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1. INTRODUCTION

This article examines whether the level of tax avoidance undertaken by firms operating in a full dividend imputation system decreases when changes made to the system enhance shareholders' after-tax returns.[1] The focus is on Australian publicly listed firms because Australia is one of a few countries which continues to operate a full dividend imputation system.[2]

A rapidly evolving academic literature on corporate tax avoidance has emerged. Studies document a variety of determinants of corporate tax avoidance and an assortment of financial reporting, capital market, and contracting outcomes associated with such activities.[4] Although considered by many as morally questionable, tax avoidance practices can lead to increases in both accounting earnings and cash flows. Furthermore, some managers believe their fiduciary duty to shareholders compels them to act aggressively with respect to tax strategy if it leads to significant cost savings and increased firm value. However, tax planning costs, management rent extraction, reputational effects, and post-audit penalties, may provide a counterweight to such incentives.[5] Indeed, Chen et al. (2010) and Chyz et al. (2013) provide evidence that company stakeholders view tax avoidance negatively and seek to limit these activities. Thus, managers face a delicate risk-reward trade-off between personal incentives, prospective shareholder benefits, stakeholder expectations, and risk.[6]

Our argument is that in Australia the full dividend imputation system provides a strong countervailing influence on the incentives managers of certain firms may have to engage in tax avoidance. This system eliminates the double taxation on profits distributed by companies to shareholders by allowing the tax paid by the company to be credited, or imputed, to the shareholders by way of a franking credit attached to dividends to reduce the final income tax payable by the shareholder.[7] Consequently, the imputation system likely leads to heterogeneity in tax avoidance incentives across Australian publicly listed firms due to differences in dividend pay-out policy. Australian firms that pay dividends with attached franking credits are more likely to face stronger incentives to pay corporate tax relative to foreign firms publicly listed in Australia, Australian firms that do not pay dividends, or Australian firms that pay unfranked dividends.[8] Importantly, this heterogeneity facilitates comparisons between these different groups operating within the same system.

Prior studies suggest that dividend imputation is associated wi

findings contribute to this debate by providing empirical evidence of the extent to which one mechanism of the current system, full franking credit refundability, helps mitigate corporate tax avoidance.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Upon receipt, shareholders pay tax on a dividend at their marginal tax rate with any final liability dependent on whether the dividend payer's resident co

Appendix demonstrates the impact of this change on shareholder-level tax liabilities for different types of resident shareholders with varying marginal tax rates.[13] Clearly, the

2001-2004 following the 2001 change consistent with an increase in demand from domestic investors. Jun et al.'s (2011) study of institutional tax clienteles shows that Australian institutional funds have a higher ownership of stocks which carry full franking credits compared to stocks which have partial, or zero franking credits.[16]

[redacted]le selection procedure. Panel B presents [redacted]cation codes.

[redacted]	Firms	Firm-years
[redacted]	1,839	8,359
	(116)	(528)
	(76)	(269)
	(784)	(2,212)
	(288)	(2,257)
	(93)	(856)
	482	2,237
	344	958
	447	1,279
		2,237
	440	2,041
	42	196
	482	2,237

[redacted]	Firm-years	Frequency (% of total)

[redacted]

Figure 1

Panel A: Domestic dividend-paying firms where all **dividends paid are fully-franked and domestic dividend-paying firms where** none/some **dividends are fully-franked**

Panel B: Domestic dividend-paying firms where at least one **dividend paid is fully-franked and domestic dividend-paying firms where** no **franked dividends paid**

Table 2 presents statistics for the full sample (Panel A) and sub-samples (Panel B).[24] In both panels, the results for *CETR* are shown along with their values prior to dividing by the statutory corporate tax rate (denoted with _A). In Panel A, the mean (median) of *CETR_A* is 0.264 (0.242) and significant differences in ETRs between domestic and significant at the 1% level (*t*-stat = 6.34). Using mean pre-tax income of AUD 193.5 million for these firms over the sample period, this 28.0% difference represents about AUD 13.7 million more in cash taxes paid in the post-refund period relative to the pre-refund period.[26] This preliminary evidence is consistent with the argument that the enhancement to the dividend imputation system *increased* the incentives for certain firms to take a less aggressive approach to tax avoidance.

We note the surprising result in row (e) and offer two possible explanations. First, it may be that these profitable firms are reducing their tax avoidance (paying more cash taxes) in the post 1 July 2000 period to start generating franking credits for possible *future* distribution with planned dividends. Second, it may be that they are increasing their tax payments so as not to stand out from their competitors to minimise any ATO scrutiny (i.e. mimicking behaviour).

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Table 2: Descriptive Statistics (continued)

Panel B: Sub-samples

Table 3: Correlations Matrix

This Table presents the correlations between the variables for the full sample. Pearson correlation coefficients are shown below the diagonal while Spearman correlation coefficients are shown above the diagonal. Significant (*p*-value < 0.05) coefficients are reported in bold.

Full sample (n=2,237): treatment group = domestic firms; control group = foreign firms

(1) (2) (3) (4) (5) (a T T

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·oups Before and After 1 July 2000

. means for CETR. The sample period is 1997-2004. The pre-refund period is defined as the years prior to the 1997, 1998, 1999, 2000) while the post-refund period is defined as the years after the new rule was implemented tatistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

	CETR		
	Mean (Pre-refund)	Mean (Post-refund)	Difference

4.4

treatment group (control group) comprises domestic dividend-paying firms that fully frank *all* dividends (fully frank *none or some* dividends).

The results in Table 7 strongly support H4. The coefficient on *TREATED*POST* in Model (1) is 0.147 and significant at the 5% level (*t*

Table 6: Corporate Tax Avoidance Following Changes to the Imput

Table 7: Corporate Tax Avoidance Following Changes to the Imputation System

This Table reports the results from estimating Equation (1) using OLS. In Models (1) and (2), the sample consists of domestic firms where *at least one* dividend paid is fully franked (treatment group) and domestic firms where *no* dividends paid are fully franked (control group). In Models (3) and (4), the sample consists of domestic firms where *all* dividends paid are fully franked (treatment group) and domestic firms where *none/some* dividends are fully franked (control group). Coefficient estimates are presented with *t*-statistics reported in parentheses. The *t*-statistics are based on heteroscedasticity robust standard errors and standard errors are clustered at the firm-level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively, using one-tailed tests for directional hypotheses, and two-tailed tests otherwise.

Dep. Var.				$CETR_t$	
Variables	Pred.	(1)	(2)	(3)	(4)
$TREATED_t$		0.453***	-	0.382***	-
		(6.48)		(5.89)	
$TREATED_t$*$POST_t$	+	0.147**	0.269***	0.171**	0.261***
		(1.84)	(3.40)	(2.21)	(3.88)
$SIZE_t$		-0.037**	-0.073	-0.033**	-0.072
		(-2.52)	(-1.45)	(-2.25)	(-1.42)
ROA_t		-1.473***	-4.113***	-1.453***	-4.098***
		(-5.00)	(-8.18)	(-4.85)	(-8.12)
LEV_t		0.231	-0.004	0.238	-0.009
		(1.57)	(-0.01)	(1.59)	(-0.03)
$INTANG_t$		0.355**	-0.338	0.359***	-0.354
		(2.57)	(-1.24)	(2.58)	(-1.31)
$CAPINT_t$		0.128	0.341	0.132	0.337
		(1.04)	(1.24)	(1.06)	(1.21)
$MKTBK_t$		0.003	0.010	0.003	0.010
		(0.60)	(1.20)	(0.63)	(1.21)
RND_t		1.001	4.979*	1.387	4.995*
		(0.93)	(1.95)	(1.17)	(1.93)
Intercept		1.038***	2.457***	1.024***	2.439**
		(3.07)	(2.61)	(2.99)	(2.57)
Industry FE		Y	N	Y	N
Firm FE		N	Y	N	Y
Year FE		Y	Y	Y	Y
Observations		1,640	1,640	1,640	1,640
R^2		0.183	0.165	0.178	0.166
Adj. R^2		0.171	0.157	0.165	0.158

5. ROBUSTNESS TESTS

5.1 Control for dividend payout ratio

In the primary analysis of Hypothesis 4, we follow McClure et al. (2018) and do not control for the dividend payout ratio because any impact on tax avoidance associated with a pre-determined commitment by the Board of Directors to pay a certain level of dividends would be more appropriately described as a dividend effect rather than an imputation effect.[31] Nevertheless, to alleviate any concerns, we follow Amiram et al. (2019) and include an additional control variable (*DIVPR*) to control for the dividend payout ratio and re-estimate the models in Table 7.[32] The results are presented in Table 8 and the direction of the coefficients on *TREATED*POST* remain in line with our prediction and are significant in three of the four models. Overall, the results do not alter our inferences from the main findings.

5.2 Inclusion of firm-years with negative pre-tax income

In the main analysis, firm-year observations with negative pre-tax income are excluded. However, because accounting losses do not necessarily translate to tax losses,[33] these firm-year observations are included and all models re-estimated.[34] Untabulated results are similar to those in the main findings although the magnitude and statistical significance increases for the coefficients on the variable of interest in Tables 6 and 7. For example, the coefficient on *TREATED*POST* corresponding to Model (1) in Table 6 increases to 0.065, which is mildly significant at the 10% level (*t*-stat = 1.27). The coefficient on *TREATED*POST* relating to Models (1) and (2) in Table 7, increases to 0.168 (*t*-stat = 2.34) and 0.309 (*t*-stat = 3.55), respectively. The results do not alter our inferences but do suggest the impact of dividend imputation may be magnified when analysing all firms, be they profitable or loss making.

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[31] Furthermore, in many cases, firms set their dividend payout ratio in *advance*

Table 8: Replication of Table 7 Results While Controlling for the Dividend Payout Ratio

This Table reports the results from replicating the results presented in Table 7 while including an additional control for the dividend payout ratio (*DIVPR*). Coefficient estimates are presented with *t*-statistics reported in parentheses. The *t*-statistics are based on heteroscedasticity robust standard errors and standard errors are clustered at the firm-level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively, using one-tailed tests for directional hypotheses, and two-tailed tests otherwise.

Dep. Var.		$CETR_t$			
Variables	Pred.	(1)	(2)	(3)	(4)
$TREATED_t$		0.437***	-	0.387***	-
		(6.34)		(6.13)	
$TREATED_t$*$POST_t$	+	0.097	0.176***	0.098*	0.164***
		(1.23)	(2.42)	(1.32)	(2.73)
$DIVPR_t$		0.582***	0.687***	0.589***	0.688***
		(7.83)	(11.44)	(7.77)	(11.35)
$SIZE_t$		-0.042***	-0.034	-0.039***	-0.034
		(-2.83)	(-0.72)	(-2.58)	(-0.71)
ROA_t		-0.892***	-1.906***	-0.865***	-1.902***
		(-3.33)	(-4.52)	(-3.19)	(-4.49)
LEV_t		0.365**	0.049	0.372**	0.046
		(2.46)	(0.17)	(2.48)	(0.16)
$INTANG_t$		0.344**	0.060	0.351**	0.052
		(2.43)	(0.20)	(2.46)	(0.17)
$CAPINT_t$		0.154	0.386*	0.161	0.384*
		(1.17)	(1.72)	(1.20)	(1.69)
$MKTBK_t$		-0.001	-0.000	-0.001	-0.000
		(-0.19)	(-0.02)	(-0.17)	(-0.01)
RND_t		0.630	1.581	1.013	1.642
		(0.67)	(0.72)	(0.97)	(0.73)
Intercept		0.558*	1.112	0.508	1.111
		(1.77)	(1.23)	(1.58)	(1.22)
Industry FE		Y	N	Y	N
Firm FE		N	Y	N	Y
Year FE		Y	Y	Mear	

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5.3 Alternative proxy for tax avoidance

Given the challenge in measuring tax avoidance precisely and because each measure has its own limitations (Blouin, 2014), an additional proxy is employed. Since the denominator in *CETR* is pre-tax net income, low *CETR*s may be driven by upwards earnings management. Moreover, if tax-avoiding firms simultaneously report lower accounting earnings and lower taxable income (i.e., conforming tax avoidance), then any change in *CETR* may be mechanical and inadvertently capturing a denominator effect only (Hanlon & Heitzman, 2010). Consequently, the second measure (*CETR_M*) modifies *CETR* by substituting net cash flows from operating activities for pre-tax net income in the denominator (Dyreng et al., 2008). The results are qualitatively similar to those in the primary analysis. For example, the coefficient on *TREATED*POST* corresponding to Models (1) and (3) in Table 5 are 0.173 (*t*-stat = 1.68) and 0.174 (*t*-stat = 1.76), respectively, and corresponding to Models (2) and (4) in Table 7 are 0.131 (*t*-stat = 2.24) and 0.112 (*t*-stat = 2.11), respectively.

5.4 Reduced sample period (1998-2003)

There may be concerns regarding the length of the time window used in the analysis, i.e., 8-year time period of 1997-2004. Therefore, the sample period is restricted to three years either side of the change i.e., 1998-2003 to allay concerns that the results are driven by confounding factors. Similar coefficients are found on the variable of interest relative to those in the primary analysis demonstrating that the results are not being unduly influenced by noise around the date of change (untabulated).

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APPENDIX: ILLUSTRATIVE EXAMPLE

Two identical debt-free firms exist in two countries that differ only in their shareholder dividend tax policies. Taxable income is assumed to equal book income. The company tax rate is 30%. All profits after tax are paid out as dividends. Panel A compares

1. INTRODUCTION

Fintech is becoming mainstream in facilitating transactions. Blockchain technology, from its humble beginning as a decentralised encrypted form of record keeping, has moved to the mainstream. The advent of cryptocurrencies as a result of blockchain technology is a more novel Fintech development. Based on similar technology, hundreds of cryptocurrencies are being created and traded. Bitcoins are by far the most popular cryptocurrency, but many others exist.[1]

The most important of these concessions is recognising cryptocurrencies as 'a legal method of payment', as in Japan,[4] or a form of 'digital currency'.[5] It may be accorded the same status as foreign currency or, in extreme cases, equivalent with currency issued by the local sovereign state.[6] To this end it is crucial from the outset to understand that that the term 'cryptocurrency' is in itself a misnomer. Whether it is to obtain the status of 'currency' will be determined by the government of the relevant jurisdiction.

If the government decides it is not 'currency', how will it be characterised? The government may, as in the case of Vietnam, determine that transactions involving cryptocurrencies merely involve the sale of property.[7] Sales of cryptocurrencies have been suggested to be akin to the sale of shares or futures. In some cases the parallel that is drawn is oil[8] or gold bullion.[9] A further related issue is whether that characterisation will be embraced for all purposes, such as in Vietnam,[10] or whether a government will be 'schizophrenic' and pick and choose which characterisation it will utilise for different purposes.[11]

The above characterisation of cryptocurrencies has in turn significant ramifications to both the regulatory framework and taxation regime. As to the former, as already addressed above, at the macro level the government will need to decide whether ICOs and trading are allowed. If ICOs and trading are allowed then it must be determined if current laws will be applied or a new legal framework will be developed for

VAT/GST but also exempt from taxes such as capital gains tax. As to which way a government might turn is anyone's guess: a toss of a (bit)coin!

While it has been noted above that these matters are global issues which each nation needs to address, the current analysis is confined to four key Asian nations, namely China, Vietnam, South Korea and Ja

debts) but not convertible into coins or precious metal, and coins minted by governments according to law',[45] to cheques that document transfers of money between account holders, to electronic payment systems such as Paypal and Alipay, and e-money such as debit cards.

The next role money plays is as a unit of account, that 'it is cryptocurrencies occurs on exchanges in a similar fashion to co the electronic currency stored in software (ie, types of cryptocurrencies that have official

As noted above, the legal treatment of cryptocurrencies will have great implications as to their regulation from a taxation perspective. To this end, Vietnamese lawmakers are still in the process of deciding whether to treat bitcoin as currency or as an asset. So far, there is little detail on the taxation treatment of cryptocurrencies in Vietnam, except that the government is determined to prevent tax evasion from those engaging in cryptocurrency transactions. From the declaration that cryptocurrencies are not a lawful means of payment referred to above, it would seem logical that for taxation purposes Vietnamese lawmakers are likely to continue not to recognise cryptocurrency as money. As discussed below, this however, needs to be supported by legislation expressly confirming such. Equally, the allowance of trading in cryptocurrencies indicates the government will treat it as a commodity.

Any profits could be taxed as corporate business income (tax rate 20 per cent) and for non-corporate taxpayers, taxed as 'non-employment' income which includes business income (tax rate of between 0.5 and 5 per cent), gains from the sale of securities (tax rate 1 per cent of sale proceeds), or capital gains (tax rate 20 per cent of the net gain or 0.1 per t se‾ p Mt A γ T

6. JAPAN

Japan is one of the eight largest cryptocurrency markets and has the highest cryptocurrency ownership in the world.[93] It is reported that approximately 40 per cent of overall trading in bitcoin is Japanese yen. Significant to these figures is the fact that, since 2018, a large number of cryptocurrency investors have mov

Subsection (i) of Paragraph 5 of Article 2 of the *Payment Services Act* also states that cryptocurrency is limited to property value which is recorded on an electronic device or any other object by electronic means, and excluding the Japanese currency, foreign currencies, and Currency-Denominated Assets.[102]

The *Payment Services Act* focuses on identifying cryptocurrencies as a payment method. As discussed above in section 3, the concept of a payment method stops short of the medium of exchange criteria of money, stipulated by Mishkin.[103] In terms of economic substance, as one of the jurisdictions most friendly towards cryptocurrencies, and therefore cryptocurrency investors potentially can pay at the highest tax rate of 55 per cent.[111]

Table 1: National Income Tax Rate, Japan[112]

Taxable Income (JPY)	Tax Rate (%)	Deduction (JPY)
below 1,950,000	5	0
above 1,950,000 and less than 3,300,000	10	97,500
above 3,300,000 and less than 6,950,000		

(KRW) stood at approximately 4 per cent of all trades.[122] While this compares to more than 40 per cent of total bitcoin trade in Japanese yen and roughly 30 per cent transacted in US dollar terms,[123] South Korean trade still plays a significant part in the overall market. Moreover, consequent to such rising demand in South Korea, cryptocurrencies have at times traded at prices 30 per cent higher than prices in other countries.[124]

Initially it appeared South Korea would follow the approach taken in Japan and allow for cryptocurrencies at both levels: ICOs and trading. However, after China banned the currency, South Korea decided on a major turnaround.[125] It followed suit and announced on 28 September 2017 a ban on all kinds of ICOs. Specifically, South Korea's Financial Services Commission prohibited domestic companies and start-ups from issuing
124 ICOs.[126] Those involved in breaches of this prohibition would face ‘stern penalties’.[127] Currently the legislature is considering lifting the ban, allowing for the issuing of domestic IC f Ǯ f 3 Ɋ ž Ǝ 3M l

over KRW 300 million.[135] Table 2 summarises the CIT rates applicable for the fiscal year starting on or after 1 January 2018.

Table 2: Corporate Income Tax Rate, Korea, 2018[136]

Tax base (KRW million)		Tax rate	
Over (column 1)	**Less than**	**Tax on column 1 (KRW)**	**Marginal tax rate (%)**
0	200	0	10
200	20,000	20	20
20,000	300,000	3,980	22
300,000		65,580	25

For individuals, business income is included in their taxable income and taxed at progressive rates up to 46.2 per cent. In addition to the personal income tax (PIT) rates detailed below, there is also a local income tax that is assessed at a rate of 10 per cent of the PIT rates. Table 3 summarises the PIT rates applicable for the income received from 1 January 2018.

[135] Deloitte, 'Korea: 2018 Tax Amendments in Effect' (10 January 2018), https://www.taxathand.com/article/9020/Korea/2018/2018-tax-amendments-in-effect (accessed 27 January 2020).
[136] Ibid.

fluctuating, there is a lack of an objective valuation method and trading platforms to determine the value of the cryptocurrency. This is especially the case given that, as established above, the economic substance of cryptocurrencies is not that of money, so that the foreign currency valuation models could not be applied to value cryptocurrencies. Further, some cryptocurrencies, such as Bitcoin Cash and Bitcoin Gold, allow coin-splits into different parts or provide free native tokens to current cryptocurrency investors. Quantifying these coin-splits and subsequent gains could be a challenge. The current tax treatment in Japan is that the split-coins and free native tokens obtained through mining are considered to have a zero face value at acquisition.[147]

Furthermore, a related issue is to decide the types of expenditure eligible for tax deduction. For example, should the electricity expense related to the mining of the cryptocurrency be deductible? Also, many taxpayers are holding their cryptocurrency in 'paper wallets' or other physical devices. Should the cost/loss be tax deductible when a taxpayer loses access to their crypto wallets or when their cryptocurrency is embezzled by hackers such as Coinbase?[148]

Whether cryptocurrency is considered a financial product akin to a share also entails further tax and non-tax issues. Financial products are regulated under securities legislation, normally administered by a state authority. If cryptocurrencies are not considered financial products, the danger is that they will be unregulated without further government regulatory intervention. From a tax perspective, if they are considered financial products, trading in cryptocurrencies will again be subject to existing business income, personal income and in some cases, capital gains tax provisions. However, as noted above, financial products are often exempt from capital gains and normally exempt from GST/VAT.

There are further issues in the context of GST/VAT. If a cryptocurrency is deemed to be a commodity, as in Vietnam and South Korea, the trade of a digital currency for consideration would constitute a supply for VAT purposes. By contrast if it is treated as currency, as in Australia and the European Union, the exchange of cryptocurrency is zero-rated.[149]

This article has focused on key domestic tax issues in this regard. However, there are further international tax issues. Due to the rapid growth of the digital economy, the taxation of cryptocurrencies presents a great challenge to the existing tax system. In particular, the nature of cryptocurrencies often poses problems in determining the source of tax and tax collection.[150]

Both domestic tax laws and double tax agreements are based on the core notions of 'source' and 'residence', and at times 'domicile'. For example, in Japan, permanent tax residents who have a domicile in Japan are subject to tax on their worldwide income.

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[147] Ibid

[148]

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Abstract

1. INTRODUCTION

In the wake of accelerated globalisation and advanced information technology, multinational enterprises (MNEs) typically engage in cross-border profit shifting to artificially shift their profits from high-tax to low-tax jurisdictions for tax avoidance. The profit shifting results in the erosion of the tax bases and hence reduced tax payments due in the high-tax jurisdictions where the MNEs operate. This practice is referred to shareholders can claim the franking credits received as a tax offset against their personal income tax. As such, for Australian shareholders, Australian corporate income tax does not reduce the after-tax returns on their investment in the companies. Foreign shareholders, however, cannot claim the franking credit tax offset in either Australia or their countries of residence, and therefore view Australian corporate tax as a real cost.[3] In line with this argument, Li and Tran (2019) reveal that among Australian listed companies, those with higher foreign ownership engage in greater tax avoidance than do those with lower foreign ownership.

Based on the findings in prior studies, this article treats DOLACs as the benchmark companies which do not have strong incentives to engage in Australian corporate tax avoidance by means such as shifting profits out of Australia. By contrast, ASFMs, due to their foreign shareholdings and the relatively high corporate tax rate in Australia,[4] are hypothesised to engage in Australian tax avoidance by shifting profits to foreign low-tax jurisdictions where their affiliates operate. More specifically, if ASFMs employ intra-group transfer pricing to shift out profits, they would have reduced gross profit margins and operating profit margins due to the inflated costs of purchases of goods and services or depressed selling prices for intra-group transactions. Likewise, if ASFMs are structured to be thinly capitalised to claim a high level of tax deductions for interest expenses, one would observe substantial interest expenses and relatively high leverage ratios for ASFMs. If by engaging in either intra-group transfer pricing or thin capitalisation, or both, ASFMs effectively shift profits out of Australia, then they would have lowered pre-tax profits as well as lowered income tax expenses.

To compare ASFMs with DOLACs on their cross-border profit shifting, paired sample *t*-tests are performed around six financial ratios which are designed to capture intra-group transfer pricing, thin capitalisation, and the effectiveness of the two profit shifting methods to avoid tax. The results show that compared to the matched DOLACs, ASFMs have lower gross profit to sale revenue ratios and lower earnings beoh aiohu h þ sb revenue ratios and lower income tax expense to sales revenue ratios, which suggests that they effectively shift profits out of Australia and lowered their Australian tax liabilities.

Multivariate regression analyses are also performed. The six financial measures of intra-group transfer pricing, thin capitalisation and the effectiveness of the two profit shifting methods are regressed on an ASFM indicator along with control variables. The results are consistent with the findings from the paired sample *t*-tests.

The article contributes to the literature on tax-induced cross-border profit shifting as well as dividend imputation systems. It shows, in an alternative way in the absence of intra-group trade data, that ASFMs engage in cross-border profit shifting to a greater extent than do comparable DOLACs, and hence also provides evidence of the impeding role of foreign ownership on the corporate tax avoidance-reducing effect of the dividend imputation system which has not been adequately examined in prior studies. The article also develops measures, using financial data and in accordance with the pertinent guidelines provided by the OECD to capture corporate tax avoidance via intra-group transfer and thin capitalisation.

The remainder of this article is organised as follows. Section 2 reviews the literature on tax-induced intra-group transfer pricing and thin capitalisation. Hypotheses are developed based on the discussion. Section 3 explains the sample selection and introduces the propensity score matching technique employed to construct the matched samples. Results from the paired sample *t*-tests and the multivariate regression analyses are presented in section 4. Section 5 provides a robustness check. Lastly, section 6 summarises and concludes the article.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

MNEs typically engage in corporate tax avoidance via cross-border profit shifting to exploit the differences in tax laws and tax rates across jurisdictions. This article focuses on two main cross-border profit shifting practices as suggested in the literature and government reports, namely, intra-group transfer pricing and thin capitalisation.

2.1 Intra-group transfer pricing

Intra-group transfer pricing refers to the prices charged on the flow of goods and services between members of an MNE that operate in different countries with different tax rates. It provides a means for MNEs to shift profits from high-tax countries (such as Australia) to low-tax countries to take advantage of the tax rate arbitrage.

Due to the lack of subsidiary-level financial and tax data and intra-group trade data, extant studies have mostly relied on examining the relationship between foreign subsidiaries' profitability levels and the local tax rates to provide indirect evidence of tax-motivated intra-group transfer pricing. A negative relation between profitability and tax rates indicates profit shifting as greater p

Dischinger (2007) reveals a negative relation between a subsidiary's pre-tax profit and the statutory corporate tax rate differential of the subsidiary relative to its foreign parent. Further analysis shows that subsidiaries located in countries w depending on the type of the goods and services that are transacted with related parties, ASFMs would have reduced gross profit margins and reduced operating profit margins.

In the absence of intra-firm trade data, this article proposes expense can be claimed, resulting in subsidiaries in high-tax countries being highly geared.

Prior studies have documented MNEs’ use of thin capitalisation for tax avoidance. For instance, Mills and Newberry (2004) find that among US subsidiaries of foreign MNEs,

H3B: ASFMs have lower income tax expense to sales revenue ratios than do comparable DOLACs.

3. RESEARCH DESIGN

3.1 Data collection and calculation

To test the hypotheses developed in section 2, ASFMs are compared with DOLACs in terms of the six ratios capturing intra-group transfer pricing, thin capitalisation and the are obtained from commercial database DatAnalysis Premium. Pre-tax accounting profit does not include the share of associates' profit or loss which is an after-tax figure. Income tax expense does not include royalty-related taxation and resource rent tax.[12] Since some ASFMs present their financial data in thousands of dollars, for consistency, all financial data are collected in thousands of dollars.

3.2 Sample selection

3.2.1 Initial sample

The sample year is 2012. Because of the significant cost of purchasing annual reports of ASFMs from the ASIC, the sample year and sample size are subject to resource constraints. Moreover, 2012 is the last year to study cross-border profit shifting without the impact of the highly publicised Base Erosion and Profit Shifting (BEPS) Project of the OECD and the related amendments to the Australian tax legislation (including the transfer pricing rules effective from 2013) which are expected to reduce international tax avoidance.

6. C

7. References

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Table 3: Logit Model Results

Panel A Gross profit ratio sub-sample

Panel B EBIT ratio sub-sample

Panel C Interest expense ratio sub-sample

	Coef.	Std. Err.	z	P > |z|
Constant	-3.082482***	0.7800295	-3.95	0.000
SIZE	0.3607459***	0.0566898	6.36	0.000
CAPINT	-3.744285***	0.4210181	-8.89	0.000
Industry 1510	0.3016014	0.4202432	0.72	0.473
Industry 2010	-0.3810947	0.4194045	-0.91	0.364
Industry 2020	-0.4199125	0.475975	-0.88	0.378
Industry 2030	0.0097727	0.6377255	0.02	0.988
Industry 2510	0.696011	0.7369267	0.94	0.345
Industry 2520	-0.4893064	0.6673301	-0.73	0.463
Industry 2530	-1.209472	0.7441346	-1.63	0.104
Industry 2540	0.433796	0.5770326	0.75	0.452
Industry 2550	0.7207028	0.4389619	1.64	0.101
Industry 3010	0.2491008	0.8148224	0.31	0.760
Industry 3020	0.8723609*	0.5005532	1.74	0.081
Industry 3030	0.78076	0.9723727	0.8	0.422
Industry 3510	-0.3210669	0.5054451	-0.64	0.525
Industry 3520	0.5054552	0.761853	0.66	0.507
Industry 4510	-0.4300584	0.5179897	-0.83	0.406
Industry 4520	0.5528407	0.5754408	0.96	0.337
Industry 4530	.	.	.	.
Industry 5010	-0.1528223	0.7124769	-0.21	0.830
Industry 5510	0.5178821	0.8283052	0.63	0.532
No. Obs.	*740*			
Pseudo R-square	*0.1997*			
Caliper	*0.06*			

Panel D Leverage sub-sample

	Coef.	Std. Err.	z	P > |z|
Constant	-2.964881***	0.7910976	-3.75	0.000
SIZE	0.3658915***	0.0573097	6.38	0.000
CAPINT	-3.919044***	0.430622	-9.1	0.000
Industry 1510	0.1838983	0.425392	0.43	0.666
Industry 2010	-0.5048729	0.4265041	-1.18	0.237
Industry 2020	-0.52165	0.4817153	-1.08	0.279
Industry 2030	-0.0604196	0.6418211	-0.09	0.925
Industry 2510	0.5856304	0.7431657	0.79	0.431
Industry 2520	-0.5934107	0.6730673	-0.88	0.378
Industry 2530	-1.796721**	0.8569325	-2.1	0.036
Industry 2540	0.3510448	0.5832651	0.6	0.547
Industry 2550	0.5721754	0.446246	1.28	0.200
Industry 3010	0.127277	0.8198096	0.16	0.877
Industry 3020	0.7931213	0.5048564	1.57	0.116
Industry 3030	0.6657727	0.9777368	0.68	0.496
Industry 3510	-0.4505523	0.5134019	-0.88	0.380
Industry 3520	0.41946	0.7687026	0.55	0.585
Industry 4510	-0.5336203	0.5236659	-1.02	0.308
Industry 4520	0.4178096	0.5826875	0.72	0.473
Industry 4530	.	.	.	.
Industry 5010	-0.2265421	0.7168937	-0.32	0.752
Industry 5510	0.4692555	0.8315327	0.56	0.573
No. Obs.	*736*			
Pseudo R-square	*0.2087*			
Caliper	*0.06*			

Table 4: Descriptive Statistics

Panel A Gross profit ratio sub-sample

	Full (unmatched) sample				**Propensity-score matched sample**		
	All Obs.	**ASFMs**	**DOLACs**	**t-test**	**ASFMs**	**DOLACs**	**t-test**
Variables	Mean	Mean	Mean	t-statistic	Mean	Mean	t-statistic
	Std. Dev.	Std. Dev.	Std. Dev.	(p > |t|)	Std. Dev.	Std. Dev.	(p > |t|)
Gross Profit Ratio	0.333	0.269	0.394	-7.210	0.263	0.374	-5.010
	0.194	0.168	0.198	(0.000)	0.158	0.187	(0.000)
SIZE	12.229	12.699	11.780	6.260	12.490	12.616	-0.640
	1.618	1.233	1.806	(0.000)	1.190	1.795	(0.520)

0.115	0.068	0.146	(0.112)