Tax Competition and Employment

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ABSTRACT: We examine the effects of international tax competition on domestic employment. We find that increases in corporate statutory tax rate differentials between domestic and foreign firms reduce domestic employment through the distinct channels of competition from importers and competition from foreign-owned domestic firms. These effects are stronger for domestic firms located in countries with weaker labor market protections, manufacturing firms, firms with fewer intangible assets, and standalone firms. International tax competition appears to primarily affect domestic employment via changes in within-firm employment at smaller firms. Our results suggest that international tax competition can affect domestic employment even when domestic capital or income is immobile. Consequently, limits on tax base mobility or on tax planning opportunities are likely insufficient to prevent tax competition.

Keywords: Tax competition, Competition, Employment, Real effects, Trade

JEL classifications: E24, F14, F16, H23, H35

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1. Introduction

The average corporate income tax rate among Organisation for Economic Co-operation and Development (OECD) countries declined by 26% over the last two decades (from 32.5% in 2000 to 23.9% in 2018). Tax competition is a central cause of this decline.[1] Proponents of reducing corporate income taxes argue that relatively high corporate tax rates reduce domestic firms' competitiveness, ultimately lowering domestic employment.[2] In this paper, we examine the relation between international tax competition and domestic employment. We define tax competition as the difference between the foreign statutory tax rate and the domestic statutory tax rate, and design our empirical tests to abstract away from any direct effect of domestic tax rates on domestic employment.

We examine two nonexclusive channels through which tax differentials can affect domestic employment. We refer to the first channel as the import competition channel. Relative reductions in foreign tax rates can relatively expand foreign importers' investment opportunity sets by reducing their after-tax cost of capital and/or relax their financing constraints by increasing their after-tax cash flows. Consequently, these foreign importers can invest in new products, product improvements, and production processes and thereby increase or improve their competition with domestic firms.[3]

For example, the United Kingdom's corporate tax rate reductions since 2011 may have provided its aerospace firms with additional resources to invest (e.g., in innovation as suggested

[1] Regarding tax competition in the E.U. specifically see, e.g., Dehejia & Genschel (1999), Redoano (2003), Winner (2005), Cassette & Paty (2008), Devereux, Lockwood, & Redoano (2008), Overesch & Rincke (2011), and Redoano (2014). Devereux & Loretz (2013) review the literature.

[2] The debate about the relation between corporate tax differentials and employment is far too large to summarize here, and includes both academic arguments carried out in scientific journals, policy debates carried out in the halls of power, and political debates carried out in the media and public consciousness. Our goal is not to settle this debate, but to investigate two channels through which tax competition can affect employment.

[3] E.g., Hall & Jorgenson (1967), Djankov, Ganser, McLiesh, Ramalho, & Shleifer (2010), Mukherjee, Singh, & Zaldokas (2017), and Kim, Nessa, & Wilson (2018).

by Mukherjee et al. (2017), consulting, or capital, as suggested by Djankov et al. (2010)). The results of these additional investments would allow UK aerospace firms to relatively increase or improve their exports to countries that did not alter their corporate tax rate (e.g., France). This increased or improved import competition may have crowded out production by French aerospace firms in France. However, prior work suggests that French aerospace firms will respond by investing in capital and research and development, potentially increasing or decreasing their employment (e.g., Kim et al., 2018). Consequently, the total effect of tax differentials on domestic employment via the import competition channel is *ex ante* unclear.

We refer to the second channel through which tax differentials can affect domestic employment as the cross-subsidization channel. Prior work argues that multinational firm groups use internal capital market transfers to support subsidiaries.[4,5] Building on this prior work, we argue that relative reductions in foreign tax rates can provide multinational firms with resources to directly support their subsidiaries operating in foreign jurisdictions. Further, relative reductions in foreign tax rates can provide multinational firms with resources to invest in projects that benefit their foreign subsidiaries.

For example, French subsidiaries of UK aerospace firms may have benefited from investments made by their UK headquarters after the post-2011 corporate tax cuts (e.g., because the investments resulted in know-how or innovations that benefited the French subsidiary). French subsidiaries may also have received direct capital transfers from their UK headquarters after the tax cut increased the headquarters' cash flows (Desai et al., 2004; Boutin et al., 2013). This support

[4] E.g., Desai, Foley, & Hines (2004), Boutin, Cestone, Fumagalli, Pica, & Serrano-Velarde (2013), and Beaver, Cascino, Correia, & McNichols (2016). Almeida, Kim, & Kim (2015) find similar results for Korean chaebols.

[5] We use *firms* to refer to the business entity that is a separate corporation located in a given country (i.e., the legal entity filing financial statements). Firms are our unit of observation. We differentiate between group firms, which are subsidiaries ultimately owned by another foreign or domestic firm and potentially affiliated with other subsidiaries through their group membership, and standalone firms, which are not owned by another corporation.

could negatively affect the subsidiary's local competitors, potentially causing them to decrease their employment. Consequently, the total effect of tax differentials on domestic employment via the cross-subsidization channel is also *ex ante* unclear. In total, both of the potential channels we examine suggest that the effect of international tax competition on domestic employment is an empirical question.

To document the effects of these two potential channels, we develop measures of country-industry exposure to tax competition from importers and from foreign-owned domestic competitors. We measure exposure to tax competition via the import competition channel using the summed difference between the foreign and the domestic corporate tax rate, weighted by the share of prior-year industry imports that originate from the foreign country (see also Kim et al., 2018). We measure exposure to tax competition via the cross-subsidization channel using the summed difference between the tax rates faced by each foreign parent firm and the domestic tax rate, weighted by the share of total industry sales made by each foreign-owned domestic competitor.

We examine the effects of tax competition on employment in 30 countries in the European Economic Area (EEA) at both the microeconomic (i.e., firm) and the macroeconomic (i.e., industry) level.[6] We focus our analysis on the EEA for several reasons. The EEA is one of the world's largest economies and in some recent years it was the world's largest. Therefore, understanding the determinants of employment in the EEA is important in its own right. The EEA also seeks to guarantee the free movement of goods, capital, labor, and services between member

[6] The EAA comprises the 28 member states of the European Union plus Iceland, Liechtenstein, and Norway. Switzerland has signed, but not ratified the EAA agreement. Our sample does not include observations from Iceland and Liechtenstein due to a lack of data, but does include Switzerland.

countries. Consequently, there is a great deal of import competition among member countries, as well as many firms with subsidiaries in multiple member countries.

EEA countries' regulatory environments are also largely homogeneous because the European Commission acts as a centralized standard setter in economic policy. However, EAA countries have a substantial degree of sovereignty in matters of corporate taxation, resulting in considerable variation in member states' corporate tax rates and intense tax competition (Zodrow, 2003; Keen & Konrad, 2013; Streif, 2016). As a result, the EEA is an ideal setting in which to examine the relation between tax competition and domestic employment.

Importantly, firm-level data on employment, ownership, and financial condition and performance is widely available for EEA firms. This data allows us to identify inter-country firm linkages and conduct our analyses including both public and private firms. We combine this data with hand collected country-year tax data and country-pair-industry import data. Our final sample includes over 21 million firm-year observations for 3.7 million unique firms, of which 86 percent are standalones and 14 percent belong to business groups. Our firm-level data is similar to, but more granular than, the data used in several recent studies.[7]

Our firm-level data and the EEA setting also allow us to address a variety of potential alternative explanations for our results. Because our empirical strategy leverages differences in industry and firm exposure to foreign tax differentials, we are able to include fixed effects for each country, each year in our analysis. These country-year fixed effects control for all time-varying characteristics of the country in which the firm operates (e.g., the political environment, macroeconomic conditions, etc.). These time-varying effects include all domestic tax policy characteristics, including the domestic corporate tax rate. We also control for country-industry

[7] E.g., Shroff, Verdi, & Yu (2014), Bethmann, Jacob, & Müller (2018), Beaver, Cascino, Correia, & McNichols (2019), and Beuselinck, Cascino, Deloof, & Vanstraelen (2019).

import competition. Consequently, changes in tax differentials in our empirical specification are identified solely from variation in exposure to foreign corporate tax rates (e.g., our empirical strategy examines the effect of the 2012 UK tax cut on French employment). Because we do not expect *foreign* governments to change their corporate tax rates based on expected changes in *domestic* employment, we do not expect selection to be a concern in our setting.

However, we acknowledge that even absent selection, our results could be driven by some correlated omitted variable. For example, foreign governments could decrease corporate tax rates when they expect flagging demand in industries that are key employers. If these key employers also import to other EEA countries, and the flagging demand also affects industry employment in these countries, then time-varying industry demand could represent a correlated omitted variable. To address this and related concerns, we include fixed effects for each industry, each year in our analysis. These industry-year fixed effects control for time-varying industry demand, as well as other time-varying industry characteristics (e.g., automation).

Consequently, to collectively explain our results a correlated omitted variable must vary systematically at the country-pair-industry-year level with changes in domestic country-industry employment. Moreover, this variable must *not* be common to all industry firms in a given year, nor to all firms in the domestic country in a given year. Finally, this variable must be correlated with changes in corporate tax rate *differentials* between country pairs (e.g., the correlated omitted variable must vary with changes in foreign countries' corporate tax rates, but not with changes in domestic countries' corporate tax rates). Although we are unaware of any potential country-pair-industry-year variables that might drive our results, we nonetheless also control for time-varying firm characteristics (e.g., size) and time-varying country-industry characteristics (e.g., industry concentration), and include fixed effects for each firm.

We find that the relation between tax competition and employment via both the import competition and the cross-subsidization channel is economically significant. The results from our preferred specification suggest that if the governments of all foreign countries from which goods or services are imported decrease their corporate tax rate by one percent of the 2018 OECD average, domestic firms' employment (labor expense) would decrease by 0.19% (0.21%). The results also suggest that if the foreign headquarters' governments of all domestic competitors decreased their corporate tax rate by one percent of the 2018 OECD average, domestic firms' employment (labor expense) would decrease by 0.02% (0.05%).

Moreover, we find that the relation between tax competition and employment varies predictably with features of the country regulatory environment, firm, and industry. The relation is stronger for domestic firms located in countries with lower degrees of unionization, consistent with stronger labor market protections shielding employees from the effects of tax competition. The relation is also stronger for manufacturing firms and capital intensive firms, consistent with manufactured products being more easily imported or supported from abroad (Kim et al., 2018; Gaertner, Hoopes, & Williams, 2019). The relation is weaker for firms with more intangible assets, consistent with trade secrets, patents, and brand names protecting firms from competition.[8] Finally, the relation is weaker for firms that are a part of a group of firms, and in particular when that group is international, consistent with group diversification helping member firms weather competition.

Our results discussed so far concern within-firm changes in employment (i.e., they document how tax competition affects the intensive margin of employment). However, tax competition may affect the extensive margin of employment differently if, for example, firms are more or less likely to exit in the face of tax competition than they are to reduce their employment

[8] E.g., Slade (1995), Aghion, Bloom, Blundell, Griffith, & Howitt (2005), Glaeser (2019), and Glaeser & Landsman (2019).

levels (Muendler & Becker, 2010). Therefore, we examine how tax competition affects changes in employment solely driven by firm exits. We find evidence that both the import competition and cross-subsidization channels of tax competition have no discernible effect on firm exits.

We also find that the effect of the cross-subsidization channel of tax competition is greater at the country-industry level and that the effect of the import competition channel is much weaker at the country-industry level. This latter finding suggests that the import competition channel of tax competition primarily affects smaller firms. We separately estimate our tests on the subsamples of firms with below and above median assets and employees and confirm that this is the case. Coupled with our cross-sectional results on group diversification and foreign ownership, this result suggests that tax competition via the import competition channel primarily "hurts the little guy" because larger firms' geographic and product line diversification affords them opportunities to weather tax competition via the import competition channel. In contrast, large and small firms are equally disadvantaged by competition from cross-subsidized local competitors.

We believe our evidence allows us to contribute to the literature on tax competition.[9] In particular, our evidence that foreign tax differentials affect domestic employment highlights a previously unexplored cost of *not* engaging in tax competition. Prior work focuses on lost tax revenues from shifted income and operations and foregone investment as primary motivators of tax competition (e.g., Djankov et al., 2010; Tørsløv, Wier, & Zucman, 2018). We build on this prior work by quantifying two channels through which tax competition can affect domestic employment through mechanisms other than shifted operations or income. Consequently, our results suggest that tax differentials can affect domestic outcomes even when domestic operations

[9] See, e.g., Brueckner (2003), Wilson (2009), Devereux & Loretz (2013), and Keen & Konrad (2013) for reviews of the literature on tax competition.

or income cannot be shifted, suggesting that limits on inter-country tax base mobility are likely insufficient to prevent tax competition (e.g., Becker & Fuest, 2012).

We believe our evidence also allows us to contribute to the literature on the real effects of taxation. Prior work on the real effects of taxation largely focuses on how taxes that directly target firms, their employees, their investors, or their domestic competitors affect firm outcomes.[10] We contribute to this literature by documenting how tax competition that directly benefits foreign firms affects domestic firm outcomes via the import competition and cross-subsidization channels. In this regard, we build on Kim et al. (2018), who document the effects of foreign tax cuts on U.S. manufacturing firms' profitability and investment, and Donohoe, Lisowsky, and Mayberry (2019), who document the effects of corporate tax cuts that benefit a subset of U.S. firms on the profitability of those firms' U.S. competitors. We build on their work by documenting the effects of tax differentials on employment, an important real outcome considered by policymakers (we discuss both papers in more detail in Section 2.3).

We acknowledge that our analysis does not constitute a full general equilibrium analysis of the effects of tax competition on domestic employment. In particular, we cannot trace the fates of employees that exit a given industry in a given country. However, employment declines in one sector will only be offset by worker reallocation to other sectors if labor supply is perfectly inelastic *and* there are no labor market frictions (Feenstra, 2004). Further, even if the workers that exit a given industry all find employment elsewhere, it is unlikely that these alternative sources of

[10] See, e.g., Goolsbee & Maydew (2000), Graham, Hanlon, & Shevlin (2011), Doidge & Dyck (2015), Hanlon, Lester, & Verdi (2015), Heider & Ljungqvist (2015), Kubick, Lynch, Mayberry, & Omer (2015), Edwards, Schwab, & Shevlin (2016), Andries, Gallemore, & Jacob (2017), Bird, Edwards, & Shevlin (2017), Ljungqvist, Zhang, & Zuo (2017), Nessa (2017), Armstrong, Glaeser, Huang, & Taylor (2018), Bird, Edwards, & Ruchti (2018), Chow, Huang, Klassen, & Ng (2018), Langenmayr & Lester (2018), Armstrong, Glaeser, & Kepler (2019), Donohoe, Jang, & Lisowsky (2019), and Giroud & Rauh (2019).

employment are perfect substitutes for their lost jobs (i.e., the reallocated workers would likely be worse off).

We organize the rest of the paper as follows: Section 2 provides details on tax competition and develops our predictions. Section 3 describes our data sources and research design. Section 4 discusses our results. Section 5 concludes.

2. Background and predictions

2.1 Tax competition

On December 22, 2017 President Trump signed the Tax Cuts and Jobs Act into law. The Act reduces the U.S. statutory corporate tax rate from 35% to 21%. This reduction continued a longstanding worldwide downward trend in corporate tax rates. Proponents of the Act, and of reducing corporate tax rates, argue that lower tax rates improve domestic firms' competitiveness (see, e.g., Peterson Institute, 2017).[11] Opponents of the Act argue that lower tax rates are the result of tax competition, which they consider harmful (see, e.g., G20, 2018). They argue that while tax competition is supposed to attract corporate activities, tax cuts also reduce tax revenues such that governments cannot provide the necessary services to correct market failures. They reason that any benefits of potentially increased corporate investment do not exceed the costs of foregone tax revenues.

Regardless of whether tax competition is "good" or "bad" it would appear that tax competition is increasingly a fact of life (OECD, 1998, 2019). Trade liberalization and communication and transport technology innovations have made it simpler to move goods, jobs, capital, and services across borders (e.g., Dehejia & Genschel, 1999). Consequently, capital and

[11] https://piie.com/blogs/realtime-economic-issues-watch/business-tax-cuts-will-boost-us-competitiveness.

goods are increasingly sensitive to foreign tax rates. Governments respond to this sensitivity by undercutting foreign tax rates to attract taxable income and capital, resulting in tax competition and a "race to the bottom" in corporate tax rates (Wilson, 1999; G20, 2018). As a result, the worldwide average GDP-weighted statutory tax rate declined from 46.63% in 1980 to 26.47% in 2018.[12]

Tax competition has been particularly intense in the EEA.[13] Goods, capital, labor, and services can travel freely between EEA countries and the European Commission maintains fairly homogeneous regulatory policy among EEA countries. This homogeneity extends to some matters of taxation, such as the collection procedure for consumption taxes, but not all. In particular, EEA countries have almost total sovereignty in regards to corporate taxation, resulting in intense tax competition. Consequently, we focus on competition in corporate statutory tax rates. Corporate statutory tax rates have the advantage of being directly measureable and affecting all firms that anticipate being profitable at some point in time.

We note that tax competition can also take other forms, including some that only manifest in marginal or effective tax rates (e.g., allowing tax avoidance strategies; Shevlin, Shivakumar, & Urcan, 2019). However, marginal and effective tax rates are simultaneously determined with endogenous corporate investment and profitability, while foreign statutory tax rates are more likely exogenous in our setting. Consequently, focusing on statutory tax rates allows us to avoid potential endogeneity issues (e.g., Ljungqvist et al., 2017). To the extent that one is interested in the effect

[12] https://taxfoundation.org/corporate-tax-rates-around-world-2018/.
[13] Regarding tax competition in the E.U. specifically see, e.g., Dehejia & Genschel (1999), Redoano (2003), Winner (2005), Cassette & Paty (2008), Devereux et al. (2008), Overesch & Rincke (2011), Redoano (2014), and Streif (2016). Devereux & Loretz (2013) review the literature.

of marginal or effective tax rates, an alternative approach would be to instrument for the effective or marginal tax rate with the statutory tax rate.[14]

2.2 Predictions

We consider two nonexclusive channels through which tax competition can affect domestic employment. We refer to the first as the import competition channel. Lower relative tax rates can provide financially constrained foreign firms with the resources to invest in process improvements, product improvements, and/or capacity expansions relative to domestic competitors (e.g., Almeida & Campello, 2007; and Denis & Sibilkov, 2009). Consequently, these foreign firms can improve or increase their import competition with domestic firms. Consistent with lower tax burdens relaxing financial constraints, Edwards et al. (2016) find that increases in financial constraints lead to increased tax planning. Consistent with financial constraints inhibiting import competition, Bellone, Musso, Nesta, & Schiavo (2010), Manova (2013), and Chaney (2016) find that financial constraints prevent firms from exporting.

However, tax competition can affect domestic employment via the import competition channel even if foreign firms are financially unconstrained. This is because lower relative tax rates can relatively increase foreign firms' expected after-tax profits, leading them to undertake previously marginal investments and sales.[15] Indirectly consistent with tax competition affecting import competition, Gaertner et al. (2019) find that the stock prices of foreign importers fell in response to news about the Tax Cuts and Jobs Act, which reduced the U.S. corporate tax. Directly consistent with foreign tax differentials increasing import competition, Kim et al. (2018) find that

[14] This approach would lead to similar inferences; dividing our reduced form estimates by the first stage coefficient from a regression of effective or marginal tax rates on the statutory tax rate would produce the second stage coefficient of interest (Armstrong, Glaeser, & Huang, 2019).

[15] E.g., Hall & Jorgenson (1967), Devereux & Griffith (1998, 1999, 2003), Desai et al. (2004), Djankov et al. (2010), Hanlon & Heitzman (2010), Mukherjee et al. (2017), Desai & Dharmapala (2018), and Jacob, Michaely, & Müller (2018).

reductions in foreign tax rates increase import competition in the U.S. However, Kim et al. (2018) also find that U.S. firms respond to the increased import competition by increasing their own capital and research and development expenditures. Further, Buettner and Ruf (2007) suggest that domestic firms may respond to tax rate differentials by opening foreign subsidiaries, whose resources they may use to support their own domestic subsidiaries. In total, prior work suggests an *ex ante* ambiguous effect of tax competition on employment via the import competition channel.

The second channel through which tax competition can affect domestic employment also suggests an *ex ante* ambiguous effect on employment. We refer to this second channel as the cross-subsidization channel. Lower relative tax rates at corporate headquarters can provide multinational firms with resources to subsidize their foreign subsidiaries via internal capital market transfers.[16] For example, Desai et al. (2004) find that multinationals provide additional internal debt to subsidiaries, and Boutin et al. (2013) find that they transfer cash to help subsidiaries combat potential market entrants. Fresard (2010) finds that capital-rich firms use their resources to finance competitive strategies such as aggressive pricing or productivity improvements (see also Bolton and Scharfstein (1990), and Campello (2006), respectively).

Lower relative tax rates at corporate headquarters can also provide multinational firms with resources to invest in process or product improvements that benefit their foreign subsidiaries. For example, headquarters could invest in additional senior management, consulting, or innovative projects. In total, while this cross-subsidization can affect employment at the foreign subsidiary, it may also negatively affect employment at the foreign subsidiary's local competitors. Therefore, the effect of this cross-subsidization on aggregate employment is *ex ante* ambiguous.

[16] See, e.g., Lamont (1997), Shin & Stulz (1998), Desai et al. (2004), and Boutin et al. (2013).

2.3 Prior work on indirect competitive effects of corporate taxation

The closest prior work to our own is Donohoe et al. (2019) and Kim et al. (2018). Donohoe et al. (2019) document the effects of corporate tax cuts that benefit a subset of U.S. firms on the profitability of those firms' U.S. competitors. Kim et al. (2018) document the effects of foreign corporate tax cuts on public U.S. manufacturing firms' profitability and investment. Our results build on Donohoe et al. (2019) and Kim et al. (2018) by documenting how tax competition affects employment. Kim et al. (2018) find that foreign corporate tax rate reductions lower U.S. firms' profitability, but increase their investment, suggesting an *ex ante* unclear effect on employment. The primary differences between our papers are the different research questions (i.e., we study the effects of tax competition on employment while they study the effects of tax cuts on profitability and investment).

While the primary difference between our paper and Donohoe et al. (2019) and Kim et al. (2018) is the research question, our setting also allows us to extend their work in three ways. First, our firm-level data allows us to separately document the effects of tax competition on domestic employment via import competition and via competition from cross-subsidized foreign-owned peers. Second, our EEA setting entails examining a separate universe of firms, across multiple countries and in non-manufacturing industries. Third, our setting facilitates the inclusion of industry-year and country-year fixed effects.

3. Data and research design

3.1 Sample

We construct our sample using different products of the Orbis database maintained by Bureau van Dijk (BvD). We download company financial data for all public and private firms in

the Orbis Generics flat files from July 2018.[17] We obtain data for the 28 member states of the European Union (EU), plus Iceland, Norway, and Switzerland. We merge this data to corporate ownership data using the historical annual versions of the Orbis database. We use this corporate ownership data to identify standalone firms and firms that belong to a group of firms.[18] For groups of firms, we identify member firms' worldwide subsidiaries and ultimate corporate owners (i.e., the parent firm at the top of the organizational structure). Finally, we use the same data to identify firms' legal status on an annual basis, allowing us to track firm exits and examine changes along the extensive margin of employment. This data is available from 2005 to 2017.

We exclude financial institutions and utilities because their unique regulatory and institutional structures may affect their sensitivity to import competition and tax competition (Kubick et al., 2015). Similarly, we exclude firms active in the fields of public administration and defense, activities of extraterritorial organizations and bodies, activities of households as employers, and non-profit organizations. We drop firms whose total assets or sales do not exceed €10,000 at least once during the sample period. We drop observations with missing industry classifications and observations with negative values for total assets, sales, number of employees, or labor expense due to potential data entry errors.

We merge firm financial data with the World Input-Output Database (WIOD).[19] The WIOD tracks detailed data on trade relationships between the 28 EU countries and 15 other major economies around the world on the industry-level. The most recent WIOD update covers the period between 2000 and 2014. We hand-collect country-level tax data from the ZEW, the IBFD

[17] For more details on the download process and data cleaning, see Olbert & Severin (2018), De Simone & Olbert (2019), and Olbert (2019). When cleaning the raw data, we follow most of the recommendations of Kalemli-Ozcan, Sørensen, & Yeşiltaş (2015).
[18] See De Simone & Olbert (2019), and Olbert (2019) for additional details on the identification of ownership structures and the construction of the ownership panel.
[19] The 2016 update used in this paper is available at http://www.wiod.org/database/wiots16.

European Tax Handbooks, KPMG, and OECD to construct tax rate differentials. We require non-missing data for all dependent and control variables.

Table 1 describes the composition of our sample by country and year. Our final sample compromises 21,757,961 firm-year observations from 30 different countries from 2006 to 2015.[20] The number of observations is largely equally distributed over the sample period. The distribution across countries primarily reflects each economy's scale and development. However, some nuances in financial reporting requirements also affect differences in the number of observations across countries. While the EU Accounting Directive generally requires all public and private firms to file and publish financial accounts, each country can set size-based thresholds to exempt small firms from publishing or to allow firms to publish abbreviated balance sheets (Breuer, 2018) The large number of observations in Spain and Italy, for example, reflects this institutional feature. Orbis coverage, and hence our sample coverage, is generally poor for some small countries (e.g., Malta and Cyprus).

However, despite the limited coverage for some small countries and firms, we believe our sample has several advantages that make it particularly suitable for arriving at representative estimates of the effect of international tax competition on domestic employment. We retrieve financial information and ownership and status information from every annual historical update of the Orbis database. As a result, our sample is much larger than those in prior studies that also use Orbis data.[21] For example, the main regressions in Beaver et al. (2019) are based on less than 1 million business group firm-years and around 620,000 standalone firm-years. Similarly, our

[20] The sample starts in 2006 because we require non-missing ownership information to construct lagged control variables and ownership information is only available from 2005 on. Our sample ends in 2015 because the last year of import data from the most recent WIOD update is 2014 and we include lagged values to compute our tax competition measures and to control for the level of (and changes in) total imports.

[21] Tørsløv et al. (2018) highlight potential limitations of the Orbis database, in particular the poor coverage of financial data in tax-haven countries. We do not consider this limitation an issue for our analysis because we are interested in employment of active businesses within the EEA.

sample is almost five times larger than the sample in Bethmann et al. (2018), who examine standalone and group firms in Europe over the period 2007-2012, but exclude firms with less than €50,000 in total assets.

3.2 Measuring exposure to tax competition

We use our firm-level data to develop measures of the effects of tax competition on employment via both the import competition and cross-subsidization channels. Our measures of tax competition vary at the country-industry-year level. We identify industries using 2-digit NACE Rev. 2 codes.[22] Our first measure, *ImportCompTax*, measures annual country-industry exposure to foreign tax differentials via import competition:

$$ImportCompTax_{j,c,t} = \sum_f \frac{Imports_{f,c,j,t-1}}{Imports_{c,j,t-1}} * (CIT_{f,t} - CIT_{c,t}) \quad (1)$$

where *t* denotes years, *c* denotes domestic countries, *f* denotes foreign countries, and *j* denotes industries. *ImportCompTax* weighs the corporate tax rate differential between foreign country *f* and domestic country *c* by the share of prior year import competition in industry *j* originating from the foreign country. We sum over all foreign countries, *f*.

We use the 2014 update of WIOD to measure country-pair-industry imports, $Imports_{f,c,j,t-1}$. The WIOD comprises annual time-series of world input-output tables, which consist of officially published input-output tables, national accounts data, and international trade statistics.[23] The cross-sectional panel dimension of the data allows us to directly track imports between countries for each industry over time. We also hand collect foreign corporate tax rates from 42 foreign countries

[22] We thereby define a product market as a country-industry, which we observe each year (see, e.g., Huang, Jennings, & Yu, 2017). For a similar industry classification see, e.g., Campello (2006), Fresard (2010), Gu (2016), Bozanic, Hoopes, Thornock, & Williams (2017), and Breuer (2018). Using 2-digit NACE codes allows us to match import data from the WIOD as this data is available on the same level of industry classification. The NACE industry classification for European markets parallels the NAICS or SIC classification in the U.S.

[23] See Timmer, Dietzenbacher, Los, Stehrer, & de Vries (2015) for details of the WIOD construction.

(i.e., all 43 countries covered by the WIOD database, comprising the 28 EU member states, and 15 other major economies around the world, less the domestic firm's home country).

Our second measure, *PeerCompTax*, measures industry exposure to foreign tax differentials via competition from foreign-owned local competitors:

$$PeerCompTax_{j,c,t} = \sum_g \frac{Sales_{g,c,j,t-1}}{Sales_{c,j,t-1}} * (CIT_{p,f,t} - CIT_{c,t}) \quad (2)$$

where subscript *g* denotes foreign-owned domestic firms, subscript *p* denotes the parent firm of firm *g*, and prior subscripts remain the same. *PeerCompTax* weighs the corporate tax rate differential between the parent firm's home country *f* and the domestic country *c* by the share of prior year industry sales in the domestic country made by domestic firm *g* owned by foreign parent firm *p*. We sum the measure over all domestic firms with foreign parents, *g*.

We only include parent firms located in one of the other 29 EAA countries as internal capital transfers between affiliated EAA firms are common and not inhibited by withholding taxes, customs, or other trade barriers (e.g., Zodrow, 2003; Álvarez-Martínez, Barrios, d'Andria, Gesualdo, Pontikakis, & Pycroft, 2019). Doing so ensures that the foreign parent and local firm are close enough in a regulatory and legal sense to support one another. We identify changes in foreign corporate tax rates from 29 foreign countries (i.e., all 30 countries covered by our Orbis dataset, comprising the 28 EU member states, Norway, and Switzerland, less the domestic firm's home country.)

3.3 Identification strategy

To examine the effect of tax competition on domestic employment, we estimate the following firm-level ordinary least squares (OLS) regression:

$$ln(Employment_{i,t}) = \alpha_0 + \alpha_i + \alpha_{c,t} + \alpha_{j,t} + \gamma_1 ImportCompTax_{j,c,t} + \gamma_2 PeerCompTax_{j,c,t} + X\phi + \varepsilon_{i,t} \quad (3)$$

where subscript *i* denotes firms. The dependent variable, $Employment_{i,t}$, is firm *i*'s employment at time *t*, measured using either the total number of employees (*Number Employees*) or total payroll (*Labor Expense*). The independent variables of interest are $ImportCompTax_{j,c,t}$ and $PeerCompTax_{j,c,t}$ (defined above) and vary by the industry (*j*), country (*c*), and year (*t*).

The vector *X* includes time-varying firm characteristics that potentially affect employment: the change in sales since the prior year (*Sales Growth*), the number of years since incorporation (*Age*), the natural logarithm of total assets (*Log. Total Assets*), and the natural logarithm of cash holdings (*Log. Cash*).[24] The vector *X* also includes time-varying industry characteristics that potentially affect employment: the Herfindahl-Hirschman-Index of market concentration calculated as the sum of squared market shares of all firms in an industry (*HHI*) and total import competition in the industry and country (*Log. Imports*).[25] We lag firm and industry controls by one year to avoid potential bad control problems. We adjust standard errors for clustering at the firm and country-industry-year to address serial dependence within firms and cross-sectional dependence within country-industries (i.e., within the time-series dimension of our data panel and cross-sectionally at the level of aggregation of our variables of interest; Petersen, 2009; Gow, Ormazabal, & Taylor, 2010).[26]

Eq. (3) includes firm fixed effects (α_i) to capture time invariant differences between firms. Consequently, Eq. (3) effectively estimates how changes in $ImportCompTax_{j,c,t}$ and $PeerCompTax_{j,c,t}$ affect changes in employment. We also include country-year fixed effects ($\alpha_{c,t}$) to control for all time-varying characteristics of the country in which the firm operates (e.g., the

[24] E.g., Hoogstra & van Dijk, (2004), Haltiwanger, Scarpetta, & Schweiger, (2013), Harrison, Jaumandreu, Mairesse, & Peters, (2014), Martin, de Preux, & Wagner, (2014), Rao (2015), Görg, Henze, Jienwatcharamongkhol, Kopasker, Molana, Montagna, & Sjöholm, (2017), and Shevlin et al. (2019).
[25] E.g. Campello (2006), Kubick et al. (2015), and Lemma, Negash, Mlilo, & Lulseged (2018).
[26] Gow et al. (2010) evaluate methods to correct for cross-sectional and time-series dependence used in the accounting literature. They show that two-way cluster-robust standard errors are required to produce well specified test statistics for valid inferences and perform best compared to other methods examined.

political environment). Importantly, the country-year fixed effects also control for domestic tax policy. Consequently, Eq. (3) identifies γ_1 and γ_2 using variation in $ImportCompTax_{j,c,t}$ and $PeerCompTax_{j,c,t}$ driven by changes in foreign tax policy, and not variation in domestic tax policy or *Log. Imports* (which is included as a control).

We do not expect foreign governments to set their tax policy with respect to employment in another country, and therefore do not expect selection to drive our results. However, we recognize that foreign governments may change tax policy in anticipation of expected employment shocks in key industries, and that these expected employment shocks may also affect same-industry employers in other countries. For example, Germany may lower its corporate tax rate in response to a global steel shortage that it expects to reduce employment in car manufacturing. To the extent this steel shortage affected car manufacturing employment in France, and France did not adjust its corporate tax rate, this could bias our results. To address this and other correlated omitted variable concerns, we include industry-year fixed effects ($\alpha_{j,t}$) to control for all time-varying factors at the industry level.

As a result of our industry- and country-year fixed effects, only an omitted variable at the country-pair industry-year level that is not common to firms in an industry in a given year *and* not common to firms in a country in a given year can bias our results. Moreover, this variable must be related to changes in domestic employment and changes in corporate tax differentials (e.g., the omitted variable must be related to reductions in the importer country tax rate, but not to reductions in the domestic country's tax rate). We think it is unlikely that such a variable exists across country pairs, in particular because almost all firms in foreign countries engaging in tax competition are also domestic firms facing international tax competition (i.e., countries in our data are both importers and exporters).

3.4 Descriptive statistics

Table 2 provides descriptive statistics for our sample. We winsorize all firm- and industry-level continuous variables at the 1st and 99th percentiles. The average firm in our sample employs 41 workers and has a labor expense of €1.5 million. The standard deviation of *Number Employees* is 1,476 and the standard deviation of *Labor Expense* is €84.7 million. These figures highlight the diversity of our sample: from very small private firms to the largest public firms.

The mean of *ImportCompTax* is 0.94, suggesting our sample is slightly weighted towards low-tax countries (consistent with corporate taxes discouraging firm creation). The standard deviation *of ImportCompTax* is 5.63, suggesting significant variation. The mean of *PeerCompTax* is 0.82, suggesting most firms in our sample face a corporate tax rate close to the corporate tax rate in their headquarter jurisdiction and also suggesting our sample is slightly weighted towards low-tax countries. The standard deviation of *PeerCompTax* is 5.59, again suggesting significant variation. Figure 1 provides histograms of the sample distribution of both *ImportCompTax* and *PeerCompTax* benchmarked against the normal distribution. Figure 2 displays the means of *ImportCompTax* and *PeerCompTax* by sample country. Both figures also suggest significant variation in our tax competition measures.

Figure 2 also suggests that relatively low-tax countries, such as Ireland or Switzerland, have favorable positions in international tax competition. The positive average values for *ImportCompTax* and *PeerCompTax* suggest that firms in these countries predominantly import from, and face competition from peer firms owned by firms in, foreign jurisdictions with higher corporate tax rates. The opposite holds for traditionally high-tax countries like Germany and France. However, the negative values in the tax competition measures are smaller in absolute terms, suggesting that a substantial part of imports and foreign firm ownership relates to other

high-tax countries, consistent with the economies of, for example, France, Germany, and the United States, being closely connected.

Firms in our sample are generally between 10-15 years old, although some are much older. The average firm keeps slightly under €200,000 in *Cash* on hand and is growing (average *Sales Growth* of 20%). Compared to other recent studies investigating similar samples (Beaver et al., 2019; Bethmann et al., 2018), our sample firms are, on average, slightly younger, have larger *Total Assets*, and exhibit larger *Sales Growth*. Remaining descriptive statistics are in line with prior studies.

4. Empirical results

4.1 Tax competition and employment

Table 3 presents the results of estimating Eq. (3). Panel A presents the results using the natural logarithm of the total number of employees employed by the firm as the dependent variable. Panel B presents the results using the natural logarithm of the firm's total labor expense as the dependent variable. In columns (1) and (2) we exclude *PeerCompTax*, in columns (3) and (4) we exclude *ImportCompTax*, and in columns (5) and (6) we exclude neither. In columns (1), (3), and (5) we exclude controls to see how their inclusion affects our coefficient estimates.

The results of our preferred specification in column (6) of Panel A suggest that a one percentage point increase in *ImportCompTax*, equivalent to the governments of all foreign countries from which goods or services are imported increasing their corporate tax rate by one percentage point, results in a 0.81% increase in the number of domestic employees at affected firms (*t*-statistic of 3.53). The results also suggest that a one percentage point increase in *PeerCompTax*, equivalent to the foreign headquarters' governments of all domestic competitors

increasing their corporate tax rate by one percentage point, results in a 0.10% increase in the number of domestic employees at affected firms (*t*-statistic of 1.82).

The results of our preferred specification in column (6) of Panel B suggest that a one percentage point increase in *ImportCompTax*, equivalent to all foreign governments increasing their corporate tax rate by one percentage point, results in a 0.88% increase in domestic payroll at affected firms (*t*-statistic of 2.40). The results also suggest that a one percentage point increase in *PeerCompTax*, again equivalent to all foreign governments increasing their corporate tax rate by one percentage point, results in a 0.20% increase in total domestic payroll at affected firms (*t*-statistic of 2.32).

To put these effects in perspective, a 1% decrease in the 2018 OECD average statutory tax rate of 23.9% is 0.239 percentage points. Consequently, these results suggests that if all foreign governments from which goods or services are imported decreased their corporate tax by 1% of the 2018 OECD average, domestic firms' employment (labor expense) would decrease by 0.19% (0.21%). Similarly, these results suggest that if the foreign headquarters' governments of all domestic competitors decreased their corporate tax by 1% of the 2018 OECD average, domestic firms' employment (labor expense) would decrease by 0.02% (0.05%).

Including controls in the even columns in Panels A and B has a limited effect on the coefficient estimates for *PeerCompTax*, consistent with these controls not being previously correlated and omitted with *PeerCompTax*. In contrast, the controls do have some effect on the coefficient estimates for *ImportCompTax*. This is mainly due to the inclusion of *Log. Imports (t-1)*, which is used in the construction of *ImportCompTax*, and highlights the importance of including this control. In total, the results in Table 3 suggest that increases in tax differentials, i.e.

decreases in foreign tax rate competition as foreign tax rates become relatively higher, increase domestic employment.

4.2 Cross-sectional differences in labor market regulation

Next, we investigate cross-sectional differences in the effects documented in Table 3. We first explore heterogeneity in labor market protection across countries. Table 4 presents the results of estimating Eq. (3) after interacting our variables of interest with a measure of country-level labor market protections.[27] We anticipate that stronger labor market protections will weaken the relation between tax competition and employment by limiting firms' ability to fire employees or reduce their wages (i.e., we anticipate that labor market protections will attenuate the relation between employment and both *ImportCompTax* and *PeerCompTax*; e.g., Botero, Djankov, La Porta, Lopez-de-Silanes, & Shleifer, 2004).

We use OECD data on the degree of unionization to measure labor market protection, or *Unionization.*[28,29] *Unionization* is defined as the ratio of union employees divided by the total employees in a given country. A higher ratio indicates a larger portion of employees that are union members. In our sample, *Unionization* ranges from 4.49% to 73.1%. Following prior literature, we anticipate that unionization constrains firms terminating employees in the face of increased competition (Aobdia & Cheng, 2018).

The negative and significant coefficients on the interaction terms in column (3) of Panel A suggest that the higher *Unionization*, the lower the effects of *ImportCompTax* and of *PeerCompTax* on domestic employment. The results suggest that a one percentage point increase

[27] Again, Panel A presents the results using the natural logarithm of the total number of employees employed by the firm, and Panel B presents the results using the natural logarithm of the firm's total labor expense as the dependent variable.
[28] Data on unionization is only available until 2013, leading to a loss of observations. Further, OECD labor market data is not available for Croatia, Bulgaria, and Romania.
[29] We do not report the main effects for these measures because they are absorbed by the country-year fixed effects.

in *ImportCompTax* (*PeerCompTax*) causes a 0.86% (0.12%) increase in employment in a country with a 24.23% degree of *Unionization* (as in the United Kingdom in 2015). In contrast, the results suggest that the same one percentage point increase in *ImportCompTax* (*PeerCompTax*) has essentially no effect on employment in a country with a 66.81% degree of *Unionization* (as in Sweden in 2015).

4.3 Cross-sectional differences in industry, business model, and industry leadership

We next explore heterogeneity in the effects across industries, firms' business models, and their competitive position within the industry. Table 5 presents the results of estimating Eq. (3) after splitting our sample by different indicator variables that account for heterogeneity in these characteristics.[30] We split on the country-industry-year medians to ensure that we compare otherwise similar firms (we do not do so in Table 4 because our unionization measure only varies at the country-year level).

We first examine heterogeneity in the effects of tax competition in separate industries. Following Kim et al. (2018), we expect manufacturing firms to respond strongly to increases in tax competition (i.e., we anticipate that the relation between employment and both *ImportCompTax* and *PeerCompTax* will be greater in manufacturing industries). Consistent with our expectation, the results reported in columns (1) and (2) of Panel A suggest that the effect of *ImportCompTax* on manufacturing firm's employment is approximately three times the effect on non-manufacturing firms. We do not, however, document significant differences for the effects of *PeerCompTax*, suggesting that competition from foreign-owned firms crowds out domestic employment independent of the industry.

[30] Again, Panel A presents the results using the natural logarithm of the total number of employees employed by the firm as the dependent variable, and Panel B presents the results using the natural logarithm of the firm's total labor expense as the dependent variable.

Second, we examine cross-sectional differences based on firm characteristics. In particular, we examine how a firm's capital-to-labor intensity and the extent to which it invests in intangible assets influences its propensity to change employment in response to changes in tax competition. We predict that more capital-intensive firms will be particularly exposed to import competition as goods and services requiring workers are less frequently imported (i.e., we anticipate that capital intensity will magnify the relation between employment and both *ImportCompTax* and *PeerCompTax*; e.g., Freeman & Katz, 1991; Revenga, 1992). We also expect intangible-intensive firms to be less affected by competition because intangible assets, such as patents, trade secrets, or brand names, protect firms from competition (i.e., we anticipate that intangibility will attenuate the relation between employment and both *ImportCompTax* and *PeerCompTax*).[31]

We measure capital-to-labor intensity using the ratio of the firm's total assets to total employees (e.g., Xu, 2012). We define an indicator variable, *CapitalIntense*, that is equal to one if the firm's capital-to-labor intensity is above the median of its peer group (i.e., within a 2-digit NACE industry in a given country and year). We measure intangibility using the ratio of the firm's intangible assets to total assets.[32] We define an indicator variable, *HighIntangible*, which is equal to one if a firm's intangibles-to-total assets ratio is greater than the median of its peer group (e.g., Goldbach, Nagengast, Steinmüller, & Wamser, 2019). Consistent with our expectation, the results reported in columns (3) and (4) of Panel A suggest that the effect of *ImportCompTax* is more than twice the size for capital intense firms compared to labor intensive firms. The difference in effects

[31] E.g., Slade (1995), Aghion, Bloom, Blundell, Griffith, & Howitt (2005), Glaeser (2019), and Glaeser & Landsman (2019).

[32] Intangible assets reported on firms' balance sheets do not include all innovative assets. In particular, we capture capitalized intangible assets in unconsolidated balance sheets. Most countries' GAAP in our sample period required capitalizing the external acquisition of intangibles such as patents, trademarks, customer bases and/or provided the option to capitalize R&D expenses if the respective intangible asset is measurable and sellable (see, for instance, Sec. 248 II in the German Trade Code (HGB), defining German GAAP). However, reported intangible assets should correlate strongly with actual intangible assets.

for *PeerCompTax* is however negligible. Further, the results in columns (5) and (6) of Panel A show that the effects of both *ImportCompTax* and *PeerCompTax* are only present for firms with a below median intangibility ratio, again consistent with our prediction.

Last, we examine cross-sectional differences based on industry leadership. Prior literature provides evidence that smaller, less successful firms are sensitive to competition from their larger, more successful, peers (e.g., Campello, 2006; Leary & Roberts, 2014; Bernard, 2016; Xiao, 2017). We build on this literature and argue that smaller firms, or industry followers, should have fewer resources to sustain increased competition. Following prior literature, we classify firms with higher prior year sales as market leaders (e.g., Campello, 2006). We define an indicator variable, *Market Leader*, which is equal to one if a firm's prior-year market share is above the median in its peer group. Consistent with our expectation, the results in columns (7) and (8) of Panel A suggest that market leaders are generally less affected by increased import tax competition.

In total, the results in Table 5 suggest that the relation between *ImportCompTax* and employment and labor expense varies predictably with differences in industry, business model, and industry leadership. However, we find limited evidence that the relation between *PeerCompTax* and employment and labor expense varies predictably with differences in industry, business model, and industry leadership. The coefficient on *PeerCompTax* is also frequently insignificant in both subsamples in Table 5. One potential explanation is that the smaller baseline effect for *PeerCompTax* leads to less ability to identify effects in subsamples or between subsamples. Another potential explanation is that the effect of *PeerCompTax* operates via different mechanisms than *ImportCompTax*, leading to different cross-sectional effects.

4.4 Cross-sectional differences in subsidiary ownership

Finally, we explore heterogeneity in the effects across different ownership structures. Table 6 presents the results of estimating Eq. (3) after splitting our sample on three different ownership structures: *Standalone*, defined as not part of a business group; *Domestic-owned*, defined as being owned by a domestic parent whose group does not include any foreign firms; and *Foreign-owned-Intl*, defined as being part of a multinational group owned by a foreign parent.[33] Firms that belong to business groups can use internal capital markets to cross-subsidize one another in the face of competition (Boutin et al., 2013). Consequently, we expect these firms to be more resilient in the face of competition (i.e., we anticipate that business group membership will lessen the relation between employment and both *ImportCompTax* and *PeerCompTax*). Moreover, we expect this resiliency to be greater for foreign-owned firms because foreign parents are less likely than are domestic parents to face the same competition facing the domestic subsidiary.

Consistent with our expectations, the results in columns (1) and (2) in both Panels A and B suggest that the employment of standalone firms is more sensitive to tax competition via both the import competition and the cross-subsidization channels. Similarly, the results in columns (3) and (4) in both Panels suggest that the employment of domestic-owned firms is more sensitive to tax competition via both channels. Finally, the results in columns (5) and (6) in both Panels suggest that the employment of foreign-owned firms is unaffected, or even oppositely affected, by tax competition via the import competition channel, potentially due to their foreign presence. In contrast, we find no evidence of a differential effect via the cross-subsidization channel.

[33] Again, Panel A presents the results using the natural logarithm of the total number of employees employed by the firm as the dependent variable, and Panel B presents the results using the natural logarithm of the firm's total labor expense as the dependent variable.

In total, the results in Table 6 suggest that employment by standalone firms is more sensitive to tax competition than employment by domestic only firms. The results also suggest that employment by foreign-owned firms is less sensitive to tax competition than employment by both standalone firms and domestic only firms. Together, these results suggest that group membership provides firms with resources to weather tax competition.

4.5 Aggregate effects at the country-industry level

Our results so far document the effect of tax competition on the intensive margin of employment at the firm-level. However, tax competition may also affect the extensive margin of employment via changes in firm exits and entries. Consequently, examining the effects on the intensive margin alone may provide an incomplete picture of the total effect of tax competition. Our prior tests also examine proportional changes in employment at the firm level (implicitly equal weighting firms). If larger or smaller firms are more affected by tax competition, these tests may also provide an incomplete picture of the total effect of tax competition. Therefore, we examine the effect of tax competition on employment at the country-industry level to capture aggregate employment effects on both the intensive and extensive margin.

To do so, we estimate Eq. (3) using the country-industry-year as the unit of observation, rather than the firm-year. Aggregating our sample to the country-industry-year reduces our sample from 21,757,961 firm-years to 9,682 country-industry-years. We present the results in Table 7.[34] The results of our preferred specification in column (6) of Panel A suggest that a one percentage point increase in *ImportCompTax* results in a 0.95% increase in the number of domestic employees in affected industries. However, this coefficient estimate is estimated with significant error (*t*-

[34] Again, Panel A presents the results using the natural logarithm of the total number of employees employed by the firm as the dependent variable, and Panel B presents the results using the natural logarithm of the firm's total labor expense as the dependent variable.

statistic of only 0.67). The results also suggest that a one percentage point increase in *PeerCompTax* results in a 0.64% increase in the number of domestic employees (*t*-statistic of 1.59). The results of our preferred specification in column (6) of Panel B suggest that a one percentage point increase in *ImportCompTax* results in a 0.44% decrease in total domestic payroll, although this result is again estimated with significant error (*t*-statistic of -0.33). The results also suggest that a one percentage point increase in *PeerCompTax* results in a 0.96% increase in total domestic payroll (*t*-statistic of 2.66).[35]

In total, the results in Table 7 suggest the effect of tax competition at the aggregate level via the cross-subsidization channel is larger than the effect at the firm level. In contrast, the results suggest that the effect of tax competition at the aggregate level via the import competition channel is much smaller. These differences may arise because Table 7 also reflects the effect of tax competition on the extensive margin (e.g., if the cross-subsidization channel causes significant changes in firm exits, this may explain why the results in this table are much larger and statistically significant). These differences may also arise because Table 7 reflects the effect of tax competition at the aggregate level (e.g., if the import competition channel disproportionately effects smaller firms, this may explain why the results in this table are much smaller).

4.6 Extensive margins

The results in Table 7 suggest that the aggregate effects of tax competition differ from the firm-level effects, potentially because the effects of tax competition on the extensive margin of employment differ significantly from the effects on the intensive margin. Therefore, we examine

[35] One concern with our sample is that small firms are not required to report all balance sheet data used to construct our control variables and are therefore omitted from our sample. To ensure this, and any other potential sources of bias in the Orbis database, do not drive our results, we compare our sample to Eurostat aggregate labor statistics in our online Appendix. We do find that the Eurostat labor statistics cover a larger sample, potentially because we require non-missing controls, including granular balance sheet data, which is often not published by smaller European firms (Breuer, 2018). However, we recreate the analysis documented in Table 7 using the Eurostat labor statistics and find qualitatively and quantitatively similar results (see Table 14 of the online appendix).

the effects of tax competition on the extensive margin. To do so, we estimate Eq. (3) after replacing the dependent variable with the natural logarithm of employment or payroll changes driven by firm exits (*Log. Loss of Employees* and *Log. Reduction of Labor Expense*).[36] Table 8 presents the results.[37]

We find no evidence that tax competition affects the extensive margin of employment via either the import competition or the cross-subsidization channel (*t*-statistics of only -0.16 to 0.43). This result suggests that firms respond to import and peer competition by reducing employment, but not by exiting. This result also suggests that the changes in effect sizes between Tables 3 and 7 are largely driven by moving from the firm-level to the country-industry-level. In other words, the results suggest that tax competition has a greater effect via the import competition channel on smaller firms and a greater effect via the cross-subsidization channel on larger firms.

4.7 Cross-sectional differences in size

In Table 9, we explore whether tax competition has a greater effect via the import competition channel on smaller firms and a greater effect via the cross-subsidization channel on larger firms. Table 9 presents the results of estimating Eq. (3) after splitting our sample by the lagged median of firm assets and firm employees.[38] We again split on the country-industry-year medians to ensure that we compare otherwise similar firms.

We find consistent evidence that the effect of tax competition via the import competition channel is greater for smaller firms. Combined with the evidence in Tables 5 and 6 that the effect

[36] For example, if a firm begins in 2005 with 100 employees, but goes bankrupt the next year, the loss of employees due to firm exits in 2005 is 0 and the loss of employees due to firm exits in 2006 is 100.
[37] Again, Panel A presents the results using the natural logarithm of the total number of employees employed by the firm as the dependent variable, and Panel B presents the results using the natural logarithm of the firm's total labor expense as the dependent variable.
[38] Again, Panel A presents the results using the natural logarithm of the total number of employees employed by the firm as the dependent variable, and Panel B presents the results using the natural logarithm of the firm's total labor expense as the dependent variable.

of tax competition via the import competition channel is greater for market followers, domestic firms, and standalone firms, this result suggests that smaller firms' lack of geographic and product line diversification limits their ability to weather tax competition via the import competition channel. In contrast, larger, more diversified, firms have a greater ability to weather, or even benefit from, lower foreign tax rates that directly benefit importers. We find limited evidence that the effect of tax competition via the cross-subsidization channel varies with firm size, potentially this occurs because nonlinearities in the effect occur at points other than the median of firm size.

5. Conclusion

We examine the effect of international corporate tax competition on domestic employment. We find that increases in corporate tax differentials with foreign countries decrease domestic employment through the distinct channels of competition from foreign importers and competition from domestic competitors cross-subsidized by foreign owners. Tax competition primarily affects the intensive margin of employment. The import competition channel of tax competition primarily affects smaller firms and the cross-subsidization channel of tax competition affects larger firms to a greater degree. The effects of tax competition on employment are stronger for firms located in countries with weaker labor market protections, manufacturing firms, capital intense firms, firms with fewer intangible assets, standalone firms, and smaller firms.

In total, our results suggest that tax competition can affect domestic outcomes even when domestic operations and income are immobile, suggesting that limits on tax-base mobility are likely insufficient to prevent tax competition. Our results contribute to the literature on the real effects of taxation by documenting how tax competition that directly benefits foreign firms affects

domestic employment. Our results may be of interest to policy makers, as they suggest that relatively lower foreign taxes can benefit foreign competitors and reduce domestic employment.

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Appendix A: Variable Definitions

Notes: This appendix presents definitions of the variables used in our empirical tests.

Variable	Source	Definition
Dependent Variables		
Log. Number Employees	Orbis	Natural logarithm of a firm's number of employees.
Log. Labor Expense	Orbis	Natural logarithm of a firm's compensation expense.
Log. Loss of Employees	Orbis	Natural logarithm of a firm's number of employees terminated due to firm exits, i.e. equals the number of employees at the start of the year in which the firm exits and zero otherwise.
Log. Reduction of Labor Expense	Orbis	Natural logarithm of a firm's labor expense foregone due to firm exits, i.e. equals the amount of labor expense at the start of the year in which the firm exits and zero otherwise.
Variables of Interest		
ImportCompTax	WIOD, IBFD, EC, KPMG	Import-weighted foreign tax rate differential as defined in Section 2.
PeerCompTax	Orbis, IBFD, EC, KPMG	Foreign-owned peer firm weighted foreign tax rate differential as defined in Section 2.
Control Variables		
Log. Imports	WIOD	Natural logarithm of net imports in a 2-digit NACE industry segment in a given country and year.
HHI	Orbis	Herfindhal-Hirschman Index calculated as the sum of squared market shares of firms within a two-digit NACE industry segment in a given country and year.
Log. Total Assets	Orbis	Natural logarithm of a firm's total assets.
Log. Cash	Orbis	Natural logarithm of a firm's cash and cash equivalents.
Sales Growth	Orbis	Relative-to-prior year growth in firm's annual sales.
Age	Orbis	Age of firm (current year minus year of incorporation).

Appendix A: Variable Definitions, continued

Cross-sectional Splitting Variables		
CapitalIntense	Orbis	Indicator variable set equal to one if firm has a capital (total assets)-to-labor (number of employees) ratio greater than the median of its peer group, i.e. within a 2-digit NACE industry in a given country in a given year.
HighIntangible	Orbis	Indicator variable set equal to one if firm has an intangibles-to-total assets ratio greater than the median of its peer group, i.e. within a 2-digit NACE industry in a given country in a given year.
Market Leader	Orbis	Indicator variable set equal to one if firm's market share (of the previous year) is above the median of its peer group, i.e. within a 2-digit NACE industry in a given country in a given year.
Standalone	Orbis	Indicator variable set equal to one if firm is standalone, i.e., is not owned by another corporate entity and does not hold majority shareholdings in other corporations.
Domestic-owned	Orbis	Indicator variable set equal to one if firm is owned by a domestic parent but does not belong to a multinational group (i.e. no other foreign subsidiaries in the group).
Foreign-owned-Intl	Orbis	Indicator variable set equal to one if firm belongs to a multinational group of firms and is owned by a foreign parent.
Large (Assets)	Orbis	Indicator variable set equal to one if subsidiary's total assets are above the median of its peer group, i.e. within a 2-digit NACE industry in a given country in a given year.
Other Variables		
Unionization	OECD	Level of unionization in a given country and year (in percent).
Peergroup	Orbis	Identifier for a 2-digit NACE country-industry-year segment.

Table 1: Sample Composition (Firm-year Observations by Country and Year)

Notes: This table presents the distribution of our final sample by country and year. Our main sample consists of 21,757,961 firm-year observations from 30 European countries from 2006 to 2015.

	Year										
Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
AT	1,286	1,874	2,492	2,983	3,149	3,294	3,542	4,300	5,090	5,094	33,104
BE	47,497	43,263	43,040	40,104	37,889	35,960	34,381	33,097	28,525	25,893	369,649
BG	24,334	28,697	39,501	49,896	55,945	59,239	68,685	120,170	131,611	136,663	714,741
CH	61	28	18	27	114	135	156	116	152	120	927
CY	0	0	0	0	0	0	4	8	8	3	23
CZ	40,519	50,405	60,371	68,608	71,858	77,160	80,614	85,921	82,386	79,037	696,879
DE	7,119	11,629	18,919	23,087	24,867	26,074	26,992	28,108	21,596	19,803	208,194
DK	13,362	13,238	12,365	11,604	10,953	10,191	8,784	8,030	7,770	6,836	103,133
EE	17,077	18,662	20,698	22,883	24,457	25,835	28,887	31,202	33,360	34,154	257,215
ES	484,762	501,326	510,283	502,876	514,026	506,207	487,230	467,399	455,557	443,884	4,873,550
FI	51,924	53,884	54,439	56,173	56,576	57,455	57,378	58,535	57,617	55,424	559,405
FR	389,908	387,113	383,767	381,251	380,857	367,604	333,095	303,407	251,991	187,579	3,366,572
GB	46,338	45,363	44,826	43,957	42,146	43,786	46,371	46,646	46,654	44,601	450,688
GR	0	0	1	1	11	7	9	6	7	5	47
HR	41,822	44,245	46,924	51,091	52,545	53,544	53,441	53,265	53,406	55,354	505,637
HU	40,625	45,146	46,218	98,230	92,857	159,601	170,080	165,837	179,844	184,161	1,182,599
IE	39	514	2,259	4,371	5,140	5,634	5,913	6,086	6,180	6,103	42,239
IT	207,032	210,866	252,122	273,978	340,289	359,211	353,203	425,816	432,406	431,939	3,286,862
LT	3	3	3	3	3	4	4	4	7	8	42
LU	0	126	148	287	427	614	746	840	856	760	4,804
LV	97	129	133	178	200	566	2,086	2,429	3,190	2,817	11,825
MT	0	0	0	0	28	32	32	33	20	13	158
NL	3,673	3,799	3,537	3,462	3,511	3,534	3,367	3,053	2,696	1,941	32,573
NO	70,341	66,925	62,244	58,927	55,749	53,246	50,875	48,701	47,189	45,521	559,718
PL	14,516	18,050	27,406	36,571	18,535	17,278	13,005	10,345	8,494	7,859	172,059
PT	7,254	7,427	209,941	210,873	1,147	435	206,615	210,147	211,958	215,561	1,281,358

Table 1: Sample Composition (Firm-year Observations by Country and Year), continued

	Year										
Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
RO	209,022	231,451	228,245	243,065	255,388	238,990	245,231	256,108	264,841	272,060	2,444,401
SE	6,723	4,080	1,080	263	270	274	293	303	302	310	13,898
SI	4,857	5,450	5,954	7,724	11,467	18,775	38,264	38,271	39,424	40,478	210,664
SK	4,753	13,814	22,340	25,766	32,655	52,514	52,945	55,861	53,904	60,445	374,997
Total	1,734,944	1,807,507	2,099,274	2,218,239	2,093,059	2,177,199	2,372,228	2,464,044	2,427,041	2,364,426	21,757,961

Table 2: Summary Statistics

Panel A: Firm-Level Statistics

Notes: This table presents summary statistics for our main sample of 21,757,961 firm-year observations. We scale *Labor Expense*, *Reduction of Labor Expense, Total Assets (t-1)* and *Cash (t-1)* by 1,000.

	Obs	Mean	SD	Median	Min	Max
Dependent Variables						
Number Employees	21,757,961	40.83	1,475.68	4.00	0.00	648,254.00
Labor Expense (,000)	21,757,961	1,510.01	84,670.94	78.99	0.00	190,783,399.38
Loss of Employees	21,757,961	0.05	12.60	0	0	39,000.00
Reduction of Labor Expense (,000)	21,757,961	1.25	687.15	0	0	2,186,125.25
Variables of Interest						
ImportCompTax	21,757,961	0.94	5.63	-0.73	-11.47	24.94
PeerCompTax	21,757,961	0.82	5.59	-0.76	-22.50	28.36
Control Variables						
Imports (t-1)	21,757,961	5,414.16	7,458.48	2,758.46	56.23	40,859.69
HHI (t-1)	21,757,961	0.03	0.05	0.01	0.00	0.34
Total Assets (t-1) (,000)	21,757,961	2,606.49	8,469.57	303.61	1.88	62,178.36
Cash (t-1) (,000)	21,757,961	198.39	651.98	21.01	0.02	4,840.51
Sales Growth (t-1)	21,757,961	0.20	1.01	0.02	-0.88	7.72
Age (t-1)	21,757,961	13.26	10.14	11.00	0.00	52.00
Cross-sectional Variables						
CapitalIntense	21,757,961	0.53	0.50	1.00	0.00	1.00
HighIntangible	21,757,961	0.35	0.48	0.00	0.00	1.00
Market Leader	21,757,961	0.53	0.50	1.00	0.00	1.00
Standalone	21,757,961	0.86	0.34	1.00	0.00	1.00
Domestic-Owned	21,757,961	0.95	0.23	1.00	0.00	1.00
Foreign-OwnedIntl.	21,757,961	0.03	0.16	0.00	0.00	1.00
Unionization	16,930,956	22.44	15.47	16.90	4.49	73.17
Large (Assets)	21,757,961	0.56	0.50	1.00	0.00	1.00

Table 2: Summary Statistics, continued

Panel B: Country-Industry Level Statistics

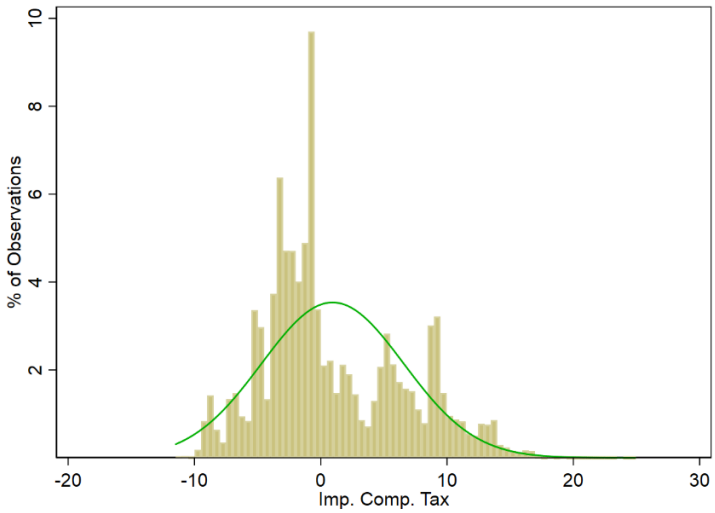
Notes: This table presents summary statistics for our country-industry level sample of 9,682 country-industry-year observations. We scale *Labor Expense*, *Total Assets (t-1)* and *Cash (t-1)* by 1,000.

	Obs	Mean	SD	Median	Min	Max
Dependent Variables						
Number Employees	9,682	79,181.12	151,432.77	22,431.00	3.00	874,397.00
Labor Expense (,000)	9,682	2,909,293.05	6,156,155.05	524,041.45	25.25	35,994,233.67
Variables of Interest						
Imp. Comp. Tax. (net)	9,682	3.27	5.62	2.95	-11.47	24.59
PeerCompTax	9,682	2.52	5.81	1.63	-21.97	28.36
Control Variables						
Imports (t-1)	9,682	2,881.60	5,000.81	981.89	5.99	29,126.44
HHI (t-1)	9,682	0.19	0.25	0.08	0.00	1.00
Total Assets (t-1) (,000)	9,682	19,463,402.39	46,322,190.68	2,918,708.38	94.94	278,209,120.00
Cash (t-1) (,000)	9,682	1,520,916.55	3,770,458.95	218,238.03	7.55	25,142,696.00
Age (t-1)	9,682	17.12	9.90	14.52	0.00	68.33
Sales Growth (t-1)	9,682	0.11	0.52	0.04	-0.38	4.48

Figure 1: Distribution of Tax Competition Measures

Notes: This figure plots the distribution of our measures of tax competition, *ImportCompTax* and *PeerCompTax*. Panel A presents the distribution of observations for *ImportCompTax*. Panel B presents the distribution of observations for *PeerCompTax*.

Panel A: Import Competition Tax



Panel B: Peer Competition Tax

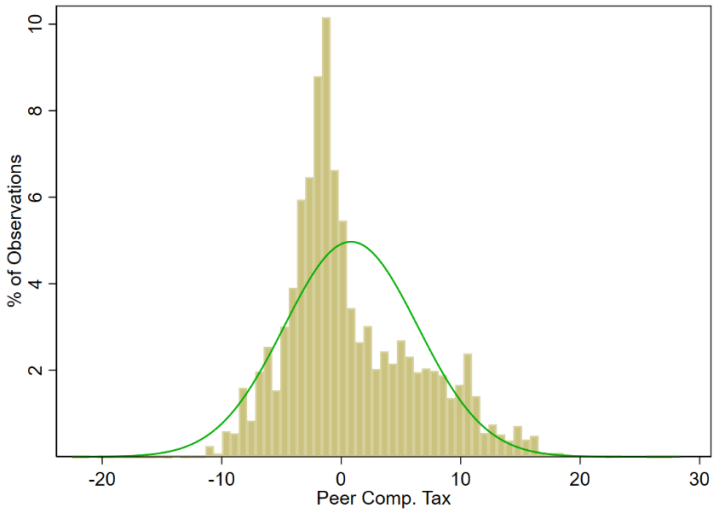


Figure 2: Means of Tax Competition Measures among Countries

Notes: This figure plots the means of *ImportCompTax* and *PeerCompTax* by sample country.

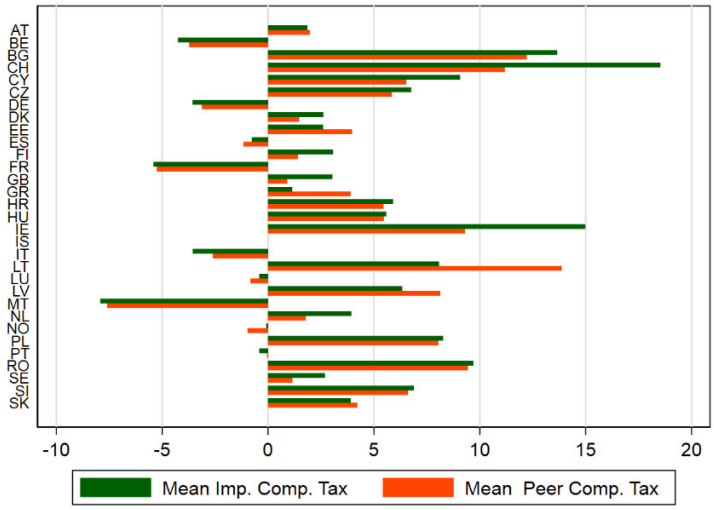


Table 3: Tax Competition and Domestic Employment

Panel A: Number of Employees

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by firm and country-industry-year, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Tables 1 and 2. We drop singleton observations (e.g., firms with only one firm-year observation).

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A	*Log. Number Employees* × 100					
ImportCompTax	1.134***	0.836***			1.108***	0.808***
	(4.21)	(3.61)			(4.16)	(3.53)
PeerCompTax			0.113*	0.112**	0.098*	0.101*
			(1.88)	(2.00)	(1.66)	(1.82)
Log Imports (t-1)		2.303***		2.151***		2.246***
		(5.82)		(5.45)		(5.66)
HHI (t-1)		-16.394***		-18.282***		-16.373***
		(-4.34)		(-4.52)		(-4.31)
Log. Total Assets (t-1)		17.215***		17.222***		17.216***
		(100.41)		(100.39)		(100.41)
Log. Cash (t-1)		1.269***		1.268***		1.269***
		(37.42)		(37.39)		(37.43)
Sales Growth (t-1)		0.807***		0.806***		0.806***
		(28.22)		(28.18)		(28.23)
Age (t-1)		1.118***		1.119***		1.118***
		(19.00)		(19.02)		(18.99)
Obs.	21,1265,76	21,1265,76	21,1265,76	21,1265,76	21,1265,76	21,1265,76
Adj. R2	0.928	0.932	0.928	0.932	0.928	0.932
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Ctry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 3: Tax Competition and Domestic Employment, continued

Panel B: Labor Expense

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by firm and country-industry-year, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Tables 1 and 2. We drop singleton observations (e.g., firms with only one firm-year observation).

	(1)	(2)	(3)	(4)	(5)	(6)
Panel B			*Log. Labor Expense* × 100			
ImportCompTax	1.564***	0.932**			1.518***	0.878**
	(3.57)	(2.52)			(3.50)	(2.40)
PeerCompTax			0.198**	0.208**	0.177*	0.195**
			(2.11)	(2.44)	(1.92)	(2.32)
Log Imports (t-1)		2.441***		2.227***		2.331***
		(3.66)		(3.36)		(3.49)
HHI (t-1)		-31.581***		-33.614***		-31.540***
		(-5.45)		(-5.44)		(-5.42)
Log. Total Assets (t-1)		34.204***		34.212***		34.206***
		(105.25)		(105.33)		(105.28)
Log. Cash (t-1)		2.768***		2.768***		2.769***
		(45.24)		(45.23)		(45.24)
Sales Growth (t-1)		2.625***		2.624***		2.625***
		(48.49)		(48.37)		(48.42)
Age (t-1)		0.618***		0.619***		0.617***
		(7.80)		(7.81)		(7.78)
Obs.	21,1265,76	21,1265,76	21,1265,76	21,1265,76	21,1265,76	21,1265,76
Adj. R2	0.934	0.939	0.934	0.939	0.934	0.939
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Ctry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 4: Tax Competition and Domestic Employment: Cross-sectional Differences in Labor Market Regulation

Panel A: Number of Employees

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition, estimated after including *Unionization* and its interaction with our tax competition variables. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by firm and country-industry-year, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Tables 1 and 2. We drop singleton observations (e.g., firms with only one firm-year observation).

	(1)	(2)	(3)
Panel A	*Log. Number Employees* × 100		
ImportCompTax	1.548***		1.368***
	(3.45)		(3.11)
ImportCompTax	-0.026**		-0.021*
**Unionization*	(-2.19)		(-1.83)
PeerCompTax		0.455***	0.407***
		(3.14)	(2.83)
PeerCompTax		-0.013***	-0.012***
**Unionization*		(-2.98)	(-2.72)
Obs.	16,220,047	16,220,047	16,220,047
Adj. R2	0.943	0.943	0.943
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Ctry-Year FE	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes

Table 4: Tax Competition and Domestic Employment: Cross-sectional Differences in Labor Market Regulation, continued

Panel B: Labor Expense

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition, estimated after including *Unionization* and its interaction with our tax competition variables. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by firm and country-industry-year, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Tables 1 and 2. We drop singleton observations (e.g., firms with only one firm-year observation).

	(1)	(2)	(3)
Panel B		*Log. Labor Expense* × 100	
ImportCompTax	1.700**		1.427**
	(2.32)		(1.97)
ImportCompTax	-0.029		-0.022
**Unionization*	(-1.53)		(-1.17)
PeerCompTax		0.648***	0.598***
		(3.13)	(2.91)
PeerCompTax		-0.016**	-0.015**
**Unionization*		(-2.52)	(-2.32)
Obs.	16,220,047	16,220,047	16,220,047
Adj. R2	0.929	0.929	0.929
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Ctry-Year FE	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes

Table 5: Tax Competition and Domestic Employment: Cross-sectional Differences in Industry, Business Model, and Industry Leadership

Panel A: Number of Employees

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition, estimated after splitting the sample on industry, business model, or industry leadership. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by firm and country-industry-year, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Tables 1 and 2. We drop singleton observations (e.g., firms with only one firm-year observation).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A	*Log. Number Employees* × 100							
	Manufact. of wood and paper products		CapitalIntense		HighIntangible		Market Leader	
	No	Yes	No	Yes	No	Yes	No	Yes
ImportCompTax	0.712***	2.391***	0.328*	0.861***	1.026***	0.156	0.986***	0.553**
	(2.94)	(2.88)	(1.81)	(3.72)	(4.89)	(0.69)	(5.59)	(2.00)
PeerCompTax	0.111*	0.079	0.074*	0.079	0.082*	0.064	0.048	0.112
	(1.92)	(1.05)	(1.66)	(1.44)	(1.77)	(1.12)	(1.25)	(1.64)
Obs.	19,932,249	409,369	9,461,945	11,015,474	13,419,617	7,202,041	9,547,701	11,089,980
Adj. R2	0.931	0.942	0.959	0.942	0.919	0.951	0.873	0.931
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: Tax Competition and Domestic Employment: Cross-sectional Differences in Industry, Business Model, and Industry Leadership, continued

Panel B: Labor Expense

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition, estimated after splitting the sample on industry, business model, or industry leadership. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by firm and country-industry-year, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Tables 1 and 2. We drop singleton observations (e.g., firms with only one firm-year observation).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel B	*Log. Labor Expense* × 100							
	Manufact. of wood and paper products		CapitalIntense		HighIntangible		Market Leader	
	No	Yes	No	Yes	No	Yes	No	Yes
ImportCompTax	0.765**	2.757**	0.118	1.035***	1.226***	-0.092	1.469***	0.417
	(1.97)	(2.11)	(0.38)	(2.70)	(3.51)	(-0.26)	(4.35)	(1.08)
PeerCompTax	0.223**	-0.053	0.180**	0.137	0.180**	0.115	0.145*	0.179**
	(2.54)	(-0.44)	(2.37)	(1.62)	(2.42)	(1.46)	(1.92)	(2.06)
Obs.	19,932,249	409,369	9,461,945	11,015,474	13,419,617	7,202,041	9,547,701	11,089,980
Adj. R2	0.939	0.950	0.950	0.942	0.933	0.952	0.899	0.952
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: Tax Competition and Domestic Employment: Cross-sectional Differences in Subsidiary-Ownership

Panel A: Number of Employees

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition, estimated after splitting the sample on differences in subsidiary ownership. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by firm and country-industry-year, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Tables 1 and 2. We drop singleton observations (e.g., firms with only one firm-year observation).

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A	*Log. Number Employees* × 100					
	Standalone		Domestic-owned		Foreign-owned-Intl	
	No	Yes	No	Yes	No	Yes
ImportCompTax	0.545**	0.898***	-0.054	0.886***	0.851***	-0.308
	(2.40)	(3.92)	(-0.21)	(3.72)	(3.65)	(-0.98)
PeerCompTax	0.039	0.116**	0.037	0.108*	0.104*	0.086
	(0.61)	(2.11)	(0.65)	(1.92)	(1.86)	(1.14)
Obs.	2,885,353	18,145,389	1,115,180	19,948,966	20,512,336	577,586
Adj. R2	0.957	0.907	0.960	0.921	0.927	0.955
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Ctry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: Tax Competition and Domestic Employment: Cross-sectional Differences in Subsidiary-Ownership, continued

Panel B: Labor Expense

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition, estimated after splitting the sample on differences in subsidiary ownership. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by firm and country-industry-year, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Tables 1 and 2. We drop singleton observations (e.g., firms with only one firm-year observation).

	(1)	(2)	(3)	(4)	(5)	(6)
Panel B	*Log. Labor Expense* × 100					
	Standalone		Domestic-owned		Foreign-owned-Intl	
	No	Yes	No	Yes	No	Yes
ImportCompTax	0.312	1.067***	-0.183	1.001***	0.961**	-0.663*
	(1.05)	(2.86)	(-0.61)	(2.63)	(2.58)	(-1.82)
PeerCompTax	0.015	0.220**	0.137**	0.200**	0.192**	0.208**
	(0.19)	(2.54)	(1.97)	(2.31)	(2.24)	(2.26)
Obs.	2,885,353	18,145,389	1,115,180	19,948,966	20,512,336	577,586
Adj. R2	0.951	0.925	0.961	0.932	0.936	0.955
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Ctry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Aggregate Effects at the Country-Industry Level

Panel A: Number of Employees

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition, estimated at the country-industry level. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by country-industry, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Table 2. We drop singleton observations (e.g., country-industries with only one country-industry-year observation).

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A	*Log. Number Employees* × 100					
ImportCompTax	0.562	0.972			0.502	0.947
	(0.18)	(0.68)			(0.16)	(0.67)
PeerCompTax			1.474*	0.645	1.472*	0.641
			(1.66)	(1.61)	(1.66)	(1.59)
Log. Imports (t-1)		11.336***		11.339***		11.327***
		(4.06)		(4.08)		(4.07)
HHI (t-1)		6.265		6.131		6.151
		(0.55)		(0.54)		(0.54)
Log. Total Assets (t-1)		46.109***		46.053***		46.121***
		(14.88)		(14.85)		(14.91)
Log. Cash (t-1)		22.744***		22.744***		22.684***
		(9.37)		(9.34)		(9.36)
Sales Growth (t-1)		10.195**		10.221**		10.218**
		(2.25)		(2.26)		(2.26)
Age (t-1)		0.782***		0.786***		0.788***
		(2.61)		(2.61)		(2.62)
Obs.	9,670	9,670	9,670	9,670	9,670	9,670
Adj. R2	0.729	0.924	0.730	0.924	0.730	0.924
Ctry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Aggregate Effects at the Country-Industry Level, continued

Panel B: Labor Expense

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition, estimated at the country-industry level. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by country-industry, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Table 2. We drop singleton observations (e.g., country-industries with only one country-industry-year observation).

	(1)	(2)	(3)	(4)	(5)	(6)
Panel B			*Log. Labor Expense* × 100			
ImportCompTax	-0.852	-0.399			-0.927	-0.438
	(-0.28)	(-0.30)			(-0.30)	(-0.33)
PeerCompTax			1.827**	0.983***	1.831**	0.985***
			(2.17)	(2.65)	(2.18)	(2.66)
Log. Imports (t-1)		11.670***		11.650***		11.656***
		(4.33)		(4.33)		(4.34)
HHI (t-1)		13.973		13.807		13.798
		(1.39)		(1.37)		(1.37)
Log. Total Assets (t-1)		47.336***		47.385***		47.354***
		(16.16)		(16.23)		(16.24)
Log. Cash (t-1)		22.696***		22.577***		22.605***
		(10.05)		(10.01)		(10.04)
Sales Growth (t-1)		7.820*		7.854*		7.856*
		(1.72)		(1.74)		(1.74)
Age (t-1)		0.947***		0.957***		0.956***
		(3.69)		(3.71)		(3.71)
Obs.	9,670	9,670	9,670	9,670	9,670	9,670
Adj. R2	0.773	0.943	0.774	0.944	0.774	0.944
Ctry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 8: Tax Competition and Domestic Employment: Extensive Margins

Panel A: Number of Employees

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition. Panel (A) presents results using the natural logarithm of the number of employees terminated due to firm exits as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense foregone due to firm exits as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by firm and country-industry-year, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Tables 1 and 2. We drop singleton observations (e.g., firms with only one firm-year observation).

	(1)	(2)	(3)
Panel A	*Log. Loss of Employees* × 100		
ImportCompTax	0.004		0.004
	(0.12)		(0.12)
PeerCompTax		0.003	0.003
		(0.43)	(0.42)
Log Imports (t-1)	0.039	0.039	0.039
	(1.14)	(1.14)	(1.14)
HHI (t-1)	-0.409	-0.414	-0.410
	(-1.20)	(-1.16)	(-1.20)
Log. Total Assets (t-1)	0.125***	0.125***	0.125***
	(7.68)	(7.70)	(7.68)
Log. Cash (t-1)	-0.012***	-0.012***	-0.012***
	(-3.74)	(-3.62)	(-3.73)
Sales Growth (t-1)	-0.050***	-0.050***	-0.050***
	(-4.75)	(-4.75)	(-4.75)
Age (t-1)	0.005***	0.005***	0.005***
	(3.84)	(3.85)	(3.85)
Obs.	21,757,959	21,757,959	21,757,959
Adj. R2	0.026	0.026	0.026
Firm FE	No	No	No
Ctry-Year FE	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes

Table 8: Tax Competition and Domestic Employment: Extensive Margins, continued

Panel B: Labor Expense

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition. Panel (A) presents results using the natural logarithm of the number of employees terminated due to firm exits as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense foregone due to firm exits as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by firm and country-industry-year, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Tables 1 and 2. We drop singleton observations (e.g., firms with only one firm-year observation).

	(1)	(2)	(3)
Panel B	*Log. Reduction of Labor Expense* × 100		
ImportCompTax	-0.019		-0.019
	(-0.16)		(-0.16)
PeerCompTax		-0.003	-0.003
		(-0.10)	(-0.10)
Log Imports (t-1)	0.206	0.208	0.207
	(1.32)	(1.32)	(1.32)
HHI (t-1)	-1.302	-1.284	-1.301
	(-1.09)	(-1.04)	(-1.09)
Log. Total Assets (t-1)	0.372***	0.372***	0.372***
	(8.62)	(8.63)	(8.62)
Log. Cash (t-1)	-0.150***	-0.150***	-0.150***
	(-8.01)	(-7.91)	(-8.01)
Sales Growth (t-1)	-0.257***	-0.257***	-0.257***
	(-4.61)	(-4.61)	(-4.61)
Age (t-1)	0.031***	0.031***	0.031***
	(4.39)	(4.39)	(4.39)
Obs.	21,757,959	21,757,959	21,757,959
Adj. R2	0.032	0.032	0.032
Firm FE	No	No	No
Ctry-Year FE	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes

Table 9: Tax Competition and Domestic Employment: Cross-sectional Differences in Size

Panel A: Number of Employees

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition, estimated after splitting the sample on differences in subsidiary size. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by firm and country-industry-year, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Tables 1 and 2. We drop singleton observations (e.g., firms with only one firm-year observation).

	(1)	(2)	(3)	(4)
Panel A	*Log. Number Employees* × 100			
	Large (Employees)		Large (Assets)	
	No	Yes	No	Yes
ImportCompTax	0.576***	-0.097	0.870***	0.737***
	(3.55)	(-0.42)	(4.86)	(2.69)
PeerCompTax	-0.025	0.046	0.081*	0.108
	(-0.64)	(0.77)	(1.91)	(1.62)
Obs.	11,179,303	9,468,750	10,245,339	10,504,003
Adj. R2	0.877	0.952	0.890	0.933
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Ctry-Year FE	Yes	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes	Yes

Table 9: Tax Competition and Domestic Employment: Cross-sectional Differences in Size

Panel B: Labor Expense

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition, estimated after splitting the sample on differences in subsidiary size. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor expense as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by firm and country-industry-year, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Tables 1 and 2. We drop singleton observations (e.g., firms with only one firm-year observation).

	(1)	(2)	(3)	(4)
Panel A	*Log. Labor Expense* × 100			
	Large (Employees)		Large (Assets)	
	No	Yes	No	Yes
ImportCompTax	1.019***	-0.455	1.142***	0.713*
	(3.08)	(-1.45)	(3.43)	(1.79)
PeerCompTax	0.092	0.112	0.202***	0.165*
	(1.22)	(1.49)	(2.63)	(1.80)
Obs.	11,179,303	9,468,750	10,245,339	10,504,003
Adj. R2	0.898	0.962	0.911	0.948
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Ctry-Year FE	Yes	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes	Yes

Online Appendix

Data Validation: Orbis Firm-Level vs. Eurostat Aggregate Employment Data

To validate the accuracy of our firm-level employment data and the representativeness of our results, we compare our country-industry sample to aggregate labor statistics provided by Eurostat. Eurostat is a Directorate-General of the European Commission responsible for providing statistical information to the institutions of the EU. The Eurostat employment data is based on official statistics of each member state, collected according to the European System of Accounts (ESA 2010).

Table 12 in the Online Appendix provides summary statistics of our Eurostat employment sample of 5,245 country-industry-year observations, and compares these to our Orbis regression sample on the country-industry-year level.[39] Eurostat country-industries on average employ 237,360 employees and pay €24,649 million in labor compensation. To compare the datasets, we report the absolute, relative and standardized differences in means. The absolute and relative differences in means suggests that the number of employees and labor expense from the Eurostat sample are larger. We attribute this differences in data to our requirement that all sample firms have available observations for control variables, which eliminates almost 50% of firm-year observations (primarily small firms).

Table 13 reports pairwise correlations for our variables of interest, *Number Employees* and *Labor Expense*, in the two datasets. The correlation coefficient of 0.721 between *Number Employees (Eurostat)* and *Number Employees (Orbis)* suggests a large positive correlation of the two variables. The correlation coefficient between *Labor Expense (Eurostat)* and *Labor Expense*

[39] Eurostat industry classifications follows NACE Rev. 2 codes but do not report values for all 2-digit NACE industry separately. For example, NACE 2-digit codes 16, 17 and 18 (manufacturing of wood and paper products) are aggregated. The total number of industries in this dataset is therefore smaller and more aggregated than in the Orbis dataset.

(Orbis) of 0.096 suggests a low correlation. Figure 3 plots time-series development of our dependent variables in both the Eurostat and Orbis databases, aggregated to the country-industry-year. The graph shows that the *Number Employees (Eurostat)* and *Number Employees (Orbis)* as well as *Labor Expense (Eurostat)* and *Labor Expense (Orbis)* follow a fairly similar pattern. In particular, the overall aggregated number of employees from both databases is rather constant over time.

Figure 4 displays the means of *Number Employees (Eurostat)* and *Number Employees (Orbis)* by sample country. The size of the green (Eurostat) and orange (Orbis) bars again shows that the Eurostat sample comprises more employees and a larger amount of labor expense. The bars also suggest that the difference in sample size is largely equally distributed over sample countries. The countries with the largest average number of employees are France, Germany, Italy, Spain, and the U.K. The Eurostat data also reports a comparatively large number of employees for Greece, the Netherlands, and Poland. Overall, we conclude that our regressions in the main analyses are not based on a fully representative dataset of employment in Europe, mainly due to employment at small firms (Breuer, 2018). However, our descriptive evidence suggests that we do capture the dynamics of employment in Europe.

We then use the aggregate employment data provided by Eurostat and replicate our country-industry-level analysis. Table 14 presents the results of running Eq. (3) on the country-industry-year-level using the Eurostat sample. The results of our preferred specification in column (6) of Panel A suggest that a one percentage point increase in *ImportCompTax* results in a 0.98% increase in the number of domestic employees in affected industries. However, this coefficient estimate is estimated with significant error (*t*-statistic of only 0.54). The results also suggest that a one percentage point increase in *PeerCompTax* results in a 1.20% increase in the number of

domestic employees (*t*-statistic of 2.34). The results of our preferred specification in column (6) of Panel B suggest that a one percentage point increase in *ImportCompTax* results in a 0.33% increase in total domestic payroll, although this result is again estimated with significant error (*t*-statistic of 0.02). The results also suggest that a one percentage point increase in *PeerCompTax* results in a 0.95% increase in total domestic payroll (*t*-statistic of 2.12).

In total, the regressions results at the country-industry-year level based on the Eurostat data are largely similar to the regression results based on the Orbis data (as reported in Table 7). Consistent with our main analysis based on the Orbis data, the empirical results suggests that the effect of tax competition at the aggregate level via the cross-subsidization channel is much larger than the effect at the firm level. In contrast, the effect of tax competition at the aggregate level via the import-competition channel is much smaller.

Table 9: Data Validation Orbis vs. Eurostat Employment Data – Summary Statistics

Notes: This table presents summary statistics for our Eurostat employment sample of 5,245 country-industry-year observations and compares these to our Orbis regression sample on the country-industry-year level. We scale *Number Employees*, *Labor Expense*, *Total Assets (t-1)* and *Cash (t-1)* by 1,000. The Eurostat employment sample builds on data available from the E.U. KLEMS Database[40], which provides employment data including the number of employees and the amount of labor compensation for 34 industries[41] in the 28 member states of the E.U. over the period 1995 to 2015. We aggregate our variables of interest and control variables, which are based on our Orbis dataset, at the Eurostat sample-specific industry aggregation and then merge these variables with the Eurostat employment data. We restrict the sample to the period from 2006 to 2015 to mirror our Orbis regression sample.

	Eurostat Data						Orbis Regression Sample		Differences in Mean		
	Obs	Mean	SD	Median	Min	Max	Mean	SD	Absolute	Relative	Standard-ized
Dependent Variables											
Number Employees (,000)	5245	237.36	436.49	72.45	0.00	2666.96	79.18	151.43	-158.18	67%	0.34
Labor Compensation (,000)	5245	24,649,029	59,482,162	4,517,800	0	370,133,000	2,909,293	6,156,155	-21,739,736	88%	0.36
Variables of Interest											
PeerCompTax	5245	2.61	5.57	2.03	-21.97	27.76	3.27	5.62	0.66	25%	0.08
Imp. Comp. Tax	5245	3.20	5.51	2.99	-11.47	20.35	2.52	5.81	-0.68	21%	0.08
Control Variables											
Imports (t-1)	5245	4,927	7,820	1,746	8	40,867	2,882	5,001	-2,046	42%	0.22
HHI (t-1)	5245	0.15	0.20	0.07	0.00	1.00	0.19	0.25	0.04	27%	0.12
Total Assets (t-1) (,000)	5245	31,658,754	62,671,636	5,934,302	6,011	303,539,421	19,463,402	46,322,191	-12,195,351	39%	0.16
Cash (t-1) (,000)	5245	2,407,818	4,930,517	406,934	304	25,394,175	1,520,917	3,770,459	-886,901	37%	0.14
Sales Growth (t-1)	5245	0.04	0.12	0.04	-0.33	0.47	0.11	0.52	0.07	175%	0.13
Age (t-1)	5245	17.49	8.97	14.74	0.09	49.50	17.12	9.90	-0.37	2%	0.03

[40] http://www.euklems.net/.

[41] The industry classification follows NACE Rev. 2 codes but does not report values for each 2-digit NACE industry separately. E.g., NACE 2-digit codes 16, 17 and 18 (manufacturing of wood and paper products) are aggregated. The total number of industries (and hence the number of observations) in this dataset is therefore smaller and more aggregated than the number of industries included in the Orbis dataset.

Table 10: Data Validation Orbis vs. Eurostat Employment Data – Pairwise Correlations

Notes: This table presents pairwise correlations between our dependent variables based on the Orbis database, *Number Employees (Orbis)* and *Labor Expense (Orbis)*, and the dependent variables based on the Eurostat database, *Number Employees (Eurostat)* and *Labor Compensation (Eurostat)*. * denotes statistical significance at the 1% level.

Variables	(1)	(2)	(3)	(4)
(1) *Number Employees (Eurostat)*	1.000			
(2) *Labor Compensation (Eurostat)*	0.168*	1.000		
(3) *Number Employees (Orbis)*	0.721*	0.096*	1.000	
(4) *Labor Expense (Orbis)*	0.669*	0.060*	0.951*	1.000

Figure 3: Data Validation Orbis vs. Eurostat Employment Data – Development over Time

Notes: This figure plots the development over time of our dependent variables, *Number Employees* and *Labor Expense*, from both the Eurostat and Orbis dataset. We scale the *Number Employees* by millions of employees and *Labor Expense* by billions of payroll.

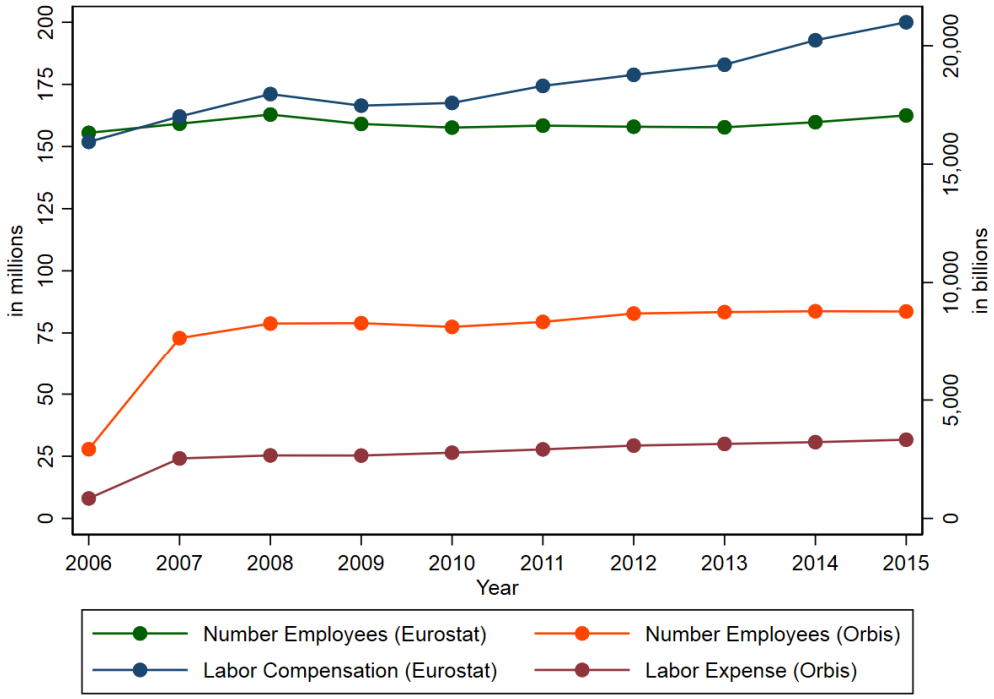


Figure 4: Data Validation Orbis vs. Eurostat Employment Data – Country-Averages

Notes: This figure plots the means of *Number Employees (Eurostat)* and *Number Employees (Orbis)* by sample country. We scale *Number Employees (Eurostat)* and *Number Employees (Orbis)* by 1,000.

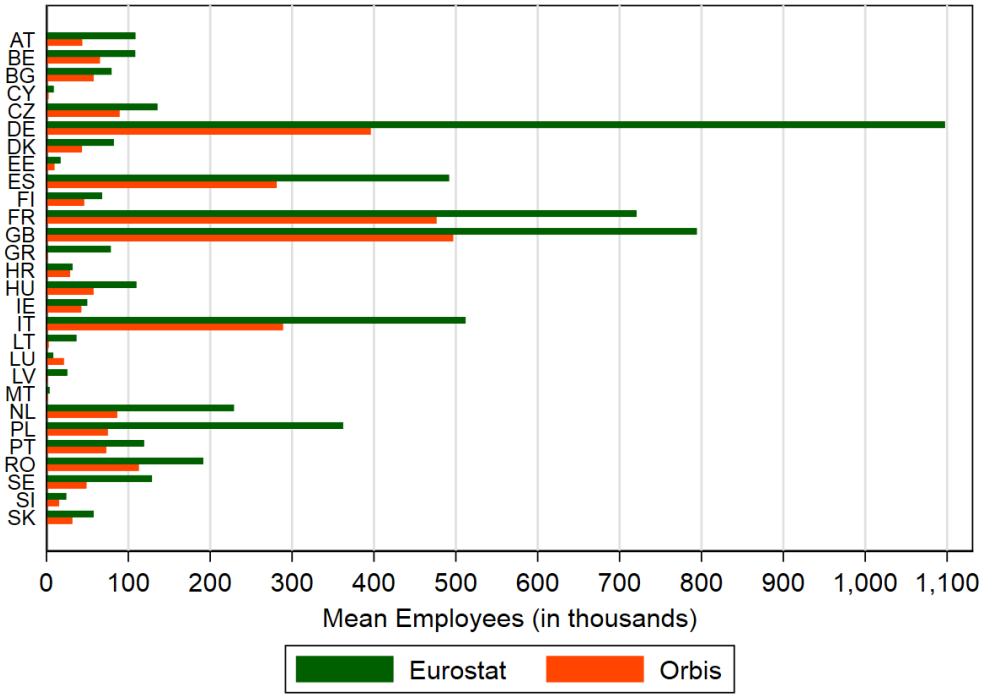


Table 11: Replicating Country-Industry-Level Results using Eurostat Employment Data

Panel A: Number of Employees

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition, estimated at the country-industry[42] level based on Eurostat employment data. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor compensation as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by country-industry, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Table 12. We drop singleton observations (e.g., country-industries with only one country-industry-year observation).

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A	*Log. Number Employees* × 100					
ImportCompTax	-0.155	0.935			-0.119	0.975
	(-0.07)	(0.51)			(-0.05)	(0.54)
PeerCompTax			1.303*	1.198**	1.303*	1.202**
			(1.96)	(2.33)	(1.96)	(2.34)
Log. Imports (t-1)		36.465***		36.254***		36.269***
		(10.08)		(9.90)		(9.93)
HHI (t-1)		-64.400***		-64.944***		-64.941***
		(-4.81)		(-4.86)		(-4.85)
Log. Total Assets (t-1)		10.692***		10.886***		11.007***
		(4.06)		(4.17)		(4.21)
Log. Cash (t-1)		0.849		0.748		0.650
		(0.37)		(0.33)		(0.29)
Sales Growth (t-1)		2.861		3.416		3.375
		(0.36)		(0.44)		(0.43)
Age (t-1)		-0.881**		-0.873**		-0.879**
		(-2.29)		(-2.25)		(-2.28)
Obs.	5,169	5,169	5,169	5,169	5,169	5,169
Adj. R2	0.912	0.947	0.912	0.948	0.912	0.948
Ctry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

[42] The industry classification follows NACE Rev. 2 codes but does not report values for each 2-digit NACE industry separately. E.g., NACE 2-digit codes 16, 17 and 18 (manufacturing of wood and paper products) are aggregated. The total number of industries (and hence the number of observations) in this dataset is therefore smaller and more aggregated than the number of industries included in the Orbis dataset.

Table 14: Replicating Country-Industry-Level Results using Eurostat Employment Data, continued

Panel B: Labor Compensation

Notes: This table presents the results of OLS regressions of Eq. (3), which models employment outcomes as a function of tax competition, estimated at the country-industry[43] level based on Eurostat employment data. Panel (A) presents results using the natural logarithm of the number of employees as the dependent variable. Panel (B) presents results using the natural logarithm of labor compensation as the dependent variable. We multiply both logged dependent variables by 100 to ease interpretation of the estimated coefficients. Robust standard errors, clustered by country-industry, are presented in parentheses. *, ** and *** denote statistical significance at the 10%, 5%, and 1% levels (two-tail). All variables are as defined in Appendix A. Sample descriptive characteristics are found in Table 12. We drop singleton observations (e.g., country-industries with only one country-industry-year observation).

	(1)	(2)	(3)	(4)	(5)	(6)
Panel B	*Log. Labor Compensation* × 100					
ImportCompTax	-0.457	0.032			-0.463	0.033
	(-0.19)	(0.02)			(-0.20)	(0.02)
PeerCompTax			0.814	0.951**	0.815	0.951**
			(1.24)	(2.12)	(1.24)	(2.12)
Log. Imports (t-1)		41.274***		41.233***		41.232***
		(12.43)		(12.51)		(12.54)
HHI (t-1)		-65.387***		-65.531***		-65.534***
		(-5.08)		(-5.12)		(-5.13)
Log. Total Assets (t-1)		10.697***		10.895***		10.900***
		(4.35)		(4.43)		(4.45)
Log. Cash (t-1)		2.690		2.557		2.554
		(1.27)		(1.21)		(1.20)
Sales Growth (t-1)		4.086		4.402		4.401
		(0.49)		(0.53)		(0.53)
Age (t-1)		-0.568*		-0.569*		-0.570*
		(-1.65)		(-1.65)		(-1.65)
Obs.	5,171	5,171	5,171	5,171	5,171	5,171
Adj. R2	0.944	0.971	0.944	0.971	0.944	0.971
Ctry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind.-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

[43] The industry classification follows NACE Rev. 2 codes but does not report values for each 2-digit NACE industry separately. E.g., NACE 2-digit codes 16, 17 and 18 (manufacturing of wood and paper products) are aggregated. The total number of industries (and hence the number of observations) in this dataset is therefore smaller and more aggregated than the number of industries included in the Orbis dataset.