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Abstract: This paper applies meta- regression analysis to the empirical literature that examines the impact of international market integration on capital taxation. The main objective is to explore whether particular data, model specification and estimation procedures exert systematic impact on the reported findings. Our results provide empirical evidence that differences across studies can be attributed to differences in the measurement of globalization. Moreover, in contrast to the conventional wisdom, study characteristics related to the measurement of the tax burden on capital appear to have an insignificant effect on the above mentioned relationship. Finally the meta- analysis fails to confirm a negative effect of globalization on the taxation of capital.

JEL: F2, H2, H4.
Keywords: capital mobility; tax competition; Meta analysis

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1. Introduction

Increased international market integration –also known as globalization-has affected significantly the design and the scope of fiscal policy. Focusing on factor income taxation, theory suggests that international factor mobility leads national government, in an attempt to attract mobile factors, to cut the tax rate on the relatively mobile factors- capital- and increase the tax burden fallen on the relative immobile factors (see e.g. Wildasin, 1988; Persson and Tabellini,1992).[1]

Although there is a large number of empirical studies examining the effect of increased international market integration on national tax policy, the results of the relevant literature appears to be highly inconclusive. Regarding capital taxation, a branch of the empirical literature concludes that higher international market integration is associated with higher capital taxes (see e.g. Garrett, 1995; Quinn, 1997; Swank, 1998) whereas another strand provide empirical evidence of a negative impact of globalization on capital tax rates (see e.g. Bretschger and Hettich, 2002; Winner, 2005; Bretschger, 2010).

Contradicting findings are mainly attributed to particular choices made by the researchers concerning the measurement of capital taxation and globalization. Specifically, a large part of the relevant literature shares the view that employing average effective tax ratios (AETR) based on the Mendoza et al (1994) approach or statutory tax rates instead of tax revenues as a share of GDP, may give rise to different findings.[2]

[1]The possibility that competition across national jurisdictions in order to attract capital results in inefficiently low tax rates and public good provision dates back to Oates (1972). However, the "benchmark tax competition model" has been first articulated by Zodrow and Mieszkowski (1986) and Wilson (1986). For surveys on international tax competition literature see Wilson (1999), Wilson and Wildasin (2004) and Haufler (2001).

[2] For example Bretschger and Hettich (2002), Adam and Kammas (2007) and Plumper et al. (2009) argue that studies employing effective tax rates, find a negative impact of globalization on capital taxation and therefore verify the validity of the efficiency hypothesis, while studies relying on tax revenues (either as a

Moreover, it is widely believed, that employing corporate profits instead of capital tax revenues as a proxy of capital taxation may be of crucial importance concerning the obtained results (see e.g. Devereux et al., 2002 ; Kammas, 2011)

Finally, a large strand of the literature places the spotlight on the alternative globalization measures employed and suggests that employing some specific indexes of globalization instead of others may be of crucial importance regarding the obtained empirical findings (see e.g. Bretschger and Hettich, 2005; Dreher, 2006). This is because globalization consist a highly multifaceted phenomenon and alternative proxies highlight different aspects of it. For example, alternative globalization measures based on actual flows (e.g. international trade (percent of GDP) or FDI (percent of GDP)) may better reflect international economic integration on goods market whereas the capital account restrictions index developed by Quinn (1997) mainly focus on international capital market integration and the KOF index of globalization developed by Dreher (2006) may better capture the various political and social features of globalization.

The above mentioned contradicting empirical findings form the motivation of the present paper. The present paper aspires to examine the results obtained by different empirical studies and to relate them to the particular characteristics of the underlying studies. To this end, we proceed by making an analytical review of the relevant literature and then we perform a meta-analysis by employing data from a total number of 23 different empirical studies. Meta-analysis allows us to summarize the main results of the literature in a systematic way, investigate the presence of biases and examine how particular choices made by the researchers affect the results and therefore to highlight the potential systematic impact of data, specifications or estimation procedures on the

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share of GDP or as a percentage of total taxation) share the view that corporate taxation is positively associated with market integration and hence seem to reject the efficiency hypothesis.

reported findings. Thus, the main objective of the present paper is to examine systematically the factors that explain the heterogeneity in the literature and the potential impact of study characteristics on the relationship between taxation of capital and globalization.

Our main results are as follows. We find that study characteristics related to the way capital taxation is measured do not exert any systematic impact on the obtained results whereas, study characteristics related to globalization measures give rise to totally different findings concerning the relationship between globalization and capital tax rates. More precisely, studies employing: (i) international trade as percent of GDP and (ii) the globalization index developed by Quinn (1997) are more likely to report a negative impact of international market integration on capital taxation, whereas studies employing the KOF index of globalization developed by Dreher (2006) are more likely to report a positive effect of globalization on capital tax rates. Moreover, we provide empirical evidence that several other study characteristics (like the journal the paper was published, the publication year and the sample employed) do have systematic impact on the reported results.

The structure of the paper emerges along the following lines; in the next section, we present the theoretical considerations and data issues; in section 3, we proceed by making a detailed review of the relevant literature and we discuss the methodology followed in order to code the empirical studies and to construct the meta-sample employed; in section 4, we present the meta-analysis and the results. Finally, section 5 concludes.

2. Globalization and Capital Taxation: Theoretical considerations and data issues

2.1 Do capital taxation measures matter?

A major problem in the empirical studies examining the determinants of capital taxation is how to approximate the tax burden on capital. The simple measure of statutory tax rate cannot capture the complexity of the whole tax system nor provide a clear image of the implied tax policy. Since the overall tax burden does not depend solely on the statutory tax rate, but also on what is defined - by the tax legislation - as tax base, researchers are in need of some more sophisticated tax measures that take into account changes in the tax base (changes in allowances, deductions e.t.c). For these reasons there are various alternative measures employed as proxies of the tax burden on capital. Namely; (i) the AETR based on the methodology of Mendoza et al. (1994), (ii) the capital tax revenues as a share of GDP or as a percentage of total taxation, (iii) the AETR and marginal (METR) effective tax rates based on the methodology of Devereux et al. (2002).

A large branch of the literature shares the view that alternative measures of the tax burden give rise to different results with respect to the impact of globalization on capital taxation. Specifically, it is believed that studies employing effective tax rates, tend to verify a negative impact of globalization on capital tax rates (see e.g. Bretschger and Hettich, 2005; Winner, 2005; Bretschger, 2010) while studies relying on tax capital revenues (either as a share of GDP or as a percentage of total taxation) tend to confirm a positive impact of market integration on capital taxation (e.g. Garrett, 1995; Quinn, 1997; Swank, 1998). According to this view, different results can be attributed to the fact that the capital tax revenue proxy misleadingly presents possible changes in the tax base (that

may be driven by changes in the rate of profitability or the size of corporate sector) as if they are changes in the tax burden (Bretschger and Hettich, 2002; Adam and Kammas, 2007).[3]

In addition, a large number of scholars tend to believe that employing corporate profits and capital gains as proxy of the capital tax base may be of crucial importance regarding the obtained results. To their view, corporate profits comprise the most mobile form of capital –relative to real estate property, operating surplus of private unincorporated enterprises e.t.c- and therefore taxes on corporate profits are affected in a greater extend by international market integration (see e.g. Devereux et al., 2002 ; Kammas, 2011)

2.2 Do international market integration measures matter?

Another debatable issue is how to better approximate international market integration. Since globalization consist a multifaceted phenomenon, each measure captures at best some specific features of it. For example, market integration measures based on actual flows of trade (e.g. international trade as percent of GDP) may better reflect international economic integration on goods market whereas the globalization index developed by Quinn (1997) can better capture international capital market integration. Similarly, the KOF index of globalization developed by Dreher (2006) can

[3] More precisely, the relevant literature concludes that in the last decades, the share of corporate profits in GDP has increased substantially in most OECD economies (see e.g. Devereux, Griffith & Klemm, 2004). This shortcoming (namely, that higher tax revenue are due to larger tax bases rather than higher tax rates) seems to be behind the positive relationship between higher economic integration and corporate tax revenues found in the data. Moreover, the proxy for tax revenues as a share of GDP is not the appropriate decision variable of the government. This is because the government is able to determine - through tax legislation - the statutory tax rate and the tax base but not GDP.

better capture the various political and social features of globalization. Therefore, employing one measure instead of another may give rise to different empirical findings.

Following this rationale, Dreher (2006) highlights the importance of employing indexes that are based on specific dimensions of globalization instead of using more general proxies. Specifically, Dreher (2006) argues that general globalization measures (e.g. actual flows of trade and investment) fail to reflect in a clear cut way the level of economic integration since they are unavoidably affected by forces of political and social integration. This shortcoming appears to be of great importance in the case of capital taxation because political and economic integration exert conflicting forces on capital tax rates. Namely; tax burden fallen on capital is expected to decrease with increased economic integration (due to the tax competition efficiency hypothesis) whereas it is expected to rise with increased political and social integration (due to increased international tax cooperation between national governments). Therefore, employing a composite index of globalization instead of a more specific one may give rise to totally different empirical findings.

Moreover, many studies underline the potential endogeneneity problem between some globalization measures based on actual flows of trade and investment and capital taxation. This problem arises because increased international capital and trade flows in a country can be viewed either as a proxy of market integration or as the result of reduced capital tax rates. In order to overcome the above mentioned endogeneity problem, many scholars choose to employ qualitative indexes of market integration like the one developed by Quinn (1997) or alternatively the KOF economic integration index developed by Dreher (2006) which is also based –to some extend- on qualitative features of globalization.

For all the above reasons, a large strand of the empirical literature shares the view that employing specific indexes of globalization instead of others may be of crucial importance regarding the obtained empirical findings

3. Review of the literature and Construction of the meta-sample.

Section 3.1 presents a review of empirical studies on capital taxation and globalization. Ee consider all empirical studies that include capital taxation on the left-hand side of the equation and a measure of international market integration on the right-hand side. Section 3.2, describes in details how we proceeded in order to construct the meta-sample which in turn served as a basis for our meta-analysis.

3.1 Review of the Literature

One of the first empirical studies examining the impact of international market integration on capital taxation is that of Garrett (1995), which employs a panel of 15 OECD countries over the period 1967-1990 and examines how the interaction between domestic political forces (e.g. ideology of cabinet) and the economic forces of market integration may affect the implemented fiscal policy. Concerning the issue of capital taxation, Garrett (1995) employs as dependent variable capital tax revenues as a share of GDP and investigates the impact of increased international trade as percent of GDP. The study provides empirical evidence of a positive impact of increased international trade on capital tax burden.

A number of subsequent articles extended in various ways the analysis conducted by Garrett (1995) by keeping as dependent variable the share of capital tax revenues to GDP. Quinn (1997) employs a panel 37 countries from 1974 to 1989 in order to investigate the

same relationship. The basic advantage of Quinn (1997) is that it develops a totally novel, qualitative measure of market integration which is strictly focused on capital market liberalization. Empirical findings provide additional evidence that capital market integration exerts positive and significant impact on capital tax rates. Similarly, Swank (1998) employing a panel data for 17 advanced countries over the period 1966-1993, concludes that increased market integration is positively associated with corporate taxation –when capital mobility is either measured as actual capital inflow and outflow as a share of GDP or captured by the liberalization index developed by Quinn (1997) – whereas it is negatively associated whenever it is measured as international trade (imports plus exports) as a share of the GDP. Finally, Slemrod (2004) using a panel of 55 countries over the period 1980-1995, shows that openness is negatively associated with statutory tax rates but positively associated with revenues collected as a fraction of GDP. Strikingly, larger and more trade-intensive countries do collect more corporate tax revenues. To our knowledge, the only study that employs as dependent variable capital tax revenues as a share of GDP and provide empirical evidence in favor of the so-called "efficiency hypothesis" (i.e. a negative impact of market integration on capital taxation) is that of Kenny and Winer (2006) which is based on a panel of 12 OECD countries over the 1975-1992 period.

Although most of the "first generation" empirical studies are employing capital tax revenues as a share of GDP as dependent variable, a large number of subsequent articles criticize heavily the use of this measure. Bretschger and Hettich (2002) argue that the positive association between globalization and the tax burden on capital found in the previous studies can be attributed to the fact that changes in the capital tax revenue may

be due to changes in the tax base (instead of changes in the tax burden of capital) and argue in favor of alternative proxies for the tax burden on capital (i.e. AETR).

One of the first studies employing AETR as dependent variable is that of Rodrik (1997). In a dataset of 18 OECD countries from 1965 to 1991 he concludes that increased market integration –measured as international trade as percent of GDP- is negatively associated with the taxation of capital. A large number of subsequent articles extended the analysis of Rodrik (1997) in several ways and provide additional evidence in favor of the "efficiency hypothesis". Bretschger and Hettich (2002, 2005) using AETR as dependent variable, for a set of 12 OECD countries over the 1967-1996 period, verify the negative impact of globalization on corporate tax rates. Their results remain qualitatively intact under alternative specifications and for different international market integration measures. Qualitatively similar findings are also obtained by other studies employing AETR as a proxy of capital taxation: Winner (2005) employing a wider dataset of 23 OECD countries over the period 1965-2000, and various alternative market integration proxies, provide strong evidence in favor of the "efficiency hypothesis". These findings are also verified in Adam and Kammas (2007). On the other hand, Bretschger (2010) argues that the positive effect of increased international trade on economic growth is due to its negative effect on capital taxation: using a dataset of 12 OECD countries in the period 1965-1999 he provides evidence for the hypothesis that trade increases growth through its curbing effect on capital taxes. The analyzed trade-growth channel includes a negative impact of openness on corporate taxes and a negative effect of taxes on capital formation and growth. Similarly, Hays (2003) employing a panel dataset of 17 OECD countries (1965-1996) and three alternative measures of capital mobility, concludes that increased international capital mobility has a strong negative impact on capital tax rates

in capital rich countries with majoritarian political institutions. Finally, Kammas (2011) provides empirical evidence of a negative and significant relationship between international trade and four alternative effective tax ratios by employing a panel dataset of 20 OECD countries over the 1982-2000 period.

However, the use of AETR as dependent variable does not preclude empirical evidence against the "efficiency hypothesis". Dreher (2006) in a panel dataset of OECD countries over the period 1970-2000, shows that greater globalization leads to higher AETR on capital. The globalization measure employed by Dreher (2006) (the so- called KOF index of market integration) besides the economic factors (e.g. trade, capital restrictions, trade barriers) takes also into account the social and the cultural aspects of integration. The results documented therein provide evidence in favour of a positive and significant influence of globalization on corporate AETR therefore rejecting the "efficiency hypothesis". Similar findings are also obtained by Garrett and Mitchell (2001) for a sample of OECD countries from 1967 to 1992 leading them to conclude that: (i) foreign direct investment, (ii) financial openness index and (iii) covered interest rate differentials are all associated with higher AETR on capital. Similarly, Gelleny and Mccoy (2001) using a panel data set comprised of 17 OECD countries for the years 1982-1991 suggest that openness is positively associated with corporate tax ratio AETR and attribute this finding to the inhibiting effect of national borders on trade. Additionally, exposure to trade may heighten pressure on governments to provide compensation to segments of the population displaced by international competition (Rodrik, 1998). Such compensation may be financed by increased corporate taxes. Following similar rationale and employing a panel of fourteen developed democracies countries from 1981 to 1995, Swank and Steinmo (2002) investigate what drives the remarkable change in

contemporary tax policy in capitalist democracies. They conclude that internationalization, domestic economic change, and budgetary pressures each prompt significant changes in tax policy yet, together, they create a system of constraints altering the level and distribution of tax burden. Regarding the impact of market integration on capital taxation, they find that both capital mobility and trade are associated with cuts in statutory corporate tax rates but not with reductions in effective average tax rates on capital income.

3.2 Meta-sample and methodology.

Empirical studies examining the effect of international market integration on capital taxation are published either in economics or in political science journals. Therefore, in order to construct our meta-sample we proceeded by searching in the following databases: (i) the Econ-Lit (The American Economic Association's electronic bibliography) database[4] in order to find articles published in economics' journals and (ii) the Scopus database[5] in order to find the articles published in political science journals. Our objective was to find articles containing at least one empirical estimate of globalization's impact on capital taxation. The keywords used in the search were "capital + taxation", "globalization", "efficiency + hypothesis".[6] These approaches identified more than 150 papers, where 23 empirical studies were included.[7] These studies form our

[4] Econ-Lit is a comprehensive index of journal articles, books, book reviews, collective volume articles, working papers and dissertations

[5] Scopus is a multi-disciplinary database covering science, engineering, medicine, and social sciences. It provides access to: Citations and abstracts of over 18,000 titles (1966 - present) from 5,000 international publishers and cited references of articles published since 1996

[6] The last search was conducted on May 5, 2011.

[7] A large number of the identified papers were theoretical, whereas there were cases of empirical studies which although they investigate the effect of international market integration on national tax structure, they employ as key dependent variable some kind of capital tax-labor tax ratio and not a clear cut capital tax rate measure (see e.g. Haufler et al., 2009). Therefore, these empirical studies are not included in our meta-sample.

meta- sample. As each study reports several estimations, we follow Doucouliagos and Stanley (2009) and report them all as independent regressions and thus our sample includes 233 observations. Table 1 lists the 23 studies employed in our analysis as well as some descriptive statistics concerning the estimated coefficient of the size effect of globalization on capital taxation.

[Insert Table 1, here]

As can be easily verified, there exist meaningful variation among the empirical studies. Firstly, the number of coefficients obtained from each study ranges significantly. That is, although we obtain a relative large number of observations from some studies (for example Dreher, 2006, with 58 reported coefficients) others contribute by providing a relatively small number of estimated coefficients (Garrett, 1995 with only 2 reported coefficients). Secondly, there exists significant variation in the mean value of coefficients, ranging from a value of -7.509 (Bretschger and Hettich, 2002) to 1.141 (Hays, 2003). Moreover, examining the "minimum", "maximum" columns we conclude that seventeen out of the twenty two studies report at least one positive coefficient, although most of the coefficients appear to be negative.

The simplest meta- analysis model regresses the reported estimated coefficient of each study (i.e. the estimated effect of globalization on the tax rate on capital) weighted by its standard error - i.e. the *t- statistic* of each study- over an intercept and the inverse of the standard error of the coefficient.[8] Then, in the absence of heterogeneity in the

[8] The variables are weighted with the standard error in order to correct the meta- regression model for its build- in heteroskedasticity problem (see Stanley et al., 2008 for more details).

literature, the coefficient of the inverse of the standard error is the "true" or underlying effect (Stanley et al., 2008).

The estimated "true" effect however can be biased in the presence of (i) publication bias and (ii) unexplained heterogeneity (Doucouliagos and Stanley, 2008). Publication bias arises in the literature when editors, reviewers and researchers have a preference for results that are statistically significant and/ or consistent with certain theoretical predictions (Stanley, 2005; Doucouliagos, 2005). Our testing for the presence of publication bias rejected the hypothesis of publication bias in all cases, and we therefore need not correct our results.

In order to tackle the problem of heterogeneity in the meta- regression we have to introduce additional meta- independent (moderator) variables.[9] The moderator variables are those particular studies characteristics that are expected to have systematic impact on the reported effect of globalization on capital taxation. Following the rationale described in Section 2 we seek to examine whether differences regarding: (i) capital taxation data and (ii) alternative globalization measures may be of crucial importance regarding the obtained results.

In order to capture the effect of alternative capital taxation data we construct two dummy variables. The first one (denoted as *AETR*) equals to one whenever an estimation employs as proxy of capital taxes, average effective tax rates based either on the Mendoza et al. (1994) methodology or on Devereux et al. (2002); the second variable (denoted as *statutory*) equals to one whenever an estimation uses statutory tax rates as a measure of capital tax rates and takes a value of zero otherwise and the third (denoted as *EMTR*) equals to one whenever an estimation employs marginal effective tax rates based

[9] In the meta- regression, these moderator variables are also divided by the standard error of the coefficient.

on Devereux et al. (2002) methodology as proxy of capital taxation. Moreover, in order to examine whether employing strictly corporate tax revenues instead of capital tax revenues as a proxy of capital taxation may be important, we construct the variable *Corporate_data,* which equals to one whenever an estimation uses exclusively corporate profits and capital gains as proxy of the capital tax base.

Following similar rationale, in order to capture the effect of different globalization measures we create four alternative international market integration dummy variables. The first one (denoted as *Openness*) equals to one whenever an estimation employs actual international trade flows as percent of GDP and equals to zero otherwise; the second (denoted as *KOF*) takes a value of one when an estimation uses the overall KOF globalization index developed by Dreher (2006) and equals zero otherwise; the third (denoted as *Quinn*) equals to one when an estimation employs the qualitative index of market integration developed by Quinn (1997). Finally, as there is a number of papers that uses more indirect measures of globalization, such as the Sachs-Werner openness index, the covered interest parity or the savings- investment correlation (see e.g. Slemrod, 2003; Winner 2005; Garrett and Mitchell, 2001) we construct a forth dummy variable (denoted as *Indirect*) which equals to one when one of the three above mentioned indirect globalization measures is employed and takes a value of zero otherwise.

Moreover, we focus on the particular characteristics of underlying studies and we examine whether there exist potential systematic impact of specifications and estimation procedures on the reported findings. On this basis, we develop several additional moderator variables, which are presented in table 2. These variables were chosen firstly on the basis of theoretical judgments concerning the importance of each variable as highlighted in the literature and secondly following the "general to specific" approach as

it is common practice in the meta- analysis research (Stanley, 2005). Moreover our decision to keep or drop a variable from the model was also based on model diagnostics (namely improvement of the R- square and the Ramsey Reset specification test).

[Insert Table 2, here]

The full set of moderator variables includes initially variables that take into account the structure of the dataset, i.e. the earliest and latest year and the number of countries included in the sample. It is also includes the year of publication and a dummy variable that takes the value of one if the journal where the article was published is not indexed in the Econ- Lit. Finally dummies are included in order to account for the other independent variables included in each regression: the dummy variable *dynamic*, which takes the value of one if lagged tax rate on capital is included in the equation, dummy *spending* to take into account if the author(s) control for the level of government spending, and the dummy *demographics* to take into account if the author(s) control for demographic factors.

The meta- regression model we estimate then (taking account the study heterogeneity) takes the form

$$Tstat_i = a\left(1/SE_i\right) + \beta_0 + \sum_{k=1}^{K} \frac{a_k Z_{jk}}{SE_j} + v_j \qquad (1)$$

Where, $Tstat_i$ and SE_i is the t-statistic and the standard error of the coefficient of interest of the i study, Z_k are the K moderator variables and v_j is the error term.[10]

4. Meta-analysis and Results

Our first task is to test for the presence of publication bias. Usually, publication bias arises in literatures characterized by consensus (Doucouliagos and Stanley, 2008). In these cases researchers "search" more in order to obtain more significant results, and editors and researchers are more reluctant to publish "unconventional" results. Given that the literature on the effect of globalization on capital taxation is characterized with highly conflicting results, publication selection may not be an issue here.

To establish that are results are not plagued with publication bias, we follow Stanley (2008) and Efendic et al. (2011) and use the Funnel Assymetry Test (FAT) to test for the presence of publication bias. FAT estimates equation (1), assuming that all a_k are zero, i.e. no heterogeneity effect and tests the null hypothesis H_0: $\beta_0=0$. A non- rejection of the null implies absence of publication bias. A non- zero constant term on the other hand implies upward or downward bias (depending on whether β_0 is positive or negative respectively) on the effects estimated in the literature.[11] The results of the FAT test are presented in Table 3.

[Insert Table 3, here]

[10] It should be noted that in equation (1), a no longer corresponds to the "true" effect. The "true" effect depends on the moderator value categories and is different across studies (see Doucouliagos and Stanley, 2009).

[11] Another way to examine the presence of publication bias is to use the funnel graph (Stanley, 2005). As this is only a graphical indication, it is an indirect way of examining publication bias and formal testing (as the FAT) is required. However we have plotted the funnel graph and it seems symmetric, as required in order to reject the presence of publication bias (the graph is always available from the authors).

The FAT test clearly rejects the presence of publication bias, at all levels of relevant statistical significance. Moreover, Table 3 reports the "true" effect of globalization on capital taxation: in the absence of heterogeneity this is given by the coefficient *a*. As Table 3 indicates there is no "genuine" empirical effect of globalization on capital taxation. This result however should be treated with caution since the relevant literature concludes that there is significant amount of heterogeneity among the empirical studies. The existence of heterogeneity is also confirmed by our results included in Table 4. Moreover, in Table 4, we estimate a multivariate meta- regression model (i.e. equation (1)), in order to investigate the potential sources of heterogeneity in the literature.

Table 4 reports the empirical results of the multivariate meta- regression. The R-square ranges from 0.19 to 0.25, implying a relatively good fit for a meta- regression model. Moreover the Ramsey test Reset test cannot reject the hypothesis that there are no ommited variables in the model at the 5% level of statistical significance.[12] As individual regressions are clustered across studies, we report cluster adjusted standard errors.

[Insert Table 4, here]

In column (1), we estimate equation (1) for the whole sample. As can be seen eight variables turn out significant. Since the coefficients of all four dummies related to the measure of globalization turn out highly significant, we conclude that alternative measures of globalization are key determinants of result heterogeneity.[13] In fact *Openess*, *Quinn* and the *Indirect measure* bear negative and significant coefficients whereas the

[12] We have also performed a link test (Pregibon, 1980) to test the linear specification of the model and in all cases the model appeared correctly specified.

[13] In the multivariate meta-regression model, the "true" effect is not captured solely by the coefficient of 1/SE but by the combination of all the moderator variables. In other words there is different "true" effect depending on the study characteristics.

KOF dummy variable bears a positive and highly significant coefficient. On the other hand, none of the dummy variables related to capital tax measures bear significant coefficients. This result highlights the fact that study characteristics related to the measurement of capital taxation fail to explain the heterogeneity of the empirical findings. Moreover, characteristics related to the structure of sample, as the number of countries (which turns out marginally insignificant), the year the study was published, the latest year in the time sample and whether the study was published in a political science journal turn out significant. Finally, it is interesting to note that estimations that included proxies of government spending in the set or control variables, resulted significantly to lower effect of globalization on the tax burden of capital. This suggests that when one takes into account the positive effect of globalization on government spending (Rodrik, 1999), the effect of higher economic integration on the taxation of capital is more consistent with the "efficiency hypothesis".

In Columns (2) to (4) of Table 4, we proceed by estimating equation (1) by: (i) excluding the cases where the marginal effective tax rates (EMTR) based on the methodology of Devereux et al. (2002) is used as capital tax proxy [Column(2)], (ii) excluding 5% of the most extreme values of the effect of globalization on tax rates [Column(3)] and (iii) excluding 10% of the most extreme values of the effect of globalization on tax rates [Column(4)].[14] As it is evident in columns (2) to (4), our main results remain qualitatively intact. Differences across studies can be attributed to differences in the measurement of globalization whereas in contrast, study characteristics

[14] Note that the set of variables in all columns is not the same. This is because by excluding some regressions from our meta- sample (i) there is no variation in some of the moderator variables, (ii) some variable lose their statistical significance (and thus are dropped) and (iii) the proper specification of the model (as indicated by our tests) changes.

related to the measurement of the tax burden on capital appear to have an insignificant effect on the above mentioned relationship.

5. Conclusions

The main objective of the present paper was to examine whether there is any systematic impact of different capital taxation data and different globalization measures on the reported effect of globalization on capital tax rates. Our analysis provides empirical evidence that study characteristics related to capital taxation do not exert any systematic impact on the obtained results. In contrast, study characteristics related to globalization measures give rise to totally different findings concerning the issue under examination. Moreover, we provide empirical evidence that several other study characteristics (e.g. whether a particular study has been published in a political or in an economic journal) do have systematic impact on the reported results. These conclusions are very important for future empirical studies examining the effects of globalization on capital taxation

Table 1. Summary statistics of the studies in our meta sample

	Authors	Number of elasticities	maximum	minimum	Median	Standard deviation	Mean
1	Garrett, 1995	2	0.065	0.040	0.052	0.018	0.052
2	Rodrik, 1997	3	-0.082	-14.330	-0.122	8.215	-4.845
3	Quinn, 1997	6	0.097	0.002	0.004	0.031	0.029
4	Garrett , 1998a	2	0.040	-0.004	0.018	0.031	0.018
5	Garrett , 1998b	8	0.190	-0.240	-0.030	0.190	-0.019
6	Swank, 1998	6	0.209	-0.009	0.003	0.100	0.062
7	Garrett and Mitchell, 2001	8	0.419	-0.810	-0.017	0.379	-0.002
8	Gelleny and McCoy, 2001	16	4.004	-5.140	0.086	1.767	0.037
9	Bretschger and Hettich, 2002	36	0.450	-22.060	-3.475	8.279	-7.509
10	Swank and Steinmo, 2002	8	0.143	-0.164	-0.010	0.096	-0.026
11	Hays, 2003	3	2.223	0.212	0.988	1.014	1.141
12	Slemrod, 2003	8	0.027	-0.056	0.005	0.029	-0.001
13	Bretschger and Hettich, 2005	14	0.980	-10.100	-0.003	3.254	-1.699
14	Winner, 2005	3	-0.135	-0.180	-0.145	0.024	-0.153
15	Dreher, 2006	58	3.410	-8.230	0.300	2.779	-0.195
16	Kenny and Winer, 2006	2	0.001	-0.004	-0.002	0.004	-0.002
17	Adam and Kammas, 2007	7	-0.003	-0.003	-0.003	0.001	-0.003
18	Devereux, Lockwood and Redoano, 2007	6	0.130	-0.003	0.035	0.056	0.052
19	Clausing, 2008	5	-0.020	-0.211	-0.191	0.083	-0.145
20	Overesch and Rincke, 2009	14	1.740	-2.210	-1.215	1.021	-0.904
21	Plumper, Troeger and Winner, 2009	8	1.280	-0.045	0.010	0.511	0.267
22	Bretschger, 2010	14	-2.178	-3.259	-2.531	0.408	-2.697
23	Kammas, 2011	14	-0.058	-0.255	-0.140	0.068	-0.155

Table 2: Moderator (Meta-Independent) variables for the impact of globalization on capital taxation

Variable	Description
AETR	=1 if estimation uses average effective tax rates (AETR) based on Mendoza et al., 1994 or Devereux et al., 2002 methodology.
EMTR	=1 if estimation uses marginal effective tax rates (EMTR) developed by Devereux et al., 2002.
Statutory	=1 if estimation uses statutory tax rates taken by Price Waterhouse Coopers or by Devereux et al., 2002.
Corporate_data	=1 if estimation uses profits and capital gains of corporations as proxy of the capital tax base.
Openness	=1 if estimation uses actual international trade flows as percent of GDP as a proxy of globalization.
KOF	=1 if estimation uses the overall KOF globalization index developed by Dreher (2006) as a proxy of globalization.
Quinn	=1 if estimation uses the qualitative index of market integration developed by Quinn (1997) as a proxy of globalization.
Indirect	=1 if estimation uses: (i) covered interest parities, (ii) saving-investment correlation and (iii) low wage imports as a proxy of globalization.
Numb_countr	the number of countries employed in the estimation.
Earliest year	Earliest year of the time sample in the study
Latest year	Latest year of the time sample in each study
Poljournal	=1 if estimation has been published in political science journal.
Publication year	The year that the study was published
Dynamic	=1 if estimation employs lagged dependent variable.
Spending data	=1 if estimation includes controls for the level of government spending.
Demographics	=1 if estimation includes controls for the structure of demographics.

Table 3: Funnel Assymetry Test	
Dependent variable: T-stat	
1/SE	-0.001
	(-0.404)
Constant	-0.556
	(-0.869)
observations	233
R- squared	0.01
F-test 1/SE=0	0.16
Ramsey Reset test (model has no omitted variables)	3.73**
Note: **, denotes rejection of the null hypothesis at the 5% level of significance. Both coefficients are insignificant at the 10% level of statistical significance. Estimated with OLS, with cluster- robust standard errors; observations weighted to give each study equal weight.	

Table 4: Meta-regressions for different combinations and study characteristics				
	(1)	(2)	(3)	(4)
1/SE	4.618	5.368	6.184	7.663
	(0.686)	(0.732)	(0.904)	(1.055)
Corporate_data	-0.004	-0.003	0.003	0.008
	(-0.241)	(-0.164)	(0.199)	(0.619)
AETR	0.002	0.003	0.002	0.003
	(0.205)	(0.235)	(0.180)	(0.213)
EMTR	0.041		0.022	0.014
	(0.719)		(0.379)	(0.236)
statutory	0.001	0.002	0.001	0.002
	(0.112)	(0.152)	(0.105)	(0.158)
Openness	-0.168*	-0.169*	-0.155*	-0.151*
	(-2.053)	(-2.038)	(-2.060)	(-2.047)
Quinn	-0.220**	-0.222**	-0.208**	-0.203**
	(-2.149)	(-2.135)	(-2.118)	(-2.089)
Indirect	-0.157**	-0.158**	-0.148**	-0.144**
	(-2.720)	(-2.684)	(-2.668)	(-2.580)
KOF	3.568***	3.423***	3.194***	2.809***
	(4.587)	-3.461	(6.584)	(5.088)
spending data	-0.047*	-0.048*	-0.045*	-0.043*
	(-1.941)	(-1.925)	(-1.857)	(-1.797)
earliest year	-0.006	-0.006	-0.006	-0.006
	(-1.588)	(-1.572)	(-1.647)	(-1.691)
latest year	-0.017**	-0.017**	-0.017**	-0.017**
	(-2.167)	(-2.132)	(-2.192)	(-2.186)
publication year	0.020*	0.020	0.019	0.019
	(1.750)	(1.717)	(1.689)	(1.634)
poljournal	0.114*	0.118*	0.114*	0.118**
	(2.017)	(1.974)	(2.081)	(2.103)
demographics	0.009	0.012	0.014	0.018
	(0.226)	(0.278)	(0.329)	(0.441)
dynamic	0.064	0.063	0.057	0.052
	(1.364)	(1.313)	(1.235)	(1.134)
numb_countries	0.001	0.001	0.001	0.001
	(1.591)	(1.540)	(1.453)	(1.261)
Constant	-0.629	-0.519	-0.337	-0.041
	(-1.096)	(-0.707)	(-0.957)	(-0.100)
observations	233	210	219	204
R-squared	0.21	0.22	0.25	0.27
Ramsey Reset test	2.6	2.6	2.7	2.7

Note: *, **, *** denote statistical significance at 10%, 5% and 1% level of statistical significance respectively. Estimated with OLS, with cluster- robust standard errors; observations weighted to give each study equal weight. The Ramsey reset test does not reject the null at the 5% level of statistical significance in all equations, indicating correct specification of the model.

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