Negotiated Tax Havens

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Abstract
Recently, the intersection of state aid and international tax has acquired a high profile in the European Union. In response, important tax and accounting policy changes are being proposed or implemented. However, these changes are predicated on rhetoric that unfair tax ruling practices by host country governments are pervasive, and significantly benefit foreign-owned companies. Yet, there is no empirical evidence as to whether this is the case. Using several novel data sources on tax concessions granted in the EU, we find that both domestic- and foreign-owned companies receive economically significant tax benefits from state aid. Our finding that tax concessions create significant disparities across firms' profitability and effective tax rates suggest that any country can operate as a tax haven for any company, without greater supervision and transparency.

JEL classification:
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1. Introduction

In a decidedly newsworthy event, the European Commission (EC) concluded that Ireland granted illegal state aid of €13 billion in the form of tax benefits to Apple via two tax agreements, or tax rulings, negotiated between Apple and Ireland. Apple handed over the money, which is being held in an escrow fund pending conclusions of appeals. This case continues to be examined and scrutinized by legal scholars and practitioners. Indeed, some natural questions arise. To what extent do host countries grant tax concessions more broadly to companies? Do they tend to favor foreign-owned companies like Apple? Is Apple just the tip of the iceberg in terms of decades of potentially illicit tax concessions or instead just a sensational story that will eventually be resolved and forgotten? Our study sheds light on these questions, and our findings ultimately question the very notion of a tax haven for both research and practice.

These questions are salient around the world, but are most easily examined within the European Union (EU) for three reasons. First, EU countries generally enjoy fiscal autonomy in the design, interpretation, and enforcement of their tax laws and there is an extensive literature documenting tax competition within the EU. Tax concessions are a common manifestation of tax competition. Second, the Treaty on the Functioning of the European Union (TFEU) provides for a single internal market with free movement of goods and services, with rules in place to ensure that competition within the EU is not distorted by tax concessions deemed 'state aid':

> "*State aid is defined as an advantage in any form whatsoever conferred on a selective basis to undertakings [businesses] by national public authorities…A company which receives government support gains an advantage over its competitors. Therefore, the Treaty [governing the EU] generally prohibits State aid unless it is justified by reasons of general economic development. To ensure that this prohibition is respected and exemptions are applied equally across the EU, the EC is in charge of ensuring that State aid complies with EU rules.*[1]

[1] See: http://ec.europa.eu/competition/state_aid/overview/index_en.html

Third, there is a plethora of empirical data for studying this phenomenon, both in terms of data on the financial accounts of EU companies, and data on tax concessions in the EU. The latter data are publicly available due to the EC's need to monitor and enforce state aid in the context of the TFEU and we are the first academic study, to our knowledge, to bring these data to light.

Very little information on this topic, though often publicly available, is in the public view, and much of what is understood to be true is not learned from official sources. In June 2016 the EC conducted a survey that examined the awareness about state aid amongst European citizens, as well as their perceptions about the transparency surrounding state aid (EU 2016). The majority of respondents (58 percent) have never heard of state aid, and of those who have, the vast majority (81 percent) do not feel well informed. While 10 percent of respondents that have heard of state aid learned what they know through online social media, less than 1 percent have ever looked at the EC website, which contains the extensive source of official data on state aid that we use in this study. Yet the public forms opinions, for example: 74 percent of respondents feel that multinationals should publicly disclose information about any state aid they receive.

For at least the past decade, and perpetually fueled by the media, multinationals have been under intense scrutiny for their alleged tax avoidance practices. In particular, there is broad consensus that companies reduce their tax liability by relocating their activities to low-tax countries, artificially shifting profits to low-tax countries, and creating double non-taxation of income by taking advantages of loopholes among domestic tax policies in countries in which they locate. While this is not new, what has recently become more widely known is that tax agreements negotiated between multinationals and host countries support and often promote some of these tax strategies, constituting illegal state aid. The rhetoric surrounding just a handful of stories is that these negotiated tax deals are rampant, loads of multinationals are getting them left and right, and

the public is being robbed. It matters if this is true because disclosure policies are being introduced in response; policies that consume resources of both firms and the state, and divulge sensitive information. It also calls into question the meaning of a tax haven. A company's ability to negotiate, with a host country, its own tax outcomes, in a way that lacks transparency, implies that any country could act as a surrogate tax haven, in practice.[2]

Descriptively, the data we bring to light show that the Apple case is indeed a symptom of a larger phenomenon. Of the 27,618 total state aid cases opened by the EC from 1987 through 2008, 1,220 of those have been tax-related, with the proportion increasing over time. Of those 1,220 tax cases, 110 have resulted in a negative decision, with recovery of taxes ordered from more than 170 companies. The decreasing prevalence of tax cases *resulting in a negative decision* over time highlights, in part, a shift in the mechanisms through which tax concessions are granted. Cases in the early years involved investigations of fiscal schemes present in the national tax laws of EU countries that appeared to selectively benefit certain companies.[3] For example, schemes such as 'Tax credits public shipyards' in Spain, 'Central corporate treasuries' in France, 'Control and coordination centres' in Germany, 'Companies with foreign income' in Ireland, and many others benefiting multinationals and domestic companies alike, were required to be abolished. In more recent years, the focus of EC investigations has been on tax rulings negotiated between individual companies and Member States.[4] As national tax laws are readily observable and tax rulings are not (until 2017 and only by taxing authorities), the granting of state aid via a tax ruling makes it more difficult for the EC to identify and enforce the TFEU.[5] Recent data released by the OECD in 2018

[2] Dharmapala and Hines (2009) define a tax haven country as a "location with a very low tax rate and other tax attributes designed to appeal to foreign investors" (p. 1058). Another attribute of a tax haven is lack of transparency.
[3] See http://ec.europa.eu/competition/state_aid/studies_reports/rapportaidesfiscales_en.pdf
[4] Figure 1 provides an example of a tax ruling granted between FedEx and Luxembourg.
[5] When rulings affect how cross-border income is taxed, they must be evaluated under EU competition law.

shows that more than 10,000 rulings affecting cross-border income of multinationals have been issued since 2010. This elevates further the need for an improved understanding of the impact of tax concessions on firms' tax outcomes.

Tax rulings have been used for decades by many countries and have positive aspects such as improved compliance, lower uncertainty for taxpayers, and enhanced relationships between tax administrators and taxpayers (through enhanced disclosure).[6] In addition, they are granted to multinationals and domestic companies' alike. The potentially harmful aspects, in the context of cross-border income, have been emphasized by the Apple case. However, with respect to who benefits from tax concessions more generally, available data on state aid cases and tax rulings only tell a partial story. EU countries have granted €1.3 trillion of state aid from 2000 through 2016 that has been approved by the EC, with €388 billion of that granted in the form of tax benefits. Additionally, recent data released by the EC in 2018 indicates more than 32,000 companies have received state aid in 2017 alone, with more than 8,000 receiving tax concessions.

Our descriptive data suggest that the recent Apple case offers little generalizability or insight into the broader phenomenon of tax concessions; i.e., which companies benefit, how much they benefit, and what sort of disclosure policies might be appropriate. To further our understanding on these issues, we utilize a multivariate framework, making use of the country-level data just described, to compare the financial outcomes of EU companies that are more or less likely to have received a tax concession. We obtain financial data from Bureau van Dijk's Orbis

[6] 'Tax ruling' is a term for a multitude of tax 'arrangements'. A tax ruling may occur in the form of an advance tax ruling, an advance pricing agreement or any other 'tax arrangement'. There are formal and informal 'tax rulings'. An 'advance tax ruling' is a statement provided by the tax authorities, or an independent council, regarding the tax treatment of a taxpayer with respect to his future transactions and on which he is – to a certain extent – entitled to rely. An 'advance pricing agreement' determines (in accordance with the law and the OECD Guidelines) in advance if the transfer price between two related parties within a group is at arm's length compared to the transfer price with an unrelated party. In practice, many other 'tax arrangements' are made – without any framework – between the taxpayer and the local tax inspector before a specific transaction takes place or before filing the tax return, after a tax mediation process, in court, within a horizontal monitoring process, or, within the context of a tax audit." (Van de Velde, 2015).

database for approximately 60 million EU companies from 1995 through 2016. Since the focus of recent state aid investigations has been on 'discrimination' and 'selectivity' with regard to foreign- versus domestic-owned companies, and public opinion (and thus tax policy) leans towards more disclosure by multinationals, this is our focus. In particular, we search for a differential effect on profitability (tax base) and tax payments (tax rate) across these two groups of companies depending on whether they operate in a country that opens a high level of state aid (tax) investigations, grants a high level of approved (tax) state aid, or issues a high level of cross-border tax rulings.

One important limitation in understanding the impact of tax concessions on firms specifically is that, with some exceptions, data do not indicate the beneficiaries of such concessions. That is, we do not know precisely which companies benefit from the preferential tax treatment. Our approach is, however, one step forward in that it allows the tax concession data to explain, or not, differences in profitability and tax payments across two groups of firms. We find strong and consistent evidence that cross-border tax rulings offer substantial tax benefits to foreign-owned companies. This contradicts the often cited reason for using tax rulings – i.e., to provide legal certainty and attract investment. We also find consistent evidence that pre-approved state aid results in a relatively *higher* tax burden for foreign-owned companies, and mixed evidence on the effect of investigations and illegal state aid.

Importantly, our results suggest that state aid offers tax benefits to both foreign-owned and domestic-owned companies. Aid that is pre-approved appears more likely to benefit domestic-owned companies, perhaps because helping domestic-owned companies is more likely to meet a broader EU objective than aiding foreign-owned companies. The recent trend towards enhanced disclosure of tax rulings as well as disclosure of aid granted at the level of the beneficiary are, in

our view, necessary steps towards appropriate enforcement of state aid rules in the EU. However, because state aid does appear to benefit domestic-owned companies, the automatic exchange of tax rulings should cover all rulings, not just those issued to foreign-owned companies. Our study also offers important descriptive evidence that state aid is rather pervasive and has real effects on firms' profitability and effective tax rates. Given this, any country can in fact operate as a tax haven for any company, without greater supervision and transparency surrounding state aid. Any study thinking about the role of taxes in location decisions should consider the role of tax concessions.

2. Background, motivation and contribution

a. Background

In light of globalization, all countries must balance revenue considerations with the need to provide internationally competitive tax treatment. Regarding taxation of inbound foreign direct investment (FDI), the prospect of generating host-country benefits, such as new jobs and technologies, creates pressure to offer a low host-country tax burden. This low burden may come in the form of a low headline statutory rate, relief that lowers the tax base, or *targeted* tax relief that attracts particular activities, types of income, or industries (with potentially less revenue loss). The anticipated domestic effects of outbound FDI are more nuanced. For instance, encouraging outbound FDI generate fears that such investment displaces domestic employment, capital investment, and tax revenue. In contrast, discouraging it may preclude increased levels of domestic activity that can arise by improving a firm's global profitability and competitiveness (Desai et al. 2009). If inbound FDI is particularly sensitive to host-country taxation, governments might offer targeted tax relief to the exclusion of domestic-owned firms, leading to 'harmful' tax competition.[7]

[7] There is no generally accepted definition of 'harmful' tax competition. However, for example, the Council of the EU states that such tax policies provide: (i) advantages only to non-residents or in respect of transactions carried out with non-residents, (ii) advantages that are ring-fenced from the domestic market, so they do not affect the national tax

The co-existence of tax competition and concerns about fair domestic competition creates an interesting dilemma for governments of EU Member States. The TFEU provides for a single internal market with free movement of goods and services. To achieve this, it includes rules to ensure that competition within the EU is not restricted by things such as cartels, abuses of market power, collusion, or state aid. State aid refers to forms of assistance granted to selected "undertakings" by national public authorities which has the potential to distort competition and affect trade between EU Member States (Article 107(1) TFEU). Examples of aid instruments include direct grants, debt write-offs, interest subsidies and various forms of tax relief. Granting tax relief to particular companies gives those companies a benefit comparable to receiving cash. From the standpoint of making the tax system competitive, this is desirable. However, if these selected companies can avoid tax, it makes it harder for companies that do pay their share of taxes to compete, making this undesirable within the framework of EU competition law.

The upshot is that any tax benefit granted to a company by a host country government in the EU may not, as a matter of law, provide an advantage, be selective, or distort domestic competition within the EU. However, determining when fiscal aid, granted in any form, confers a selective economic advantage to a business is challenging. Thus, the EC enforces the TFEU through a process in which state aid, including tax benefits, is verified. In general, there is a mandatory notification process for new aid measures before they can be put into effect. The EC assesses whether the notified aid measure is state aid (i.e., has the potential to distort competition), and if so, whether it is compatible with the objectives of the EU. Aid that is not deemed distortive,

base, (iii) advantages that are granted even without any real economic activity and substantial economic presence within the jurisdiction offering such tax advantages, (iv) rules for profit determination in respect of activities within a multinational group of companies that departs from internationally accepted principles, or (v) tax measures that lack transparency, including where legal provisions are relaxed at administrative level in a non-transparent way. https://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/primarolo_en.pdf

or is otherwise justified by reasons of general economic development, may be put into effect. For administrative convenience, the EC exempts from notification a range of pre-defined aid measures deemed to be less distortive, de minimis aid, and aid previously approved. State aid is thus considered illegal only in situations where it was put into effect without going through (or being explicitly exempt from) the notification process, as in the case of Apple.

Information about approved state aid is published by the Directorate General for Competition on EUROSTAT, the EU's open data portal.[8] The data are based on the annual reporting by EU Member States about aid expenditures made for which the EC adopted a formal decision or received an information sheet from the Member States in relation to measures qualifying for exemption. From 2000 through 2016, 387 billion Euros of approved aid was granted in the EU, in the form of either tax deferral (3 percent) or tax exemption (97 percent), approximately 21 percent of total aid granted during this period. The percent of total approved aid granted in the form of tax benefits increases over time from 13 percent to 32 percent, consistent with tax competition in the EU, but varies significantly across countries. We utilize this data source in our empirical analysis.

Recognizing the possibility that illegal state aid exists, that approved aid measures are being misapplied, or that approved aid measures from the past are no longer compatible with EU objectives, the EC opens formal investigations with EU Member States on an ongoing basis. Companies and consumers in the EU are important players who may trigger these state aid cases by lodging complaints with the EC. Indeed, the EC invites interested parties to submit comments when they have doubts about the compatibility of an existing aid measure with EU law. If the

[8] http://data.europa.eu/euodp/en/data/dataset/comp_ai_sa_01/resource/cffe91fa-9d54-4f4c-9787-745de344b236

ultimate decision of the EC investigation is negative, the EC will require the member state to recover the aid from the beneficiary. All decisions are subject to review by the courts.

All state aid cases that have been the object of a Commission decision since 2000 are maintained in an online database housed on the EC website.[9] EC decisions are published in the Official Journal of the European Union and provide information about the aid instrument, an assessment of the aid under the TFEU, and any comments from the host country in defense of its actions. There are two different types of state aid cases: (i) individual application, which can be further characterized as an 'ad hoc case' or 'individual application of a scheme' or (ii) schemes. Schemes are by far the most common type of tax-related case (approximately 82 percent), whereby the aid is provided explicitly via national tax laws that favor certain companies.[10] If the EC issues a negative decision, these so-called fiscal schemes must be terminated. The balance of cases are those that benefit a specific company, either through the misapplication of an otherwise acceptable fiscal scheme to a particular taxpayer (approximately 11 of cases), or those ad-hoc cases where a particular taxpayer was granted selective tax treatment through a formal or informal agreement with the taxing authority (approximately 9 percent of cases).

While there have been 1,220 tax-related state aid cases since 2000, 110 of which have been determined to be illegal, only a handful of recent ad-hoc cases have made global headline news. A common theme among them is that the unlawful state aid was granted via a tax ruling negotiated between the host country and a foreign-owned company – i.e., Luxembourg with ENGIE, Amazon and Fiat; Ireland with Apple, Netherlands with Starbucks, and Belgium with 35 individual MNCs.

[9] The EC state aid database: http://ec.europa.eu/competition/elojade/isef/index.cfm?clear=1&policy_area_id=3

[10] These fiscal schemes vary from those that favor mobile business activities or sources of income (e.g., head-office activities, coordination centers, treasury functions, holding companies, royalties) or those that favor certain industries or activities (e.g., video games in the UK, electronics manufacturing in Spain, advertising in Hungary).

International tax rulings are in themselves not considered a problem and many countries issue them to provide legal certainty (see Diller et al. 2017). They intend to establish, in advance, the application of the tax system to a particular case in view of its facts and circumstances. The ruling may address how a bilateral tax treaty or national law will be applied, or how "arm's-length profits" will be determined for related-party transactions. However, their utility is questionable when rulings offer a low level of taxation, encouraging companies to shift profits there, leading to revenue losses for other countries. Consider a comment by Joaquin Almunia, former Commissioner for Competition, "a limited number of companies actually manage to avoid paying their proper share of taxes by reaching out to certain countries and shifting their profits there. In those cases, where national laws or tax-administration decisions permit or encourage these practices, there might be a state aid component involved and I intend to get to the bottom of it."[11]

Since June 2013, the EC has been investigating the tax ruling practices of Member States. A dedicated Task Force Tax Planning Practices was set up in summer 2013 to follow up on public allegations of favorable tax treatment of certain companies (in particular in the form of tax rulings) voiced in the media and in national Parliaments. This working group asked all Member States to provide information about their tax ruling practices, and to provide detailed information about rulings granted between specific companies and host countries. Most notably, on August 30, 2016, Ireland was ordered to recover unpaid taxes in Ireland from Apple of €13 billion. The EC reported that part of their EU profits were transferred (making the use of tax rulings) to intra-group companies with no employees which are not taxed in the EU, and that the ability to do so conferred a selective economic advantage to Apple.

b. Motivation and contribution

[11] http://ec.europa.eu/rapid/press-release_IP-14-309_en.htm

While the EC allows EU Member States to carry out their own state aid policies, this responsibility must be met with appropriate safeguards to prevent distortions. There is undoubtedly a general move toward transparency of public subsidies as one such safeguard. This is not unique to tax subsidies, however, some important tax and accounting policy changes are being introduced in response to the need for more state aid transparency. While transparency is important because it promotes accountability and more effective policies, some argue that this type of tax information should not be disclosed, to ensure confidentiality and protection of business secrets. In order to argue that transparency is needed, it would be helpful to know the extent to which state aid is of significantly broader concern beyond a handful of recent cases.

For instance, inherently fueled by the media and the Apple case, there are significant concerns about tax rulings granted to foreign-owned companies. Consider the somewhat controversial (among legal scholars) statement in a letter to US Treasury Secretary Lew, from Vestager of the EC asserting that "EU Courts have long established that under EU State aid rules Member States cannot give multinational groups a more favorable tax treatment than standalone companies."[12] Action 5 of the OECD/G20's endeavors to combat Base Erosion and Profit Shifting (BEPS) provides a framework for improving transparency through the spontaneous exchange of information, beginning in 2017, with respect to certain tax rulings. The tax ruling must generally be an international tax ruling and be issued in the last five years. Thus, the rulings subject to exchange target those issued to foreign-owned companies, but it is not clear why transparency requirements should not apply to domestic rulings as well.[13] More than 10,000 rulings have been

[12] Letter from Margrethe Vestager, European Commissioner for Competition, to Jacob J. Lew, U.S. Secretary of the Treasury (Feb. 29, 2016), https://drive.google.com/file/d/0B_p5wXj7Q88MYUVyTG83R01BZEk/view

[13] Tax rulings on the following topics are covered: a) preferential regimes, e.g., holding company, domiciliary company, principal company, mixed company, the license/ patent box in Nidwalden, and IP regimes subsequently introduced, b) unilateral tax rulings dealing with related party cross-border transfer pricing, c) unilateral, downward adjustments of taxable profit not reflected in financial statements, e.g., finance branch regimes, d) cross-border permanent establishment or profit allocation rulings with respect to permanent establishments, e) cross-border related

identified in aggregate by OECD countries under these rules in the first year of implementation. Notably, Australia reported having more than 30,000 rulings, but only about 200 were cross-border related, begging the question of what the effect tax rulings in other countries might have more generally on the performance of companies and competition.

Another important movement towards transparency is the state aid modernization program adopted in 2014, aimed at disclosures about aid beneficiaries to the public, rather than country, regional, or industry-level statistics like traditional state aid disclosures. For all aid awards granted on or after July 1, 2016, national authorities must now provide information about the design of every state aid measure and are requested to publish, in a searchable database, information on the identity of the individual beneficiaries who received awards exceeding €500,000. Again, there is little empirical evidence as to whether this level of transparency is necessary, or whether it should focus on certain beneficiaries. For instance, based on a Eurobarometer survey almost three quarters of respondents (74%) think large companies, including multinationals, should provide open access to all the information about the state aid they receive, while 67% say this about state owned companies and 58% about small and medium sized companies (EU 2016).

Implications surrounding increased transparency of state aid also extend to firms' financial reporting. Consider the following disclosure by a multinational firm reporting under IFRS: "From 2012 until 2015, the Group's Canadian subsidiary Maple-leaf Inc benefited from a tax ruling of the Canadian tax authorities allowing it to qualify for a reduced corporate tax rate. In 2016, there was a change in the Canadian government. The new government is currently investigating certain tax rulings granted in the past, which include the tax ruling applied by the Group. If the tax ruling applied in the past is retroactively revoked, then additional tax expenses for the period 2012–2015

party conduit rulings. In October 2015, the European Parliament adopted a resolution calling for the inclusion of all tax rulings in the automatic exchange rather than only 'cross-border' rulings, but it was not passed.

may be incurred."[14] Under GAAP, the FASB has added to its disclosure framework for income taxes the requirement to disclose "the terms of any rights or privileges granted by a governmental entity directly to the reporting entity that have reduced, or may reduce, the entity's income tax burden."

Accounting disclosures like the one above indicate that our study contributes to the extensive literature on tax avoidance and tax risk. For instance, is some of what we think of as tax avoidance by companies just tax concessions granted by host country governments? And, are those different things? They certainly arise from different opportunities and pose different kinds of risk to firms. A peculiar, but unexplained, finding from the accounting literature is that over the past 25 years, effective tax rates (ETRs) have declined at approximately the same rate for domestic and multinational firms in the U.S. (Dyreng et al., 2017). The authors note that it is contrary to conventional wisdom that the decline is not concentrated in multinational firms. But should this be the conventional wisdom? Where does conventional wisdom come from? Is it possible that, particularly in the EU where firms are even more mobile, that host country governments grant tax concessions to local firms at least as much, if not more than, foreign-owned companies, and that these tax concessions can explain a significant portion of firm's overall tax benefits?

We also contribute to the broader literature on performance gaps between a subsidiary of a multinational firm (i.e., foreign-owned) and a local firm (i.e., domestic-owned). These gaps have been identified across numerous literatures in such areas as productivity, wages, profitability, growth, market-entry strategies, survival, export intensity, labor relations, market shares, bankruptcy, exit, size, skill intensity, innovation, and advertising intensity.[15] The broad issue

[14] https://home.kpmg.com/content/dam/kpmg/xx/pdf/2016/11/ifs-2016-illustrative-disclosures.pdf
[15] See Bellak (2004) for an excellent review of this literature. Studies vary in the conclusions reached. Some studies find no difference in performance at all, while other studies disagree on determinants of the performance gap.

examined in decades of research is why performance gaps exist, theoretically, and whether foreign ownership, per se, explains such gaps empirically. An important normative question that arises from all of this work is whether discriminatory inbound investment promotion policies can be justified. After all, these 'costly' investment policies are rooted in the belief that the superior performance of foreign-owned firms will have positive spillover effects on the domestic economy in the host country. Tax research has attempted to document that at least some of the profitability differences are attributable to profit shifting [e.g., Grubert et al. (1993), Oyeler and Emmanuel (1998), Langli and Saudagaran (2004), Demirgüç-Kunt and Huizinga (2001); and Egger et al. (2010)]. After all, it is counter-intuitive why foreign-owned firms would report lower profitability while generally exceling in every economic respect compared to their local counterparts, if not for profit shifting.

3. Hypothesis development, research design and data sources

a. Hypothesis development

In light of the discussion above, state aid is a topic of increasing awareness and interest by citizens, host country governments, and companies operating in the EU. However, the EC has limited resources and cannot examine all forms of potentially selective tax relief granted by host country governments to companies. Are the recent illegal state aid cases just extraordinary stories about a handful of multinational companies that are deemed to have received preferential tax treatment in a way that was unfair? Or, are these cases just the tip of the iceberg and in fact foreign-owned companies have been enjoying various forms of what could be considered illegal state aid for decades? Does state aid ever benefit domestic-owned companies? There is no systematic large sample evidence regarding the differential effect of state aid across firms. Our interest in filling this void motivates us to test the following null hypothesis:

Tax relief granted by host-country tax administrators in the EU is not associated with different financial outcomes across domestic-owned and foreign-owned companies.

Our focus on domestic-owned and foreign-owned companies arises from the EC's stated intention to pursue cross-border tax rulings based on state aid rules.[16] For instance, on the day of the Apple decision, the Commission confirmed that a further 1,000 tax rulings from all Member States were under review and that the scope of state aid tax investigations would be expanded to cover double-taxation treaties as well as tax settlements. Thus, comparing domestic-owned and foreign-owned companies will further our understanding of whether state aid more generally favors multinationals relative to independent companies, a common comparison in evaluating whether tax relief is selective.

We focus on two financial outcomes – profitability and effective tax rates. We examine both because tax aid instruments vary considerably and may manifest differently in financial outcomes. For instance, some aid lowers the host-country tax base via a generous deduction, allowance or exemption. Other types of aid might lower the host-country effective tax rate via a generous tax schedule, holiday, or credit. This is evidenced by the distinct types of tax-related "aid instruments" in the databases maintained by the European Commission (described in Section 4.a.ii. below) – i.e., 'tax rate reduction' versus 'tax advantage or tax exemption'. As it is not clear ex ante in a large sample how the tax aid instrument in each case helps the firm, this will allow the data to tell us which dimension is impacted.

Finally, as we describe further under data sources, we focus on various types of tax relief that can arguably be measured with available data. In particular, we examine the potential impact of cross-border tax rulings on firm performance. If the use of 'cross-border' tax rulings is strictly

[16] European Commission (2016), 'Communication from the Commission, Commission Notice on the notion of State aid as referred to in Article 107(1) TFEU', para 170.

limited to providing certainty for foreign-owned companies, rather than selective tax treatment, they should not be associated with any differences in financial outcomes across firms. We also examine approved aid, aid that is either not distortive or is compatible with EU objectives, as well as state aid investigations, which represent instances of tax relief that is not pre-approved and may be selective. As in the case of both approved aid and state aid cases, it is not clear ex ante whether these forms of aid benefit particular companies. Again, we allow the data to tell us.

b. Research design

We first consider a baseline difference, if any, in pre-tax profit and effective tax rates across foreign-owned and domestic-owned companies operating in the EU over the past two decades. Prior literature examining profitability differences between foreign-owned and domestic-owned firms has done so in the context of estimating profit shifting [e.g., Grubert et al. (1993) in the US, Oyeler and Emmanuel (1998) in the UK, Langli and Saudagaran (2004) in Norway]. To obtain this baseline, we estimating the following equation:

$$I_{ijct} = \alpha_0 + \beta_1 Foreign\text{-}owned_{ijct} + \beta_2 Size_{ijct} + \beta_3 Age_{ijct} + \mu_j + \varepsilon_{ijct} \quad (1)$$

where I_{ijct} is the independent variable for company i in industry j in country c in year t. The dependent variable is either *Income/Assets*, the ratio of income before tax to total assets, or *Tax/Income*, the ratio of tax expense to income before tax. *Foreign-owned* is an indicator set equal to one when company i in country c is controlled by a parent company located in a different country, and zero otherwise. Age, size, and industry are consistently important factors in Grubert et al. (1993). Both *Size* and *Age* in Equation (1) are logged values of total assets and the number of years company i appears in the data, respectively, and control for the fact that foreign-owned companies tend to be larger and more mature, which may have a direct effect on profitability and

bias the coefficient on *Foreign-owned*. μ_j represents industry fixed effects at the 1-digit NAICS code.

To examine the effects of tax relief, a direct test of our hypothesis, requires that we introduce an interaction term as in Equation (2) below:

$$I_{ijct} = \alpha_0 + \beta_1 Foreign\text{-}owned_{ijct} + \beta_2 Foreign\text{-}owned_{ijct} * Tax\ relief_c + \beta_3 Size_{ijct} + \beta_4 Age_{ijct} + \mu_j + \eta_{ct} + \varepsilon_{ijct} \quad (2)$$

The variable *Tax relief* is an indicator set equal to one if country *c* is in the highest quartile within the EU with respect to the form of tax relief we consider, and zero otherwise. We consider three primary measures of *Tax relief*. *High rulings* is an indicator variable set equal to 1 based on the number of tax rulings (scaled by GDP) exchanged under BEPS Action 5. *High approved aid* is an indicator variable set equal to 1 based on the ratio of the Euro amount of tax aid approved to the total amount of aid approved by the EC. *High aid cases* is an indicator variable set equal to 1 based on the ratio of the number of tax-related aid cases to the total number of aid cases opened by the EC. To alternatively consider only those cases with a negative outcome, we introduce a fourth measure, *High negative aid cases* is an indicator variable set equal to 1 based on the ratio of the number of tax-related aid cases *with negative decisions* to the total number of aid cases opened by the EC.

Equation (2) above closely resembles the research design used by Demirgüç-Kunt and Huizinga (2001). These authors recognized that it is difficult to conclude from a single country study whether any differential between foreign-owned and domestic-owned firms is attributable to tax factors, because it is difficult to control for non-tax factors. In their study, they argue that they can detect profit shifting in foreign-owned firms more directly by running pooled regressions across countries, and including the statutory corporate income tax rate and its interaction with the foreign-owned indicator as an additional dependent variable. If foreign-owned companies engage

in profit shifting, the coefficient on the interaction term would be negative. Instead, single country studies focus on the coefficient on the foreign-owned indicator, which may be biased.

The focus of our hypothesis testing is the interaction term *Foreign-owned*Tax relief*. The coefficient on this interaction term, $\beta_{2,}$ is the estimated effect of relatively high amounts of tax relief on the profitability and tax rate of foreign-owned companies, relative to domestic-owned companies, controlling for country-year-specific time invariant shocks. Because we include country-year fixed effects, η_{ct} , in our model, we do not include *Tax relief* on its own because this variable is invariant within a country year and the coefficient cannot be estimated. A negative coefficient on β_2 implies that the form of tax relief considered benefits foreign-owned companies, while a positive coefficient on β_2 implies that the form of tax relief considered benefits domestic-owned companies. This interpretation is consistent with thinking of lower profitability and lower ETRs as a benefit of tax relief as both outcomes imply a lower tax burden.

c. Data sources

We collect financial and ownership data for all companies operating in the EU from 1995 through 2016 from Orbis. With respect to our company-level data requirements outlined above, we keep only those observations with non-missing tax expense, pre-tax income, total assets, industry membership, and country of location. We also require each company to have ownership data. As ownership data is static, we capture ownership at five points in time (i.e., 2005, 2007, 2013, 2015, and 2017) and determine foreign-owned versus domestic-owned using the most recent data point for each company during the intervening years. We consider a company foreign-owned if it has at least 50 percent, ultimate ownership (direct or indirect), by a parent company located in a different country. Figure B provides a detailed illustration of our classification.

The data sources that we use to measure *Tax relief* at the country-level are all publicly available, but to our knowledge have not yet been used in an academic study. We therefore describe the data source for each measure in this section and provide country-level data for each measure in the next section. *High rulings* is based on information about the number of tax rulings that qualify for exchange under the new BEPS Action 5 transparency framework, which we obtained from the first annual peer review report released by the OECD in December 2017.[17] We examined each country profile and determined the total number of 'cross-border' rulings issued by each country from January 2010 through December 2016. Since it is reasonable to expect larger countries to issue more tax rulings, we scaled the number of rulings by GDP.

High approved aid is based on state aid approved by the EC, which occurs when the EC determines that the aid is not distortive or that it meets a broader EU objective. We accessed a table in EUROSTAT titled "Share of aid instruments – million EUR" and computed a ratio for each country based on the amount of tax-related aid to all aid granted in a particular year.[18] These data are reported annually from 2000 – 2016 by each EU Member State to the EU, however, we do not make use of the annual data. The reason is that when a country grants tax relief to a company, the tax benefits invariably accrue over a number of years. Consider Apple's 1991 tax ruling that benefited the company until 2006, when it renegotiated another ruling in 2007 that carried with it tax benefits for another decade. We therefore view the granting of tax relief in our study as an invariant country-level characteristic because the time series relationship between granting tax relief and benefiting from tax relief is not at all clear. *High approved aid* is the average ratio across all years that a country appears in the data.

[17] http://www.oecd.org/tax/beps/harmful-tax-practices-peer-review-reports-on-the-exchange-of-information-on-tax-rulings-9789264285675-en.htm

[18] http://data.europa.eu/euodp/en/data/dataset/comp_ai_sa_01/resource/cffe91fa-9d54-4f4c-9787-745de344b236

In order for the aid to show up in the measure above, EU Member States must report the aid measure to the EC either to obtain pre-approval, or to report exempt aid. Thus, we introduce *High aid cases* state aid investigations opened by the EC. As the EC does not generally investigate aid measures that were approved, these data represent cases where aid was given, but not thought to be distortive by the granting authority (alternatively, one might take an extreme view and think that the host country was giving the aid but 'hiding' it from the EC). We obtained data on state aid cases from the EC website in April 2018 (the database is updated daily) and again do not make use of the annual data. *High aid cases (High negative aid cases)* is the average ratio of tax cases (with a negative decision) to all cases, across all years that a country appears in the data.

4. Descriptive data and multivariate results

a. Descriptive data

Table 1 provides descriptive data for our measures of *Tax relief*. Panel A provides detailed data by year for all EU countries, while Panel B provides detailed data by country for all years that data are available. *Rulings* subject to information exchange were disclosed for the first time in 2017 and relate to all rulings issued between 2010 and 2016. Firms in the EU have identified 10,219 cross-border rulings issued over this period as of the end of 2017. It is possible that some countries have not yet identified all such rulings. Notably, Panel B shows that 6 countries in the EU still have not identified any such rulings, while Belgium, Luxembourg, Netherlands, and the UK account for the vast majority. Data on *Approved aid* from 2000 to 2016 shows a fairly steady increase over time in the proportion of total aid in the EU given via a tax-related aid instrument. Large countries like Spain, France and Germany account for a large portion of total EU aid but our focus is on the ratio of tax-related aid to total aid across countries. Interestingly, Luxembourg has never reported the granting of approved aid. This implies that Luxembourg, for whatever reason,

does not view what it does for companies as providing state aid. Finally, data on *Aid cases* are available by year based on the year the Commission investigation was opened against the EU Member State. While a handful of the negative state aid cases appearing in the data in 2014 and 2015 have been highly publicized, you can see from Table 1 that negative tax-related state aid cases have occurred since the late 90s and not solely confined to countries sometimes thought of as EU tax havens; e.g., Luxembourg and Netherlands. In fact, 19 out of the 28 EU countries have been found to have granted illegal state aid to a company so it is not unreasonable to think that nearly all countries do this to some extent, regardless of whether they are caught by the EC.

The weak correlations among each of these measures in Table 2 confirms that they each measure a different aspect of state aid. The only meaningful correlation in Table 3 is that *Approved Aid* is positively correlated with *Aid Cases*, but not with *Negative Aid Cases*. This is consistent with aid investigations being related to situations where countries issue tax relief to companies without pre-approval, but which is not ultimately deemed distortive. In these cases, the country may have legitimately believed the aid was not distortive when it was issued, and hence the reason it did not seek pre-approval.

Table 3 provides descriptive data for each of our regression variables. We aggregate unconsolidated financial statement data within country-year for each commonly-controlled corporate group. If a firm does not have controlling corporate owner, it is a stand-alone firm and its financial data enter the sample as is. If a firm has a controlling corporate owner, its financial statement data are aggregated with all other firms within the same country-year that have the same controlling owner. The data items we aggregate are tax expense, total assets, number of employees, and pretax income. We calculate all ratios (e.g., Tax/Income, Income/Assets, etc.) as the quotient of two aggregates and not as aggregates of quotients. To code age, we take the maximum of the

ages of all of the firms contributing to the aggregation. To code the industry, we use the 4-digit NACE code of the firm with the most revenue of the firms contributing to the aggregation as the industry of the aggregated firm.

In the EU, approximately 4 percent of companies are foreign-owned. The descriptive data indeed confirm that foreign-owned companies are larger (*Size* is 9.45 versus 5.54 for log of total assets) and more mature (*Age* 8.12 versus 6.31 years). There is very little difference across foreign- and domestic-owned companies in terms of our outcome variables. Foreign-owned companies exhibit slight higher average ETRs (*Tax/Income* of 0.25 versus 0.24), but lower tax payments when scaled by total assets (*Tax/Assets* of 0.02 versus 0.03) and lower profitability. Lower profitability in foreign-owned companies is consistent with much of the prior literature on profit shifting (see Grubert et al. 1993).

b. Multivariate results – profitability differences

Table 4 reports the results of estimating Equations (1) and (2) where the dependent variables is *Income/Asset*. The first column reports the results of the pooled regression from Equation (1) without the interactions term; the remaining column adds the interaction of our four *Tax relief* measures with the *Foreign-owned* indicator. The negative coefficient on *Foreign-owned* in column (1) is consistent with much of the prior literature on profit shifting showing that foreign-owned companies report lower profitability because they have greater opportunities to shift income, relative to domestic-owned companies (e.g., Mataloni, 1993). The magnitude of the coefficient suggests that foreign-owned companies report, on average, a 6.9 percent lower return on pre-tax profitability than domestic-owned companies. The sign on the coefficient estimate for *Size* indicates that larger firms are more profitable, consistent with a returns to scale story, while the sign on the coefficient estimate for *Age* indicates that more mature firms are less profitable.

This is inconsistent with the general expectation that more mature firms suffer from lower start-up costs that reduce profitability.

In the second column of Table 4, we interact *Foreign-owned* with a measure of tax relief based on tax rulings. The negative and significant coefficient estimate on the interaction with *High Rulings* suggests that, in countries issuing high amounts of tax rulings, foreign-owned companies report a 10.1 percent lower return on pre-tax profitability relative to domestic-owned companies. This suggests that cross-border rulings are not simply used to provide tax certainty to multinationals and that indeed, as in the Apple case, they often enable foreign-owned companies to shift profits out of the host country. This does not mean that tax rulings do not also benefit domestic-owned companies, but it does confirm that *cross-border rulings*, the only type of ruling publicly observable, appear to extend significant amounts of tax benefits in the form of a reduced tax base to foreign-owned companies.

In the third column of Table 4, we interact *Foreign-owned* with a measure of tax relief based on approved aid. The positive and significant coefficient estimate on the interaction with *High Approved Aid* suggests that, in countries granting high amounts of approved aid, foreign-owned companies report a 2.6 percent higher return on pre-tax profitability relative to domestic-owned companies. We observe the same sign and significance in columns 4 and 5 when the measure of tax relief is based on *High Aid Cases* and *High Negative Aid Cases*. This suggests that the overall effect of state aid that is granted, regardless of whether it is pre-approved, ultimately approved or determined as illegal (after an investigation), puts foreign-owned companies at a disadvantage from a tax perspective by increasing their reported pre-tax profitability (or tax base) relative to domestic-owned companies. This could be consistent with, though not directly testable, the vast majority of tax concessions (including those granted via tax rulings) granted by host

country governments benefiting domestic companies. In October 2015, the European Parliament adopted a resolution calling for the inclusion of all tax rulings in the automatic exchange rather than only 'cross-border' rulings, but it was not passed.

c. Multivariate results – effective tax rate differences

Table 5 Panel A reports the results of estimating Equations (1) and (2) where the dependent variable is *Tax/Income.* In Panel B, we consider the dependent variable *Tax/Assets*, which does not require that we analyze only profitable companies, to see if the results differ. The negative coefficient on *Foreign-owned* in column (1) suggests that foreign-owned companies report effective tax rates that are 1.9 percent lower than domestic-owned companies. Note that this is different than the typical focus on profitability in the prior literature because lower effective tax rates are not generally attributable to income shifting, which lowers the tax base but not the tax rate in the host country. A lower effective tax rate arises from other strategies and opportunities such as the ability to create stateless income, the ability to bi-furcate value chains to generate tax-favored streams of income in certain locations, or simply from receiving tax relief in the form of a lower tax rate, tax credit or tax exemption.

In the second column of Table 5 Panel A, we interact *Foreign-owned* with a measure of tax relief based on tax rulings. The negative and significant coefficient estimate on the interaction with *High Rulings* suggests that, in countries issuing high amounts of tax rulings, foreign-owned companies report effective tax rates that are 0.8 percent lower, relative to domestic-owned companies. This again confirms that cross-border rulings are not used solely to provide certainty to foreign-owned companies. We see the same result in Table 5 Panel B when tax expense is scaled by total assets.

In the third column of Table 5 Panel A, we interact *Foreign-owned* with a measure of tax relief based on approved aid. The positive coefficient suggests that in countries with *High Approved Aid* the lower effective tax rate reported by foreign-owned companies largely dissipates. As in Table 4, this is again be consistent with pre-approved tax concessions (including those granted via tax rulings) granted by host country governments benefiting domestic companies. We see the same result in Table 5 Panel B when tax expense is scaled by total assets. Results in columns 4 and 5 when the measure of tax relief is based on *High Aid Cases* are less consistent than other results and so difficult to say exactly what we learn. Panel A suggests that foreign-owned companies report effective tax rates that are 1.3 percent lower than domestic-owned companies in countries with high amounts of tax-related aid cases, while Panel B suggests that foreign-owned companies report higher tax expense when scaled by assets than their domestic counterparts.

d. Additional analyses (in-process)

i. Torslov, Wier, and Zucman (2018) document that foreign-owned firms are systematically more profitable than domestic-owned firms in tax haven countries, but in non-haven countries, foreign-owned firms are systematically less profitable than domestic-owned firms. The objective of their analysis is to quantify the amount of profits that are redistributed within multinational companies, away from high-tax countries and towards low-tax places. At a broad level, their objective is related to much of the prior tax literature comparing foreign-owned and local firms. Relevant for our study is their novel use of a relatively new data source on firm profits separated by foreign-controlled versus local firms.

Specifically, they make use of macro data disseminated by Eurostat and the OECD called foreign affiliate statistics (FATS). These data are arguably more comprehensive than Orbis data because statistical authorities have access to more data sources to compile national statistics than

does Orbis data. While FATS are macro-level data and therefore, our regressions would compress to only 17 EU country-level observations over approximately 5 years, we are interested to see how the results and descriptive data in FATS compares to those we present above using Orbis.[19] For instance, Torslov et al. demonstrate that Orbis and FATS produce similar aggregate corporate profits for a country like France, but significantly less profits show up in Orbis for a low-tax country like Ireland, relative to FATS.

ii. Another data source we are currently exploring are newly available state aid data in the EU reported at the level of the *beneficiary*. These data are available only since 2017, but because they allow us to observe the beneficiary of all state aid awards in the EU exceeding 500,000 Euros. Data at the beneficiary level will allow us to, albeit for a single year, assess who receives aid, as well as how and to what extent the state aid impacts the company's performance. The database is updated daily but as of September 2018, there were 32,400 aid awards granted in the EU to individual companies, and 8,085 of those awards were granted in the form of tax benefits.

5. Conclusion

For at least the past decade, multinational firms (MNCs) have been under intense scrutiny for their alleged tax avoidance practices. What has recently become widely known within the European Union (EU) is that international tax rulings negotiated between MNCs and host governments back some of these tax avoidance strategies. Concerns about illegal state aid, sweetheart deals between host country governments and multinationals, and lack of transparency are being addressed in the EU through enhanced disclosure. However, there is no large sample empirical evidence on state aid, or its impact on individual companies.

[19] Only 17 EU countries currently report FATS statistics, but these countries include Ireland, Luxembourg, Netherlands and Belgium – some of the most prominent EU 'tax havens'.

Furthermore, what is not highlighted in the media is that the European Commission (EC) has issued around 170 decisions ordering recovery of illegal state aid from individual companies for tax matters since 1999, which in many cases involved domestic-owned companies. Some natural questions arise. Are the recent illegal state aid cases just extraordinary stories about a handful of multinational companies that are deemed to have received preferential tax treatment in a way that was unfair? Or, are these cases just the tip of the iceberg and in fact foreign-owned companies have been enjoying various forms of what could be considered illegal state aid for decades? Does state aid ever benefit domestic-owned companies? Our study aims to fill this void.

Using the Orbis database, we search for profitability and effective tax rate differences between foreign-owned and domestic-owned companies in the EU from 1995 – 2016, and in particular focus on whether those differences are larger or smaller in countries that grant relatively more tax concessions to companies. A novel aspect of our study is bringing to light new data on state aid to create cross-country measures of tax concessions. We offer four measures, each capturing a related but not completely overlapping aspect of tax relief – cross-border tax rulings, pre-approved state aid, state aid investigations, and illegal state aid. We find strong and consistent evidence that cross-border tax rulings offer substantial tax benefits to foreign-owned companies. This contradicts the often cited reason for using tax rulings – i.e., to provide legal certainty and attract investment. We also find consistent evidence that pre-approved state aid results in a higher tax burden for foreign-owned companies, and mixed evidence on the effect of state aid investigations and illegal state aid.

Overall, our results suggest that state aid offers tax benefits to both foreign-owned and domestic-owned companies. Aid that is pre-approved appears more likely to benefit domestic-owned companies, perhaps because helping domestic-owned companies is more likely to meet a

broader EU objective than aiding foreign-owned companies. The recent trend towards enhanced disclosure of tax rulings as well as disclosure of aid granted at the level of the beneficiary are, in our view, necessary steps towards appropriate enforcement of state aid rules in the EU. However, because state aid does appear to benefit domestic-owned companies, the automatic exchange of tax rulings should cover all rulings, not just those issued to foreign-owned companies. Our study also offers important descriptive evidence that state aid is rather pervasive and has real effects on firms' profitability and effective tax rates. Given this, any country can in fact operate as a tax haven for any company, without greater supervision and transparency surrounding state aid.

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Figure A

Example of cross-border tax ruling between Fedex and Luxembourg

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For the attention of Mr Marius Kohl

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ENTRÉE
16 JUIL. 2010

ADMINISTRATION DES CONTRIBUTIONS
SERVICE D'IMPOSITION
BUREAU SOCIETES 6

July 16, 2010

References: SES/MLMX/CEAA/Q0610017M-COAA

FedEx International Holdings Limited (Luxembourg) S.C.S. - Tax Number: To be issued
FedEx Luxembourg S.à r.l. - Tax Number: To be issued

Dear Mr. Kohl,

In our capacity as tax consultant for the aforementioned client, please find below the tax treatment applicable to the transactions foreseen by our client. This letter seeks to confirm the conclusions reached during our meeting held on June 9, 2010 and will serve as a basis for the preparation of the tax returns of FedEx International Holdings Limited (Luxembourg) SCS (**"FedEx SCS"**) and FedEx Luxembourg S.à.r.l. (**"FedEx SARL"**).

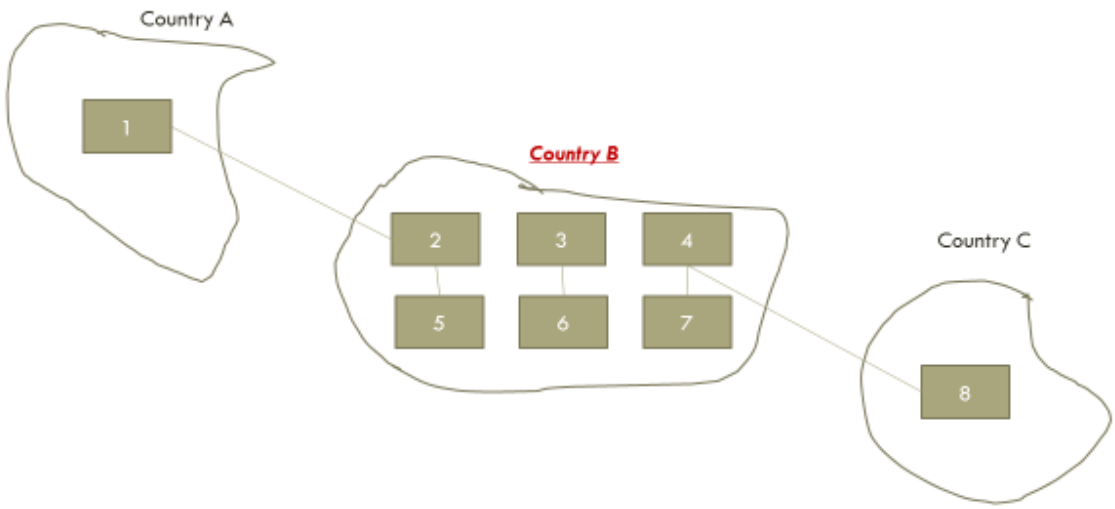
A. Facts

A.1 Background

1. FedEx Corporation (**"FedEx"**) provides customers and business worldwide with a broad portfolio of transportation, e-commerce and business services. FedEx is

Figure B

Diagram illustrating our classification of foreign-owned and domestic-owned companies



Consider an example with 3 countries and 8 companies. Entity 1 in Country A is the parent company with two subsidiaries in Country B. Entity 2 is owned by Entity 1 directly, while Entity 5 is owned by Entity 1 indirectly through Entity 2. Entity 3 in Country B is the parent company of one subsidiary; Entity 6 also in Country B. Entity 4 in Country B is the parent company of two subsidiaries; Entity 7 in Country B and Entity 8 in country C.

Characterization of entities from the perspective of host country B:

We characterize entities 2 and 5 as foreign-owned, and entities 3, 4, 6, and 7 as domestic-owned. In determining profitability and effective tax rates, we aggregate the unconsolidated financial statement data within a country. So 3 and 6 would be combined as well as 4 and 7. In addition, we further distinguish the group that contains 3 and 6 from the group that contains 4 and 7 because the latter has a foreign subsidiary, making it a domestically-controlled multinational. Our empirical tests compare foreign-owned and domestic-owned companies (excluding domestically-controlled) multinationals.

Table 1 Panel A

Underlying data used to compute tax relief measures (by year)

Year	'Cross-border' tax rulings subject to exchange	Total approved aid	Tax-related approved aid	Total aid cases	Tax-related aid cases	Tax-related aid cases w/negative decision
	(1)	(2)	(3)	(4)	(5)	(6)
	Data used to compute the following *Tax relief* measures:					
	Rulings	*Approved Aid (EUR mil)*		*(Negative) Aid Cases*		
1987	-	-	-	1	0	0
1988	-	-	-	1	0	0
1992	-	-	-	2	0	0
1993	-	-	-	3	0	0
1994	-	-	-	4	0	0
1995	-	-	-	17	0	0
1996	-	-	-	25	1	1
1997	-	-	-	76	4	3
1998	-	-	-	291	4	1
1999	-	-	-	718	27	12
2000	-	93,015	11,748	718	31	6
2001	-	105,226	13,174	921	49	21
2002	-	136,271	17,502	971	41	11
2003	-	119,863	22,999	839	22	4
2004	-	105,594	20,427	929	27	6
2005	-	104,721	20,993	1011	49	4
2006	-	153,106	23,983	1172	94	4
2007	-	110,590	24,027	1758	62	3
2008	-	131,808	26,921	1620	62	5
2009	-	129,593	25,825	1890	34	5
2010	-	122,663	24,735	1253	34	0
2011	-	93,393	21,725	1081	67	2
2012	-	96,413	21,640	1083	74	4
2013	-	101,220	22,258	1263	93	2
2014	-	90,679	28,236	1536	130	12
2015	-	93,657	30,746	3044	133	3
2016	10,219	97,411	30,880	2466	78	1
2017	-	-	-	2121	73	0
2018	-	-	-	804	31	0

Data Source: Column (1) : http://www.oecd.org/tax/beps/harmful-tax-practices-peer-review-reports-on-the-exchange-of-information-on-tax-rulings-9789264285675-en.htm; columns (2) & (3): http://data.europa.eu/euodp/en/data/dataset/comp_ai_sa_01/resource/cffe91fa-9d54-4f4c-9787-745de344b236; columns (4) – (6) : http://ec.europa.eu/competition/elojade/isef/index.cfm?clear=1&policy_area_id=3

Table 1 Panel B

Underlying data used to compute tax relief measures (by country)

Country	'Cross-border' tax rulings subject to exchange	Total approved aid	Tax-related approved aid	Total aid cases	Tax-related aid cases	Tax-related aid cases w/negative decision
	(1)	(2)	(3)	(4)	(5)	(6)
	Data used to compute the following *Tax relief* measures:					
	Rulings	*Approved Aid (EUR mil)*		*(Negative) Aid Cases*		
Austria	76	18,571	2,783	933	7	2
Belgium	643	27,366	7,367	1066	37	5
Bulgaria	0	1,763	251	185	10	0
Croatia	0	779	149	129	5	0
Cyprus	0	2,619	1,210	219	4	0
Czech Republic	53	23,335	2,899	1129	48	0
Denmark	50	34,310	5,989	534	41	1
Estonia	28	602	102	298	9	0
Finland	60	16,180	6,642	377	30	1
France	49	201,782	83,328	1545	141	10
Germany	25	359,695	109,876	4859	125	17
Greece	1	16,998	2,635	609	24	7
Hungary	104	19,884	6,788	580	59	5
Ireland	29	12,571	5,824	428	42	3
Italy	97	135,683	15,813	4244	107	18
Latvia	69	3,681	332	333	22	0
Lithuania	0	1,789	480	330	21	0
Luxembourg	5819	0	0	106	12	5
Malta	0	1,955	1,124	103	18	1
Netherlands	2180	51,615	7,642	1939	59	3
Poland	25	56,617	14,111	997	92	3
Portugal	26	52,651	22,255	373	46	5
Romania	0	16,626	4,614	185	11	1
Slovakia	3	3,941	1,848	298	27	2
Slovenia	8	4,331	731	600	16	0
Spain	174	113,404	15,590	3063	60	18
Sweden	29	42,546	34,366	319	60	0
United Kingdom	671	92,632	33,073	1837	87	3

Data Source: Column (1) : http://www.oecd.org/tax/beps/harmful-tax-practices-peer-review-reports-on-the-exchange-of-information-on-tax-rulings-9789264285675-en.htm; columns (2) & (3): http://data.europa.eu/euodp/en/data/dataset/comp_ai_sa_01/resource/cffe91fa-9d54-4f4c-9787-745de344b236; columns (4) – (6) : http://ec.europa.eu/competition/elojade/isef/index.cfm?clear=1&policy_area_id=3

Table 2

Correlations among country-level measures of 'Tax relief'

	Rulings	***Approved Aid***	***Aid Cases***	***Negative Aid Cases***
Rulings		-0.32	0.20	0.90
Approved Aid	-0.36		0.66*	-0.18
Aid Cases	0.01	0.46*		0.33
Negative Aid Cases	-0.01	0.22	0.40	

Notes: This table reports the correlations among the measures of tax relief reported in Table 1 Panel B. Pearson correlations are above the diagonal and Spearman correlations are below. *Rulings* is the number of tax rulings exchanged by the country under BEPS Action 5, scaled by the country's average GDP for the sample period. *Approved Aid* is the ratio of the Euro amount of tax aid approved by the country to the total amount of aid in the country approved by the EC. *Aid Cases* is the ratio of the number of tax-related aid cases in the country to the total number of aid cases opened in the country by the EC. *Negative Aid Cases* is the ratio of the number of tax-related aid cases *with negative decisions* in the country to the total number of aid cases opened in the country by the EC.
*p<0.05**.**

Table 3
Descriptive data

FULL SAMPLE	**N (million)**	**Mean**	**S.D.**	**p25**	**Med**	**p75**
Independent variables						
Income/Assets	62.810	0.051	0.313	-0.006	0.033	0.130
Tax/Income	39.500	0.237	0.216	0.067	0.208	0.333
Tax/Assets	55.500	0.025	0.046	0.000	0.007	0.029
Company-level dependent variables						
Foreign-owned	64.280	0.044	0.205	0.000	0.000	0.000
Size (log(assets))	63.080	5.712	2.470	4.190	5.587	7.040
Age (years)	64.280	6.387	4.698	3.000	5.000	9.000
Country-level measures of *Tax relief*						
Rulings	64.280	0.289	3.310	0.020	0.047	0.136
Approved Aid	64.280	0.302	0.178	0.137	0.278	0.413
Aid Cases	64.280	0.067	0.044	0.025	0.060	0.091
Negative Aid Cases	64.280	0.005	0.003	0.003	0.005	0.006

***Foreign-owned* = 1**	**N (million)**	**Mean**	**S.D.**	**p25**	**Med**	**p75**
Independent variables						
Income/Assets	2.796	0.035	0.260	(0.008)	0.033	0.106
Tax/Income	1.760	0.250	0.188	0.122	0.234	0.335
Tax/Assets	2.372	0.023	0.037	0.001	0.009	0.028
Company-level dependent variables						
Size (log(assets))	2.804	9.445	3.562	7.031	9.174	11.650
Age (years)	2.826	8.120	5.263	4.000	7.000	11.000
Country-level measures of *Tax relief*						
Rulings	2.826	1.095	9.639	0.020	0.065	0.290
Approved Aid	2.826	0.319	0.165	0.175	0.305	0.413
Aid Cases	2.826	0.065	0.042	0.035	0.054	0.091
Negative Aid Cases	2.826	0.004	0.004	0.002	0.004	0.006

Table 3 (continued)

Descriptive data

***Foreign-owned* = 0**	**N (million)**	**Mean**	**S.D.**	**p25**	**Med**	**p75**
Independent variables						
Income/Assets	60.010	0.052	0.316	(0.006)	0.033	0.131
Tax/Income	37.740	0.237	0.217	0.063	0.207	0.333
Tax/Assets	53.130	0.025	0.046	0.000	0.007	0.029
Company-level dependent variables						
Size (log(assets))	60.270	5.539	2.262	4.127	5.501	6.880
Age (years)	61.460	6.307	4.655	3.000	5.000	9.000
Country-level measures of *Tax relief*						
Rulings	61.460	0.252	2.675	0.020	0.047	0.136
Approved Aid	61.460	0.301	0.179	0.137	0.278	0.413
Aid Cases	61.460	0.067	0.044	0.025	0.060	0.091
Negative Aid Cases	61.460	0.005	0.003	0.003	0.005	0.006

Notes: *Income/Assets* is the ratio of pre-tax income to total assets, winsorized at 1 and 99 percent. *Tax/Income* is the ratio of pre-tax income to total assets, truncated at 0 and 1. *Tax/Assets* is the ratio of pre-tax income to total assets, winsorized at 1 and 99 percent. *Foreign-owned* is an indicator variable equal to 1 for foreign-owned companies, and 0 otherwise. We consider a company foreign-owned if it has at least 50 %, ultimate ownership (direct or indirect), by a parent company located in a different country. *Size* is the log of total assets. *Age* is the log of the number of years the company appears in Orbis beginning in 1995. *Rulings* is the number of tax rulings exchanged by the country under BEPS Action 5 scaled by GDP. *Approved Aid* is the ratio of the Euro amount of tax aid approved by the country to the total amount of aid in the country approved by the EC. *Aid Cases* is the ratio of the number of tax-related aid cases in the country to the total number of aid cases opened in the country by the EC. *Negative Aid Cases* is the ratio of the number of tax-related aid cases *with negative decisions* in the country to the total number of aid cases opened in the country by the EC.

Table 4
The impact of tax relief on profitability differences across foreign-owned and domestic-owned firms

	(1) *Income/Assets*	(2) *Income/Assets*	(3) *Income/Assets*	(4) *Income/Assets*	(5) *Income/Assets*
Foreign-owned	-0.069***	-0.041***	-0.076***	-0.074***	-0.073***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Interaction of *Foreign-owned* and:					
High Rulings		-0.101***			
		(0.002)			
High Approved Aid			0.026***		
			(0.001)		
High Aid Cases				0.034***	
				(0.001)	
High Negative Aid Cases					0.047***
					(0.001)
Size	0.010***	0.010***	0.010***	0.010***	0.010***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	-0.024***	-0.024***	-0.024***	-0.024***	-0.024***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.019***	0.018***	0.019***	0.019***	0.019***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	55,411,065	55,411,065	55,411,065	55,411,065	55,411,065
R-squared	0.04097	0.04184	0.04103	0.04103	0.04105

Notes: This table reports the results of estimating Equation (2) using least squares pooling company-level data (aggregated at the country-level) across 28 EU countries for the period 1995 – 2016. The dependent variable, *Income/Assets* is the ratio of pre-tax income to total assets, winsorized at 1 and 99 percent. *Foreign-owned* is an indicator variable equal to 1 for foreign-owned companies, and 0 otherwise. We consider a company foreign-owned if it has at least 50 %, ultimate ownership (direct or indirect), by a parent company located in a different country. *Size* is the log of total assets. *Age* is the log of the number of years the company appears in Orbis beginning in 1995. *High Rulings*, *High Approved Aid*, *High Aid Cases* and *High Negative Aid Cases* are time invariant country-level variables applicable to the company's host country. *High rulings* is an indicator variable set equal to 1 for those countries that fall in the upper quartile of EU countries based on the number of tax rulings (scaled by GDP) exchanged under BEPS Action 5. *High approved aid* is an indicator variable set equal to 1 for those countries that fall in the upper quartile of EU countries based on the ratio of the Euro amount of tax aid approved to the total amount of aid approved by the EC. *High aid cases* is an indicator variable set equal to 1 for those countries that fall in the upper quartile of EU countries based on the ratio of the number of tax-related aid cases to the total number of aid cases opened by the EC. We include industry and country-year fixed effects and report robust standard errors clustered by firm. *** p<0.01, ** p<0.05, *p<0.1.

Table 5: Panel A

The impact of tax relief on effective tax rate differences across foreign-owned and domestic-owned firms

	(1) *Tax/Income*	(2) *Tax/Income*	(3) *Tax/Income*	(4) *Tax/Income*	(5) *Tax/Income*
Foreign-owned	-0.019***	-0.017***	-0.025***	-0.017***	-0.019***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Interaction of *Foreign-owned* and*:*					
High Rulings		-0.008***			
		(0.002)			
High Approved Aid			0.020***		
			(0.002)		
High Aid Cases				-0.013***	
				(0.002)	
High Negative Aid Cases					0.001
					(0.001)
Size	0.009***	0.009***	0.009***	0.009***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	0.012***	0.012***	0.012***	0.012***	0.012***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.145***	0.145***	0.145***	0.145***	0.145***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	34,946,342	34,946,342	34,946,342	34,946,342	34,946,342
R-squared	0.28868	0.28870	0.28876	0.28870	0.28868

Notes: This table reports the results of estimating Equation (2) using least squares pooling company-level data (aggregated at the country-level) across 28 EU countries for the period 1995 – 2016. The dependent variable, *Tax/Income* is the ratio of pre-tax income to total assets, truncated at 0 and 1. *Foreign-owned* is an indicator variable equal to 1 for foreign-owned companies, and 0 otherwise. We consider a company foreign-owned if it has at least 50 %, ultimate ownership (direct or indirect), by a parent company located in a different country. *Size* is the log of total assets. *Age* is the log of the number of years the company appears in Orbis beginning in 1995. *High Rulings*, *High Approved Aid*, *High Aid Cases* and *High Negative Aid Cases* are time invariant country-level variables applicable to the company's host country. *High rulings* is an indicator variable set equal to 1 for those countries that fall in the upper quartile of EU countries based on the number of tax rulings (scaled by GDP) exchanged under BEPS Action 5. *High approved aid* is an indicator variable set equal to 1 for those countries that fall in the upper quartile of EU countries based on the ratio of the Euro amount of tax aid approved to the total amount of aid approved by the EC. *High aid cases* is an indicator variable set equal to 1 for those countries that fall in the upper quartile of EU countries based on the ratio of the number of tax-related aid cases to the total number of aid cases opened by the EC. We include industry and country-year fixed effects and report robust standard errors clustered by firm. *** p<0.01, ** p<0.05, *p<0.1.

Table 5: Panel B

The impact of tax relief on effective tax rate differences across foreign-owned and domestic-owned firms

	(1) *Tax/Assets*	(2) *Tax/Assets*	(3) *Tax/Assets*	(4) *Tax/Assets*	(5) *Tax/Assets*
Foreign-owned	0.002***	0.008***	-0.002***	0.001***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Interaction of *Foreign-owned* and:					
High Rulings		-0.026***			
		(0.000)			
High Approved Aid			0.013***		
			(0.000)		
High Aid Cases				0.007***	
				(0.000)	
High Negative Aid Cases					0.003***
					(0.000)
Size	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.041***	0.040***	0.041***	0.041***	0.041***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	49,142,133	49,142,133	49,142,133	49,142,133	49,142,133
R-squared	0.11927	0.12162	0.11991	0.11937	0.11928

Notes: This table reports the results of estimating Equation (2) using least squares pooling company-level data (aggregated at the country-level) across 28 EU countries for the period 1995 – 2016. The dependent variable, *Tax/Assets* is the ratio of pre-tax income to total assets, winsorized at 1 and 99 percent. *Foreign-owned* is an indicator variable equal to 1 for foreign-owned companies, and 0 otherwise. We consider a company foreign-owned if it has at least 50 %, ultimate ownership (direct or indirect), by a parent company located in a different country. *Size* is the log of total assets. *Age* is the log of the number of years the company appears in Orbis beginning in 1995. *High Rulings*, *High Approved Aid*, *High Aid Cases* and *High Negative Aid Cases* are time invariant country-level variables applicable to the company's host country. *High rulings* is an indicator variable set equal to 1 for those countries that fall in the upper quartile of EU countries based on the number of tax rulings (scaled by GDP) exchanged under BEPS Action 5. *High approved aid* is an indicator variable set equal to 1 for those countries that fall in the upper quartile of EU countries based on the ratio of the Euro amount of tax aid approved to the total amount of aid approved by the EC. *High aid cases* is an indicator variable set equal to 1 for those countries that fall in the upper quartile of EU countries based on the ratio of the number of tax-related aid cases to the total number of aid cases opened by the EC. We include industry and country-year fixed effects and report robust standard errors clustered by firm. *** p<0.01, ** p<0.0