

# Can Tax Drive Capital Investment?

Le Phuong Dung

RMIT UNIVERSITY

## *Abstract*

Classical tax systems and imputation systems are used not only to generate government revenue but also to drive economic growth. This paper examines whether tax system changes and corporate tax payout do impact on capital investment. This study examines the impacts on capital investment of (1) corporate tax payout in Canada and the United Kingdom (UK) (1981-2015); and (2) when there was a shift from a classical to an imputation tax system in Australia (1981-2002) and Taiwan (1989-2013). Using fixed effect models, our findings show that corporate tax payout within the imputation tax system of Canada and the UK does impact capital investment. We also find that moving from a classical to an imputation system has an impact on capital investment in both Australia and Taiwan. However, we did not find a strong relationship between tax payout and capital investment within a classical system.

JEL classification: G30, G31, G32, H25

Key words: Corporate Tax Payout, Capital Investment, Imputation Tax System

## 1. Introduction

Governments design tax systems to promote private sector investment, increase capital expenditure and stimulate economic growth (Arnold et al. 2011; Easterly & Rebelo 1993; Jorgenson & Yun 1990). The objective of government is to balance the budget while creating efficiencies in the allocation of funds in order to promote productive public and private capital expenditure (Surrey 1970). The tax system needs to provide incentives to businesses to invest and for investors to provide capital (Zee, Stotsky & Ley 2002). Some governments have moved from a classical to an imputation tax system as a way to increase this effectiveness.

There are two main reasons why countries may move to an imputation tax system. *First*; the classical tax system may constrain capital investment because of double taxation<sup>1</sup> (Handley & Maheswaran 2008). Classical systems, with a tax shield, also promote debt (Graham 1996; MacKie-Mason 1990). The tax shield will impact on capital structure of firms because the tax shield makes it attractive to acquire debt. Classical systems may as a result inadvertently increase the potential for financial distress by increasing the appetite for debt. *Second*; the tax system needs to stimulate capital investment (Black, Legoria & Sellers 2000; Cummins, Hassett & Hubbard 1996). Governments move to imputation tax regimes because they believe they are better able to do this (Zee, Stotsky & Ley 2002). This is because they make it more attractive for investors to provide capital to equity markets, making these markets deeper and less expensive. This makes the investment cost of capital expenditure cheaper. Imputation tax systems also remove double taxation, and reduce the incentive for debt. Imputation systems encourage small time investors to participate in the

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<sup>1</sup> Double taxation means that tax is first applied at the corporate level through income tax on corporate profits, and that a second tax is levied at the individual level through taxation of dividend payout or and capital gains.

equity market as a way of diversifying their savings (Boyle 1996). This helps to boost liquidity in capital markets. Greater liquidity creates a deeper pool of investment capital. A deeper pool reduces the cost of acquiring funds.

These are good reasons why governments would move to imputation tax systems; i.e. removing double taxation, promoting investment, stimulating equity investment, increasing liquidity and creating boarder community opportunity to invest. Obviously, governments have policy tools (i.e. tax policy) that can have significant impacted on firms' investment decisions. How firms can actually behave in a particular way in response to the selected policies that governments have implemented? Empirically, however, it has not been verified (1) whether shifting from classical to imputation tax systems has a significant impact on capital investment as is intended or; (2) Whether corporate tax payout<sup>2</sup> within imputation tax systems impacts on capital investment.

The objective of this paper is to better understand (1) whether a change of tax system from a classical to an imputation impacts capital investment. (2) Whether corporate tax payout within an imputation system has an impact on capital investment. (3) Whether corporate tax payout within classical systems has an impact on capital investment.

We focus on two countries whose systems have shifted (Australia and Taiwan) and two countries with well-established imputation tax systems (Canada and the UK) to examine these issues. Based on OECD tax system, there are six countries that have used imputation tax systems (Canada, the UK, Australia, New Zealand, Chile and Norway). In this study, we decide to focus on four countries including Canada, the UK,

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<sup>2</sup> To analyse the impacts of corporate tax payout on investment, we define corporate tax payout as the interaction between corporate tax rate and cash flow.  
i.e. when payout goes up, it is because they are paying more taxes, which means taxes have increase.

Australia and Taiwan which is 50% of total sample and focus on developed and emerging economy because their important in terms of global economic growth. This provides us with a good dataset that is multinational and which represents cases where those questions can be addressed. We examine whether the shift from a classical to an imputation tax system has caused an increase in capital investment in Australia and Taiwan. We have also investigated the impact of corporate tax payout on capital investment in Canada and the UK. It is also the case that both Canada and Australia are open markets, have similar socio-economic systems and have used the imputation tax system for a long time period. The economy of the UK is the fifth-largest national economy in the world. Taiwan, on the other hand, is a new emerging economy as the 5th largest economy in Asia. There is a limit set of countries to choose from, and it is also difficult to acquire data for the early period in Australia. Taiwan and Australia are good examples of countries that have shifted to an imputation tax system. It is important to note that these four countries have attempted to increase capital investment through their respective imputation tax system (Chang, Chen & Chen 2016). Therefore, we have the opportunity to determine whether a shift from a classical to an imputation increases capital investment as predicted, and whether within an imputation, corporate tax payout impacts on capital investment. i.e. reduces depending on debt and thus the potential for financial distress.

We have run regression models called “firm-fixed effect” estimation that controls time-invariant influence on capital investment and account for unobservable business cycle and other macro-economic effects. For the baseline tests, this paper uses the regressions between investment and corporate tax payout which is the interaction between payout tax rates with cash flow. The coefficient of interaction is positively significant. It means that the higher payout taxes are, the more firms invests.

This paper is expected to contribute to the understanding of the effectiveness of tax policy changes whether imputation tax system changes or payout tax have a positive effect on firms' capital investment. This is important for governments because they need to know if tax payout can be used to stimulate economic growth.

This paper contributes to the literature in three ways. First, our study contributes to the existing tax literature on imputation tax systems that investigates the effects of imputation tax systems on firms' capital structure (Pattenden & Twite 2008; Schulman et al. 1996; Twite 2001), dividend policies (Chen, 2011, Pattenden & Twite, 2008), capital investment (Black, Legoria, & Sellers 2000, Chang, Chen & Chen 2016) and firm value (Prevost, Rao & Wagster 2002). However, little is known about whether corporate tax payout within an imputation system impacts capital investment or whether a shift from classical to an imputation system impacts capital investment. This study helps to fill these gaps in the literature.

Secondly, we provide empirical evidence that corporate tax payout does have an effect on capital investment in the imputation tax system of Canada and the UK. Our results indicate that firms generate more income, create more cash flow and have higher payout taxes. This means corporate tax rate payout within imputation does impact capital investment. Therefore, there is strong relationship between corporate tax payout and capital investment within imputation systems as we expected.

Thirdly, in classical tax system, corporate tax payout has a negative effect on capital investment in both Australia and Taiwan. When shifting from classical to a well-established imputation tax system, corporate tax payout has a positive effect on capital investment. Once the imputation tax system is well-established, the tax-saving efficiencies help firms to lower its cost of financial capital. From a policy perspective, this shift promotes capital investment.

Fourthly, our study provides tax policy making implications for countries using imputation tax systems and for countries shifting the tax system to an imputation system. Use of corporate tax payout as a tool to stimulate economic growth can increase capital investment. Countries including Canada and the UK have implemented corporate tax payout to increase capital investment. Our results suggest that corporate tax payout can help stimulate capital investment in capital markets in countries under an imputation tax system. In addition to contributing to the literature on the effectiveness of tax policy changes, our findings suggest that imputation tax regimes increase firms' capital investment.

The paper is organized as follows. Section 2 represents a review of literature. Section 3 discusses the data sources and section 4 discusses the panel data methods. In section 5, we present the results. Section 6 summarizes our empirical findings and provides recommendations.

## **2. Literature review**

The impact of corporate taxes on capital investment is an important issue for governments. The effects matter not only for designing tax policy to generate government revenue, but also how it will impact on economic development and growth. This section reviews the literature on the impact of corporate tax on capital investment in a classical tax system, and an imputation tax system.

*In a classical tax system*, empirical evidence on the effect of statutory corporate tax rates on corporate investment suggests that there is a significant impact between corporate tax and capital investment. Auerbach (1992) estimate models of investment behavior in which tax changes directly affect investment, especially for investment in machinery and equipment. Jacob, Wentland and Wentland (2016) find that increasing uncertainty about tax has the effect of decreasing investment by firms, especially

decisions regarding significant investments. House and Shapiro (2008) use the tax policy to estimate firms' investments. Others have found negative impacts between investment incentives and corporate tax asymmetries for taxable firms and found positive impacts for nontaxable firms (Edgerton 2010). However, Desai and Goolsbee (2004) find that even after several years of tax cuts, investment still does not increase significantly in comparison with previous periods. This suggests that tax policy is ineffective in promoting firms' investments within classical tax systems. In summary, the empirical literature which examines tax and investments does not provide conclusive evidence whether tax does or does not impact capital expenditure.

Second, there is also empirical evidence regarding the relationship between tax and capital investment in *dividend relief tax systems*. Alstadsæter, Jacob and Michaely (2015) investigated Sweden's 2006 dividend tax decrease and found that dividend tax cuts increase corporate investments. Dobbins and Jacob (2016) also report that corporate tax cuts increase real investment by domestic firms, especially, those relying more on internal funds. Thus, empirical evidence suggests that tax changes within dividend relief tax systems can promote capital investments.

Third, *in the imputation tax system*, Chang, Chen and Chen (2016) find that decreases in corporate tax rates led to increases in dividend payouts and foreign investment in Taiwan from 2008 to 2011. However, this study only focused on the corporate tax on foreign investment and did not focus on payout tax and the tax system changes affecting capital investment. Black, Legoria and Sellers (2000) investigated the effect of tax reform on capital investment in Australia and New Zealand from 1982 to 1991. The major tax change that was consistent across both countries, the implementation of dividend imputation in 1988 in Australia and 1987 in New Zealand. After the introduction of dividend imputation, the coefficient on dividend payout was

negative and significant, which did not support the expectation of increases in investment after the introduction of imputation tax system in New Zealand. In Australia, there was a positive relationship between corporate capital investment and Australia's tax reform. They found that dividend imputation increases capital investment.

Research has shown that when Australia and New Zealand adopted imputation tax systems this resulted in changes in corporate capital investment, but there is conflicting findings regarding the impact of these changes. This paper intends to fill this gap. In contrast to Black, Legoria and Sellers (2000) and Chang, Chen et al. (2016), this paper examines four countries who have adopted an imputation tax system, namely Canada, the UK, Australia and Taiwan. This study differs from prior research in that it investigates whether corporate tax payout affects capital investment in Canada and the UK. This paper also examines how the introduction of imputation tax systems affect capital investment in Taiwan and Australia. By examining the investment effects in countries that have used dividend imputation and in countries that have changed to imputation tax systems, this paper provides evidence of potential impacts on capital investment occurring in other countries. To the best of our knowledge, this has not yet been undertaken.

### **3. Hypothesis development**

This section presents the hypotheses regarding the effects of corporate tax payout and tax system changes on capital investment.

#### **3.1. Corporate tax payout and capital investment**

Payout taxes affect a firm's investment. Studies have identified two main effects: that payout tax has impact on investment depending on a firm's use of equity financing



(Harberger 1962, 1966; Feldstein 1970; Poterba and Summers 1985) by raising the relative cost of capital and reduce investment; and that payout tax can increase investment when a firm uses internal resources i.e. retained earnings (Auerbach 1979a, Bradford 1981, King 1977). Firms are likely to differ in their ability to finance investment with internal resources, if they do, the tax rate will affect their investment (Lamont 1997).

Corporate tax payout also has an impact on investment through the tax systems. In particular, the imputation system in which corporate and payout taxes are strongly intertwined because there is a dividend tax credit at the shareholder level for underlying corporate profits tax. Thus, the corporate tax rate is in some way a measure of investor taxes. In this system, internal cash flow is a strong predictor of a firm's investment when taxes are high. In other words, internal financing resources tend to matter more when there is an increase in corporate taxes (Becker, Jacob & Jacob 2013). In the similar vein, firms have more investment opportunities if they can access more internal resources (e.g., Lamont, 1997; Rauh, 2006).

We argue that there should be a positive effect between corporate tax payout and capital investment in countries with imputation tax systems. Canada and the UK are selected because they both have well-established imputation tax systems since 1989 which designed to stimulate corporate investment (Mishra and Ratti, 2014; Chang, Chen and Chen 2017; Feuerherdt, Gray and Hall, 2010). The study by Becker, Jacob and Jacob (2013) support our position that payout taxes have a large impact on corporate investment and growth. Therefore, it is predicted that under an imputation tax system, there should be a positive association between corporate tax payout and capital investment in Canada and the UK.

***Hypothesis 1: Positive relationship between corporate tax payout and capital investment in an imputation tax system.***

### **3.2. Tax system changes and capital investment**

Tax reforms have focused on reducing the top corporate tax rate, and integrate the corporate and individual tax systems, reducing double taxation of corporate income.

Prior studies have concentrated on major tax reforms that included numerous significant changes in the tax structure. A relation between investment and the Tax Reform Act (TRA) of 1986 in the U.S has been confirmed (Cummin and Hassett 1992; Auerbach et al 1991). The numerous tax reforms in the U.S and other countries provided the evidence that taxes can be linked to changes in investment (Cummins et al 1994, 1996).

Ayres (1987) studies the impact of Investment Tax Credit on security returns and finds a negative significant association between them. Further, Rosacker and Metcalf (1993) examine the impacts of Investment Tax Credit on capital investment in the US firms. They find that while there is positive impact on capital investment before the introduction of Investment Tax Credit, a negative impact on capital investment is found after the introduction of Investment Tax Credit.

Other study has attempted to link the impacts of tax system changes in corporate investment. Black, Legoria and Sellers (2000) examine the effects of dividend imputation on capital investment in New Zealand and Australia where there was the changes in tax system from a classical tax system to an imputation in 1987 and 1998, respectively. They demonstrate that there are positively impacts of dividend imputation on corporate capital investment. The findings suggest that the dividend imputation stimulates capital investment in these both countries.

The objective of this study is to increase understanding of the impacts of changes in tax system on distributed corporate earnings and their effects on capital investment. This study differs from prior research in that we examine whether a specific tax reform – dividend imputation – increases investment. By examining the capital investment in

countries that have implemented dividend imputation, we derive implications of the potential effects of similar changes in the U.S. and other countries.

In this study, we argue that there should be an increase in capital investment in countries where there is an introduction of an imputation tax system. Taiwan and Australia have identified in this research because both these countries shifted to an imputation tax system. Taiwan and Australia had classical tax systems before 1998 and 1987. After that, these both countries also adopted a dividend-imputation system in order to design to stimulate corporate investment in Australia and Taiwan (Chang, Chen and Chen 2016). It is also expected that the introduction of a dividend imputation tax system significantly impacts corporate capital investment in Australia and Taiwan. The change in the tax system would get more firms who invest more in the security market in order to access a cheaper cost which can stimulate a capital investment. Therefore, there should be a positive association between capital investment and payout tax. This leads to our second hypothesis:

***Hypothesis 2: An introduction of imputation tax system significant increases capital investment.***

#### **4. Corporate tax and tax systems across countries**

##### **4.1. Tax systems**

Table 1 shows a time line of the tax systems in the UK, Canada, Taiwan and Australia<sup>3</sup>. While the UK and Canada have used imputation tax from 1989 to 2015, Australia and Taiwan adopted an imputation tax system in 1987 and 1999, respectively. The UK,

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<sup>3</sup> <http://www.oecd.org/tax/tax-policy/tax-database.htm>  
<https://www.google.com/search?tbm=bks&q=the+report+Taiwan+2007>

Australia and Canada (after 2009) have used full imputation tax systems<sup>4</sup>. Canada (before 2009) and Taiwan have used partial imputation tax systems<sup>5</sup>.

According to the Organisation for Economic Co-operation and Development's tax databases, countries that currently use full or partial imputation tax systems for dividends include Australia, Canada, and the UK. Taiwan also uses this system since 1999 (Report Taiwan, 2007). There is some contention about the classification of the UK as a partial tax system. The OECD continues to classify the UK as a partial imputation country after 1999. The UK changed tax system since 1999, but the formula for calculating dividend taxes after 1999 still bears some characteristics of a partial imputation system. Some authors classified that the UK is classical tax system post 1999 (Fan, Titman, and Twite, 2012). The other academic studies we have seen examining the change in the UK tax system have similarly classified it as a partial imputation system post 1999 (Becker, Jacob and Jacob 2013, Mishra and Ratti 2014, and Alzahrani and Lasfer 2012).

This research aligns with Becker, Jacob and Jacob (2013), Mishra and Ratti (2014), and Alzahrani and Lasfer (2012) who have also defined the tax system in the UK as a partial imputation tax system from 1981 to 2015.

**Table 1: The tax systems in the UK, Canada, Taiwan and Australia**

<b>Country</b>	<b>The effects of corporate tax payout on capital investment</b>		
UK	<b>FI</b> (1989-2015)		
Canada	<b>PI</b> (1989-2009)	<b>FI</b> (2010-2015)	
<b>Country</b>	<b>The effects of tax system changes from a classical to an imputation tax on capital investment</b>		
Taiwan	<b>CL</b> (1989-1999)	Integrated <b>PI</b> (2000-2005) (6 year period) (2000-2006) (7 year period)	Well-Established <b>PI</b> (2006-2011) (6 year period) (2007-2013) (7 year period)

<sup>4</sup> Full imputation (dividend tax credit at shareholder level for underlying corporate profits tax) (Source: OECD, 2016).

<sup>5</sup> Partial imputation (dividend tax credit at shareholder level for part of underlying corporate profits tax) (Source: OECD, 2016).

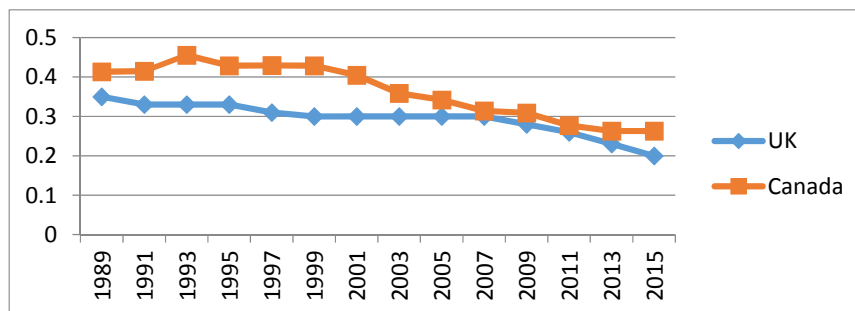
Australia	CL (1981-1986)	Integrated FI (1989-1994) (6 year period) (1989-1995) (7 year period)	Well-Established FI (1995-2000) (6 year period) (1996-2002) (7 year period)
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Note: Table 1 reports the tax regimes in the UK (1989-2015), Canada (1989-2015), Taiwan (1989-2013), and Australia (1981-2002). FI, PI, and CL abbreviate Full Imputation Tax System, Partial Imputation Tax System and Classical Tax System.

#### 4.2. Corporate tax rate

We use multiple sources to obtain and verify the corporate tax rate in Canada, the UK, Australia and Taiwan. The primary data sources employed are the OECD's Tax Database (Combined corporate tax rate income section)<sup>6</sup> and the World Bank's World Development Indicators (Highest marginal tax rate)<sup>7</sup>. We supplement this with data from the University of Michigan's World Tax Database<sup>8</sup>. Corporate tax rate in Figure 4 is the top marginal statutory corporate income tax rate from 1989 to 2015 in Canada and the UK. Corporate tax rate in Figure 2 and 3 are from 1981 to 2002 in Australia and 1989-2013 in Taiwan.

**Figure 4: Corporate tax changes in Canada and the UK**



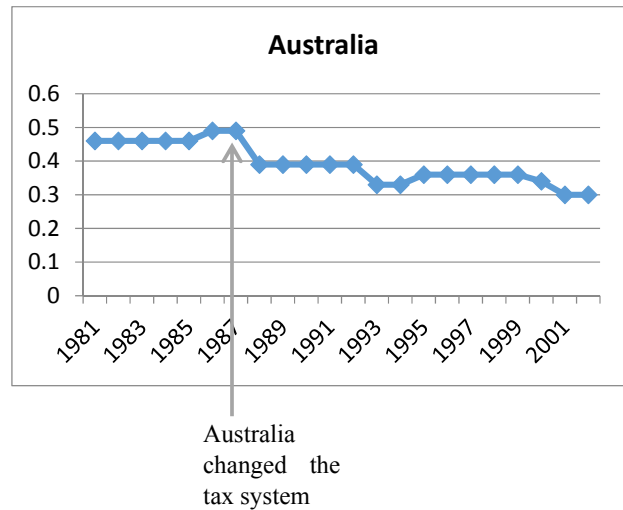
**Figure 5: The tax system changes in Australia and Taiwan**

<sup>6</sup> <http://stats.oecd.org/Index.aspx?QueryId=59615>

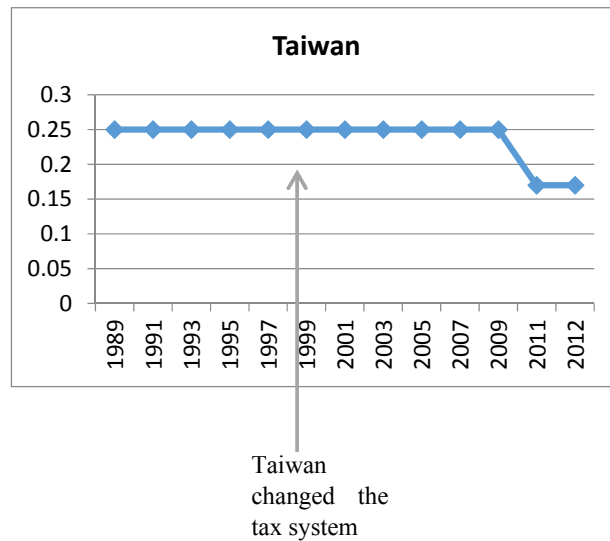
<http://www.oecd.org/tax/tax-policy/tax-database.htm>

<sup>7</sup> [http://www.econstats.com/wdi/wdiv\\_443.htm](http://www.econstats.com/wdi/wdiv_443.htm)

<sup>8</sup> <http://www.bus.umich.edu/otpr/otpr/default.asp>



**Figure 6: The tax system changes in Taiwan**



The corporate tax data shown in Figure 4, 6 and 6 covers the period from 1989 to 2015. Within this sample period, the trend of statutory corporate tax rate is declining. When Australia changed to an imputation tax system in 1987, the corporate tax rate was reduced at the same time from 49% to 39%. However, when Taiwan shifted from a classical to an imputation tax system in 1988, the corporate tax rate remained at 25% until 2009. In 2010, corporate tax rate in Taiwan reduced to 17%,

this tax cut was aimed at enhancing Taiwan's competitiveness and attract more foreign investors<sup>9</sup>.

## **5. Data Sample**

In this section, we describe the data including corporate tax rates, capital investment and control variables.

### **5.1. Firm data**

We use firm-level data obtained from Datastream for the UK, Canada and Taiwan. For Australia, we use data from the Morningstar database from 1990 to 2002 and for the early period from 1980 to 1989, we hand collected data directly from annual reports. As is common with other studies, companies offering financial, insurance services and utilities are excluded because these firms have motives to pay out cash that are different from non-financial firms, and that likely affect their investment behavior (Dittmar 2000; Fama & French 2001). Our sample data consists of 3,548 companies in Canada and the UK over the period 1989 to 2015, a total of 29,749 firm-year observations. We start the year of our analysis in Australia from 1981 to analyse the effects of corporate tax system changes on capital investment. For Australia, we have 171 firm-year observations in the classical tax system, 599 firm-year observations in the integrated full imputation tax system, and 1,815 firm-year observations in the well-established full imputation tax system period. As for Taiwan, there are 588 firm-year observations in the classical tax system, 3,100 firm-year observations in the integrated partial imputation tax system, and 5,507 firm-year observations in the well-established partial imputation tax system.

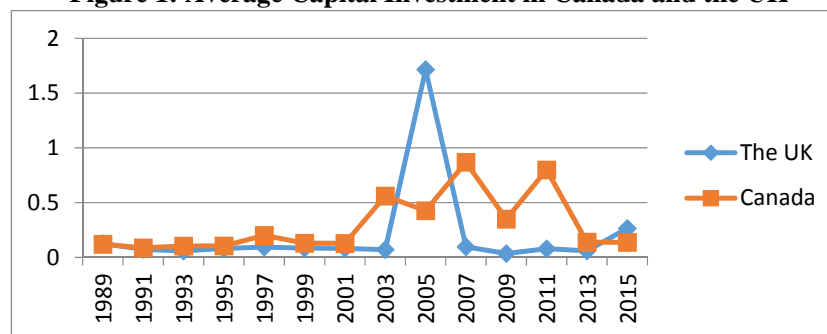
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<sup>9</sup> The 2010 amendment was approved after Taiwan passed the Industrial Innovation Act on April 16, 2010, which grants tax breaks, subsidies, and other incentives to business in order to encourage innovation and employment (<http://www.loc.gov/law/foreign-news/article/taiwan-corporate-income-tax-reduced-to-17/>).

## 5.2. Capital Investment

Our proxy for *capital investment* is defined as capital expenditure, including additions to property, plant and equipment and investment in machinery and equipment divided by total assets. In the sample, firms on average have capital investment at 2% of the value of the previous year total assets in Canada and the UK. In Australia, average capital investment increases from 2% to 3% of the value of the previous year total assets when the tax system changes from the classical tax to the well-established full imputation tax system. By contrast, average capital investment decreases from 1% to 0.3% of the value of the previous year total assets in Taiwan when the tax system changes to a partial imputation. We translate *capital investment* into real term<sup>10</sup>. Figure 1 presents the average *capital investment* of Canada and the UK. Figure 2 and 3 present the average *capital investment* of Australia and Taiwan, respectively, as follow.

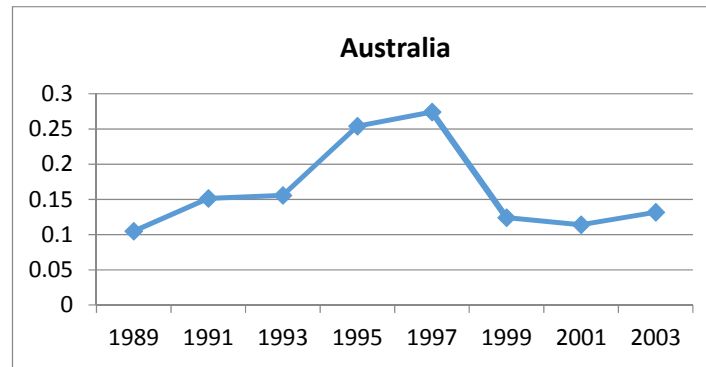
**Figure 1: Average Capital Investment in Canada and the UK**



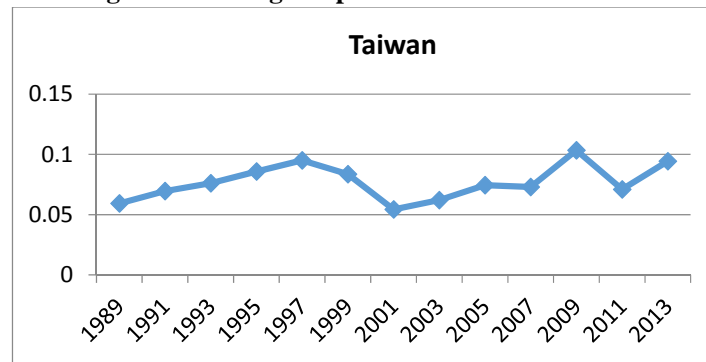
**Figure 2: Average Capital Investment in Australia**

<sup>10</sup> Based on the year in the middle for each countries, Canada and the UK choose the year of 2002, Australia choose the year of 1992, and Taiwan choose the year of 2002.





**Figure 3: Average Capital Investment in Taiwan**



### 5.3. Corporate tax payout

Canada and the United Kingdom have used imputation tax systems since 1989. Taiwan and Australia used classical tax systems before adopting dividend imputation systems in 1998 and 1987, respectively. The imputation tax system plan was designed to stimulate investment in Canada, the UK, Australia and Taiwan (Mishra and Ratti, 2014; Chang, Chen and Chen 2017; Feuerherdt, Gray and Hall, 2010). To investigate whether corporate tax payout impacted on capital expenditure, we define corporate tax payout variable as the interaction of average of statutory corporate income tax rate and cash flow (Becker, Jacob and Jacob 2013)

Therefore, it is expected that under an imputation tax system, there should be a positive relationship between corporate tax payout and capital investment in Canada and the UK. We also expect that the introduction of a dividend imputation tax system will have an impact on corporate capital investment in Australia and Taiwan. The change in the tax system would get more firms who invest more in the security market

in order to access a cheaper cost which can stimulate a capital investment. Therefore, there should be a positive relationship between capital investment and corporate tax payout.

#### 5.4. Control variables

The ratio of *Cash flow*, *Debt change*, *Size growth*, *Tobin's Q* and *Sales growth* are included as firm-level control variables. Prior studies have shown that capital investment with certain characteristics (Becker, Jacob & Jacob 2013; Black, Legoria & Sellers 2000). Definitions of all variables are shown in Table 2. Table 3, 4 and 5 present the summary statistics of dependent and independent variables.

**Table 2: Definitions of Variables**

<b>Variables</b>	<b>Definitions</b>
Investment	<i>Investment</i> is measured as the changes in capital expenditure from t to t-1 over one year lagged total assets
Cash flow	<i>Cash flow</i> is defined as the ratio of cash flow in year t over prior year total assets
Debt changes	<i>Debt changes</i> is the ratio of year from t to t-1 total debt to one-year lagged total assets
Tobin's Q	<i>Tobin's Q</i> is defined as the market value of the firm over total assets (Market to book ratio).
Size growth	<i>Size growth</i> is the logarithm of the growth rate of total assets from t to t-1
Sales growth	<i>Sales growth</i> is captured as the logarithm of the growth rate of sales from t-2 to t

Note: All variables are in real term (the year in the middle)

Table 3 presents the summary statistics of dependent and independent variables in the UK and Canada. On average, a firm in the UK and Canada have an investment ratio of 0.0196. In terms of control variables, the means of *cash flow*, *debt changes*, *size growth*, *Tobin's Q* and *sales growth* is 0.3021, 0.0315, 0.0654, 0.0019 and -0.2644, respectively.

Table 4 reports the summary statistics of dependent and independent variables in Australia for each period of tax systems. The average estimated in capital investment is 0.0209 in a classical tax system, 0.0231 in an integrated full imputation tax system and 0.0322 in a well-established tax system. We find that there is an increasing in

capital investment when tax system shifts in Australia and which is consistent with the prediction.

Table 4 reports the summary statistics of dependent and independent variables for firms in Taiwan. The average estimated in capital investment is 0.0111 in a classical tax system, 0.0081 in an integrated full imputation tax system and 0.0039 in a well-established tax system. We find that there is a decreasing in capital investment when tax system shifts in Taiwan and which is consistent with the prediction.

**Table 3: Sample Overview and Summary Statistics in the UK and Canada from 1989 to 2015**

Variables	Number of Firms	Number of Observations	Mean	Standard Deviation	Median
Investment	3548	29749	0.0196	0.2571	0.0015
Payout Tax	3548	29749	0.3021	0.0366	0.2905
Cash flow	3548	29749	0.0315	0.1299	0.0766
Debt changes	3548	29749	0.0654	0.7205	0.0766
Size growth	3548	29749	0.0915	0.4294	0.0704
Tobin's Q	3548	29749	0.0019	0.0468	0.0009
Sales growth	3548	29749	-0.2644	0.9022	-0.1863

Note: This Table sets out descriptive statistics for the UK and Canada from 1989 to 2015. This period is the imputation tax system in the UK and Canada. This table provides the number of firms, the number of observations, mean, median, and standard deviation of each variable.

**Table 4: Sample Overview and Summary Statistics in Australia**

Classical Tax System (1981-1986)				
Variables	Number of Firms	Mean	SD	Median
Investment	171	0.0209	0.1543	0.0016
Payout Tax	171	0.4668	0.0126	0.4600
Cash flow	171	0.0363	0.0708	0.0259
Debt changes	171	0.0207	0.1742	0.0037
Size growth	171	0.0465	0.0918	0.0211
Tobin's Q	171	0.2268	0.3346	0.1399
Sales growth	171	-0.0529	0.1504	-0.0319
Integrated Full Imputation (1989-1995)				
Investment	599	0.0231	0.1489	0.0043
Payout Tax	599	0.3560	0.0298	0.3300
Cash flow	599	0.0819	0.2788	0.0663
Debt changes	599	-0.0130	0.1971	-0.0001
Size growth	599	0.0830	0.3499	0.0622
Tobin's Q	599	0.0012	0.0098	0.0009
Sales growth	599	-0.2375	1.0071	-0.1442
Well Established Full Imputation Tax System (1996-2000)				
Investment	1815	0.0322	0.3689	0.0022
Payout Tax	1815	0.3556	0.0082	0.3600
Cash flow	1815	-0.012	1.3261	0.0622
Debt changes	1815	0.0271	0.2241	0.0020
Size growth	1815	0.1080	0.5327	0.0629

Tobin's Q	1815	0.0015	0.0113	0.0008
Sales growth	1815	-0.2697	1.2229	-0.1794

Note: Table 4 sets out descriptive statistics for Australia from 1981 to 2000. Australia has the classical tax system from 1981 to 1986 and then moves to the partial imputation tax system from 1989. This Table provides the number firms, the number of observations, mean, standard deviation, and median of each variable.

**Table 5: Sample Overview and Summary Statistics in Taiwan**

<b>Classical Tax System (1989-1999)</b>				
<b>Variables</b>	<b>Number of Firms</b>	<b>Mean</b>	<b>SD</b>	<b>Median</b>
Investment	588	0.0111	0.0749	0.0009
Payout Tax	588	0.2289	0.0016	0.2289
Cash flow	588	0.0687	0.1064	0.0578
Debt changes	588	0.1405	0.5686	0.1197
Size growth	588	0.0948	0.1993	0.0775
Tobin's Q	588	0.0017	0.0009	0.0015
Sales growth	588	-0.1133	0.5326	-0.0381
<b>Integrated Partial Imputation Tax System (2000-2005)</b>				
Investment	3100	0.0081	0.0692	0.0008
Payout Tax	3100	0.2210	0.0059	0.2192
Cash flow	3100	0.0735	0.1134	0.0640
Debt changes	3100	0.0465	0.0115	0.6167
Size growth	3100	0.0861	0.2209	0.0725
Tobin's Q	3100	0.0011	0.0008	0.0008
Sales growth	3100	-0.2326	0.4586	-0.2360
<b>Well Established Partial Imputation Tax System (2006-2011)</b>				
Investment	5507	0.0039	0.0722	-0.0003
Payout Tax	5507	0.2146	0.0106	0.2167
Cash flow	5507	0.0732	0.1657	0.0724
Debt changes	5507	-0.0244	0.6869	0.0000
Size growth	5507	0.0391	0.2269	0.0338
Tobin's Q	5507	0.0010	0.0012	0.0008
Sales growth	5507	-0.0408	0.4974	-0.0689

Note: Table 5 sets out descriptive statistics for Taiwan from 1989 to 2011. Taiwan has the classical tax system from 1989 to 1999 and then moves to the partial imputation tax system from 2000. This Table provides the number firms, the number of observations, mean, standard deviation, and median of each variable.

## 6. Results

We estimate the relationships between capital corporate investment and corporate tax payout by using the following model:

$$\text{Investment}_{it} = \beta_1 \text{Payout\_Tax}_{it} + \beta_2 \text{CashFlow}_{it} + \beta_3 \text{Debt\_Changes}_{it} + \beta_4 \text{Size\_Growth}_{it} + \text{Tobin's } Q_i + \text{Sales\_Growth}_{it} + \varepsilon_{it} \quad \text{Eq.(1)}$$

As prior studies have shown, investors tend to invest in firms with certain characteristics (Becker, Jacob & Jacob 2013; Black, Legoria & Sellers 2000). We include these firm characteristics in our regression: *Cash flow*, *Debt changes*, *Size growth*, *Tobin's Q*, and *Sales growth*. To mitigate the possibility that the effects of the

tax payout on corporate capital investment are affected by corporate tax and by unobservable firm characteristics, we use fixed-effects estimation with panel data that include firm fixed-effects and year fixed-effects (Faccio and Xu, 2015).

We test the effects of corporate tax payout and the tax system changes on capital investment by using firm-fixed effects and year-fixed effects approach. For our baseline test, we regress capital investment on firm controls, fixed effects for firms and for year-cells, and interaction of corporate tax rate with cash flow. This help controls for business cycles and other macroeconomic variables (Jacob, Becker and Becker 2012). We control for relative *Size growth*, *Tobin's Q*, *Cash flow*, *Sales growth* and *Debt changes* in all our regression. We translate all determinants into real term<sup>11</sup>. The main variable of interest is *Payout Tax* which is the interaction of *cash flow* and *corporate tax rate*. Corporate tax rates raise the relative cost of capital for firms using external funds. We expect that with high taxes, firms have a stronger effect of cash flow on capital investment (since high cash flow means a firm can finance more investment). Therefore, we predict that the interaction coefficient should be positive in countries under imputation tax systems such as Canada, and the UK (**H1**). We also predict that this interaction should be positive when the tax system shifts to a well-established imputation tax system in Australia and Taiwan (**H2**).

### **6.1. The impact of corporate tax payout on capital investment in Canada and the UK**

Table 6 presents the effects of *corporate tax payout* on *capital investment* in Canada and the UK. Table 6 presents our main findings in Canada and the UK. The estimated coefficient of *Corporate tax rate*\**Cash flow* is positive (0.424) and statistically significant at the 1% level. The estimated coefficient for the tax-cash flow

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<sup>11</sup> Base the year in the middle for each country

interaction variable is consistently positive and significant. In other words, the higher payout taxes are, the stronger is the tendency for investment to occur where retained earnings are high as we predicted. Firms have cheaper to access equity funding, more cash flow to invest. The estimates indicate that the corporate tax payout can have significant investment effects in the UK and Canada. Overall, the above results support to our main hypothesis *HI* that there is an increasing in capital investment in the well-established imputation tax system. This evidence confirms earlier results by Becker, Jacob and Jacob (2013) who conclude that corporate tax payout has an impact on firms' capital investment.

Regarding the impacts of control variables on capital investment, we find that the majority of the results are in line with theoretical predictions and existing evidence in the literature. Specifically, *cash flow* is negatively association with capital investment. *Debt\_changes* is positively association with capital investment; firms tend to use more debt when invest more. *Size growth* is positively association with capital investment; larger firms tend to have more investment opportunities. *Sales growth* is negatively association with capital investment.

**Table 6: Firm Investment and Corporate Tax Payout in the UK and Canada**

	Capital Investment
Payout Tax	0.4240*** (0.0768)
Cash flow	-0.1386*** (0.0212)
Debt changes	0.0025** (0.0009)
Size growth	0.0727*** (0.0021)
Tobin's Q	-0.0073 (0.0342)
Sales growth	-0.0039*** (0.0009)
Firm-Fixed Effect	Yes
Year-Fixed Effect	Yes
Observations	29749
R-Squared	0.26

Note: This table presents the regression results for capital investment, over the 1989-2015 period in the UK and Canada. The dependent variable is *Capital Investment*, measured as the change in Capital Expenditure. *Cash flow* is defined as cash flow in year  $t$  over prior year total assets. *Debt changes* is defined as the ratio of year  $t$  to  $t-1$  total debt to one-year lagged total assets. *Size growth* is the logarithm of the growth rate of total assets from  $t$  to  $t-1$ . *Tobin's Q* is defined as the market value over total asset (Market to book ratio). *Sales growth* is captured as the logarithm of the growth rate of sales from  $t-2$  to  $t$ . Standard errors (shown in parentheses) are clustered by firm-year. \*\*\*, \*\*, \* indicate statistical significance at 1%, 5%, and 10% level, respectively.

## 6.2. The impact of tax system changes on capital investment

### 6.2.1. The impact of tax system changes on capital investment in Australia

Table 7 presents our main findings for Australia. We look at the effect of corporate tax payout on capital investment when the tax system changes. First from classical to a period of integrated full imputation tax system, and then to a well-established full imputation tax system. The results for Australia show that corporate tax payout does not have an effect on investment in the classical tax system (1981-1986). In the second period (1989-1994), corporate tax payout still does not have a significant effect on firms' investment. A possible reason for this might be that this describes a period of transition to full imputation in Australia. After the tax system changes completely into a full (well-established) imputation system (1995-2000), corporate tax payout has a significant positive effect on capital investment ( $p < 0.05$ ). In sum, the estimates indicate that corporate tax payout has a large significant effect on capital investment in the full imputation tax system in Australia, providing support **H2**.

Regarding to the impacts of control variables on capital investment in Australia, we find that *debt changes* has positive significant effects on capital investment in a classical tax system (1981-1986). *Size growth* and *Tobin's Q* have positive significant effects on capital investment, in an integrated full imputation tax system (1989-1994); more profitable firms invest more because of higher availability to fund investments internally (Faulkender & Petersen 2012; Fazzari et al. 1988; Lamont 1997). More

profitable firms invest more because high available to fund investment internally. Although *cash flow* has negative impact on capital investment, *debt changes* is positively association with capital investment. *Size growth* has positive significant effects on capital investment in a well-established full imputation tax system (1995-2000); high-growth firms have more investment opportunities

Table 7 shows the effects of tax system changes to an imputation tax system on capital investment in Australia and Taiwan as follow:

**Table 7: Firm Investment and Tax System Changes in Australia**

	Classical Tax System (1981-1986)	Integrated Full Imputation (1989-1994)	Well- Established Full Imputation (1995-2000)
	(1)	(2)	(3)
<b>Payout Tax</b>	<b>-5.287</b> <b>(-0.041)</b>	<b>-1.853</b> <b>(1.183)</b>	<b>0.4823**</b> <b>(0.1923)</b>
Cash flow	4.1031 (0.0695)	0.6248 (0.3922)	-0.1682** (0.0675)
Debt changes	0.9147*** (11.287)	-0.0313 (0.0279)	0.0699*** (0.0177)
Size growth	-0.5721*** (-3.4745)	0.1079*** (0.0178)	0.1384*** (0.0067)
Tobin's Q	-0.0785 (-1.3972)	2.1717*** (0.5107)	-0.9737 (0.6875)
Sales growth	-0.0471 (-0.7624)	0.0078 (0.0062)	-0.0005 (0.0018)
Firm-Fixed Effect	Yes	Yes	Yes
Year-Fixed Effect	Yes	Yes	Yes
Observations	171	599	1815
R-Squared	0.87	0.78	0.47

Note: This table presents the regression results for capital investment, over the 1981-1986 period of Classical Tax System, the 1989 to 1994 period of Integrated Full Imputation Tax System and the 1995-2000 period of Well-Established Full Imputation Tax System in Australia. The dependent variable is *Capital Investment*, measured as the changes in Capital Expenditure. *Cash flow* is defined as cash flow in year  $t$  over prior year total assets. *Debt changes* is defined as the ratio of year  $t$  to  $t-1$  total debt to one-year lagged total assets. *Size growth* is the logarithm of the growth rate of total assets from  $t$  to  $t-1$ . *Tobin's Q* is defined as the market value over total asset (Market to book ratio). *Sales growth* is captured as the logarithm of the growth rate of sales from  $t-2$  to  $t$ . Standard errors (show in parentheses) are clustered by firm-year. \*\*\*, \*\*, \* indicate statistical significance at 1%, 5%, and 10% level, respectively.

### 6.2.1. The impact of tax system changes on capital investment in Taiwan

Table 8 presents the findings for Taiwan. In the classical tax system (1989-1988), corporate tax payout has a negative impact (-46.419) on capital investment at the 5%



level. Under the period of integrated partial imputation tax system (2000-2005), corporate tax payout does not have a statistically significant impact on capital investment. As expected, we find consistent evidence of a positive and significant effect (2.0667) of corporate tax payout and capital investment at the 1% level when the tax regime moves to being a well-established partial imputation tax system (2006-2011). This means that capital investment responds strongly to corporate tax payout. The adjusted R2 ranges are 56% to 35% from columns (1) to (3). The results for Taiwan are the same as for Australia, for both periods of integrated and well-established imputation tax systems, providing further support *H2*.

As for the impacts of control variables on capital investment in Taiwan, *cash flow* and *size growth* have positive significant effects on capital *investment* in a classical tax system (1989-1999). While *debt changes*, *size growth* and *sales growth* have positive significant effects on capital investment, *Tobin's Q* has negative significant effects on capital *investment* in an integrated partial imputation tax system (2000-2005). Although *cash flow* has negative impact on capital investment, *debt changes*, *size growth* and *sales growth* still have positive significant effects on capital investment in a well-established partial imputation tax system (2006-2011).

**Table 8: Firm Investment and Tax System Changes in Taiwan**

	Classical Tax System (1989-1999)	Integrated Partial Imputation (2000-2005)	Well- Established Partial Imputation (2006-2011)
	(1)	(2)	(3)
<b>Payout Tax</b>	<b>-46.419**</b> <b>(23.958)</b>	<b>3.9145</b> <b>(3.3067)</b>	<b>2.0667***</b> <b>(0.6479)</b>
Cash Flow	10.835** (5.4750)	-0.8329 (0.7417)	-0.3822*** (0.1367)
Debt Changes	0.010 (0.0067)	0.0033* (0.0019)	0.0091*** (0.0017)
Size Growth	0.2128*** (0.0245)	0.0347*** (0.0074)	0.0951*** (0.0055)
Tobin's Q	-3.1798 (5.3594)	-2.4417** (1.1118)	1.2450 (1.0234)
Sales Growth	-0.0041	0.0121***	0.0132***

	(0.0101)	(0.0032)	(0.0024)
Firm-Fixed Effect	Yes	Yes	Yes
Year-Fixed Effect	Yes	Yes	Yes
Observations	588	3100	5507
R-Squared	0.56	0.32	0.35

Note: This table presents the regression results for capital investment, over the 1989-1999 period of Classical Tax System, the 2000 to 2005 period of Integrated Partial Imputation Tax System and the 2006-2011 period of Well-Established Partial Imputation Tax System in Taiwan. The dependent variable is *Capital Investment*, measured as the changes in Capital Expenditure. *Cash flow* is defined as cash flow in year  $t$  over prior year total assets. *Debt changes* is defined as the ratio of year  $t$  to  $t-1$  total debt to one-year lagged total assets. *Size growth* is the logarithm of the growth rate of total assets from  $t$  to  $t-1$ . *Tobin's Q* is defined as the market value over total asset (Market to book ratio). *Sales Growth* is captured as the logarithm of the growth rate of sales from  $t-2$  to  $t$ . Standard errors (show in parentheses) are clustered by firm-year. \*\*\*, \*\*, \* indicate statistical significance at 1%, 5%, and 10% level, respectively.

Taken together, we conclude that corporate tax payout has a significant effect on capital investment when the imputation tax system is well-established. These results have important implications for our findings on the large effects of corporate income taxation payout and capital investment. It seems likely that tax system changes to imputation regimes encourage capital investment. The results are in line with Black et al. (2000).

Overall, this section provides strong support for hypothesis **H2** that the changes of tax system to an imputation lead to increase capital investment.

## 7. Robustness test

We re-estimate Eq.(1) for alternative period. We use seven years to check the robustness of our results thus far. We use seven years for the integrated imputation tax system (1989-1995) in Australia, (2000-2006) in Taiwan and the well-established imputation tax system in both Australia (1996-2002) and Taiwan (2007-2013). Tables 9 and 10 present the findings in Australia and Taiwan that show the effects of tax system changes from the classical to an imputation tax system.

## 7.1. Australia

We find the same results investigating the effects of corporate tax payout using a seven years period for both Australia. The interaction between *corporate tax and cash flow* does not have an impact on *capital investment* in the classical tax system in Australia (1981-1987). Furthermore, this interaction does not have significant effect on capital investment in the period of integrated imputation tax systems in Australia (1989-1995). When entering into the well-established imputation tax systems, the interaction has a positive effect (4.6177) on capital investment in Australia (1996-2002) at the 1% level. These estimates are slightly greater than those reported in the baseline tests in Table 7, and are consistent with the literature (). The adjusted R<sup>2</sup> varies from 87% to 38% from columns (1) to (3) in Table 9.

**Table 9: Firm Investment and Tax System Changes in Australia (Seven years period)**

	Classical Tax System (1981-1986)	Integrated Full Imputation (1989-1995)	Well- Established Full Imputation (1996-2002)
	(1)	(2)	(3)
<b>Payout Tax</b>	<b>-5.287</b>	<b>-2.9792</b>	<b>4.6177***</b>
	<b>(-0.041)</b>	<b>(3.1943)</b>	<b>(0.6134)</b>
Cash Flow	4.1031	0.9574	-1.6183***
	(0.0695)	(1.0412)	(0.2062)
Debt changes	0.9147***	0.0426	-0.0595*
	(11.287)	(0.0282)	(0.0350)
Size growth	-	0.0165***	0.2369***
	0.5721***	(0.0158)	(0.0150)
	(-3.4745)		
Tobin's Q	-0.0785	0.4731	-2.1946*
	(-1.3972)	(0.6388)	(1.120)
Sales growth	-0.0471	-0.0061	-0.0137**
	(-0.7624)	(0.0063)	(0.0061)
Firm-Fixed Effect	Yes	Yes	Yes
Year-Fixed Effect	Yes	Yes	Yes
Observations	171	793	2629
R-Squared	0.87	0.96	0.38

Note: This table presents the regression results for capital investment, over the 1981-1986 period of Classical Tax System, the 1989 to 1995 period of Integrated Full Imputation Tax System and the 1996-2002 period of Well-Established Full Imputation Tax System in Australia. The dependent variable is *Capital Investment*, measured as the changes in Capital Expenditure. *Cash Flow* is defined as cash flow in year  $t$  over prior year total assets. *Debt Changes* is defined as the ratio of year  $t$  to  $t-1$  total debt to one-year lagged total assets. *Size Growth* is the logarithm of the growth rate of total assets from  $t$  to  $t-1$ . *Tobin's Q* is defined as the market value over total asset (Market to book ratio). *Sales Growth* is captured as the logarithm of the growth rate of sales from  $t-2$  to

*t*. Standard errors (show in parentheses) are clustered by firm-year. \*\*\*, \*\*, \* indicate statistical significance at 1%, 5%, and 10% level, respectively.

## 7.2. Taiwan

We find the same results investigating the effects of corporate tax payout using a seven years period for Taiwan. The coefficient of interaction between *corporate tax and cash flow* has negative impact on *capital investment* in the classical tax systems (between 1989 and 1999). Furthermore, this interaction does not have significant effect on capital investment in the period of transition (between 2000 and 2006). When shifting into the well-established partial imputation tax system, the coefficient of interaction has a positive effect on capital investment in Taiwan (between 2007 and 2013) at the 10% level. The adjusted R2 varies from 56% to 22% from columns (1) to (3) in Table 10.

**Table 10: Firm Investment and Tax System Changes in Taiwan (Seven years period)**

	Classical Tax System (1989-1999)	Integrated Partial Imputation (2000-2006)	Well- Established Partial Imputation (2007-2013)
	(1)	(2)	(3)
<b>Payout Tax</b>	<b>-46.419**</b> <b>(23.958)</b>	<b>-0.5847</b> <b>(2.2373)</b>	<b>1.1636*</b> <b>(0.6893)</b>
Cash flow	10.835** (5.4750)	0.2123 (0.5089)	-0.1631 (0.1444)
Debt changes	0.010 (0.0067)	0.0061*** (0.0022)	0.0102*** (0.0015)
Size growth	0.2128*** (0.0245)	0.1143*** (0.0075)	0.0835*** (0.0056)
Tobin's Q	-3.1798 (5.3594)	3.2214 (2.6557)	2.7088*** (0.9947)
Sales growth	-0.0041 (0.0101)	-0.0087*** (0.0031)	0.0063*** (0.0023)
Firm-Fixed Effect	Yes	Yes	Yes
Year-Fixed Effect	Yes	Yes	Yes
Observations	588	4089	7204
R-Squared	0.56	0.28	0.22

Note: This table present the regression results for capital investment, over the 1989-1999 period of Classical Tax System, the 2000 to 2006 period of Integrated Partial Imputation Tax System and the 2007-2013 period of Well-Established Partial Imputation Tax System in Taiwan. The dependent variable is *Capital Investment*, measured as the changes in Capital Expenditure. *Cash flow* is defined as cash flow in year *t* over prior year total assets. *Debt changes* is defined as the ratio of year *t* to *t-1* total debt to one-year lagged total assets. *Size growth* is the logarithm of the growth rate of total assets from *t* to *t-1*. *Tobin's Q* is

defined as the market value over total asset (Market to book ratio). *Sales growth* is captured as the logarithm of the growth rate of sales from t-2 to t. Standard errors (shown in parentheses) are clustered by firm-year. \*\*\*, \*\*, \* indicate statistical significance at 1%, 5%, and 10% level, respectively.

Overall, our robustness tests show that the positive impact of *corporate tax payout* on *capital investment* is present in both Australia and Taiwan when the tax systems changes to an imputation, providing further support hypothesis **H2**.

## 8. Conclusion

This paper tests the effects of corporate tax payout on capital investment in Canada and the UK and the effects of tax system changes to an imputation on capital investment in Australia and Taiwan. Using firm-level data in Canada (1989-2015) and the UK (1989-2015), we test the corporate tax payout on firms' capital investment. Using firm-level data in Australia (1981-2002) and Taiwan (1989-2013), we examine the effects of tax system changes on capital investment. We use the fixed effect models, which has an advantage of being independent of macroeconomic effects. We find that firms' capital investment decisions are sensitive to corporate tax payout and that payout tax affects the capital investment in the imputation tax systems. We find stronger investment effects firms in the well-established imputation tax system than those in the classical tax systems. To the best of our knowledge, our paper provides the first empirical evidence that making the comparison between corporate tax payout under the imputation tax system and tax system changes to an imputation tax system have impacts on capital investment.

Our results have several implications. *First*, our findings showed that corporate tax payout would have impacts on firms' capital investment in countries under an imputation tax system because firms can have a lower cost of capital to invest with equity in the capital market, which reduces their cost of capital. *Second*, the results

also revealed that tax system changes would help increase capital investment. Our findings suggest that firms' capital investment in an imputation tax system respond more strongly than firms in classical tax systems to corporate tax payout. Capital investment is significantly improved when the tax system shifts to well-established imputation tax system. *Third*, our study complements the literature on imputation tax systems and provides an important implication about the benefits of corporate tax payout in countries with an imputation tax system and the benefits of tax system changes to an imputation.

Future research needs to be addressed. First, we will examine if, and to what extent, the monetary policy influences capital investment. Second, we will investigate to what extent; the changes in the tax system (from a classical to an imputation) have impacts on capital investment (including variables such as personal tax rate and macro variables including inflation and GDP). The identification strategy to demonstrate a causal relation between corporate tax rates/tax systems and investment. In the Australian case, the shift to the imputation tax system may be accompanied by other major economic and tax changes, which may be responsible for changes in capital investment (Roca, 1999). Finally, other aspects of major overhauls of each country's taxation systems over the sample period should be further considered when examining how tax drives capital investment, for example the introduction of a cash rebate in Australia, the Advanced Corporation Tax (ACT) or the removal of the surplus credit refunds in cash in the UK (Cannavan, Finn and Gray 2004; Bond, Chennells, and Devereux 1995).

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