RETHINKING THE CORPORATE TAX BASE: EVIDENCE OF THE RELATIONSHIPS BETWEEN CASH FLOW AND NET INCOME

Pierluigi Santosuosso*

*Faculty of Economics, Sapienza University of Rome, Italy

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Abstract

This study examines how the operating cash flow net of cash from investing activities (CFINV) is correlated with the net income for a sample of 189 Italian listed firms from 2011 to 2015. Research findings revealed three main results. First, firms that have a positive amount of CFINV greater than the amount of net income are unprofitable and levered. Second, CFINV is positively affected by firm profitability, efficiency and leverage. Third, the corporate tax burden is positively affected by firm profitability and efficiency, but negatively influenced by leverage. A similar association between corporate tax burden and CFINV was also found. The relations we present aim to provide additional evidence for the debate about the use of a cash-flow tax base as an alternative solution to the traditional income tax base.

Keywords: Corporate Tax Burden, Cash Flow, Firm Profitability, Cash-Flow Tax, Italian Listed Companies

1. INTRODUCTION

Tax evasion is a central problem for many countries around the world. It has been estimated that European shadow economies account for about 22% of the total economic activity with clear implications for tax loss every year (Murphy, 2012; Schneider et al., 2015). Policy makers and administrative officials are therefore engaged in countering tax evasion and erosion with a variety of measures (Alm, 2012). Examples of traditional initiatives are audit programs that use withholding tax, payments through the banking system and third-party sources of information. Examples of non-standard measures are policies that emphasize the assistance services for taxpayers, the importance of taxes in providing public services and the simplification of the tax system and modes of payment.

The use of a cash flow base for calculating corporate taxes is considered a way of simplifying the tax system to overcome the limitations of the most widely used income corporate tax. There have been several experiences with cash-flow taxation in many countries all over the world (e.g., European Commission, 2015) and other initiatives are being taken into consideration by policy makers. For example, the UK government's Making Tax Digital transformation programme has recently introduced the cash flow basis for calculating profits to eligible unincorporated property businesses (HM Revenue and Customs, 2017). Taxation based on cash flows has also been introduced for small businesses in Italy, as already applies for the self-employed (Act n°232, 2016). In particular, as from 1 January 2017, partnerships with annual revenues not exceeding a specific amount (400,000 euros for service companies and 700,000 euros for other companies) can pay taxes on cash-flow accounting. The importance of the cash flow element in the corporate tax system has also been underlined recently in the US by the discussion of a proposal to introduce the so-called destination-based cash-flow tax (e.g, Auerbach et al., 2017; Cui, 2017; Patel and McClelland, 2017). Although the cash-flow tax and its variants are not new for academics (e.g, Brown, 1948; Meade Committee, 1978; King, 1987; Edwards, 2003) and for legislators of several countries (e.g., European Commission, 2015; Department of Treasury, IRS, 2016), the above-mentioned examples testify to a renewed interest in cash flows in fiscal policy.

This study examines how the operating cash flow net of cash from investing activities (CFINV) is correlated with the net income using a sample of 189 Italian listed firms from 2011 to 2015. CFINV and net income were used as proxy variables of the cash-flow tax base and the income tax base respectively. More specifically, three main research questions are addressed in this study. (1) Is the amount of CFINV similar to the amount of net

income and which factors can explain this difference? (2) Is CFINV correlated to net income and to other variables that may affect its value? (3) Is the relationship between corporate tax burden and firm profitability similar to the relationship between corporate tax burden and CFINV? These issues were explored with the aim of enriching the debate on corporate tax burden and cash flow for an assessment of a hypothetical substitution of the income tax base with a cash-flow tax base.

The remainder of the paper is organized as follows: the second section develops the research questions, the third section describes the sample selection and the survey methodology, the fourth section reports on the research findings and the last section presents concluding remarks.

2. BACKGROUND AND RESEARCH QUESTIONS

Although the cash-flow tax occupies a prominent role in the alternative solutions to the traditional corporate income tax, the relationship between the cash-flow tax base and the income tax base appears to have been only partially explored in the research literature. Most studies that have examined the corporate tax burden have focussed on several issues related to corporate income tax. For example, corporate tax burden has been examined in relation to the cost of capital (Rao and Stevens, 2006), the impact of foreign operations (Bauman and Schadewald, 2001), Tobin's Q ratio (Burton and Cathey, 2005), earnings management (Cook et al., 2008), firm value (Kubota and Takehara, 2010), tax haven operations (Jaafar and Thornton, 2015) and factors affecting the corporate tax rate, such as firm profitability, firm size, capital structure and asset mix (e.g., Janssen, 2005; Liu and Cao, 2007; Delgado et al., 2014; Fernández-Rodríguez and Martínez-Arias, 2014; Dyreng et al., 2017). Apart from the use of the operating cash flow as the denominator of the effective tax rate (e.g., Gupta and Newberry, 1997; Derashid and Zhang, 2003; Richardson and Lanis, 2007), no explicit mention can be found in the research literature about the operating cash flow and/or CFINV as a determinant of the corporate tax burden. Specific attention to various measures of cash flow can be found in several studies that have outlined the cash-flow tax and its variants (e.g, Brown, 1948; Meade Committee, 1978; King 1987; Shome and Schutte, 1993; Edwards, 2003; Zee, 2007; Boadway et al., 2016; Auerbach et al., 2017; Cui, 2017; Patel and McClelland, 2017). However, research to date has tended to focus on the evaluation of the properties of cash-flow taxation (Auerbach et al., 2017), addressing a series of implementation difficulties (Cui, 2017) and theoretical effects (Boadway et al., 2016).

Unlike previous research, this paper seeks to contribute to the debate by empirically analysing some basic aspects of the relationship between proxies of the income tax base and the cash-flow tax base. More specifically, CFINV was used as a proxy of the tax base under the most common version of cash-flow taxation. One of the best known proposed versions of the cash-flow tax is a real transactions-based cash-flow tax where the tax base is the net cash inflow of transactions from the sale of goods and services minus current and capital expenses (Meade Committee, 1978; European Commission, 2015). CFINV was then compared with net income after tax (NIAT) since the amount of CFINV that was available on databanks is computed after the payment of taxes.

On the basis of this scenario and as mentioned above, three issues were examined in the present study.

The first issue we explored is the difference between the amount of CFINV and NIAT. A negative value of the difference between CFINV and NIAT (DIFF) reveals *ceteris paribus* that firms could benefit from a hypothetical substitution of the tax base, whereas a positive value could disadvantage firms. The average value of DIFF was then used as a binary variable in the logistic regression model in order to examine factors affecting its value.

Second, we analysed how CFINV is correlated with NIAT. It is reasonable to expect a positive relationship since a firm ordinarily generates cash from its sales and makes payments for expenses even if CFINV is computed by including cash from investing activities. Some references concerning the positive association between the contemporaneous and predictive relationships between measures of cash flow and earnings may be found in studies that have investigated the role of cash flow and earnings in forecast accuracy (e.g., Bowen et al., 1986; Arnold et al., 1991; Dechow et al., 1998; Lorek and Willinger, 2009; Farshadfar and Monem, 2013; Call et al., 2013; Jung, 2015). A significant positive correlation between CFINV and NIAT would suggest *ceteris paribus* that a cash-flow tax base, as proxied by CFINV, is associated with a proportional amount of net income.

The third issue we examined concerns the relationship between corporate tax burden under income taxation and NIAT and between the same corporate tax burden and CFINV. Firm profitability is considered the main determinant of corporate tax burden since profitable firms pay taxes every year, whereas firms that do not have high profits pay fewer taxes or none in case of losses. We, therefore, expected a positive correlation between corporate tax burden under income taxation and firm profitability. Given the positive relationship, our next objective is to verify the existence of a similar relationship between corporate tax burden under income taxation and CFINVA. A positive correlation would signal that the corporate tax burden is also justified by the presence of CFINV.

Based on extant studies, the above-mentioned relations were explored using various proxy variables of firm characteristics, such as firm profitability, firm size, leverage and asset mix. These factors were examined by numerous prior studies with an emphasis on their role in influencing corporate tax burden.

As mentioned above, firm profitability is considered a factor affecting corporate tax burden since profitable firms pay higher taxes than unprofitable firms under income taxation. More specifically, although some studies have found that higher firm profitability is associated with a lower effective tax rate (Derashid and Zhang, 2003; Noor et al., 2010), most of the research confirmed a positive

relationship (Gupta and Newberry, 1997; Liu and Cao, 2007; Richardson and Lanis, 2007; Wu et al., 2012; Delgado et al., 2014; Fernandez-Rodriguez and Martinez-Arias, 2012, 2014; Lazăr, 2014).

Firm size is considered one of the most important factors affecting the corporate tax burden. Several studies have found a negative correlation between firm size and the effective tax rate (Kim and Limpaphayom, 1998, Derashid and Zhang, 2003; Richardson and Lanis, 2007) in accordance with the political power theory (Salamon and Siegfried, 1977) suggesting that large firms have more resources to achieve optimal tax savings. On the other hand, a positive correlation was also documented (Omer et al., 1993; Noor et al., 2010; Delgado et al., 2014) in accordance with the political cost theory (Zimmerman, 1983) that posits a higher tax burden for larger firms because of the greater public scrutiny and regulatory actions by government. No association between firm size and the effective tax rate (Gupta and Newberry, 1997; Feeny et al., 2005; Liu and Cao, 2007; Lazăr, 2014) and mixed results were also found (Wu et al., 2012; Fernandez-Rodriguez and Martinez-Arias, 2014; Delgado, 2014).

Firm leverage has been identified by numerous studies as a major explanatory variable of corporate tax burden. Empirical findings revealed a negative correlation between the effective tax rate and leverage because of the tax deductibility of interest payments (Stickney and McGee, 1982; Fernández-Rodríguez, 2012; Liu and Cao, 2007; Richardson and Lanis, 2007; Noor et al., 2010), though a positive association (Feeny et al., 2005; Janssen, 2005) and inconclusive results were also found (Gupta and Newberry, 1997). In such a context, it is worth mentioning that a large part of the empirical research has documented an inverse relation between firm profitability and leverage according to the Pecking order theory that suggests that firms prefer funds generated internally, then the issuing of debt and lastly the issuing of new shares (e.g., Myers, 1984; Myers and Majluf, 1984; Titman and Wessels, 1988; Baskin, 1989; Allen, 1993; Fama and French, 2002; Panno, 2003; Tong and Green, 2005; Bharath et al., 2009; Lemmon and Zender, 2010; Al Manaseer et al., 2011; Mazen, 2012).

Lastly, firms' asset mix is usually included in the analysis of factors affecting corporate tax burden. Asset mix, as proxied by capital intensity and/or inventory intensity, can affect the corporate tax burden because of the income tax deductibility of depreciation that allows firms to recover the cost of the certain property. Empirical evidence suggests that firms with higher capital intensity, as measured by fixed assets divided by total assets, tend to have a lower effective tax rate (Stickney and McGee, 1982; Gupta and Newberry, 1997; Derashid and Zhang, 2003; Plesko, 2003; Janssen, 2005; Adhikari et al., 2006; Richardson and Lanis, 2007; Lazăr, 2014). A positive relationship between capital intensity and the effective tax rate (Wu et al., 2007, 2012), no association (Liu and Cao, 2007) and mixed results were also found (Fernandez-Rodriguez and Martinez-Arias, 2012, 2014).

3. SAMPLE AND METHODOLOGIES

We examined a sample made up of Italian listed firms for the years 2011-2015. We manually collected consolidated financial statement data from it.reuters.com. Although various databases are available, this website provides information about cash flow measures that are not available elsewhere. We excluded firms with missing data, banks and insurance companies. On the basis of these selection criteria, the sample includes 189 firms with positive or with negative values of income taxes (ITAX) reported in the consolidated statement of income. ITAX includes two main corporate taxes. Italian corporate entities are subject to a corporate income tax (IRES) and to a regional tax on productive activities (IRAP). The IRES taxable base is the net income before taxes (NIBT) adjusted for tax accounting rules (as from 2017 the tax rate is 24%, whereas the previous tax rate was 27.5%). The IRAP taxable base approximately consists of the company's gross margin in its income statements (the standard tax rate is 3.9%). Firms included in our sample operate in various industries: basic materials (2.65%), consumer goods (22.75%), consumer services (11.11%), financials (7.41%), health care (4.23%), industrials (26.46%), oil & gas (3.17%), technology (8.99%), telecommunications (3.17) and utilities (10.05%).

Firm-specific variables used for exploring the relations between CFINV and NIAT are denoted by proxies for firm profitability, firm size, leverage and asset mix. More specifically, ROTA, ROA and ROS are measures of firm profitability. ROTA is earnings before interest and taxes (EBIT) divided by total assets, ROA is the NIAT divided by total assets and ROS is the return on sales measured by EBIT divided by total revenues. We included in the regression analyses the asset turnover ratio (ATURN), defined as total revenues divided by total assets, in order to have a measure expressing firm efficiency. As a measure of the asset mix, we used current assets divided by total assets (CATA). LEV is the debt divided by total assets ratio and LNA is the natural logarithm of total assets as proxies of leverage and firm size respectively. These variables were computed as the mean during the period 2011-2015 and jointly or separately used in regression analyses to avoid multicollinearity problems.

The first issue we explore is the difference between the amount of CFINV and NIAT (DIFF). DIFF was computed yearly for firm *i* from 2011 to 2015 in order to ascertain for how many years CFINV was positive and greater than NIAT. The relationship between CFINV and NIAT was then explored using the average value of DIFF (MDIFF) for firm *i* as the binary dependent variable in the logistic regression model (1). More specifically, the logistic regression involved the binary dependent variable MDIFF with the probability between 0 and 1 that the dependent variable will occur (firms with a positive MDIFF=1; firms with a negative MDIFF=0) and β_p, as the *pth* parameter of the logistic model obtained by the method of maximum likelihood.

The logistic regression has the following general form:

$$MDIFF_i = \beta 0 + \beta 1\ ROTA_i + \beta 2\ ROS_i + \beta 3\ ATURN_i + \beta 4\ CATA_i + \beta 5\ LEV_i + \beta 6\ LNA_i \quad (1)$$

where: MDIFF is the average value of the difference between the amount of CFINV and NIAT, ROTA is earnings before interest and taxes (EBIT) divided by total assets, ROS is the return on sales measured by EBIT divided by total revenues, ATURN is the asset turnover measured by total revenues divided by total assets, CATA is current assets divided by total assets, LEV is the debt divided by total assets ratio and LNA is the natural logarithm of total assets.

The second issue we analysed is the correlation between CFINV and NIAT. We preliminarily estimated the correlation coefficient between CFINV and NIAT (CORR) over the period 2011-2015 for firm i and the average value for the 189 firms in the sample was computed using Fisher's z transformation defined as $½\ ln[(1+r_i)/(1-r_i)]$, where ln is the natural logarithm and r_i is the correlation coefficient (CORR) for firm i. The relationship between the average value of CFINV divided by total assets (CFINVA) and NIAT divided by total assets (ROA) for firm i was then examined using the regression analysis based on the ordinary least squares (OLS regression). We used CFINVA as the dependent variable and ROA as the independent variable together with various firm-specific variables that can explain the above-mentioned relationship. The OLS regression has the following general form:

$$CFINVA_i = \beta 0 + \beta 1\ ROA_i + \beta 2\ ROS_i + \beta 3\ ATURN_i + \beta 4\ CATA_i + \beta 5\ LEV_i + \beta 6\ LNA_i \quad (2)$$

where: CFINVA is CFINV divided by total assets and ROA is the NIAT divided by total assets. All remaining terms are as previously defined.

The third issue we examined concerns the relationship between corporate tax burden, NIAT and CFINV. The inclusion of firms in the sample with positive or negative values of ITAX limited the use of some proxy variables of corporate tax burden. More specifically, the most frequent proxy variable used in the studies on the determinants of the corporate tax burden is the average effective tax rate. Although alternative measures have been used by researchers, the effective tax rate is generally defined as the amount of tax paid divided by NIBT (e.g., Plesko, 2003; Spooner, 1986; Fullerton, 1983; Stickney, 1979; Nicodeme, 2001). However, the possibility that ITAX and measures of net income assume positive or negative values makes it difficult to interpret the effective tax rate. For example, as already noted (Gupta and Newberry, 1997; Adhikari et al., 2006), the effective tax rate could be positive with a negative ITAX (in case of tax refund) and a negative NIAT, even if firms do not pay taxes. Analogous distortions occur when the effective tax rate assumes negative values because of the negative and positive values of the numerator or the denominator of this ratio. The corporate tax burden was, therefore, measured in our study by dividing the amount of ITAX reported in the consolidated statement of income by the total assets and its average value (TAXA) was then computed for 5 years from 2011 to 2015. We used TAXA as the dependent variable for firm i in three regression analyses estimated using the OLS regression of the following general form. In model (1), ROA and CFINVA were considered jointly, whereas in models (4) and (5) they were analysed separately in order to distinguish the individual contributions of ROA and CFINVA.

$$TAXA_i = \beta 0 + \beta 1\ ROA_i + \beta 2\ ROS_i + \beta 3\ ATURN_i + \beta 4\ LEV_i + \beta 5\ LNA_i + \beta 6\ CFINVA_i \quad (3)$$

$$TAXA_i = \beta 0 + \beta 1\ CFINVA_i + \beta 2\ ROS_i + \beta 3\ ATURN_i + \beta 4\ LEV_i + \beta 5\ LNA_i \quad (4)$$

$$TAXA_i = \beta 0 + \beta 1\ ROA_i + \beta 2\ ROS_i + \beta 3\ ATURN_i + \beta 4\ LEV_i + \beta 5\ LNA_i \quad (5)$$

where: TAXA is the corporate tax burden as measured by ITAX divided by the amount of total assets. All remaining terms are as previously defined.

Table 1 presents the correlation matrix related to the variables involved in the above-mentioned regression analyses. The overall results suggest the absence of a multicollinearity problem for the variables used in the models, as confirmed by the value of the variance inflation factor (VIF) shown in the table notes.

Table 1. Correlation matrix for independent variables

	CFINVA	***ROA***	***ROTA***	***ROS***	***ATURN***	***CATA***	***LEV***	***LNA***
CFINVA	1							
ROA	0.4697	1						
ROTA	0.485	0.9257	1					
ROS	0.1749	0.3317	0.3708	1				
ATURN	0.2142	0.2174	0.2584	0.2196	1			
CATA	0.0541	0.0937	0.1237	0.1446	0.4707	1		
LEV	0.0381	-0.1884	-0.1294	0.0097	-0.2363	-0.1644	1	
LNA	0.2219	0.3328	0.299	0.1475	-0.0706	-0.2952	-0.0746	1

Note: VIF ranges from 1.090 for the LEV coefficient to 1.580 for the ROA coefficient.

4. EMPIRICAL RESULTS

The descriptive statistics of DIFF and the variables used in the regression models from 2011 to 2015 are presented in panel A and in panel B of Table 2 respectively. As reported in panel B, the analysis revealed that CFINVA (mean = 0.014; median = 0.019) is on average higher than ROA (mean = 0.006; median = 0.011). Moreover, three main results emerge from an examination of DIFF. First, as presented in panel A, there are 50.69% firm-year observations with a positive value of DIFF (50.69% = 17.78% plus 23.17% and 9.74% of firm-year observations) during the period from 2011 to 2015. Second, as shown in panel A, there are 40.95% of firm-year observations (17.78% plus 23.17% firm-year observations) with a positive amount of CFINV greater than the amount of NIAT. *Ceteris paribus*, such a result suggests that firms could be disadvantaged in these cases by moving from an income tax to a cash-flow tax. Third, as reported in panel B, the analysis revealed a low average correlation between CFINV and NIAT (CORR = 0.273) estimated for firm *i* during the period 2011-2015. In other words, CFINV and NIAT are essentially independent if we limit the analysis to the correlation coefficient CORR.

Table 3 presents the results of the logistic regression according to model (1). First, the negative coefficient of ROTA suggests that the probability of having a "firm with a positive MDIFF" response (MDIFF = 1) increases as ROTA decreases. The existence of a negative association between MDIFF and ROTA may be explained by the role that EBIT has in decreasing, *ceteris paribus,* the amount of NIAT used for the computation of DIFF. Second, the regression results show a positive association between DIFF and firm leverage, as measured by LEV. This is probably related to the inverse relationship between firm profitability and leverage outlined by several studies that have confirmed the validity of the Pecking order theory, suggesting that profitable firms prefer funds generated internally, then the issuing of debt and lastly the issuing of new shares.

Table 2. Descriptive statistics of selected variables for firm *i* over the period 2011-2015

Panel A				
	Positive NIAT	***Negative NIAT***	***Positive NIAT***	***Negative NIAT***
	Firm-year observations (%)		DIFF > 0 (%)	
Positive CFINV	47.41%	17.78%	23.17% > 0	1
Negative CFINV	17.67%	17.14%	0	9.74% > 0

Panel B					
	Mean	***Median***	***10th percentile***	***90th percentile***	***St. deviation***
TAXA	0.013	0.010	-0.001	0.033	0.016
CFINVA	0.014	0.019	-0.037	0.067	0.077
ROA	0.006	0.011	-0.058	0.074	0.082
ROTA	0.031	0.032	-0.040	0.112	0.084
ROS	-0.155	0.052	-0.165	0.190	1.660
ATURN	0.692	0.678	0.177	1.167	0.398
CATA	0.448	0.423	0.174	0.740	0.214
LEV	0.313	0.297	0.089	0.576	0.183
CORR	0.273(1)	0.330	-0.884	1.279	

Notes: (1) average value for 189 firms computed using Fisher's z transformation defined as ½ ln[(1+r$_i$)/(1-r$_i$)] where ln is the natural logarithm and r$_i$ is the correlation coefficient between CFINV and NIAT for firm i.

Table 3. Logistic regression results of MDIFF on various firm characteristics

	Estimate	***Std. Error***	***z***	***p-value***	
const	-0.55539	0.870246	-0.6382	0.52334	
ROTA	-17.2336	3.90212	-4.4165	0.00001	***
ROS	0.150447	0.120863	1.2448	0.21322	
ATURN	0.606469	0.512581	1.1832	0.23674	
CATA	-0.394128	0.975469	-0.4040	0.68618	
LEV	3.11595	1.06805	2.9174	0.00353	***
LNA	0.00106949	0.0746204	0.0143	0.98856	

*Notes: Adjusted R^2 = 0.135; *** Significant at the 0.01 level.** Significant at the 0.05 level.* Significant at the 0.10 level (two-tailed).*

Table 4 shows the results of the regression analysis according to model (2). The research findings reveal a significant positive association between CFINVA and ROA confirming our expectation about the relationship between CFINV and NIAT. *Ceteris paribus,* this result suggests that the cash-flow tax base, as proxied by CFINV, is associated with a proportional amount of net income. Regression results also show a positive relationship between CFINVA and ATURN, suggesting that a high level of firm efficiency, as measured by the asset turnover ratio, allows firms to increase the generation of CFINV. A positive contribution to CFINVA was, moreover, due to the firm's leverage as measured by LEV, confirming the role that leverage has in increasing DIFF, as previously highlighted on the basis of model (1).

Table 4. OLS regression results of CFINVA on various firm characteristics

	Estimate	***Std. Error***	***t***	***p-value***	
const	-0.0553683	0.0262629	-2.1082	0.03638	**
ROA	0.411931	0.0686158	6.0034	<0.00001	***
ROS	-0.00113719	0.00321458	-0.3538	0.72393	
ATURN	0.0340451	0.0145653	2.3374	0.02051	**
CATA	-0.00286969	0.0276065	-0.1039	0.91732	
LEV	0.0711371	0.028181	2.5243	0.01245	**
LNA	0.00320333	0.00226359	1.4152	0.15873	

*Notes: Adjusted R^2 = 0.244; *** Significant at the 0.01 level.** Significant at the 0.05 level.* Significant at the 0.10 level (two-tailed).*

Table 5 presents the results of the regression analysis according to models (3), (4) and (5). The coefficient of the explanatory variable ROA (panel A) that emerges on the basis of model (3) suggests a positive relationship between TAXA and firm profitability, whereas a negative association between TAXA and LEV was found, as documented by studies reported in section 2. Firms that have a higher value of TAXA also present a greater firm efficiency level, as shown by a significant positive coefficient of ATURN (panel A), but no statistically significant association was found between TAXA and CFINVA. These results are consistent with the assumption of a positive association between corporate tax burden and firm profitability. However, a statistically significant positive relationship between TAXA and CFINVA was found on the basis of model (4) when ROA was excluded from the analysis, as shown in panel B. Panel B of Table 5 also reports on a positive relationship between TAXA and firm profitability and efficiency, as measured by ROS and ATURN respectively, whereas a negative association between TAXA and LEV was confirmed, as in the preceding regression analysis. A weak positive association was also found with the firm's size as measured by LNA. Regression results for model (5) presented in panel C of Table 5 confirm the role of ROA, ATURN and LEV in explaining the corporate tax burden as measured by TAXA when CFINVA was excluded from the explanatory variables. In sum, the relationship between corporate tax burden under income taxation and ROA resulting from model (4) appears similar to the relationship between the same corporate tax burden and CFINVA that emerges from model (5), suggesting that the corporate tax burden is justified by the presence of both ROA and CFINV.

Table 5. OLS regression results of TAXA on various firm characteristics

Panel A	***Estimate***	***Std. Error***	***t***	***p-value***	
const	0.0093427	0.00446259	2.0936	0.03769	**
ROA	0.0626453	0.0148237	4.2260	0.00004	***
ROS	0.000717171	0.000632137	1.1345	0.25808	
ATURN	0.00755362	0.00267442	2.8244	0.00527	***
LEV	-0.0148295	0.00563561	-2.6314	0.00924	***
LNA	0.000331192	0.000427011	0.7756	0.43899	
CFINVA	0.0197195	0.0146298	1.3479	0.17937	
Panel B	***Estimate***	***Std. Error***	***t***	***p-value***	
const	0.00751729	0.0046428	1.6191	0.10715	
CFINVA	0.044844	0.0139727	3.2094	0.00157	***
ROS	0.00140802	0.000638289	2.2059	0.02864	**
ATURN	0.00832131	0.00278909	2.9835	0.00324	***
LEV	-0.0197425	0.00576414	-3.4251	0.00076	***
LNA	0.000772712	0.000432784	1.7854	0.07585	*
Panel C	***Estimate***	***Std. Error***	***t***	***p-value***	
const	0.00822396	0.00439456	1.8714	0.06289	*
ROA	0.0707651	0.0135749	5.2129	<0.00001	***
ROS	0.000694134	0.000633322	1.0960	0.27452	
ATURN	0.00821319	0.00263517	3.1168	0.00213	***
LEV	-0.0134211	0.00555032	-2.4181	0.01659	**
LNA	0.000395602	0.00042528	0.9302	0.35349	

*Notes: Panel A, Adjusted R^2 = 0.303; Panel B, Adjusted R^2 = 0.238; Panel C, Adjusted R^2 = 0.30. *** Significant at the 0.01 level.** Significant at the 0.05 level.* Significant at the 0.10 level (two-tailed).*

5. CONCLUDING REMARKS

Using a sample of 189 Italian listed firms for the years 2011-2015, we examined how the cash flow net of cash from investing activities (CFINV) and the net income after taxes (NIAT) are correlated. Our study aims to provide insights into a cash-flow tax base as an alternative solution to the traditional income tax base.

The research findings revealed three main results. First, the firms that could be disadvantaged, *ceteris paribus,* from a replacement of the income tax base with a cash-flow tax base are unprofitable and levered. More specifically, the analysis of the difference between CFINV and NIAT (DIFF) documented that firms have a positive amount of CFINV that is greater than the amount of NIAT for 40.95% of the overall firm-year observations. Moreover, the logistic regression outlined that this margin is negatively affected by firm profitability, as measured by ROTA and ROS, and positively influenced by leverage as measured by LEV. Second, the cash-flow tax base as proxied by CFINV is on average associated *ceteris paribus* with firm profitability. More specifically, the OLS regression's results revealed a significant positive relationship between the average value of CFINVA and ROA, though firm-year observations of CFINV and NIAT related to firm *i* were uncorrelated when the correlation coefficient was estimated (CORR = 0.273) over the period 2011-2015. A positive contribution of CFINVA was, moreover, due to firm efficiency as measured by ATURN and by firm leverage. Third, the corporate tax burden under income taxation is justified by the presence of both net income and CFINV. More specifically, research findings revealed positive correlations between corporate tax burden under income taxation and firm profitability and between the same corporate tax burden and CFINVA. Firm efficiency has also a positive role in affecting corporate tax burden, whereas leverage influenced it negatively. A similar association was found between corporate tax burden under income taxation and CFINVA when firm profitability, as measured by ROA, was excluded from the regression model.

This study contributes to the extant literature by examining the correlation between proxy variables of the income tax base and the cash-flow tax base. In doing so, the present study attempts to throw a stone into the water by addressing some preliminary aspects of a complex debate that has led policy makers to a rethinking of the corporate tax base. However, this paper has several limitations. First, the firm sample includes only listed firms with the exclusion of unlisted companies, since data about measures of their cash flow were unavailable.

Second, research findings should be interpreted with some caution since measures of cash flow (CFINV) and net income (NIAT) that were available on databanks were computed after the payment of taxes.

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