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Corporate income taxation and external balances in the European Union

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ABSTRACT
This study examines the impact of corporate taxation on the external balances of 27 European Union member countries from the late 1990s to 2021. Using an ARDL process and a 2-stage least squares estimation procedure, we find that, in the short term, higher corporate taxation is positively and significantly related to the current account balance and the trade balance for the whole sample. There are considerable differences in the effects in the euro area and non-euro countries, with the latter experiencing a much stronger short-term impact. In the long term, there are no critical differences in the results between the two groups, and the impact of corporate taxation is positive but statistically significant only for the trade balance. The size of the impact of corporate taxation on net exports and current account balances is of similar magnitude, which likely implies that the international profit shifting *via* manipulating intrafirm prices in international trade does not strongly affect the external balances in our sample. Our results imply that initiatives to increase global tax rates could be justified from an international trade perspective.

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1. Introduction

The relationship between taxation and external balances has become an increasingly important research topic over the last decade. Several contributions in this area have studied the effect of a fiscal devaluation on the trade balance, i.e., a tax shift from labour to consumption taxation (see, e.g., Adarov et al., 2021; Brady & Magazzino, 2018a, 2018b; Dalena & Magazzino, 2012; De Mooij & Keen, 2013; Engler et al., 2017; Farhi et al., 2014; Holzner et al., 2018, 2019; Lipińska & von Thadden, 2019; Magazzino et al., 2019; Magazzino & Mele, 2022). These studies were primarily motivated by the trade imbalances among European Union (EU) countries that became a high-priority policy issue after the global financial crisis in 2007 and 2008. Such tax shifts were considered a practical policy option, especially for countries that cannot rely on nominal exchange rate devaluation to increase external cost competitiveness,

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such as the euro area countries with a trade deficit. The studies mentioned above on fiscal devaluation found that it positively affects the trade balance in the short term. Thus, even if tax policies primarily aim to achieve economic goals unrelated to external balances, understanding their effects on international trade and other current account transactions may be necessary for policymakers and could improve macroeconomic management.

In addition to labour and consumption taxes, corporate taxation can have consequences for external balances (through different channels and mechanisms). However, empirical research on this potential relationship is relatively scarce. In their theoretical model, Keen & Syed (2006) argue that increases in corporate taxation immediately lower domestic investment and consumption, leading to short-term improvements in net exports, which are related to induced capital outflows. As a delayed consequence of these initial capital outflows, there is an increase in net income from abroad, so the impact on the trade balance is mitigated and largely disappears in the long term. Ivanova (2012) found that higher corporate income tax rates hurt investments, which in turn affects the current account. Her research suggests that higher corporate income tax rates are associated with higher current account balances. More recently, Holzner et al. (2021) found that corporate income taxes in the EU and OECD reduce exports and imports only when the stock of FDI is high, implying that multinational enterprises decrease their operations in countries that increase corporate taxes. However, the effect is found to be small in aggregate.

Devereux et al. (2008) found that countries compete for mobile investment using statutory corporate income taxes. This result has been recognised as a factor behind the long-term downward trend in statutory corporate income tax rates, observed across different country groups. It appears to have been particularly intense in the EU (EC, 2015). The observed decline in statutory rates has primarily been accompanied by a broadening corporate tax base, which alone affected effective tax rates.[1] Given that the effective rates are an essential factor in investment-location decisions (Buettner & Ruf, 2007; Devereux & Griffith, 1998; Herger et al., 2016) and capital accumulation (Bond & Xing, 2015), corporate tax base reforms may affect capital flows and external balances, even when statutory rates remain unchanged. Thus, some long-discussed corporate taxation reforms in the EU, such as those aiming to address debt bias in corporate taxation or those harmonising the corporate tax base, may influence the effective corporate tax burden (unequally across countries; see EC, 2016a; and EC, 2016b), and therefore affect countries' external balances. The same holds for the more recent OECD/G20 initiative (from October 2021), supported so far by 137 jurisdictions, which may substantially impact the tax base determination as well as the effective corporate tax rates for the largest multinational enterprises (MNE) (see OECD, 2021).

Our study builds upon the existing literature and investigates the hypothesised relationship between corporate taxation and external balances. There may be differences in the effects of corporate income taxation on net exports (trade balance in goods and services) and the current account balance. Especially since the latter also contains non-trade-related items possibly affected by corporate taxation, such as the primary income account where earnings of MNEs are recorded. For example, the widespread

profit-shifting transfer pricing practices (see, e.g., Heckemeyer & Overesch, 2017, for a recent review of related research) of MNEs involve manipulating intrafirm prices in international trade. This transfer pricing has a likely (partial) effect on the trade balance, which can be offset by the countervailing impact on the primary income in the current account balance.[2] For this reason, unlike earlier empirical studies, we directly compare the effects on two measures of external balances.

We further contribute to the existing literature by allowing for differences in the potential impact of corporate taxation across two country groups: the euro area and non-euro countries. As member states of the euro area cannot use nominal exchange rates as instruments to achieve policy goals related to their external balances or tailor monetary policies to a single country's needs, policy reactions and adjustments to shocks could differ from those in non-euro countries. Furthermore, the euro area countries are likely to be more closely financially integrated due to the absence of exchange rate risk.

We examine the hypothesised impact of corporate taxation on the external balances of EU member states (all 27 countries, UK excluded) from the late 1990s, depending on data availability for each country, to 2021. We use an ARDL process and a 2-stage least squares estimation procedure to account for endogeneity in the relationship between external balances and corporate income taxes, as international trade may also affect corporate taxes.

Using a dynamic empirical model is appropriate because the impacts of corporate taxation on net exports and the current account balance can extend over several years for at least two reasons. First, corporate taxation influences investment decisions and the future income streams from these investments, affecting the economy's intertemporal external balance constraints. Second, empirical findings show that a considerable portion of the corporate tax burden is shifted to labour in the form of lower labour costs per employee, i.e., lower producer wages (Arulampalam et al., 2012). This wage lowering may improve countries' competitiveness measured by real exchange rates deflated by unit labour costs. As shifting the corporate tax burden to labour may take time, depending on the countries' wage-setting institutions, this specific channel may be relevant in the longer term.

Our study is structured as follows. The next section describes different channels of influence of corporate taxation on net exports and the current account balance, identified in the related theoretical and empirical literature and briefly noted above. The third section presents our data set and the empirical model applied to test the relationship between corporate taxation measures and external balances. The fourth section presents the results of our econometric estimations and robustness checks. In section five, we discuss and summarise our main findings, while the last section concludes.

2. Literature review

2.1. Theoretical framework

Investigating the relationship between corporate taxation and external balances has gained attention in recent years, shedding light on the potential impacts of tax

policies on international trade and current account dynamics, possibly channelled through firm location, investment decisions, and export performance. Chow et al. (2022) find that a one-percentage-point increase in corporate income tax increases the probability of firms moving out of the state. On a sample of Italian firms, Federici et al. (2020) show a similar result and additionally find that the export intensity of existing exporters decreases. Numerous studies have explored the impact of fiscal devaluation, which involves shifting taxes from labour to consumption, on trade balances (Adarov et al., 2021; De Mooij & Keen, 2013; Engler et al., 2017; Farhi et al., 2014; Holzner et al., 2018, 2019). These studies addressed trade imbalances within the EU following the 2007–2008 global financial crisis when fiscal devaluation was considered a viable policy option, particularly for euro area countries with a trade deficit. The findings of these studies indicate that fiscal devaluation has a positive short-term impact on the trade balance.

To provide a theoretical framework for their empirical analysis of the value-added and corporate taxation effects on net exports, Keen & Syed (2006) introduce a simple two-period theoretical model. The model's present value of net exports is zero, consistent with an effective intertemporal constraint on trade balances. The model predicts that an increase in the (de facto widely used) source-based corporate taxation reduces domestic consumption and investment on impact, i.e., induces capital outflows, necessitating improved trade balance during the first period. In the second period, because of the initial capital outflows, there is an increase in net income from abroad, which is related to a decline in the trade balance. On the other hand, an increase in the residence-based corporate tax does not affect the return on investment of non-resident investors. However, it lowers returns on residents' savings so that they initially increase their consumption, leading to a decline in the trade balance. This trend in the trade balance is reversed in the second period due to lower income from abroad resulting from lower resident savings in the initial period. The study's empirical findings are consistent with the expected effects under source-based corporate taxation, whose elements, as the authors discuss, are often found in practice.[3] Thus, they found a positive and significant initial effect of corporate taxes on net exports, which converges to zero in the longer term.

2.2. Channels of influence from corporate taxation on external balances

Keen & Syed (2006) do not model exchange rates and only briefly note depreciation related to capital outflows. However, such depreciation may amplify the short-term positive effect described in the model. The extent of the exchange rate depreciation related to capital outflows depends on the exchange rate regime. While nominal exchange rates are fixed among the members of a currency union, such as the euro area, the strongest reactions can be expected in countries with freely floating currencies. Although the nominal exchange rate may affect trade balance, real exchange rates (deflated by unit labour costs) more often represent a better measure of export competitiveness. Therefore, there is an additional potential channel of influence from corporate taxation on external balances—labour costs. In theory, with perfect international capital mobility (and no uncertainty), small open economies have no

incentive to tax (source-based) corporate income, as such tax would merely distort the capital-labour ratio and would be fully passed onto labour (Gordon, 1986). Despite some restrictive assumptions leading to this theoretical result, empirical studies have found that a significant portion of the corporate tax burden is borne by labour. For example, Suárez Serrato & Zidar (2016) found that in the US, workers bear 30–35% of the state corporate tax burden. Arulampalam et al. (2012) use a large sample of companies in nine European countries. They estimate that for each $1 increase in the tax bill, real producer wages (labour cost per employee) are reduced by 49 cents. In the latter study, the reduction in wages occurs through wage bargaining over quasi-rents in imperfect competition, which declined due to corporate tax increases. Reductions in producer wages may affect external balances, as they tend to depreciate the real exchange rate deflated by unit labour costs, even if nominal exchange rates do not change. Thus, such shifts of the (additional) corporate tax burden to labour may weaken the motive for capital outflows due to corporate tax increases that lead to initial improvement in external balances and may improve the cost competitiveness of exporters. Other things equal, the cause of the external balance improvement then switches from capital outflows to the depreciated real exchange rate. Depending on the labour market institutions in a country, i.e., due to staggered wage setting, the shift of the corporate tax burden to labour may not be instantaneous. If it materialises in the long term, it works in the direction opposite from the long-term effect found in Keen & Syed (2006) so that the positive impact of corporate taxation on external balances may persist over a longer term.

2.3. Different measures of corporate taxation

Notably, there are different measures of corporate taxation. In addition to analysing the statutory tax rate on external balances, this study also examines the impact of the effective average and the effective marginal tax rates—as in much of the research on the impact of corporate taxes on investment decisions discussed below. The effective marginal tax rate is the proportional difference between the cost of capital and the required post-tax real rate of return for a hypothetical incremental investment by a company that may be domestic or foreign. The effective average tax rate considers discrete investment choices for (mutually exclusive) hypothetical investment projects across potential locations. It is measured by the proportion of total income taxed away in specific locations (see EC, 2021, pp. 280–281). A detailed description of the effective tax rate calculation methodology is available in Devereux & Griffith (1999). It should be noted that the effective average rate may be interpreted as a weighted average of the effective marginal tax rate and the (adjusted) statutory rate (see Devereux & Griffith, 2003).

2.4. International capital flows and corporate taxation

There is extensive literature examining the responsiveness of capital flows to differences in corporate taxation, which is a critical part of how corporate taxation affects the external balances described above. A considerable portion of this research is

concerned with international capital flows resulting from the discrete investment choices of corporations. According to Devereux (2007), a company considering investing abroad faces a series of consecutive decisions. First, it must decide whether to invest abroad or produce at home and export its products to foreign markets. Second, if the company decides to invest abroad, it must choose the country of foreign production, often assuming that only one country can be chosen. Third, the company must determine how much capital it should invest after choosing the investment location. The final decision is where to declare the generated taxable income.

The first decision is affected mainly by trade costs, import tariffs in foreign markets, or the relative sizes of plant-level and firm-level economies of scale.[4] However, the host country's choice, conditional on the decision to invest abroad, is likely to be affected by the effective average tax rate, as confirmed by the empirical evidence presented in Devereux & Griffith (1998). Their results further indicate the relevance (although weaker) of the effective average rate on the location decisions of companies investing in more than one country and its insignificance when deciding whether to invest abroad in the first place. The results of Buettner & Ruf (2007) confirm that the effective average tax rate, unlike the effective marginal rate, is a significant determinant in choosing between (mutually exclusive) production locations. However, unlike the findings of Devereux & Griffith (1998), their results also indicate stronger explanatory power of statutory tax rates than effective average rates for the location of foreign investment. This result partially contrasts with De Mooij & Ederveen (2003) meta-analysis, which found that foreign direct investment is most responsive to the effective average rate and significantly impacts effective marginal rates. The findings of Herger et al. (2016) demonstrate the effects of different taxation indicators on different types of foreign investment. The impact of host countries' corporate taxation is broadly negative, slightly stronger for the statutory than for the effective average tax rate measure, and stronger for vertical than horizontal foreign direct investment.

After choosing the foreign production location, the company must decide on the amount of investment—a decision that may be affected by the effective marginal tax rate. There is a lack of empirical evidence on the impact of corporate taxation on the scale of foreign investment projects. The reason may be the difficulty of isolating this specific effect due to the discrete choice nature of such investments. In theory, the effective marginal tax rate is an essential determinant of investment scale for domestic and foreign investors (see Keuschnigg, 2008). Consistent with this theoretical hypothesis, Bond & Xing (2015) provide evidence that the tax component of the user cost of capital (a measure of the corporate tax burden closely related to the effective marginal tax rate) does affect aggregate capital accumulation (most strongly for equipment investment).[5] Their result implies that the effective marginal tax rate may induce international capital flows unrelated to discrete choice investment decisions of foreign corporations, as funds for capital accumulation in domestic companies may originate from abroad (e.g., through domestic financial sector intermediation of foreign capital or in the form of external debt of the domestic corporate non-financial sector). This segment of capital flows is also related to domestic investment and consumption, affecting the countries' external balances. In addition, Devereux et al. (2008) found indications that countries compete over effective marginal tax rates to attract capital.

An investor's final decision concerns the location of profits—an MNE decides where to declare the generated taxable income. This decision is related to profit-shifting opportunities and is expected to depend on the statutory tax rate. Devereux et al. (2008) found that countries compete over the statutory tax rates to attract mobile profits. The observed decline in the statutory rates across countries can be explained by this type of strategic interaction if there are no significant restrictions on international capital flows.

However, international shifting of MNEs' profits due to corporate taxation may impact the current account and trade balances differently. According to a recent literature review by Heckemeyer & Overesch (2017), a commonly used profit-shifting method is transfer pricing, i.e., manipulation of prices in international trade between a parent company and its foreign affiliate (or among different foreign affiliates of the same MNE; see Huizinga & Laeven, 2008). Shifting profits from an MNE's subsidiary located in a high-tax jurisdiction through transfer pricing involves decreasing its export prices and increasing its import prices in intrafirm trade. Using US international trade price data, Clausing (2003) estimated that intrafirm trade with a country with a 1% lower statutory corporate income tax rate was associated with export (i.e., import) prices 1.8% lower (i.e., 2% higher) than non-intrafirm prices in trade with the same country. More recent evidence on lower intrafirm export prices in trade with affiliates in low-tax jurisdictions is available for French companies from Davies et al. (2018). They focus on effective marginal tax rates, but their results were qualitatively confirmed when using effective average or statutory rates. Such pricing practices produce an immediate negative impact of higher corporate taxes on the trade balance in goods and services (without necessarily affecting real activity). This partial effect is of the opposite sign than the generally expected positive short-term effect induced by capital outflows. However, the current account balance also contains non-trade-related items, including the primary income account, which, among other transactions, comprises the earnings of MNEs. If a portion of the earnings is shifted abroad, the primary income balance is affected positively. This change in the primary income balance should immediately offset the corresponding partial negative effect on net exports, resulting in a zero impact on the current account balance through transfer pricing. Such expectation is consistent with findings on the effects of profit shifting on economic accounts in Bruner et al. (2018), which show that the trade balance is affected negatively through such practices, while the impact on the current account is negligible. Thus, transfer pricing may reduce the overall corporate taxation effect on the trade balance, unlike the current account balance. Holzner et al. (2021) also explore multinational enterprises by studying the effect of corporate taxation on sectoral exports and imports of OECD and EU countries conditional on the stock of FDI. They do not find evidence of transfer pricing, but instead, that multinational enterprises reduce their operations in countries that raise their corporate taxes only when the stock of FDI is high.

Overall, the literature generally finds that corporate taxation impacts international capital flows, as it influences investors' discrete choices of production location and possibly the investment size. Conclusions regarding the most relevant corporate tax indicators for different investment decisions are not unanimous. Corporate taxes may

affect the capital accumulation of domestic companies, with potential consequences on segments of international capital flows other than those related to the discrete investment choices of MNEs. Taxation also affects the location of profits, with the consequence that the transfer pricing practices may deteriorate the balance of trade in goods and services.

In line with previous research and the theoretical framework, the hypotheses we would like to test are the following:

H1: The long-term effects of corporate taxation on trade balances are positive.

H2: The long-term effects of corporate taxation on current account balances are positive.

H3: The effect of corporate taxation on external balances varies across euro area and non-euro area countries, at least in the short term.

H4: In the long term, the effects of corporate taxation on external balances do not differ between euro area and non-euro area countries.

3. Data and empirical model

3.1. Model and methodology

We rely on the empirical specification used by De Mooij & Keen (2013) and Holzner et al. (2018) to investigate the effects of fiscal devaluation on net exports. This specification is a reparameterisation of the ARDL(1,1) process, which we augment with additional control variables, as follows:

$$\Delta eb_{i,t} = \lambda eb_{i,\ t-1} + \beta_D \Delta tv_{i,t} + \beta_L tv_{i,t-1} + \boldsymbol{\gamma}_D' \Delta \boldsymbol{X}_{i,t} + \boldsymbol{\gamma}_L' \boldsymbol{X}_{i,t-1} + \delta iip_{t-2} + \theta eu_t + \vartheta ea_t + \alpha_i + \tau_t + u_{i,t}. \tag{1}$$

The subscript i represents the country index, t is the time index, Δ is the first-difference operator, and α_i and τ_t represent the country- and time-fixed effects, respectively. *eb* denotes the external balances variable, either the current account balance (denoted with *cab*) or the trade balance in goods and services (denoted with *tbgs*). We have included the dependent variable's lagged value to capture the dynamic relationship between external balances and our regressors. *tv* indicates different measures of the corporate tax variable of interest: the statutory corporate income tax rate (denoted with *citr*), the effective average tax rate (*eatr*), and the effective marginal tax rate (*emtr*) so that $tv \in (citr, eatr, emtr)$.[6] These tax indicators are forward-looking, unlike, e.g., the share of corporate income tax revenues in GDP used in Keen & Syed (2006) (in addition to the statutory rate). Although these tax measures should not be prone to endogeneity issues stemming from simultaneous shocks to dependent and tax variables (unlike revenue shares in GDP), policy endogeneity is possible, i.e., that policymakers change the tax rates in response to unfavourable developments in the external balances. In our view, such policy reactions to contemporary developments in external balances are not very likely, as tax reforms usually take time to prepare

and implement. The coefficient of the differenced tax variable β_D captures the instant effect of a change in *tv*. The long-term impact is measured by the coefficient of the lagged tax variable divided by that of the lagged external balance variable, $-\beta_L/\lambda$, (if $\lambda = 0$, the short- and long-term effects are the same).

The control variables are standard international trade determinants found in the literature, and in order to reduce endogeneity, they are included with a lag. Following De Mooij & Keen (2013) and Holzner et al. (2018), the set of control variables in vector $\boldsymbol{X}$ includes the GDP growth rate (denoted with *gdpg*), the unemployment rate (*ur*), government revenues other than those from corporate income tax (*grev*), general government balance (*ggb*), and the dependency ratio (*dep*). Variable names, definitions, and data sources can be found in Appendix A1. The impact of GDP growth on external balances is likely to be negative if higher growth rates induce higher expected income and increased consumption (Ca'Zorzi et al., 2012). However, the effect may depend on whether the growth is mostly export-driven or primarily due to domestic consumption. More specifically, the unemployment rate controls for changes in workers' consumption demand with an expected positive coefficient. The impact of the dependency ratio depends on the consumption and savings decisions of the older population so that, e.g., in the case of net dissaving, the expected effect should be negative.

Regarding the fiscal variables, including government revenues in the model (other than corporate income tax revenues—as corporate taxation variables control for these) should account for distortionary effects induced by government taxation. De Mooij and Keen (2013, p. 450) expected a positive coefficient for this variable. However, we note that it might be challenging to pre-assess its impact on external balances, as this indicator comprises revenues from different taxation forms. The inclusion of the government budget balance can be interpreted '… as identifying effects conditional on other measures to maintain the government balance unchanged' (De Mooij & Keen, 2013, p. 454). In addition, a positive coefficient is predicted by the related literature, as noted by Ca'Zorzi et al. (2012).

As an additional control, we include the international investment position (*iip*) variable (lagged twice), which captures the longer history of external balances. The main argument for its inclusion, as noted by Ca'Zorzi et al. (2012), is that highly indebted countries, which have been recording deficits over a longer period, are eventually forced to improve their trade and current account balances to preserve long-term solvency. This external sustainability constraint is also relevant to the theoretical model of Keen & Syed (2006). The correction of long-lasting deficits is impeded for the current account balance by the negative income flows typical for deficit countries. We include dummy variables for the EU and euro area membership, denoted with *eu* and *ea*, respectively. EU membership abolishes all restrictions (if any) in trade with other member states, and the new member state joins the common trade policy of the Union, which may affect its trade balance. Adopting the euro removes exchange rate risks in trade and financial flows within the euro area, which may also be an important determinant of external balances. Berger & Nitsch (2010) found that introducing the euro was associated with larger and more persistent trade imbalances among euro-area countries.

We note that our specification omits the real exchange rate variable sometimes used in regressions of external balances, as it may be affected by the corporate taxation variable for two reasons: by nominal exchange rate fluctuations related to international capital movements induced by changes in corporate taxation and (for the real exchange rate deflated by unit labour costs) by the pass-through from corporate taxation on wages (see, e.g., Arulampalam et al., 2012; Suárez Serrato & Zidar, 2016).[7]

As corporate taxation affects international capital flows, it may also induce movements in countries' exchange rates unless a country is a monetary union member or firmly committed to a fixed exchange rate policy. Unlike in the euro area, non-euro area countries with fixed exchange rate regimes may experience pressures on the exchange rate or a shortage of finances for domestic investment due to capital outflows, so these countries may react by using monetary policy measures tailored to their needs. For example, suppose a central bank of such a country intervenes in the foreign exchange market by buying domestic currency to defend the peg. In that case, it reduces domestic liquidity (in the case of nonsterilised intervention), which may increase interest rates and have (additional) contractionary effects on domestic investment (see, e.g., Sarno & Taylor, 2001). If a non-euro area country does not need to defend the peg despite capital outflows, it may want to promote domestic investment by, e.g., relaxing the reserve requirements of the banking sector.[8] Within the euro area, capital flows do not exert pressures on the nominal exchange rates, and monetary policy reactions tailored to single-country needs are not feasible (without externalities on other member states). Furthermore, capital flows are entirely free across the whole EU. However, the flows among the euro area countries, i.e., their financial integration, are facilitated by a complete absence of exchange rate risks (Schmitz & Von Hagen, 2011). Consequently, due to potentially different adjustment mechanisms to capital flows induced by the changes in corporate taxation in the two country groups, i.e., different monetary policy and exchange rate reactions (or their absence in the euro area), there may be varying effects on external balances.

For these reasons, in an additional empirical specification, we allow for variation between the two country groups in the impacts of corporate taxation on the dependent variables. This variation is accomplished by multiplying the coefficients of corporate taxation variables, β_D and β_L, by a dummy variable for euro area membership (denoted with ea) and by a dummy variable for non-euro area countries (denoted with $non - ea$). Thus, we allow for sample heterogeneity and variation in the estimated parameters of interest and perform statistical tests to check whether the differences in estimated coefficients for the two country groups are significantly different from zero.

3.2. Sample

To test for the effects of corporate taxation on external balances, we collected data on 27 EU countries from 1995 to 2021 (all member states, UK excluded). The time dimension of the panel in most regressions is reduced, as the time series on effective tax rates begin only in 1998. Early observations are lost due to lagged and first-

differenced variables, and some control variables are unavailable for some countries during the entire period, which makes our sample unbalanced. The study period was characterised by a downward trend in average statutory corporate income tax rates. As many EU countries broadened their corporate tax bases, this trend, although observed, has been less pronounced for the effective average and marginal rates. This finding is documented and discussed in more detail in Bräutigam et al. (2017), which covers a sample of EU countries and a period that largely overlaps our sample. They emphasise, though, that some EU countries increased their statutory rates and tax rate broadening as a response to financial and sovereign debt crises. The outbreak of the financial crisis in 2007 and 2008 was significant for developments in the external balances of the EU countries. Before the crisis, some EU countries, predominantly Mediterranean and Baltic economies, recorded large external deficits financed by massive capital inflows, mainly from the EU core (Chen et al., 2013). As the crisis emerged and foreign capital inflows declined, deficit countries were forced to improve their external positions *via* a complex and painful but eventually successful adjustment process so that external imbalances within the EU have largely been corrected (see Kang & Shambaugh, 2016).

Descriptive statistics that include the number of observations, the mean, the standard deviation, minimum and maximum values, as well as the median, 25th and 75th percentiles can be found in Appendix A2. The average statutory corporate income tax rate amounts to 26.3% and ranges from 10 to 56.8%. The effective average and marginal rates are lower, ranging from 8.8 to 41.2% for the former and from −19.5 to 37.9% for the latter. As expected, there is significant variation in our dependent variables. The current account and the trade balance range from two-digit negative to two-digit positive values, while their mean values are −0.9 for the current account and 1.7% for the trade balance. Eighty-two percent of our sample are country-year observations for EU member states (the rest is data for years prior to membership), while almost half of our sample (47%) is for countries in the euro area.

4. Estimation results

Our model suffers from possible endogeneity issues from reverse causality since exports and imports can affect corporate taxes and omitted variable bias. Thus, our empirical specification requires using the instrumental variables approach in econometric estimation, as including country-fixed effects in dynamic models causes biased estimates of the lagged dependent variable. This bias is always negative for the positive first-order autoregressive parameter of the dependent variable (Nickell, 1981), which, in our case, implies a negative bias in the estimation of the coefficient λ in our reparameterisation of the ARDL(1,1) process in equation (1). We use a 2-stage least squares (2SLS) estimation procedure. In the first-stage equation, we include final household consumption and gross fixed capital formation variables (lagged twice, defined as shares in GDP) as excluded instruments for the lagged external balances variable. These variables should not be directly affected by current external trade. The Kleibergen-Paap underidentification and the Hansen J tests are used to assess the appropriateness of the chosen instruments.

Table 1. Results of 2SLS estimations – basic model.

	Dependent variable: change in external balance (Δeb_t)					
eb:	*cab*	*cab*	*cab*	*tbgs*	*tbgs*	*tbgs*
tv:	*citr*	*eatr*	*emtr*	*citr*	*eatr*	*emtr*
	(1)	(2)	(3)	(4)	(5)	(6)
eb_{t-1}	−0.22*	−0.20*	−0.19	−0.21***	−0.18**	−0.18**
	(0.12)	(0.11)	(0.12)	(0.08)	(0.08)	(0.08)
$\Delta gdpg_t$	−0.03	−0.03	−0.05	0.10	0.11	0.08
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
$gdpg_{t-1}$	−0.13	−0.12	−0.12	−0.10	−0.09	−0.10
	(0.13)	(0.13)	(0.13)	(0.12)	(0.12)	(0.12)
Δur_t	0.84***	0.87***	0.89***	0.63***	0.66***	0.66***
	(0.20)	(0.20)	(0.21)	(0.15)	(0.15)	(0.16)
ur_{t-1}	0.12	0.13	0.14	0.05	0.05	0.07
	(0.08)	(0.09)	(0.09)	(0.06)	(0.06)	(0.07)
$\Delta grev_t$	−0.43**	−0.43*	−0.44*	−0.56***	−0.56***	−0.57***
	(0.22)	(0.22)	(0.22)	(0.21)	(0.21)	(0.22)
$grev_{t-1}$	−0.05	−0.04	−0.03	−0.14	−0.12	−0.11
	(0.22)	(0.23)	(0.23)	(0.22)	(0.23)	(0.23)
Δggb_t	0.10	0.10	0.10	0.08	0.08	0.09
	(0.10)	(0.10)	(0.10)	(0.08)	(0.08)	(0.08)
ggb_{t-1}	0.08	0.09	0.10	−0.00	−0.01	0.02
	(0.10)	(0.10)	(0.11)	(0.08)	(0.08)	(0.09)
Δdep_t	0.36	0.30	0.38	0.02	−0.07	0.05
	(0.44)	(0.43)	(0.41)	(0.38)	(0.38)	(0.36)
dep_{t-1}	0.24**	0.28***	0.27**	0.22**	0.26***	0.22**
	(0.11)	(0.11)	(0.11)	(0.09)	(0.09)	(0.09)
iip_{t-2}	−0.00	−0.00	−0.00	−0.00	−0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
eu_t	0.98*	0.87	0.92	0.87	0.86	0.93
	(0.56)	(0.58)	(0.59)	(0.53)	(0.57)	(0.57)
ea_t	−0.02	0.03	0.10	0.16	0.08	0.21
	(0.72)	(0.77)	(0.79)	(0.60)	(0.64)	(0.66)
Δtv_t	0.16**	0.09	−0.04	0.15**	0.08	−0.05
	(0.07)	(0.10)	(0.04)	(0.06)	(0.08)	(0.04)
tv_{t-1}	0.08	0.09	0.02	0.12***	0.14**	0.02
	(0.05)	(0.06)	(0.03)	(0.04)	(0.05)	(0.02)
Long-term effect of *tv*	0.37	0.45	0.10	0.58**	0.42*	0.12
Observations	489	484	478	488	483	477
K-P LM statistic	52.08***	51.05***	45.06***	78.20***	76.59***	70.10***
Hansen J	0.45	0.28	0.29	0.02	0.00	0.00
Adjusted R^2	0.29	0.28	0.28	0.30	0.29	0.29

Notes: Heteroskedasticity-robust standard errors in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10% levels, respectively. Instrumented: lagged level of external balance. Included instruments: all other variables. Excluded instruments: second lags of the final consumption of households and gross fixed capital formation variables.
Source: Author's calculations.

Table 1 presents the results of our basic specification in equation (1). The first three columns display the results of regressions with the current account balance as the dependent variable (i.e., $eb = cab$) and three different measures of corporate taxation, i.e., with $tv = citr$, $eatr$, and $emtr$, respectively. Columns (4) to (6) use the same tax variables in regressions with the trade balance of goods and services as the dependent variable (i.e., $eb = tbgs$).[9] In all but one regression, the lagged external balance variable is statistically significant, although only at the 10% significance level for two current account balance model specifications. This result justifies the choice of a dynamic specification of our empirical model. The Kleibergen-Paap (K-P) rk LM statistic shows that the null hypothesis that the endogenous variable is underidentified

can be rejected at the 1% significance level. In addition, the Hansen J statistic implies that the joint null hypothesis that the instruments are uncorrelated with the error term and that the excluded instruments are correctly excluded from the estimated equation can never be rejected. The results of the first-stage regressions for the excluded instruments, summarised in Table B2 in Appendix B, show that they are always highly significant with sizeable coefficients, and the Kleibergen-Paap Wald rk F statistic and the Cragg-Donald Wald F statistic do not indicate weak instruments issues.

The estimated coefficient of the GDP growth variable is negative but not statistically significant. Change in the unemployment rate is positively related to both measures of external balance at 1% significance levels for the current account and balance of trade, respectively. The coefficient of the previous year's unemployment rate is also positive but is not statistically significant. Another highly significant control variable is the change in the share of government revenues (other than those from corporate income tax) in GDP. The negative coefficient implies that distortions created by taxation (other than corporate taxation) increase external deficits almost equally for the current account and the balance of trade in goods and services. The positive coefficient of the dependency ratio for both dependent variables implies that the net dissaving assumption of the elderly population does not hold in our sample. This corresponds with the results of Ivanova (2012). Government balances are not statistically significant. Controlling for the accumulated current account balances, i.e., the international investment position, seems redundant, as we found the coefficient of this variable to be equal to zero and not statistically significant. That EU membership is related to improvement in external balances is found only for the model with the current account balance and statutory corporate income tax rate, and this result is statistically significant only at the 10% level. In contrast, the euro area membership dummy is not statistically significant in any models.

Finally, only the change in the statutory rate has a positive and statistically significant impact on external balances at the 5% significance level. This is consistent with the short-term estimates in Keen & Syed (2006) for the statutory tax rate.[10] The magnitude of the effect is only marginally higher for the current account balance regressions, suggesting that the impact of corporate taxation on the non-trade items of the current account is somewhat limited (consistent with Ivanova, 2012). Generally, there are no important differences in the magnitude of the impact of corporate taxation on net exports and current account balances, likely implying that the hypothesised impact from international profit shifting *via* manipulating intrafirm prices in international trade does not strongly affect the external balances in our sample. The results suggest that the long-term effect is generally stronger for the trade balance, which is hard to interpret. In the short run, a stronger impact on the current account balances is found only for the non-euro area countries. This aligns with the results obtained by Holzner et al. (2021), who also rely on bilateral trade data. The coefficients of the lagged tax variables are also positive but are statistically significant only for the statutory rate and the effective average rate in the trade balance regressions. For example, the effect of the lagged statutory tax rate on the trade balance suggests that an increase in the rate by ten percentage points (from 10 to 20%) leads to an

increase in the trade balance in the amount of 1.2 percentage points of GDP ($0.12^{*}0.1 = 0.012$). The average trade balance of 1.7 would mean an increase to 2.9% of GDP. The implied long-term impact of corporate taxation is always positive, from 0.10 to 0.58, but is significant at the 5% significance level for the statutory rate in the model with the trade balance and at the 10% significance level for the effective average rate in model (5).

These results are very close to those of FE regressions without instrumenting the lag of the external balance variable (see Table B1 in Appendix B). One notable difference is the long-term effect of the statutory rate in current account balance regressions, which equals 0.25 and is statistically significant in the FE regressions.

We also examined the sensitivity of our results to alternative model specifications by individually excluding all the control variables from our model.[11] Excluding GDP growth, government balance, dependency ratio, international investment position, and EU or euro area dummy variables has no important implications for our estimates. In the specifications without government revenues, estimates of the long-term effects of tax variables are statistically more reliable and slightly bigger but of the same sign. If the unemployment rate variable is omitted, the long-term effects of the corporate income tax variable become statistically significant and stronger. In contrast, the short-term effects become stronger in magnitude. Other results are largely unaffected.

Another robustness check that we performed included an analysis of potentially influential observations. After analysing the distribution of errors in each of the six regressions, we identified 9 to 18 observations (depending on the specification) with an idiosyncratic component of the error term larger than three standard deviations. We constructed outlier dummy variables for these potentially influential observations, added them to corresponding models, and reran the regressions. Our results were primarily confirmed, but the models' estimates, including the outlier dummy variables, were characterised by a higher adjusted R^2 (from 0.6 to 0.7). In addition, coefficients of the GDP growth, unemployment rate, and government balance variables became statistically significant in some specifications. In contrast, the estimated coefficients for the long-term effect of tax variables were lower.

As noted above, international capital flows induced by corporate tax changes may affect exchange rates or trigger monetary policy responses in countries where there is a possibility of independent monetary policy conduct or some degree of exchange rate flexibility. Thus, we expect the impact of corporate taxation on external balances to vary across EU members depending on their exchange rate and monetary policy regimes. The most crucial distinguishing criterion among EU countries in this respect is the euro area membership. To determine whether corporate taxation changes induce different responses across the euro area and non-euro member states, we extend our basic model and multiply the taxation variables by the euro area and non-euro area dummy variables. The results are presented in Table 2. The first-stage regression and diagnostic test results are provided in Table B3 in Appendix B, with similar (favourable) implications regarding the appropriateness of instruments to those of the basic approach.

The estimates of the non-tax variable coefficients, including the lagged external balances, are similar to those presented in Table 1. The effect of taxation varied

Table 2. Results of 2SLS estimations – model with *ea* interaction term.

Dependent variable: change in external balance (Δeb_t)

eb:	*cab*	*cab*	*cab*	*tbgs*	*tbgs*	*tbgs*
tv:	*citr*	*eatr*	*emtr*	*citr*	*eatr*	*emtr*
	(1)	(2)	(3)	(4)	(5)	(6)
eb_{t-1}	−0.19	−0.18	−0.18	−0.19**	−0.18**	−0.18**
	(0.11)	(0.11)	(0.11)	(0.08)	(0.08)	(0.08)
$\Delta gdpg_t$	−0.01	−0.01	−0.05	0.12	0.12	0.08
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
$gdpg_{t-1}$	−0.11	−0.10	−0.13	−0.09	−0.07	−0.10
	(0.13)	(0.13)	(0.13)	(0.12)	(0.12)	(0.13)
Δur_t	0.85***	0.89***	0.90***	0.63***	0.67***	0.66***
	(0.20)	(0.20)	(0.20)	(0.15)	(0.15)	(0.15)
ur_{t-1}	0.11	0.13	0.13	0.04	0.05	0.06
	(0.08)	(0.08)	(0.08)	(0.06)	(0.06)	(0.06)
$\Delta grev_t$	−0.43**	−0.42*	−0.46**	−0.56***	−0.55***	−0.58***
	(0.22)	(0.22)	(0.22)	(0.21)	(0.21)	(0.22)
$grev_{t-1}$	−0.06	−0.05	−0.05	−0.15	−0.13	−0.12
	(0.23)	(0.23)	(0.23)	(0.23)	(0.23)	(0.24)
Δggb_t	0.09	0.09	0.09	0.07	0.06	0.08
	(0.10)	(0.10)	(0.10)	(0.08)	(0.08)	(0.08)
ggb_{t-1}	0.08	0.08	0.09	−0.01	−0.01	0.01
	(0.10)	(0.10)	(0.10)	(0.08)	(0.08)	(0.09)
Δdep_t	0.41	0.34	0.48	0.05	−0.04	0.08
	(0.45)	(0.44)	(0.44)	(0.39)	(0.39)	(0.37)
dep_{t-1}	0.22**	0.26**	0.29**	0.20**	0.25***	0.22**
	(0.10)	(0.11)	(0.11)	(0.09)	(0.09)	(0.09)
iip_{t-2}	−0.00	−0.00	−0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
eu_t	1.00*	0.94	1.00*	0.89*	0.90	0.93
	(0.56)	(0.59)	(0.59)	(0.57)	(0.57)	(0.58)
$\Delta tv_t \times ea_t$	0.07	−0.05	−0.07**	0.08	−0.02	−0.06*
	(0.07)	(0.09)	(0.03)	(0.06)	(0.08)	(0.03)
$tv_{t-1} \times ea_t$	0.07	0.09	0.02	0.11**	0.14***	0.02
	(0.05)	(0.06)	(0.03)	(0.04)	(0.05)	(0.02)
$\Delta tv_t \times non-ea_t$	0.44***	0.55***	0.41**	0.39***	0.41***	0.13
	(0.17)	(0.20)	(0.18)	(0.14)	(0.15)	(0.11)
$tv_{t-1} \times non-ea_t$	0.10*	0.11*	0.05	0.13***	0.16**	0.02
	(0.06)	(0.07)	(0.06)	(0.05)	(0.06)	(0.06)
Observations	489	484	478	488	483	477
K-P LM statistic	52.51***	52.84***	50.23***	78.54***	78.08***	75.63***
Hansen J	0.43	0.28	0.24	0.03	0.00	0.00
Adjusted R^2	0.29	0.29	0.29	0.30	0.30	0.28

Notes: Heteroskedasticity-robust standard errors in parentheses. ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively. Instrumented: lagged level of external balance. Included instruments: all other variables. Excluded instruments: second lags of the final consumption of households and gross fixed capital formation variables.
Source: Author's calculations.

considerably across the euro area and non-euro area countries: the short-term coefficients for the non-euro countries are positive and highly significant for different tax measures and both dependent variables, with the highest coefficient for the effective average tax rates. The impact of corporate taxation on the current account is stronger than on the trade balance only for the non-euro area countries. The short-term tax variable coefficients across different tax indicators and the two dependent variables for the euro area countries were generally much lower than those for non-euro area member states and statistically less reliable. The short-term impact of the effective marginal rate was small, negative, and statistically significant at the 10% (trade

Table 3. Long-term effects of corporate taxation – model with *ea* interaction term.

Dependent variable: change in external balance (Δeb_t)

eb:	*cab*	*cab*	*cab*
tv:	*citr*	*eatr*	*emtr*
(a) Euro area long-term effect of *tv*	0.37	0.47	0.11
(b) Non-euro area long-term effect of *tv*	0.52	0.62	0.26
H0: (a) – (b) = 0; $\chi^2(1)$ statistic	0.49	0.57	0.18
eb:	*tbgs*	*tbgs*	*tbgs*
tv:	*citr*	*eatr*	*emtr*
(a) Euro area long-term effect of *tv*	0.59**	0.79*	0.13
(b) Non-euro area long-term effect of *tv*	0.67*	0.89	0.10
H0: (a) – (b) = 0; $\chi^2(1)$ statistic	0.28	0.21	0.01

Note: ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively.
Source: Author's calculations.

balance) and 5% (current account) levels for the euro area. Since this is the first study that differentiates between two different exchange rate regimes, this result is important since it reveals that the positive effect of higher corporate taxes can be rather strong, especially in the short term. For example, the short-term effect of the statutory tax rate on the current account of non-euro countries suggests that an increase in the rate by 10 percentage points (from 10 to 20%) leads to an increase in the current account in the amount of 4.4 percentage points of GDP ($0.44*0.1 = 0.044$). The average trade balance of 1.7 would mean an increase to 6.1% of GDP. Compared to previous research, such as Keen & Syed (2006) or Ivanova (2012), this is a much stronger effect than previously anticipated.

The long-term effects are summarised in Table 3 for both country groups and all six models.[12] Although the estimated coefficients are positive for all specifications, they are significant only at the 10% and 5% levels for the statutory rate and the effective average rate in regressions for the trade balance. We tested whether the estimated long-term effects are equal in the two country groups, and the test results (chi-square statistic in Table 3) imply no statistically significant difference.[13] Thus, large differences between the effects of corporate taxation in the euro area and non-euro area countries are restricted to the short term and appear to be related to the varying propagation of tax shocks. In the long term, the effects in the two country groups are (statistically) the same. Corporate income taxation was positive but statistically significantly related only to trade balances when measured by the statutory and the effective average rate (consistent with previous research).

Our estimates are largely confirmed in the FE estimation approach, without instrumenting the lagged external balance variables, with one notable difference of somewhat larger coefficients for this variable (in absolute value) in FE estimates, estimated at stricter statistical significance levels. These results are presented in Table B4 in Appendix B. The long-term effects in FE regressions are generally larger but significant at 5 or 10% for the statutory rates in current account balance regressions (Table B5 in Appendix B). The corresponding long-term coefficients in the trade balance regressions are significant at the 1% (for the statutory rates and effective average rate in the euro area) or 5% levels (for the effective average rate in the non-euro area).

Altering model specifications by individually excluding the control variables from the regressions in Table 2 has similar implications to those in the basic model. A

difference is recorded in the specification excluding international investment position, which produces less precise estimates and smaller long-term and short-term tax effects coefficients. If the dependency ratio variable is omitted, tax variables' long-term and short-term coefficients become somewhat smaller. More precise estimates are produced for the long-term coefficients when omitting government revenues or government balance. At the same time, excluding the unemployment rate variable gives more precise estimates for the short-term tax effects. The results are pretty robust to the inclusion of the outlier dummy variables, constructed in the same manner as in our basic model.[14]

To sum up, changes in the statutory rate have a positive and statistically significant impact on external balances, mostly in line with previous research. However, we have found no significant differences in the impact on net exports and current account balances, implying that hypothesized effects from profit shifting *via* manipulating intrafirm prices in international trade do not strongly affect external balances. These results corroborate our hypotheses H1 and H2 while providing an additional conclusion regarding profit shifting. Short-term impacts of corporate taxation on euro area countries are smaller and less reliable than for non-euro area countries, a result which corroborates our hypothesis H3. In our specifications with euro area dummies, we find that the long-term effects are generally stronger for the trade balance, particularly for non-euro area countries, suggesting that monetary and exchange rate policy also affect external balances and tax policy. This partially disproves our H4 hypothesis, but the result that in the long term, effects in both country groups are statistically the same supports our hypothesis H4.

5. Discussion

This study estimates the impact of corporate income taxation on the current account and trade balances in the EU. As the ongoing discussions of corporate taxation system reforms, including the global OECD/G20 initiative, may affect the corporate tax burden and influence countries' external balances, informing policymakers of these potential effects is vital for improved macroeconomic management. While previous research (e.g., Gechert & Heimberger, 2022) showed that higher corporate taxes are growth-neutral, our results emphasise that the short-term effect on external balances could be positive. Although we explore only EU member states, making our policy implications limited and less generalizable, we differentiate between short- and long-term effects making our results less directly comparable to previous research.

For the entire sample, we find that an increase in the statutory corporate income tax rate positively and statistically significantly affects the current account and trade balance in the short term. There are considerable differences between the effects on the euro area and non-euro area countries, with the latter group experiencing a much stronger short-term impact. These variations likely stem from differences in monetary policy and exchange rate reactions, influencing capital flows following changes in corporate taxation.

Conversely, the two country groups have no important differences in the long-term results. Generally, the impact of corporate taxation on net exports and current

account balances is of similar magnitude, which implies that the international profit shifting *via* manipulating intrafirm prices in international trade does not strongly affect the external balances in our sample. These results are robust across different specifications and estimation methods and are unaffected by the potentially influential observations. The long-term effects of corporate taxation are always positive. However, they are statistically significant only for the statutory and the effective average rate in the trade balance regression (as shown in previous research). The marginal rate is not statistically significant because of gradual effects, i.e., long-term effects might take time to materialise fully. Over the extended period, changes in statutory and effective average tax rates could lead to significant adjustments in trade flows and external balances.

On the other hand, the short-term impact of marginal rate changes might need to be more substantial to yield statistically significant results in the long run. It is also possible that the statutory and effective average tax rate changes might prompt businesses to adjust their strategies, investment decisions, and trade patterns more significantly compared to marginal rate adjustments. Such substantial policy changes can lead to observable and statistically significant effects on the trade balance over time. In the long run, the lack of statistical significance for the current account suggests that corporate taxation tends to have a more pronounced and reliable impact on trade balances. This could be due to several factors, e.g., corporate taxation may directly and visibly impact the profitability and competitiveness of businesses engaged in international trade, leading to more apparent effects on trade balances. Since the current account considers a broader range of transactions (trade, net income from abroad, net transfers), the impact of corporate taxation on these other components of the current account may be less straightforward and more influenced by other various factors. It is also possible that changes in corporate taxation influence capital flows, e.g., tax incentives attract foreign direct investment, which could lead to higher exports, thus affecting the trade balance. However, these capital flows may have little impact on other components of the current account, such as net income or net transfers. Finally, many external factors can influence the current account balance, including global economic conditions, exchange rates, and global demand for a country's goods and services. These external influences make it harder to isolate the effects of corporate taxation on the current account.

Allowing for heterogeneous impacts of corporate taxation in the euro area and non-euro countries reveals much stronger short-term effects for the latter group. In the short term, only the marginal effective rate coefficients are statistically significant for the euro area. These differences in the short-term effects likely reflect different monetary policy and exchange rate reactions (or their absence in the euro area) and, thus, adjustment mechanisms to likely capital flows related to changes in corporate taxation. In the long term, there are no significant differences between the corporate taxation impacts across the two country groups. The effects of the statutory rate are statistically significant for both groups only in the trade balance regressions.

In contrast, the coefficient for the effective average rate is significant only for the euro area again only in the trade balance regressions. The long-term effects of the two tax indicators for the current account balance are positive and similar in

magnitude but not statistically significant. Thus, whereas earlier research found that the initial positive short-term impact of corporate taxation is reversed in the long term due to increased income from abroad arising from the initial capital outflows (Keen & Syed, 2006), our results indicate that corporate taxation might also have long-term effects on external balances. The effects may persist because a significant portion of the corporate tax burden is borne by labour in the form of lower producer wages (Arulampalam et al., 2012). These may depreciate real exchange rates deflated by unit labour costs and lead to a (partial) positive effect in the longer term.

Contrary to Bruner et al. (2018) and Davies et al. (2018), but in line with Holzner et al. (2021), we find that there are no important differences in the magnitude of the impact of corporate taxation on net exports and current account balances, likely implying that the hypothesised impact from international profit shifting *via* manipulating intrafirm prices in international trade, does not strongly affect the external balances in our sample. The study by Holzner et al. (2021) also uses bilateral trade data to analyse the impact of corporate taxation, so we find the results of their and our research advantageous in comparison to aggregate data since bilateral data provides detailed information on trade flows, and enables an accurate measure of trade balance between two countries.

From the policy perspective, the most exciting result is the statistically significant long-term effect of the statutory and effective average tax rates (for the euro area countries) on the external balances. As the long-discussed corporate tax system reforms in the EU (see, e.g., EC, 2016a; and EC, 2016b) as well as the OECD/G20 global initiative (OECD, 2021) would unequally change the (effective) tax rates across countries, there could be a correspondingly distributed impact on their external balances. In line with the research by Gechert & Heimberger (2022), in which they cannot reject the null hypothesis of a zero effect of corporate income tax on GDP growth, our result emphasises that although the net effect could be neutral, higher corporate income taxes can have a moderately positive effect on external balances. Considering that, initiatives aimed at increasing global tax rates could be justified from an international trade perspective.

6. Conclusions, limitations, and future lines of research

The findings of this study contribute to our understanding of the impact of corporate income taxation on current accounts and trade balances in the EU. Specifically, the analysis reveals that an increase in the statutory corporate income tax rate has a positive and statistically significant effect on external balances in the short term. This implies that higher corporate taxes, at least temporarily, can lead to improvements in the current account and trade balances. These results align with previous research highlighting the short-term positive effects of corporate taxation on external balances.

However, it is important to note variations in the magnitude of these effects between the euro area and non-euro area countries. The non-euro area countries experience a stronger short-term impact from increased corporate taxes than the euro area. This difference in impact can be attributed to various factors, such as differences in monetary policy, exchange rate reactions, and adjustment mechanisms related to

capital flows. These variations emphasise the importance of considering different regions' specific characteristics and economic conditions when analysing corporate taxation effects on external balances. Despite these short-term differences, the study indicates no significant disparities in the long-term impact of corporate income taxation on external balances between the euro area and non-euro area countries. This suggests that over time, the effects of corporate taxation on external balances tend to converge, regardless of the specific country group. These findings highlight the persistent nature of corporate taxation effects on external balances, indicating that changes in tax rates can have long-lasting implications for a country's external economic performance.

The study also sheds light on the potential mechanisms driving the observed effects. It suggests that the persistence of corporate taxation effects on external balances may be attributed to the burden placed on labour through lower producer wages. Corporations facing higher tax obligations may reduce wages to compensate, leading to lower unit labour costs. This, in turn, can result in depreciated real exchange rates, which positively impact external balances. These findings emphasise the intricate linkages between corporate taxation, labour markets, and exchange rates and provide insights into the channels through which corporate taxes affect external balances.

Moreover, the analysis indicates that international profit shifting through manipulating intrafirm prices in international trade does not strongly influence external balances within the studied sample. This finding contradicts earlier research that suggested a significant impact of profit shifting on external balances. The results imply that other factors, such as the labour burden and exchange rate dynamics, play a more substantial role in determining the effects of corporate taxation on external balances.

From a policy perspective, the significant long-term effect of the statutory and effective average tax rates on external balances, particularly for euro area countries, carries important implications. Considering the ongoing discussions and reforms in the EU and the global OECD/G20 initiative, these findings emphasise the potential consequences of changes in corporate tax rates on a country's external economic position. Policymakers must carefully consider corporate taxation's long-term effects on external balances when designing tax reforms and initiatives. The results suggest that higher corporate income taxes, despite potential neutrality in GDP growth, can positively impact external balances. This implies that initiatives aimed at increasing global tax rates within a framework that ensures fairness and avoids detrimental effects could be justified from an international trade perspective.

The results have significant policy implications and suggest various potential actions. Firstly, in light of the short-term improvement in current account and trade balances, policymakers should strategize the allocation of the additional tax revenue resulting from increased corporate income taxes. Options include directing funds toward infrastructure development, reducing public debt, or financing targeted programs to stimulate economic growth. An important consequence of enhanced trade balances is the potential upward pressure on the national currency's exchange rate. Policymakers should assess whether they wish to actively manage the exchange rate to prevent excessive appreciation, considering the potential negative impact on export competitiveness.

Additionally, the positive effects on trade balances can be further reinforced by aligning corporate tax adjustments with favourable trade policies. Policymakers could explore avenues such as trade agreements, tariff modifications, or initiatives promoting exports to bolster trade. Scrutiny of the impact of heightened corporate income taxes on businesses is crucial. This entails monitoring whether these taxes adversely affect corporate profitability, investment, and competitiveness. Responsive measures may be necessary to ensure a conducive business environment. Another policy implication involves considering the potential influence of corporate income tax changes on labour markets and consumer spending. If businesses respond to increased taxes by reducing employment or raising prices, broader economic consequences could emerge. Policymakers may need to implement mitigating measures like workforce training programs or social safety nets. While acknowledging the short-term gains, it is imperative to assess the long-term sustainability of this policy. Ensuring that heightened corporate income taxes do not discourage long-term investment or hinder future economic growth prospects is essential.

Furthermore, the impact of these tax changes on foreign investors' decisions to establish or expand operations in the country should be carefully evaluated. Policymakers must balance short-term trade balance improvements and potential reductions in foreign direct investment. Effectively coordinating tax policies with other economic policies and neighbouring countries is imperative. Policymakers must avoid situations where changes in corporate income taxes are counteracted by other tax measures or trade practices that could undermine the intended effects on trade balances. In terms of management, continuous monitoring of the impact of heightened corporate income taxes on the current account, trade balances, and the broader economy is crucial. Policies should be adjusted as necessary based on real-time data and feedback. On a broader scale, the short-term improvements in trade balances present an opportunity to diversify the economy and reduce dependence on specific industries or trading partners. Governments may invest in sectors with potential growth to ensure sustained economic resilience. Finally, policymakers should conduct thorough risk assessments concerning the potential consequences of heightened corporate income taxes, such as tax avoidance, business relocations, or economic disruptions. Contingency plans to address these risks if they materialize should be developed. In navigating these considerations, policymakers must carefully balance short-term gains with long-term economic sustainability and competitiveness, tailoring policies to specific economic conditions and objectives for effective decision-making.

Several avenues for further research can enhance our understanding of this complex relationship and its implications. Firstly, future studies should expand the analysis to incorporate other OECD countries beyond the EU member states. By including a broader range of countries, the generalizability of the findings can be strengthened. This would allow researchers to assess the impact of corporate taxation on external balances in different economic contexts and policy environments. Comparing the effects across countries with varying levels of economic development and different tax systems would provide a more comprehensive understanding of the relationship between corporate income taxation and external balances.

Moreover, considering the global nature of trade and tax systems, it is important to investigate the spillover effects of corporate tax changes on developing countries. While this study focused on the EU, exploring the implications of corporate taxation on external balances in developing countries would provide valuable insights for policymakers worldwide. Developing countries often face unique challenges and vulnerabilities in their trade relationships, and understanding how corporate taxation affects their external economic performance is crucial for designing effective policies that promote sustainable development and economic growth.

Furthermore, future research should delve deeper into the mechanisms driving the observed effects of corporate taxation on external balances. The study highlighted the burden on labour through lower producer wages as a potential mechanism. Investigating the channels through which corporate tax changes affect labour markets, exchange rates, and external balances would enhance our understanding of the dynamics at play. This could involve analysing the impact of corporate taxation on different components of labour markets, such as employment levels, wage dynamics, and productivity. Additionally, examining the role of exchange rate dynamics and their interaction with corporate taxation would provide valuable insights into the transmission mechanisms and further clarify the relationship between tax policies and external balances.

Lastly, future research should explore the long-term effects of corporate taxation on other macroeconomic variables beyond external balances. While this study focused on current account and trade balances, it would be insightful to examine the implications of corporate income taxation on other aspects of economic performance, such as GDP growth, investment levels, and income distribution. Understanding the broader macroeconomic consequences of changes in corporate taxes can inform policymakers' decision-making processes and help design tax reforms that promote sustainable economic development.

In conclusion, while this study provides important insights into the impact of corporate income taxation on external balances in the EU, there are numerous directions for further research. Future studies can deepen our understanding of the complex relationship between corporate taxation, external balances, and global trade dynamics by expanding the analysis to include more countries, exploring spillover effects on developing countries, investigating the underlying mechanisms, and examining broader macroeconomic implications. Such research is essential for informing evidence-based policy decisions and fostering sustainable economic growth.

Notes

1. Bräutigam et al. (2017) provide a detailed discussion of developments in the tax structures of most EU countries from 1998 to 2015.
2. This hypothesis is consistent with the results by Bruner et al. (2018), who find sizeable effects from profit shifting on the US trade balance, but those on the current account are very small.
3. Haufler (2001, pp. 51–53) discusses the problems related to the implementation of the residence principle.
4. See Markusen (2002, chapter 5) to analyse the broader conditions under which firms undertake (horizontal) foreign investment in a general equilibrium oligopoly model in an asymmetric setting.

5. In regressions for total capital and investment in structures, the statutory tax rate is statistically significant in the long term. In contrast, the effective average rate is only significant in regressions for total capital.
6. Details on the data sources and definitions of the variables are available in Appendix A1.
7. De Mooij and Keen (2013) and Holzner et al. (2018) omit the real exchange rate variable because it represents a channel through which tax changes may affect external balance.
8. See Loungani and Rush (1995) for empirical evidence on this causal link, which occurs at least partly through impact on credit activity.
9. The corresponding results of fixed effects (FE) regressions, without the instrument for the lagged external balance variable, are in Table B1 in Appendix B.
10. Keen and Syed (2006) note that they performed an analysis using effective marginal tax rates but found no significant effects on net exports.
11. The variance inflation factor statistics do not imply serious collinearity issues in the specifications in Table 1.
12. Wooldridge (2010) suggests that when $N > T$, as in our case, unit (country) and time (year) fixed effects are added instead of performing unit root tests. The power of unit root tests is low in small sample sizes. Equation (1) shows we added country- and year-fixed effects to our econometric model.
13. We applied the same test to estimated short-run tax coefficients of the euro area and non-euro area countries. The null hypothesis that the difference between the coefficients is zero was always rejected (at 1 or 5% levels).
14. Estimates of the models, including the outlier dummy variables, were characterised by a higher adjusted R^2. In contrast, coefficients of the GDP growth and government balance variables became statistically significant for specifications with the current account for the former and trade balance for the latter case. Meanwhile, the estimated coefficients of the government revenues lost their statistical significance.

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No potential conflict of interest was reported by the author(s).

Disclaimer

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Appendix A1. Variables and data sources

Current account balance (*cab*): current account balance (BPM6) in % of GDP; Eurostat.

Balance of trade in goods and services (*tbgs*): external balance (exports minus imports) of goods and services in % of GDP; Eurostat.

Corporate income tax rate (*citr*): top statutory corporate income taxation rates (non-targeted), including surcharges and local taxes, in %; European Commission.

Effective average tax rate (*eatr*): the proportion of total corporate income taken in tax for a hypothetical investment, corporate level; see EC (2021, pp. 280 – 281) for details, non-financial sector, in %; ZEW (2020).

Effective marginal tax rate (*emtr*): the proportionate difference between the cost of capital and the required post-tax real rate of return, corporate level; see EC (2021, pp. 280 – 281) for details, in %; ZEW (2020).

Real GDP growth (*gdpg*): chain-linked volumes, change in GDP over the previous period, in %; Eurostat.

Unemployment rate (*ur*): unemployed persons in % of the active population (LFS), annual average; Eurostat.

Government revenues (*grev*): total general government revenue minus revenues from corporate income tax in % of GDP; Eurostat.

General government balance (*ggb*): general government, net lending (+)/net borrowing (-), in % of GDP; Eurostat.

Dependency ratio (*dep*): share of the population aged 65 or above over the population aged 15–64, in %; Eurostat.

International investment position (*iip*): financial account, net position at the end of the period (BPM6), in % of GDP; Eurostat.

Final consumption of households (*fch*): final consumption expenditure of households in % of GDP; Eurostat.

Gross fixed capital formation (*gfcf*): gross fixed capital formation in % of GDP; Eurostat.

Appendix A2. Descriptive statistics

Variable	Number of observations	Mean	Standard deviation	Min	Max	Median	25th percentile	75th percentile
cab	657	−0.91	5.56	−23.90	13.90	−0.60	−4.10	2.60
tbgs	647	1.70	8.83	−20.27	45.15	0.73	−2.08	4.76
citr	755	26.31	8.64	10.00	56.80	25.50	20.00	33.99
eatr	671	22.61	7.15	8.80	41.20	22.60	16.70	28.10
emtr	644	16.41	9.01	−19.50	37.90	16.55	11.30	21.88
gdpg	721	2.52	3.74	−14.84	25.18	2.73	1.14	4.48
ur	724	8.64	4.25	2.00	2.78	7.70	5.70	10.30
grev	730	39.66	6.59	19.00	55.50	38.55	34.96	45.14
ggb	751	−2.71	3.51	−32.10	6.90	−2.60	−4.50	−0.30
dep	748	24.71	4.60	15.60	37.00	24.50	21.23	27.80
iip	570	−112.58	531.56	−4,635.10	260.80	−14.75	−34.65	1.10
fch	754	54.54	8.25	23.91	76.64	54.61	49.07	61.28
gfcf	754	22.16	4.26	4.45	53.59	21.79	19.71	24.14
EU	756	0.82	0.38	0	1	1	1	1
euro	756	0.47	0.50	0	1	0	0	1

Appendix B. Additional results and diagnostic tests

Table B1. Results of fixed-effects estimations – basic model.

	Dependent variable: change in external balance (Δeb_t)					
eb:	*cab*	*cab*	*cab*	*tbgs*	*tbgs*	*tbgs*
tv:	*citr*	*eatr*	*emtr*	*citr*	*eatr*	*emtr*
	(1)	(2)	(3)	(4)	(5)	(6)
eb_{t-1}	−0.45***	−0.45***	−0.45***	−0.39***	−0.37***	−0.37***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
$\Delta gdpg_t$	−0.04	−0.04	−0.06	0.08	0.09	0.06
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
$gdpg_{t-1}$	−0.18**	−0.17**	−0.18**	−0.13*	−0.11	−0.14*
	(0.08)	(0.08)	(0.08)	(0.07)	(0.07)	(0.07)
Δur_t	0.78***	0.81***	0.82***	0.61***	0.64***	0.63***
	(0.13)	(0.13)	(0.13)	(0.12)	(0.12)	(0.12)
ur_{t-1}	0.24***	0.26***	0.28***	0.14**	0.15**	0.16***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	0.06
$\Delta grev_t$	−0.30**	−0.29**	−0.31**	−0.50***	−0.49***	−0.52***
	(0.13)	(0.13)	(0.13)	(0.11)	(0.12)	(0.12)
$grev_{t-1}$	−0.01	−0.02	0.02	−0.15**	−0.13*	−0.12*
	(0.08)	(0.08)	(0.08)	(0.07)	(0.07)	(0.07)
Δggb_t	0.16**	0.16**	0.17***	0.12**	0.12**	0.14**
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
ggb_{t-1}	0.17***	0.19***	0.21***	0.06	0.07	0.10
	(0.07)	(0.07)	(0.07)	(0.06)	(0.06)	(0.06)
Δdep_t	0.06	0.01	0.16	−0.27	−0.34	−0.14
	(0.43)	(0.44)	(0.44)	(0.39)	(0.41)	(0.41)
dep_{t-1}	0.25**	0.30**	0.26**	0.23**	0.27**	0.19
	(0.13)	(0.13)	(0.13)	(0.11)	(0.12)	(0.12)
iip_{t-2}	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
eu_t	1.35*	1.25*	1.32*	1.15*	1.18*	1.28*
	(0.70)	(0.72)	(0.72)	(0.64)	(0.66)	(0.67)
ea_t	0.80	0.99*	1.17*	0.89*	0.86	1.12**
	(0.57)	(0.59)	(0.60)	(0.52)	(0.55)	(0.56)
Δtv_t	0.16**	0.06	−0.05	0.17**	0.06	−0.07**
	(0.07)	(0.09)	(0.04)	(0.07)	(0.08)	(0.04)
tv_{t-1}	0.11**	0.09	−0.01	0.17***	0.16**	−0.00

(*continued*)

Table B1. Continued.

Dependent variable: change in external balance (Δeb_t)						
eb:	*cab*	*cab*	*cab*	*tbgs*	*tbgs*	*tbgs*
tv:	*citr*	*eatr*	*emtr*	*citr*	*eatr*	*emtr*
	(0.06)	(0.07)	(0.03)	(0.05)	(0.06)	(0.03)
Long-term effect of *tv*	0.25**	0.20	−0.02	0.43***	0.42**	−0.01
Observations	489	484	478	488	483	477
Adjusted R^2	0.35	0.34	0.35	0.34	0.33	0.33

Notes: Heteroskedasticity-robust standard errors in parentheses. ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively.

Table B2. First-stage results and weak identification test statistics – basic model.

Dependent variable: lagged current account balance (cab_{t-1})			
tax variable (*tv*):	*citr*	*eatr*	*emtr*
fch_{t-2}	−0.45***	−0.46***	−0.46***
	(0.07)	(0.08)	(0.08)
$gfcf_{t-2}$	−0.49***	−0.49***	−0.49***
	(0.09)	(0.09)	(0.10)
Weak identification tests with H0: instruments are weak[1]			
Cragg-Donald Wald F statistic	47.71	48.80	43.59
K-P Wald rk F statistic	27.01	26.94	23.82
Dependent variable: lagged balance of trade in goods and services ($tbgs_{t-1}$)			
tax variable (*tv*):	*citr*	*eatr*	*emtr*
fch_{t-2}	−0.42***	−0.41***	−0.41***
	(0.09)	(0.09)	(0.10)
$gfcf_{t-2}$	−0.42***	−0.40***	−0.40***
	(0.12)	(0.12)	(0.12)
Weak identification tests with H0: instruments are weak[1]			
Cragg-Donald Wald F statistic	112.47	116.41	102.97
K-P Wald rk F statistic	57.70	58.75	51.39

Notes: Heteroskedasticity-robust standard errors in parentheses. ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively.

[1]Critical values for the weak instrument test based on size, with one endogenous regressor and two excluded instruments, equal 19.93 (10% maximal IV size) and 11.59 (15% maximal IV size) (see Stock & Yogo, 2005, table 5.2). H0 is rejected at the 5% significance level for test statistics exceeding the critical values. The Kleibergen-Paap rk Wald F statistic is the simple F statistic of excluded instruments, which is always significant at the 1% significance level.

Table B3. First-stage results and weak identification test statistics – model with *ea* interaction term.

Dependent variable: lagged current account balance (cab_{t-1})			
tax variable (*tv*):	*citr*	*eatr*	*emtr*
fch_{t-2}	−0.44***	−0.44***	−0.43***
	(0.07)	(0.07)	(0.07)
$gfcf_{t-2}$	−0.49***	−0.48***	−0.47***
	(0.09)	(0.10)	(0.10)
Weak identification tests with H0: instruments are weak[1]			
Cragg-Donald Wald F statistic	49.40	51.87	53.09
K-P Wald rk F statistic	26.85	27.61	27.88
Dependent variable: lagged balance of trade in goods and services ($tbgs_{t-1}$)			
tax variable (*tv*):	*citr*	*eatr*	*emtr*
fch_{t-2}	−0.39***	−0.39***	−0.39***
	(0.10)	(0.10)	(0.10)
$gfcf_{t-2}$	−0.40***	−0.39***	−0.39***
	(0.13)	(0.13)	(0.13)
Weak identification tests with H0: instruments are weak[1]			
Cragg-Donald Wald F statistic	112.76	118.78	116.83
K-P Wald rk F statistic	55.74	58.48	59.19

Notes: Heteroskedasticity-robust standard errors in parentheses. ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively.
[1]Critical values for the weak instrument test based on size, with one endogenous regressor and two excluded instruments, equal 19.93 (10% maximal IV size) and 11.59 (15% maximal IV size) (see Stock & Yogo, 2005, table 5.2). H0 is rejected at the 5% significance level for test statistics exceeding the critical values. The Kleibergen-Paap rk Wald F statistic is the simple F statistic of excluded instruments, which is always significant at the 1% significance level.

Table B4. Results of fixed-effects estimations – model with *ea* interaction term.

Dependent variable: change in external balance (Δeb_t)						
eb:	*cab*	*cab*	*cab*	*tbgs*	*tbgs*	*tbgs*
tv:	*citr*	*eatr*	*emtr*	*citr*	*eatr*	*emtr*
	(1)	(2)	(3)	(4)	(5)	(6)
eb_{t-1}	−0.43***	−0.43***	−0.42***	−0.37***	−0.36***	−0.36***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
$\Delta gdpg_t$	−0.03	−0.03	−0.07	0.10*	0.10*	0.06
	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.06)
$gdpg_{t-1}$	−0.17**	−0.16**	−0.19**	−0.12**	−0.10	−0.13*
	(0.08)	(0.08)	(0.08)	(0.07)	(0.07)	(0.07)
Δur_t	0.78***	0.82***	0.82***	0.60***	0.65***	0.63***
	(0.12)	(0.13)	(0.13)	(0.11)	(0.12)	(0.12)
ur_{t-1}	0.23***	0.25***	0.25***	0.13**	0.14**	0.14***
	(0.06)	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)
$\Delta grev_t$	−0.30**	−0.29**	−0.34***	−0.49***	−0.48***	−0.52***
	(0.12)	(0.12)	(0.12)	(0.11)	(0.11)	(0.11)
$grev_{t-1}$	−0.01	0.01	0.01	−0.15**	−0.12*	−0.11*
	(0.07)	(0.07)	(0.08)	(0.07)	(0.07)	(0.07)
Δggb_t	0.15**	0.15**	0.15**	0.11**	0.11*	0.13**
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
ggb_{t-1}	0.17***	0.18***	0.19***	0.06	0.07	0.08
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Δdep_t	0.07	0.02	0.22	−0.26	−0.34	−0.13
	(0.41)	(0.42)	(0.42)	(0.38)	(0.39)	(0.39)
dep_{t-1}	0.24**	0.28**	0.26**	0.22**	0.25**	0.18
	(0.12)	(0.12)	(0.13)	(0.11)	(0.11)	(0.12)
iip_{t-2}	0.00	0.00	0.00	−0.00	−0.00	−0.00

(*continued*)

Table B4. Continued.

	Dependent variable: change in external balance (Δeb_t)					
eb:	*cab*	*cab*	*cab*	*tbgs*	*tbgs*	*tbgs*
tv:	*citr*	*eatr*	*emtr*	*citr*	*eatr*	*emtr*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
eu_t	1.37**	1.25*	1.32*	1.15*	1.16*	1.18*
	(0.67)	(0.69)	(0.71)	(0.62)	(0.64)	(0.66)
$\Delta tv_t \times ea_t$	0.11	−0.04	−0.07*	0.11	−0.02	−0.07**
	(0.08)	(0.09)	(0.04)	(0.07)	(0.09)	(0.03)
$tv_{t-1} \times ea_t$	0.11**	0.10	0.00	0.17***	0.17***	0.01
	(0.05)	(0.06)	(0.03)	(0.05)	(0.06)	(0.02)
$\Delta tv_t \times non - ea_t$	0.36**	0.43***	0.28**	0.37***	0.37**	0.07
	(0.14)	(0.16)	(0.14)	(0.13)	(0.15)	(0.13)
$tv_{t-1} \times non - ea_t$	0.11*	0.08	−0.03	0.15***	0.15**	−0.05
	(0.06)	(0.07)	(0.05)	(0.05)	(0.06)	(0.05)
Observations	489	484	478	488	483	477
Adjusted R^2	0.35	0.35	0.35	0.34	0.34	0.32

Notes: Heteroskedasticity-robust standard errors in parentheses. ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively.

Table B5. Long-term effects of corporate taxation from fixed-effects estimations – model with *ea* interaction term.

Dependent variable: change in external balance (Δeb_t)			
eb:	*cab*	*cab*	*cab*
tv:	*citr*	*eatr*	*emtr*
(a) Euro area long-term effect of *tv*	0.26**	0.24	0.01
(b) Non-euro area long-term effect of *tv*	0.25*	0.20	−0.07
H0: (a) – (b) = 0; $\chi^2(1)$ statistic	0.09	0.39	0.51
eb:	*tbgs*	*tbgs*	*tbgs*
tv:	*citr*	*eatr*	*emtr*
(a) Euro area long-term effect of *tv*	0.46***	0.46***	0.01
(b) Non-euro area long-term effect of *tv*	0.42***	0.41**	−0.15
H0: (a) – (b) = 0; $\chi^2(1)$ statistic	0.49	0.54	2.08

Note: ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively.