering financial distress are those making very little or no profit and consequently the tax savings on such small profit are not material. Although tax losses if incurred can be carried forward and allow for tax savings in the future, they cannot solve the present liquidity problem. For these reasons, the below hypothesis contends that under an economic crisis, firms' tax aggressive activities are also positively associated with corporate failure.

H5: Corporate tax aggressiveness is positively associated with corporate failure during the financial crisis.

As logical thought flows, my study is also interested in examining whether the association between tax aggressiveness and corporate bankruptcy during an economic downturn is different from that association under normal business conditions (i.e. before and after an economic crisis). It is possible that during an economic crisis, the worsened business conditions may lead to an even stronger positive relation between tax sheltering and company failure. This is because when the crisis occurs and has widespread impacts on all businesses, any tax aggressive activities that are uncovered will impose costs that are of much higher burden compared to if those tax avoidance activities are detected when the company is not under macroeconomic pressures. Vice versa, a company already in distress is placed in even worse position during a global crisis, resulting in a stronger incentive to engage in any tax avoidance that is feasible. Indeed, for financially distressed firms, the tax sheltering decision is often a result of the perception that the potential costs of tax aggressiveness are much less than the potential benefits in the form of cash savings in tax payments (Brodonlo 2009; Edwards, Schwab and Shevlin 2013). These arguments point towards a prediction of a stronger magnitude of the relationship between tax aggressiveness and corporate failure during a financial crisis compared to the period before crisis. The hypothesis for this test is stated as follows:

H6a: The positive association, if any, between tax aggressiveness and corporate failure during the financial crisis is stronger than that positive association for the pre-crisis period.

However, it is difficult to predict whether the positive relationship between tax aggressive schemes and bankruptcy probability during the economic downturn is stronger or weaker compared to the period after the financial crisis. There are three reasons for my research to not make this prediction. Firstly, because tax aggressive schemes are most effective when they are utilised for a long-term period (Dyreng, Hanlon and Maydew 2008), companies may still keep the tax aggressive strategies adopted during the financial crisis before even when the crisis has passed and business conditions return to normal. This situation indicates that in the post-crisis time, while bankruptcy probability decreases, the level of tax aggressiveness might remain similar to that during the crisis time. Secondly, if companies incur tax losses during the economic downturn and carry forward those losses which are usable in the years after the downturn, this availability of tax loss carry-forwards creates a remarkable difference between the pre- and post-crisis times. This also means that the association between tax aggressiveness and corporate failure may be quite different between the periods before and after the financial crisis. Thirdly, for companies undertaking tax avoidance strategies while in an economic crisis, such activities might have created a culture of high risk-taking preference which is carried on to the following years, i.e. the post-crisis time. The interplay between all those factors makes it challenging to predict how the relationship between tax sheltering and corporate bankruptcy changes from the crisis period to the post-crisis period. Therefore, my hypothesis contends that this relationship is positive in each of the two periods but does not provide prediction on the comparison of the magnitude of this relation between the two periods.

H6b: The positive association, if any, between tax aggressiveness and corporate failure during the financial crisis is different from that positive association for the post-crisis period.

It is noted here that hypotheses H6a and H6b are relevant only when the tests conducted in H4 and H5 yield a result of a positive relationship between tax sheltering activities and bankruptcy probability for all the three periods in question, i.e. before, during and after a financial crisis.

IV.2. Research methodology

In addressing the research questions, my study will follow the positivism philosophical framework and utilise primarily quantitative research methodology. My research adopts the quantitative methodological approach because the desired achievements of the research are to maintain objectivity in analysing and explaining the research problems, and to produce results that have both 'validity' and 'reliability', which are the main strengths of the quantitative methodology (McKerchar 2010). With respect to the 'validity', a qualitative methodological approach is not suitable for my study when the research seeks not only the 'construct validity' and 'internal validity', but also the 'external validity' in terms of giving the research findings certain generalisation power (McKerchar 2010). On the same note, 'reliability' is also a quality that my research will endeavour to achieve. According to McKerchar (2010), a quantitative research method provides better opportunities for replication of the reported findings at a later time, which helps to strengthen the 'reliability' quality of a research.

My study will collect data in two settings, Australia and the US, and perform regression models to test research hypotheses established in Section IV.1 of this paper. It should also be noted that my research topic centres around tax aggressive activities of companies and their financial distress, which are not only confidential information in their nature to the organisations but may also be unknown to companies' executives (in the case of potential failure in the future); thus, survey, interview or case study may not be appropriate strategy of inquiry for my research. For that reason, regression models and statistical analysis will be employed in my study in order to address the research questions.

IV.3. Regression models

IV.3.1. Model to test hypothesis H3

The following regression model will be used to test hypothesis H1:

$$\mathbf{TA}_t = \alpha + \beta_1*\mathbf{INCRISIS} + \beta_2*\mathbf{POSTCRISIS} + \beta_3*AGE + \beta_4*SIZE + \beta_5*LEV + \beta_6*RD + \beta_7*CAPINT + \beta_8*INV + \beta_9*GROWTH + \beta_{10-18}GICS + \varepsilon$$

The above model is developed based on the model adopted in the Australian research by Taylor and Richardson (2014) who examine the incentives for companies to engage in tax avoidance activities.

The variables used in the regression models are described as follows: TA_t = corporate tax aggressiveness in year t; INCRISIS = dummy variable that takes value of 1 if the observation falls in the in-crisis period (2008-2010) and 0 otherwise; POSTCRISIS = dummy variable that takes value of 1 if the observation is after the economic crisis (i.e. after 2010) and 0 otherwise; AGE = firm age measured as number of years since first listed on the ASX; SIZE = firm size measured as the natural log of total assets; LEV = firm leverage measured as the ratio of non-current liabilities to total assets; R&D = research and development (R&D) activity measured by R&D expenditure divided by total assets; CAPINT = capital intensity measured as fixed assets divided by total assets; INV = inventory intensity measured as inventory divided by total assets; GROWTH = firm growth measured as the ratio of market value to book value of firm equity; GICS = nine dummy variables representing ten GICS industry sectors which take value of 1 if the company belongs to a specific GICS sector and value of 0 otherwise.

IV.3.2. Model to test hypotheses H4, H5, H6a and H6b

In order to test hypotheses H4, H5, H6a and H6b, the following two-stage least squares (2SLS) model specification is employed:

Stage 1: Estimate corporate tax aggressiveness using the standard model in CTA research as follows (Model A):

$$\mathbf{TA}_t = \alpha + \beta_1*AGE + \beta_2*SIZE + \beta_3*LEV + \beta_4*RD + \beta_5*CAPINT + \beta_6*INV + \beta_7*GROWTH + \beta_{8-16}GICS + YEAR + \varepsilon$$

The variables used in Model A are described as follows: TA_t = corporate tax aggressiveness in year t; AGE = firm age measured as number of years since first listed on the ASX; SIZE = firm size measured

as the natural log of total assets; LEV = firm leverage measured as the ratio of non-current liabilities to total assets; RD = research and development (R&D) activity measured by R&D expenditure divided by total assets; CAPINT = capital intensity measured as fixed assets divided by total assets; INV = inventory intensity measured as inventory divided by total assets; GROWTH = firm growth measured as the ratio of market value to book value of firm equity; GICS = a dummy variable taking value of 1 if the company belongs to a specific GICS sector and value of 0 otherwise; YEAR = a dummy variable taking value of 1 if for a specific year and value of 0 otherwise.

Stage 2: Use the fitted values of TA obtained from stage 1 in estimating the corporate failure model as follows (Model B):

DISTRESS = $\beta_0 + \beta_1$***TA** + β_2***TA*INCRISIS** + β_3***TA*POSTCRISIS** +

(Macro-Cond) $+ \beta_4$*GDP + β_5*TA*GDP + (OR β_4*MKTINDEX + β_5*TA*MKTINDEX)

(Firm's Risk) $+ \beta_6$*FIRMBETA +

(Liquidity) $+ \beta_7$*OPERCASH +

(Profitability) $+ \beta_8$*NPAT +

(Leverage) $+ \beta_9$*LEV

(Productivity) $+ \beta_{10}$*COSTCTRL +

(Industry) $+ \beta_{11\text{-}17}$*GICS

(Error term) $+ \varepsilon$

The variables used in Model B are described as follows: TA_t = corporate tax aggressiveness in year t; DISTRESS = Altman's Z-score (1968); INCRISIS = dummy variable that takes value of 1 if the observation falls in the in-crisis period (2008-2010) and 0 otherwise; POSTCRISIS = dummy variable that takes value of 1 if the observation is after the economic crisis (i.e. after 2010) and 0 otherwise; GDP = a measure of macroeconomic conditions calculated as the growth rate of gross domestic production (GDP) (Kim and Qi 2010; Feidakis and Rovolis 2007)) with higher value indicating better economic situation; MKTINDEX = a measure of macroeconomic conditions calculated as the return of the market portfolio (Kim and Qi 2010) (in the US, this is measured as the return of the CRSP value-weighted index pertaining to Kim and Qi (2010); in Australia, this is measured as the return of the All Ordinaries Index (XAO) representing 500 largest listed firms on ASX); FIRMBETA = firm's risk factor measured as individual firm's beta; OPERCASH = firm's liquidity on cash basis computed as operating cash flows divided by total assets (Jones and Hensher 2004); NPAT = a profitability measure calculated as net profit after tax scaled by total assets (Zmijewski 1984); LEV = firm's leverage on book basis measured as the ratio of total debt to total assets (Altman 1968); COSTCTRL = firm's productivity measured by the ratio of cost of goods sold over sales revenue (Jung, Lim and Oh 2011; Neely, Gregory and Platts 2005); GICS = nine dummy variables representing ten GICS industry sectors which take value of 1 if the company belongs to a specific GICS sector and value of 0 otherwise.

V. RESEARCH PLANNING: AUSTRALIA AND US

V.1. Data collection for Australian study

My research uses a sample of Australian publicly listed companies with financial information available for the period from 2006 to 2015 financial years and it is anticipated that more companies will fail during the GFC and also in the following years of the worsened economy owing to the European debt crisis. Since Australia adopts the International Financial Reporting Standards (IFRS) from 1 January 2005 (Pawsey 2010; Chua, Cheong and Gould 2012), company financial information reported prior to the IFRS adoption may not be comparable with the post-IFRS information from company financial reports. Chua, Cheong and Gould (2012) report findings that show accounting quality post-IFRS adoption is better than accounting quality under the Australian generally accepted accounting principles (GAAP) prior to IFRS adoption in 2015. For that reason, my Australian sample starts from 2006 in order to ensure comparability of accounting quality from financial information obtained. The 2006-2015 period will be divided into three stages of the economy surrounding the financial crises as follows: before the GFC and the European crisis (2006 – 2007: two years), during the crises (2008 – 2010: three years) and after the crises (2011 – 2015: five years). Company financial data are obtained from *Aspect Huntley Datalink* which collects data of ASX listed firms.

In my study, the crisis period is defined as from 2008 to 2010, which allows for coverage of not only the GFC in 2008-2009 but also the European sovereign debt crisis in 2010 (Lane 2012; Popov and Horen 2013). According to Kolb (2010), Australia, in spite of its better performance compared to the US and other developed economies, witnessed significant drop in the stock market and bankruptcy of some large companies in the 2008 and 2009 years, including Babcock and Brown, Timbercorp and Great Southern. Followed by the GFC is the debt crisis in 2010 which has spread across the Euro area under the contagion effects as discussed in Missio and Watzka (2011) and Constancio (2012). As a result of globalisation, it is possible that such contagion effects of the European debt crisis might have also reached Australia in 2010. In fact, 2010 is an interesting year because it is not only the year when the European sovereign crisis occurred but also when businesses around the world just started recovering from the GFC. As such, further tests for the in-crisis period will be carried out with the 2010 year left out of the in-crisis definition, i.e. the in-crisis time examined will only cover 2008 and 2009.

With regards to identification of company failure cases, the impediment encountered is how to locate those listed companies that failed due to financial distress because not all companies that were delisted or deregistered are considered as 'failed'. Corporations can action delisting or deregistration for various reasons other than failing to meet the financial obligations. Taking into consideration the difficulties involved in identification of failed companies, I will adopt Altman's (1968) Z-score as a measure of firm bankruptcy probability in my study. This Z-score variable will be incorporated into the regression models used to investigate the relationship between tax aggressive activities and firm bankruptcy possibility. Australian company financial data required for computing Z-score are available from *Aspect Huntley Datalink*.

V.2. Data collection for US study

For my US study, I collect data of US publicly listed corporations with financial information available for the period from 2003 to 2015 years. US firms' financial data are collected from *Compustat North America* database. The time period for my US research will be categorised as follows: before the GFC and the European crisis (2003 – 2007: five years), during the crises (2008 – 2010: three years) and after the crises (2011 – 2015: five years).

Similar to the research carried out for Australian companies, the crisis period covers 2008, 2009 and 2010 on the basis that the GFC occurred in 2008-2009 and the European sovereign debt crisis was at peak in 2010 (Lane 2012; Popov and Horen 2013). It is also recognised here that 2010 is a special year because not only that it follows immediately after the 2008-2009 GFC but it is also when the European crisis happened with Greece being so heavily indebted that other countries in the Euro zone and the International Monetary Fund had to lend money to rescue it (Missio and Watzka 2011). Thus, in my research, additional analysis will be performed where the in-crisis period is limited within 2008-2009 timeframe and all 2010 observations will be excluded from the main sample.

As previously discussed, financial distress is not always easily detected simply from reviewing profit and loss statements although there are certain signs of distress that are revealed from the financial performance reports. Previous researchers have developed a number of models to predict company bankruptcy probability and the most prominent model amongst those is the Z-score model of Altman (1968). For my research, Altman's (1968) Z-score will be used to measure a firm's failure probability. This Z-score variable will be incorporated into the regression models used to investigate the relationship between tax aggressive activities and corporate bankruptcy. US company financial data required for computing Z-score are available from *Compustat North America* database.

VI. SUMMARY

This paper sets out the rationale of my study and the overarching research objectives. My research examines tax aggressive activities by companies and reviews corporate tax avoidance measures employed by researchers up to date. In the first part of my research, I review the literature to document the proxies for corporate tax aggressiveness used by previous researchers. Following a review of the company tax aggressiveness proxies, my study will conduct principal component analysis in order to construct an index measure of corporate tax aggressiveness.

In the second part of my study, the research results provide strong evidence of a positive and statistically significant association between ETR – the most commonly used tax avoidance proxy – and franking level of dividends paid by Australian companies, on both annual basis and long-run basis (i.e. over a five-year period). From there my study recommends using dividend franking level as a new proxy for corporate tax aggressiveness which is available under a dividend imputation tax system such as Australia, and discusses the readily useable status of this proxy as well as other advantages and limitations it has.

Furthermore, my research examines tax aggressive strategies by companies operating in a financial crisis environment as opposed to operating during a non-crisis time. Regression analysis is conducted

to test the relationship between tax aggressiveness and corporate failure under stable economic conditions as well as under impacts of a financial crisis such as the GFC or the European sovereign debt crisis. My research studies this relationship in both Australian and US companies and carries out a comparative analysis to understand if there are any differences between the two countries in respect of the relation between tax avoidance and corporate failure, especially when this relationship is placed under an economic downturn. Accordingly, the third part of my research makes the following contributions to the corporate tax avoidance field of study: (a) the levels of tax aggressive planning employed by companies during both crisis and non-crisis times, (b) the relationship between corporate tax aggressiveness and corporate failure and the impacts of a financial crisis on this relationship, and (c) a comparative study of Australia and the US in respect of (a) and (b). Moreover, an additional contribution of my study is my examination of the usefulness of incorporating corporate tax aggressiveness into a corporate bankruptcy model.

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