Alternative Corporate Tax Systems: An Estimate of Fiscal Revenues Using World Supply and Use Tables

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Abstract

In this paper, I combine the World Input Output Database (WIOD), a global supply and use table, with National Account data and data on multinational entreprises to estimate fiscal revenues in the case of various alternative tax systems for the profits of corporations. In a first step, I derive a full matrix of corporate profits by production and market country, with a breakdown between multinational and non multinational corporations. In a second step, I use this decomposition to estimate the tax base and corporate profits in the considered scenarios. I find that a switch to a destination based system in which profits are taxed in the market country redistributes fiscal gain from tax havens and countries with large trade surpluses to large market jurisdiction, but does not increase the aggregate tax revenues by much. It could nevertheless allow nations to apply their official tax rates to multinational corporations, which would increase aggregate tax revenues by a considerable 65%. A Global Formulary Apportionment system (GFA) with apportionment coefficients based on sales would yield close results because of the preponderant share of multinational entreprises in international trade.

Keywords: Taxing rights, Profit Shifting, Destination Based, Formulary Apportionment, Multinationals, Global Value Chains

JEL codes: H25, H26, H32, F23, F68

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1 Introduction

There is a very broad consensus among scholars, civil servants from national and international institutions as well as a large part of the political class that the current system of taxation of profits for companies engaging in international trade is flawed. This topic has been receiving increased scholarly attention in the past five years, as is evident from the high number of publications of various types being released on the subject. The subject has also received a lot of public attention over the past two years, in particular thanks to the focus of the Democratic Presidential Campaign on the taxation of profitable companies and individual in the United States. As a candidate, Joe Biden for example promised to impose a minimum tax rate of 21% on the profits of multinational entreprises (MNEs), and as President, he pushed this agenda — though toned down to a rate of 15% — at the G7 and G20 summits of 2021. While this proposition is yet to become a rule, it has met sizeable support from the 139 countries forming the Inclusive Framework of the Base Erosion and Profit Shifting project (BEPS), the world's main international taxation discussion institution, hosted by the OECD.

In this dissertation, I combine world input-output tables with national account statistics and data on MNEs to estimate the tax base and revenues in different systems of taxation of international profits. I first derive a full bilateral matrix of profits associated with production in one country for consumption in another. I then use this decomposition to test different tax scenarios. I find that a switch to a destination based scenario in which profits would be taxed in market countries rather than production country redistributes fiscal gains but does not alter much the global tax revenue. Countries with low profit rates and trade deficit have the most to gain from such a scenario and tax havens have the most to lose. Another finding of this paper is that official tax rates poorly represent the actual tax burden faced by corporations, and MNEs face an effective tax rates significantly lower than the statutory tax rates in most countries. A switch to a destination based scenario could nevertheless empower nations to apply official tax rates to all companies. In that case, tax revenues would increase by 65%. I also present fiscal revenue estimates for a destination based scenario based on residual profits, GFA schemes and minimum tax rates with taxing rights for the country owning the MNE. This paper is organised as follows: the remainder of this section presents the current tax system and its two main flaws, profit shifting and tax competition, and presents alternative taxation systems that I evaluate in the paper. The relevant literature is discussed throughout. In

Section 2 I detail the methodology that I use and describe my data sources. Section 3 presents my results for the different scenarios and discusses them. Section 4 concludes.

Key Concepts and Literature

The Separate Accounting System The current system of international taxation is not overseen by multilateral treaties or international organisations, but rather consists of a collection of bilateral treaties. Countries generally have different tax systems, whether because they have different definitions of the basis of corporate profit (interest payment may or may not be deductible, there can be a variety of tax credits etc.) or because the notion of what profit can be taxed by which countries varies across countries. In particular, profits can be taxed on a "residence" basis — according to the nationality of the firm making profit, regardless of the location of the economic activity — or on a "source" basis — according to the location of the economic activity, regardless of the nationality of the firm — or any combination of both. This variety of corporate tax systems is then multiplied at the bilateral level, with thousands of existing tax treaties. (see Gadžo (2018) or Devereux, Auerbach, et al. (2021) Chap 1). Among the diversity of tax rules, the dominant feature is the separate accounting system.

The separate accounting system is characterised by a source base principle, with the source being the origin of the economic activity. This means that the basis for corporate tax income is the country in which production takes place, regardless of the "destination" of the product, *i.e.* the country in which the product is sold. While this notion is relatively straightforward for firms that are only active in a single country, e.g. a Dutch firm producing a good selling to a wholesale importer in France, it becomes more complicated when the firm producing the good is established in several countries, as is increasingly the case for international trade. Cadestin et al. (2018) find that 50% of trade is made by MNEs and UNCTAD (2013) finds that 80% of global trade is "coordinated" by MNEs — this figure includes sales to final consumers, intra-group sales and sales between entreprises linked by licensing, franchising or other binding forms of contractual relationship. The separate accounting system is extended for MNEs by using the arm's length principle for intra-firm trade. This principle states that transactions between affiliates of the same MNE should be treated as having a price matching what it would have been if the transaction had taken place between independent entities. If an MNEs builds cars in the Netherlands but makes the tyres in Germany and shifts them to be assembled in the Netherlands, the basis for profits taxed

in the Netherlands will be the profits minus "what it would have cost to buy tyres from a German exporter", while the basis for the profits in Germany will be this amount net of all operating costs.

The separate accounting system and the nexus of tax treaties leave plenty of room for MNEs to manipulate their accounts in order to book profit in low-tax jurisdictions, a practice called profit shifting. Another important consequence of such a system is that it pushes countries to lower their corporate tax rates in order to attract capitals at the expense of other countries. This practice is called corporate tax competition.

Profit Shifting Profit shifting can take place through a series of channels. Beer, Mooij, and Liu (2020) list seven main techniques used by MNEs to displace profits into low tax jurisidictions. The first one is through the manipulation of transfer pricing — *i.e.* by manipulating the price of intra-trade transfers so that the arm's length principle attributes profits to the low tax jurisdiction. The second one is through locating intellectual property assets (patents, trademarks etc.) in low tax countries so that royalty payments accrue to tax havens. The third one is through intra-company loans, with affiliates from high tax jurisdictions borrowing to affiliates from low tax jurisdictions. The fourth one is "treaty shopping", exploiting the complex legal environment to find loopholes allowing not to pay tax. The fifth one is risk transfer, using contracts to limit the profits associated to activities in high tax jurisdictions. The sixth one is through avoiding legal presence in high tax countries even when sales are performed there (absence of permanent establishment). The seventh one is through using low tax countries to perform asset sales in order to pay less tax on capital gains.

The profit shifting behaviour of MNEs has been the focus of economists for a quarter of a century. One of the first milestones in this literature is Hines and Rice (1994). In their study of the profit shifting behaviour of American MNEs, they uncover evidence of profit shifting through micro analysis of a number of companies. Desai, Foley, and Hines (2006) extend this analysis of US businesses and offer a typology of tax havens by size. They also find factors associated with the use of tax havens by MNEs. Companies with large intra-firm trade and high RD expenses are more likely to engage in profit shifting. The size of a company is also shown to be a good predictor of recourse to tax avoidance. Also using micro data from American MNEs, Clausing (2016) provides an estimate of profit losses caused by profit shifting for the US Treasury. She finds that between $77 and $111 billion of corporate tax revenue were lost in 2012, and that this quantity is only increasing

over time. Gumpert, Hines, and Schnitzer (2016) study tax avoidance for German businesses and find that while a sizeable amount of profits are shifted, there are significant costs to profit shifting and only the largest companies engage in such behaviour.

In addition to this micro-literature, authors have also tried to estimate the amount of profits lost to tax avoidance at a global scale using aggregate statistics. Crivelli, de Mooij, and Keen (2016) use a regression-based approach to estimate profit shifted globally. They find that $650 billion are shifted every year at the world level. Using a similar methodology with different specifications, Cobham and Janský (2018) find an overall amount of $500 billion. These figure are of the same order of magnitude as the ones computed by Tørsløv, Wier, and Zucman (2018) using data on the profitability of the affiliates of MNEs to find that $616 billion are shifted annually. The same paper provides another measure of shifted profit through the analysis of bilateral trade statistics and finds that $646 billion are shifted globally. Using a comparable "misalignment of profits" approach, Cobham, Garcia-Bernardo, et al. (2020) find a much larger estimate of $1.38 trillion. Laffitte and Toubal (2019) use macro data on US MNEs to find that foreign sales platform (corresponding to the sixth channel aforementioned) account for $80 billion of shifted profits. These measures are sometimes difficult to compare because they may not always take the same definition for shifted profits, and use different counterfactual. For a more exhaustive presentation of the literature on tax avoidance, see Beer, Mooij, and Liu (2020).

Tax Competition As opposed to profit shifting, tax competition entails actual movement of capitals and production processes towards lower tax jurisdictions in order to limit the amount of corporate income tax paid by companies. This means that tax competition does not concern only MNEs but any kind of firm. A French firm producing goods for the French market could decide to relocate to Germany where the corporate tax rate is lower. Of course, when it comes to real economic processes, the corporate tax rate cannot be the sole factor for investment decisions. The broader tax system, labour productivity, trade barrier costs and closeness to the final market also play a major role (for a synthesis on the determinants of foreign direct investments (FDIs) see Yeaple (2003), Antràs and Yeaple (2014)). It has been the focus of the literature to try to distinguish between these effects and identify the role of corporate tax rates.

From a theoretical point of view, tax competition can be defined as "any form of noncooperative tax setting by independent governments" (Wilson and Wildasin (2004) p.1066). The first theoretical

model for such game was created by Zodrow and Mieszkowski (1986), which conclude that movement of capital entails a much lower equilibrium corporate tax rate than under autarky. This basic workhorse model was enriched by Wilson (1999) to show that smaller countries have a stronger incentive to cut tax rates and by Devereux, Griffith, et al. (2002) to show that even when accounting for different fiscal tools, the competitive equilibrium entailed a "race to the bottom".

These results seem to be confirmed by the global decrease of corporate tax rates in the world over the last fifty years (OECD, 2020). Because of the strategic interactions between countries and the score of other factors when it comes to investment decisions, it has nevertheless proven challenging to identify the role of tax competition in this decline. There nevertheless seems to be evidence that tax competition plays a significant role (Devereux, Lockwood, and Redoano, 2008; Overesch and Rincke, 2011). While some papers find more mixed results e.g. Chirinko and Wilson (2017), the meta analysis of 33 previous estimates by Heimberger (2021) finds a tax rate elasticity of 0.8, meaning that "a one percentage point decline in corporate tax rates in competitor jurisdictions is, on average, associated with a fall in the corporate tax rate at home by about 0.8% – with the 95% confidence interval ranging from 0.7% to 0.9%"(p.12)

Tax competition and profit shifting are closely linked, and the border between both is extremely porous. The shifting of intangible assets to tax havens can be associated with real economic activity — financial services, governance and administration services etc. — and the distinction between both has to be made explicit by authors when trying to measure them. Tørsløv, Wier, and Zucman (2018) and Cobham and Janský (2018)for example define excess profits by the differential of profitability between domestic firms and foreign affiliates in a country. This assumption may not hold if the most profitable firms are the one who use profit shifting and tax competition-driven FDIs the most. For this reason, other estimates such as Crivelli, de Mooij, and Keen (2016) and Cobham and Janský (2018) do not discriminate between fiscal losses due to profit shifting and those due to tax competition.

Alternative Tax Systems These features of the current international tax system have pushed economists and legal experts to imagine reforms of the current tax system or to design alternative systems. The main reformist approach is promoted by the BEPS. The initiative started in 2013 and aims to address the main issues of international taxation — mainly tax planning by MNEs — without significantly altering the current system (OECD, 2013). In addition to a series of more

technical "actions" to address some profit shifting planning, the project is built around two "pillars" (OECD (2021)): pillar I consists in having part of the profits allocated to to the destination country, while pillar II states that all profits should be taxed at a minimum tax rate. If this tax rate is not applied by the origin country, as is the case for tax havens, the tax revenues should accrue to the residence country of the parent company. These measures should apply only to the largest MNEs.

Scholars have also proposed more radical overhauls of the international tax system. In particular, in order to tackle the inefficiency caused by tax competition and profit shifting, economists have proposed to use a less mobile tax base. As a generalization of pillar one, this has generated a class of destination-based systems. A recent proposal is for example Auerbach (2017), which combines a destination based principle and cash-flow tax base[1], a proposal for which expected fiscal revenues for the US have been computed by Hebous et al. (2019) based on US MNE micro data. In this work, I explore the scenario of a move to a destination based system at the global level using macro data. Another class of tax systems stems from the generalisation of pillar II (see for example Barake et al. (2021) for the exploration of tax revenues in a source-based system in the European Union.

In a world in which MNEs account for an increasing part of international production, the notion of origin country as the basis for profit is unsatisfactory. Indeed, when production takes place between different countries, attributing a share of the profits to a country according to the arm's length principle can make no economic sense. If factors settled in different countries interact in a non-additive way (with a Cobb-Douglas function with non-linear return to scale for example), there is no good way to attribute a share of profits to each factor as there is a residual profit, or surplus, not linked to any jurisdiction. In order to tackle this issue, a popular approach is the Global Formulary Apportionment approach (GFA). Advocated by Avi-Yonah (2008) or more recently Krever and Vaillancourt (2020), the idea is to compute total profits at the MNE scale and then to apportion them to all countries in which the company is active according to a apportionment formula. This formula can be based on production (origin based), on sales (destination based), or on any other factor or combination of factor (see Seco Justo, 2020).

The inadequacy of the current tax system is well documented but the way to solve its problems is still an open debate. In this paper I explore different tax scenarios that offer solutions to tax

[1] A cash-flow tax base means that the tax base is the net revenue of the corporation — there is no deduction for capital depreciation but investment expenses are counted as expenses and therefore receive full tax credit. For more details see Meade (1978)

competition and profit shifting in order contribute to this discussion. Knowing what countries have to gain or to lose in different scenarios is key to framing and understanding the position of the different actors of this discussion.

2 Methodology and Sources

2.1 Methodology

2.1.1 Underlying Production Model

I consider a globalised production system in which any good (indexed by k) sold in any country (indexed by j) can be produced in any combination of countries, consistently with the Global Value Chains (GVC) framework. Let the total value added of this good be noted VA^{kj}. The global distribution of value added for this good can be written:

$$VA^{kj} = VA_1^{kj} + VA_2^{kj} + ... + VA_n^{kj} \tag{1}$$

Where VA_1^{jl} is the value added produced in country 1 for the good k in country j and there are n countries in total. Note that if country i does not participate in the production of the good, the framework is unchanged and we simply set $VA_i^{kj} = 0$

In each country, the value added is shared between labour and capital. The capital share net of depreciation of capital corresponds to the profits booked in the country for the sales of good k in country j. If total profits made with this good are denoted Π^{kj} and distributed as follows:

$$\Pi^{kj} = \Pi_1^{kj} + \Pi_2^{kj} + ... + \Pi_n^{kj}$$

They can be rewritten

$$\Pi^{kj} = \tau_{k,1} VA_1^{kj} + \tau_{k,2} VA_2^{kj} + ... + \tau_{k,n} VA_n^{kj} \tag{2}$$

Where $\tau_{k,1}$ represents the profit rate of industry k in country 1. Note that this decomposition is only available for goods that are produced by corporations. If other sectors or other forms of ownership are involved in the production process, a first step must breakdown value added between

corporate and non corporate entities and recover profits for corporations in a second step.

By taking the sum over all products, one obtains the amount of profits booked in country i for sales in country j: Π_i^j.

This production model is designed to follow the categories of national accounting and is a good depiction of a production process in which all industries produce a single good and therefore the notion of profit associated to a good is straightforward. In reality, multinational firms will combine inputs in different countries to produce a variety of goods, and assigning a proportion of the profit for a good sold in a given country to another country may prove difficult (cf. supra). There nevertheless exist sophisticated methods applied by fiscal authorities to associate a place of profits with products, the most common one being transfer pricing monitoring. Corporations have to produce balance sheets at the country level, which are then reported in the National Accounts. This allows us to carry our analysis.

2.1.2 Tax Systems

This simple framework can be used to describe the taxable profits in a variety of tax systems and then match them with international national accounting data.

General systems. They are designed to work in a similar fashion for domestic firms selling abroad and MNEs.

Separate Accounting. This system is the one currently in place. The tax base is the quantity of profits associated with production in the country, regardless of where the sales take place and of the structure of the company. In this system, the corporate tax base for country l is:

$$\sum_{j=1}^{n} \Pi_l^j$$

Destination Based Taxation. This system is the one in which all profits associated to sales in a country are to be taxed there. In this system, the corporate tax base for country l is:

$$\sum_{i=1}^{n} \Pi_i^l$$

Residual Profit Taxation. This system is a hybrid between the first two systems. The default

tax base is origin based as in the separate accounting case. In order to secure a minimum tax rate for all corporations, profits booked in a producing country where the tax rate is below the tax rate of the destination country will be taxed in the destination country at the differential rate between both countries. In this system, the corporate tax base for country l is:

$$\sum_{j=1}^{n} \Pi_l^j + \sum_{i=1}^{n} \Pi_i^l \max\{\frac{\tau_l - \tau_i}{\tau_l}, 0\}$$

MNEs Custom Systems are designed especially for multinationals, in order to take into account the fact that profits made within an MNE cannot always easily be allocated to a single country or a single good. The underlying production model can be modified to take into account MNEs. A good can be partly produced by MNEs and partly produced by domestic firms. I denote by $\tilde{VA}_i^{kj}$ the value added share by an affiliate of any MNE settled in country i for the production of good k in country j. $\hat{VA}_i^{kj}$ is the value added share by a domestic firm in country i for the same good. Equation 1 rewrites:

$$VA^{kj} = \hat{VA}_1^{kj} + \tilde{VA}_1^{kj} + ... + \hat{VA}_n^{kj} + \tilde{VA}_n^{kj}$$

GFA. GFAs allocate a portion of total multinational corporate profit according to to an apportionment rule. In this system, the corporate tax base on MNEs for country l is:

$$\omega_l \sum_{i=1}^{n} \sum_{j=1}^{n} \tilde{\Pi_i^j}$$

Where ω_l is the apportionment factor. In the Result Section, I evaluate this scenario with an apportionment factor equal to the share of value added sales, which is an approximation of a sales based GFA. In this case, ω_l is defined as follows:

$$\omega_l = \sum_{i=1}^{n} \tilde{\Pi_i^l} / \sum_{i=1}^{n} \sum_{j=1}^{n} \tilde{\Pi_i^j}$$

GFA on Untaxed Profits. In a similar fashion to the Residual Profit Taxation System, the GFA can be implemented only on untaxed profits in order to ensure a minimum tax rate for MNEs.

In this system, the corporate tax base on MNEs for country l is:

$$\sum_{j=1}^{n} \tilde{\Pi_l^j} + \omega_l \sum_{i=1}^{n} \sum_{j=1}^{n} \tilde{\Pi_i^j} \max\{\frac{\tau_l - \tau_i}{\tau_i}, 0\}$$

Minimum Tax Rate. The Biden proposal of a 15% minimum tax rate paid to the country of origin of the MNE can be expressed in this framework. In this system, the corporate tax base on MNEs for country l is:

$$0.15 \sum_{i=1}^{n} \sum_{j=1}^{n} \tilde{\Pi}_{i,l}^{j} + \sum_{j=1}^{n} \tilde{\Pi_l^j} \max\{\frac{\tau_l - 0.15}{\tau_l}, 0\}$$

2.2 Empirical Strategy - The GVC Approach

In this section I layout my approach to estimate the corporate tax base using existing bilateral trade balance and national statistics for a selection of countries.

2.2.1 Recovering the Value Added Decomposition

I follow the GVC methodology as developed by Johnson and Noguera (2012). It consists of an adaptation of the input-output Leontief framework to international tables.

Let the economy be composed of n countries and m industries. There are $n \times m$ country-industries that combine intermediate inputs from other country-industries with a constant return to scale technology. If i and j are used to index countries and k and l to denote industries, the technical coefficient (a_{kl}^{ij}) corresponds the amount of input from industry k in country i used by industry l in country j to produce one dollar worth of output. Let A be the $nm \times nm$ matrix of technical coefficients, the total quantity of intermediate consumption for total demand X is AX. For the final demand vector Y of dimension $nm \times 1$ (one line per country-industry), the total consumption vector X follows the following identity:

$$X = AX + Y \iff X = (I - A)^{-1} Y$$

The first equality simply states that the total output is equal to intermediate consumption plus final demand. The second equality is Leontief's important equation, with $(I - A)^{-1}$ being called

the Leontief inverse matrix[2], oftened denoted with the letter B.

For a given industry in a given country, multiplying the total output by a value added coefficient equal to the difference between total production and intermediate consumption divided by total production allows to recover the value added created by this country. Formally, the coefficient va_l^j is defined by $va_l^j = \frac{X_l^j - IC_l^j}{X_l^j}$ where X_l^j is the total output of industry l in country j and IC_l^j the total intermediate consumption for this industry. At a matrix level, let VA be the $nm \times 1$ vector of value added per country-industry. The following relationship holds:

$$VA = V(I - A)^{-1}Y$$

with V the diagonal matrix of the va_l^j value added coefficients. This approach allows to compute the value added distribution for any good and country demand. If we denote by Y^F the final demand vector for France, we get

$$VA^F = V(I - A)^{-1}Y^F$$

And the sum over goods for each country allows to recover equation 1 for the case of France : $VA^F = VA_1^F + VA_2^F + ... + VA_n^F$.

2.2.2 Estimating A, Y and V

The main aggregates necessary to compute value added decomposition can be recovered by combining domestic Input-Output tables as well as bilateral trade balance on a systematic scale. I present in Table 1 a synthetic table inspired by Koopman, Wang, and Wei (2013). It shows how the different aggregates are recovered from the global input-output table. For readability issues, the table will display a two-country (A and B) and two-industry (1 and 2) economy.

The WIOD database The World Input-Output Database (WIOD) is a world input-output table computed by Timmer et al. (2015). I use the latest release, published in 2016 with data from the year 2000 to 2014. The WIOD provides a full intermediate consumption table for 43 countries and

[2]The series decomposition of B is $B = (I - A)^{-1} = I + A + A^2 + A^3 + ...$ This can be interpreted as the fact that you first need to produce the quantity in the final demand vector (IY), then the intermediate consumption for this quantity (AY), then the intermediate consumption for the intermediate consumption ($A(AY) = A^2Y$) and so on and so forth.

Table 1: Synthetic description of a World Input-Output Table

		A		B		Y		X
		1	2	1	2	A	B	
A	1	IC_{11}^{AA}	IC_{12}^{AA}	IC_{11}^{AB}	IC_{12}^{AB}	Y_1^{AA}	Y_1^{AB}	$X_1^A = \sum_{i,j} IC_{1i}^{Aj} + \sum_j Y_1^{Aj}$
	2	IC_{21}^{AA}	IC_{22}^{AA}	IC_{21}^{AB}	IC_{22}^{AB}	Y_2^{AA}	Y_2^{AB}	$X_2^A = \sum_{i,j} IC_{2i}^{Aj} + \sum_j Y_2^{Aj}$
B	1	IC_{11}^{BA}	IC_{12}^{BA}	IC_{11}^{BB}	IC_{12}^{BB}	Y_1^{BA}	Y_1^{BB}	$X_1^B = \sum_{i,j} IC_{1i}^{Bj} + \sum_j Y_1^{Bj}$
	2	IC_{21}^{BA}	IC_{22}^{BA}	IC_{21}^{BB}	IC_{22}^{BB}	Y_2^{BA}	Y_2^{BB}	$X_2^B = \sum_{i,j} IC_{2i}^{Bj} + \sum_j Y_2^{Bj}$
Total Intermediate Consumption		$IC_1^A = \sum_{i,j} IC_{i1}^{jA}$	$IC_2^A = \sum_{i,j} IC_{i2}^{jA}$	$IC_1^B = \sum_{i,j} IC_{i1}^{jB}$	$IC_2^B = \sum_{i,j} IC_{i2}^{jB}$			
Value Added		$VA_1^A = X_1^A - IC_1^A$	$VA_2^A = X_2^A - IC_2^A$	$VA_1^B = X_1^B - IC_1^B$	$VA_2^B = X_2^B - IC_2^B$			

56 sectors as well as estimates for the rest of the world. These 53 countries cover more the 85% of the world's GDP with data for all countries of the European Union as well as other large economies: Australia, Brazil, Canada, China, India, Indonesia, Japan, Mexico, Norway, Russia, South Korea, Switzerland, Taiwan, Turkey, the United-Kingdom and the United States.

The table is built by compiling and harmonising national supply and use tables to compute the bloc diagonal part of the matrix. The authors then use bilateral trade statistics and check their two-by-two consistency and use a proportionality hypothesis to apportion the imports in each sector between the different uses (final and intermediary consumption). The rest of the world (ROW) is finally constructed by aggregating results for the 53 other countries. The specificity of the WIOD compared to other existing world input-output tables is that the authors give primacy to National Account Statistics. This means that all values in the table will be consistent with National Account values for a given year[3]. Moreover, the table is built in compliance with the most recent System of National Accounts (SNA) before using optimisation routines when necessary. This contrasts with other existing database such as Eora or EXIOBASE, which make use of all the information available and use optimisation algorithm to fill in the gaps and deal with the discrepancies. The latter approach allows to have a larger number of country and a finer decomposition but often loses consistency with National Accounts. I have chosen the WIOD in order for aggregates to be consistent with the other data sources necessary for my estimation. This means that a large number

[3]Of course when there are bilateral discrepancies in the trade balance, a priority rule must be devised.

of tax havens will be absent from the database and that a large proportion of shifted profits will be missing in the data. I believe that it does not make the estimation irrelevant for two main reasons. Firstly because the main European tax havens (Ireland, Luxembourg, Switzerland and the Netherlands) are present in the database, which means that estimates will tend to incorporate shifted profit well for European countries since tax evasion for them is mostly performed in one of these tax havens. Secondly, my main estimate for destination based taxation focuses as much if not more on tax competition than on tax evasion, for which the essential part of the database are the main global economies, present in the database.

One of the main limitations of the WIOD is the proportionality assumption. Because national supply and use tables do not separate between domestic and imported intermediary consumption, the separation of imports has to be imputed. The assumption in this table is that imports are used in a similar fashion as domestic inputs. As put by Johnson (2017), this implies that Japanese steel is used in the US exactly as Canadian steel. At a relatively aggregated nomenclature as in the case in the WIOD, this assumption is likely not to hold. This implies that value chains might be biased, although the direction of the bias is hard to predict.

2.2.3 Estimating Corporate Shares, Profit Rates and Tax Rates

Corporate Shares The corporate share in value added is defined as the share of corporate value added in total value added in an economy (corresponding to the GDP). I use a measure of corporate share by country and distinguish between corporate share for domestic use and corporate share for foreign use. Since there are no accounts by sector for trade statistics, it is impossible to derive the corporate share for exports from national account sources. I have made the assumption that this share is 100%. Indeed, most companies engaging in international trade are large and even state-related exports such as weapons or administrative services are either small or operated through state-owned corporations. This assumption does not impact the overall corporate share because I derive the corporate share for domestic use in a way that ensures that the overall corporate share is aligned with the national account data[4].

[4]If VA_C denotes total corporate VA, VA_C^D denotes the corporate VA for domestic use, VA_C^F denotes the corporate VA for foreign use, with GDP, GDP^D and GDP^F defined in a similar fashion, one can derive the quantities of interest from available corporate share VA_C/GDP:

$$\frac{VA_C^D}{GDP^D} = \frac{VA_C - VA_C^E}{GDP^D} = \frac{VA_C}{GDP}\frac{GDP}{GDP^D} - \frac{VA_C^E}{GDP^E}\frac{GDP^E}{GDP^D}$$

Profit Rates. In the SNA, the production account is structured as follows. For a given sector, the Output O corresponds to the total output of the sector. Value added VA is defined by total output minus intermediate consumption IC. Net Value Added (NVA) is defined as the value added minus Capital Depreciation (D). Net Value Added is then allocated between Labour Compensation (L) and capital compensation (Net Operating Surplus NOS). Gross Operating Surplus (GOS) is defined as the Net Operating Surplus plus Capital Depreciation. These relationships are summarised in the following accounting equalities:

$$O - IC = VA = L + \underbrace{NOS + D}_{GOS}$$

The definition of taxable profit is not perfectly aligned with national accounting definitions. In the general case under separate accounting, the corporate income tax base (TI for taxable income) is defined as follows:

$$TI = NOS + NI + ITCB + RTCB$$

With NI standing for Net Interest Payments, $ITCB$ standing for Investment Tax Credit Base and $RTCB$ standing for Research Tax Credit Base. The tax base corresponds to corporate revenues ($NOS + NI$) minus research and investment deduction. While the former appears in national accounts, investment and research tax credit schemes vary greatly from country to country and contribute to the difficulty to compute corporate tax rates. Furthermore not all interest payments are deductible[5], which means that taxable income is not directly observable in the National Accounts.

I have chosen to use Net Operating Surplus as the proxy for corporate profits because it corresponds best to a real economic measure of profit. Adding interest payments indeed makes the measure of profits highly dependent on the financing structure of the firm. Indeed, two identical firms, one financed by equity and one financed by loans can have entirely different revenues because of interest payments even though they perform the exact same economic activity and should therefore be considered equally profitable. This is the reason why intra-firm interest payments are widely used by MNEs in order to avoid corporate taxation (see Section 1).

Since value added derived from the World Input-Output approach is gross of capital depreciation, the profit ratio τ from equation 2 corresponds to NOS/VA for the corporate sector. It differs from

[5]In some cases, corporate tax is paid gross of interest payment and corresponding tax credit is made for interest payment revenues for the lenders to avoid double taxation.

most common measures of profit rates because it corresponds to net profits over gross value added while a more intuitive measure would be the share of net profits in net value added which correspond to the capital share of income[6].

Tax Rates There is no single measure — and one could surely add that there is no single *good* measure — of corporate tax rates. The most straightforward measure of corporate tax rates certainly would be the statutory tax rate (STR), *i.e.* the tax rate defined by law. It nevertheless proves to be a very an impractical measure. Firstly because statutory tax rates can be defined marginally by level of income, in which case the highest marginal statutory tax rate is often used, but mostly because the tax base varies a lot from country to county as highlighted in the previous paragraph. In order to overcome this issue, one can compute effective tax rates (ETRs). The OECD for examples computes an EMTR (Effective Marginal Tax Rate), which corresponds to the extent to which taxation increases the user cost of capital [7], and an EATR (Effective Average Tax Rate), which corresponds to the difference between pre and post-tax profit relative to pre-tax profit. These measures of profits nevertheless suffer from the fact that they are not computed with existing data but rather on the expected profitability of virtual investments in a given country. They do not reflect well the profitability of capital stocks by focusing on investments. In order to take into account all of the existing capital stock, I use a national accounting oriented definition of corporate tax rate by dividing total corporate tax income by total corporate profit. This is called for by the choice of model[8] but I also find it to be the most intuitive and comprehensive definition of corporate tax rate. It makes all countries easily comparable and is much more straightforward and tractable than forward ETR such as the one computed by the OECD. This methodology is comparable to the use of Bureau of Economic Analysis (BEA) data on the affiliates of US MNEs to compute effective tax rates (e.g. Cobham and Janský (2018), Tørsløv, Wier, and Zucman (2018)) but is more suited to the analysis of entire economies. I present in the Appendix a comparison of these different measures (Figures 10, 11 and 12 and Table 4).

[6]Such an example of profit rates can be found at Corporate Profit Share. I have ensured that my approach is consistent with existing exploitation rates — see Table 3 in the Appendix.

[7]Consult OECD Corporate Trade Statistics for details.

[8]The corporate tax rate t has to be such that corporate tax revenues T must be equal to

$$T = t \times \Pi \iff t = \frac{T}{\Pi}$$

Data Sources Measures for the Total Output, Intermediary Consumption, Capital Depreciation and Operating Surplus are all taken from OECD and Eurostat databases. In the rare cases where there were discrepancy between the two bases, priority was given to OECD data since they are the one used in priority to build the WIOD.

Measures of corporate tax revenues are collected from the OECD, and individual government budgets. They are particularly subject to caution because of the way tax credits are accounted for. Some countries — like France — report the corporate income tax revenue gross of tax credit and other report only the net tax revenue. I have tried to make sure that I only use tax revenues net of tax credit but the information on the content of the category is not always easy to get.

Missing Data Unfortunately, some countries are missing from the data sets, in particular for measures of the depreciation of capital or fiscal revenues. When I have been able to compute the profit ratio for non financial corporations with the detailed non financial account data, I have approximated the profit rate of all corporations by the profit rate of non-financial corporations. (The list of countries and justification for this choice can be found in the Appendix, Figure 13). In countries for which depreciation of capital was missing, I have computed the Gross Operating Surplus to Gross Value Added ratio and used the existing information to predict the wanted profit ratio. Finally, in countries for which no information was available, I have chosen rates of similar countries for which information was available. For rates of corporate value added to total value added, the same countries were used to approximate missing values. The list of missing countries and replacement can be seen in table 5 in the Appendix.

I was unable to compute the corporate tax rate for a number of countries. Plotting the graph of corporate profit rates as a function of corporate tax rates shows that there is a very strong relationship between both variable (see Figure 2). As a matter of fact, the tax rate is explained much better by the profit rate than by the statutory tax rate or by the effective tax rate. This interesting results points to the fact that statutory and effective tax rates prove to be poor measures of the corporate tax burden, with companies being able to navigate the tax system to pay vastly different amount of taxes than would be described by these numbers. I have therefore used the relationship to predict the tax rates in countries for which it was missing (see details in Appendix, Table 6).

2.2.4 Incorporating MNEs

For the scenarios that treat differently MNEs and non MNE corporations, I decompose corporate value added into MNE and non MNE share. MNEs are composed of domestic MNEs as well as affiliates of foreign MNEs. I operate the breakdown at the national level with a distinction between domestic use production and foreign use production. I also allow for different profit rates for MNEs. Data on relative profit rates for MNE and non MNE corporations are from Tørsløv, Wier, and Zucman (2018), Table 4 in the Appendix. .

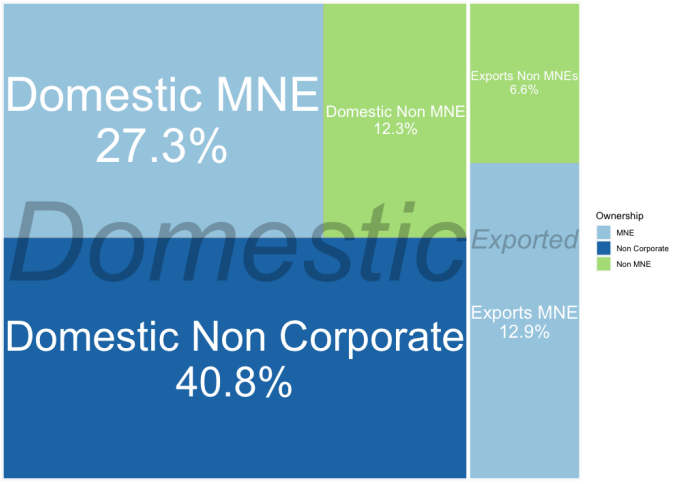
The Analytical AMNE Database. All data on the distribution of value added for MNEs is taken from the analytical AMNE database. This database was compiled by Cadestin et al. (2018) from the OECD AMNE (Affiliates of MultiNational Entreprises) database that gathers information on affiliates of MNEs by country of ownership and country of operation. In addition to the AMNE database, analytical AMNE offers a full matrix of the output of foreign affiliates in 59 countries as well as information on domestic MNEs absent from the original database. A variety of other data sources and completion algorithm were used to enrich the original data. It was also designed to match the WIOD, which makes it particularly convenient to use in this work. For domestic markets, it offers a breakdown of output between domestic MNEs, foreign affiliates and other entities. For exports, it only offers a breakdown between domestic MNEs and other entities so I imputed the share of foreign affiliates in exports by assuming that it matched the share of foreign affiliates in domestic production. The value added of corporate non MNEs is simply computed as the difference between total corporate value added and MNE value added. For small countries there were cases were this implied that the share of non MNE corporation in VA was negative. When that was the case, I attributed 20% of all corporate production to non MNE domestic corporations and 80% to MNEs. These type of absurd results points to the fact that these databases are far from being perfect. Not all countries report data on foreign affiliates, and the breakdown between domestic MNE and other type of corporation is even more difficult. As a consequence any estimate of MNE profits is subject to caution. Ownership of MNE shares were computed on the basis of the share of output by nationality of foreign affiliates for all countries. If the global output of affiliates of French MNEs represents $n\%$ of the global output of foreign affiliates for all countries, I imputed that $n\%$ of the value added of MNEs was produced by French MNEs.

The reader should be reminded that this methodology assumes that firms do not adjust to the change in tax system. This assumption is very restrictive and therefore all results in the following section should be interpreted as very short term. In reality, the reaction for profit shifting behaviour would likely be very fast since they do not imply moving real assets. The reallocating production processes as a result of the change incentives (end of tax competition) would take more time.

3 Results

3.1 Summary Statistics

Figure 1: Distribution of Global Value Added



Total output for the year 2014 was $73,807 Billion, with 80.5% of it being produced for domestic use and the rest for foreign use. Table 8 shows GDP by country. Some economies such as India or the US use most of their production for domestic use (resp. 86.5% and 91.1%) while some countries specialise in foreign use production (65.4% for Luxembourg and 55.9% for Ireland). The breakdown for all countries is shown in Table 7. At the world level, 59.2% of all production is made by corporations, of which 40.2% is made by MNEs. Greece has the lowest corporate and MNE share while Ireland has a corporate share of 67%, 95% of which are MNEs. The full breakdown by country is shown in Table 12. A full breakdown is detailed for domestic and foreign use in Table 10 and Table 11. Figure 14 displays the value added breakdown for France in a similar way as the

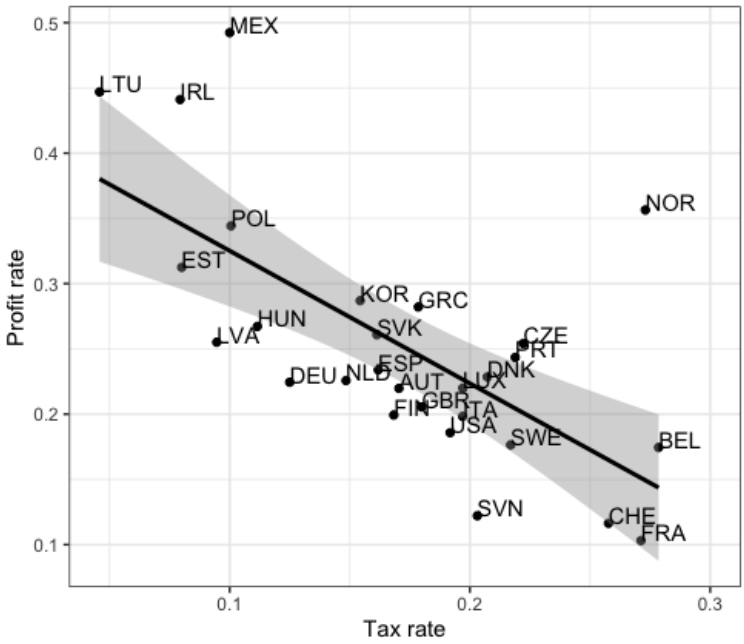
treemap of Figure 1.

In 2014, total corporate profits were of $10,103 Billion or 13.7% of global GDP. 65.7% of total profits are booked by MNEs and the rest by non MNE corporations. Some countries like France have a very low profit share of GDP (6.3%), which is driven by a high share of non corporate value added and a low profit to value added rate. Some countries like Ireland (29.8%) and Mexico (25.2%) have much higher profit to GDP shares. The full table of corporate profits by country and ownership type is shown in Table 13.

The highest results in value added and profit share — for countries like Ireland, Luxembourg, Malta etc. — are largely explained by tax avoidance behaviour of corporations. An artificially high amount of economic activity is reported in these jurisdictions, which combined to an artificially high profit rate allows for a profit to GDP ratio close to 5 times higher in Ireland than in France.

3.2 Profit Rate - Tax Rate Relationship

Figure 2: Profit Rate as A Function of Tax Rate



As shown in Figure 2, there seems to be a very strong relationship between corporate profits and the average corporate tax rate. I find a significant relationship when I estimate it with OLS — a

point estimate of -1.01661 with a standard error of 0.22068 and significant at the 0.0001 threshold. This result is consistent with Garcia-Bernardo, Jansky, and Tørsløv (2019) and Garcia-Bernardo, Jansky, and Tørsløv (2020), who find a similar relationship for affiliates of US MNEs using micro and country-by-country reporting data. I have not seen this relationship discussed at a macro scale although it is closely related to the literature on tax competition and profit shifting. This is certainly partly explained by the fact that the most commonly used tax rates (OECD ETRs and STR) carry little information on the effective tax burden of corporations, especially on the biggest and most profitable ones. As a result, this relationship ceases to be significant when the considered explanatory variables are STR or ETR.

This relationship seems to be in direct contradiction with non-arbitrage reasoning. Indeed, if one assumes that the capital intensity cannot explain the difference in profit rate, which seems particularly reasonable since the most capital intensive countries seem to be on the lower-end of the profit rate spectrum, one would expect that the relationship should be with a positive coefficient. If the capital intensity is the same in two countries (say L for low tax and H for high tax), a non arbitrage conditions dictates that the post tax return of FDIs in both countries should be equal.

Let r_h be the post-tax net return on capital in country H. r_h is such that

$$r_H = \frac{\Pi_H}{K_H}(1 - t_h)$$

with Π_H the pre-tax profit of the project, K_H the amount of capital invested and t_h the tax rate in country H. This can be rewritten:

$$r_H = \frac{\Pi_H}{VA_H}\frac{VA_H}{K_H}(1 - t_H) = \frac{\tau_H}{k_H}(1 - t_H)$$

With τ_H the profit rate in country H and k_h the capital intensity. The same relationship holds for country L so the non arbitrage conditions means:

$$r_H = r_L \iff \frac{\tau_H}{k_H}(1 - t_H) = \frac{\tau_L}{k_L}(1 - t_L) \iff \tau_H = \frac{1 - t_L}{1 - t_H}\frac{k_H}{k_L}\tau_L$$

If we assume that the capital intensity is the same in both countries, we get:

$$\tau_H = \frac{1 - t_L}{1 - t_H}\tau_L \iff \tau_H \geq \tau_L$$

This means that the high tax country should have a higher profit rate than the low tax country, which is the exact opposite of our empirical observation.

This can be explained by corporate tax competition and profit shifting. In the first case, the underlying mechanism is that profitable companies will choose to settle affiliates in countries where the tax is low. This means that there is no market mechanism that counteracts the tax wedge between countries and that companies have significant room to chose low tax countries for production. The second mechanism is purely an accounting fallacy. Production — and therefore profits — are in fact made in high tax countries, but through profit shifting, they are booked in low tax country, artificially increasing the profit ratio in these countries.

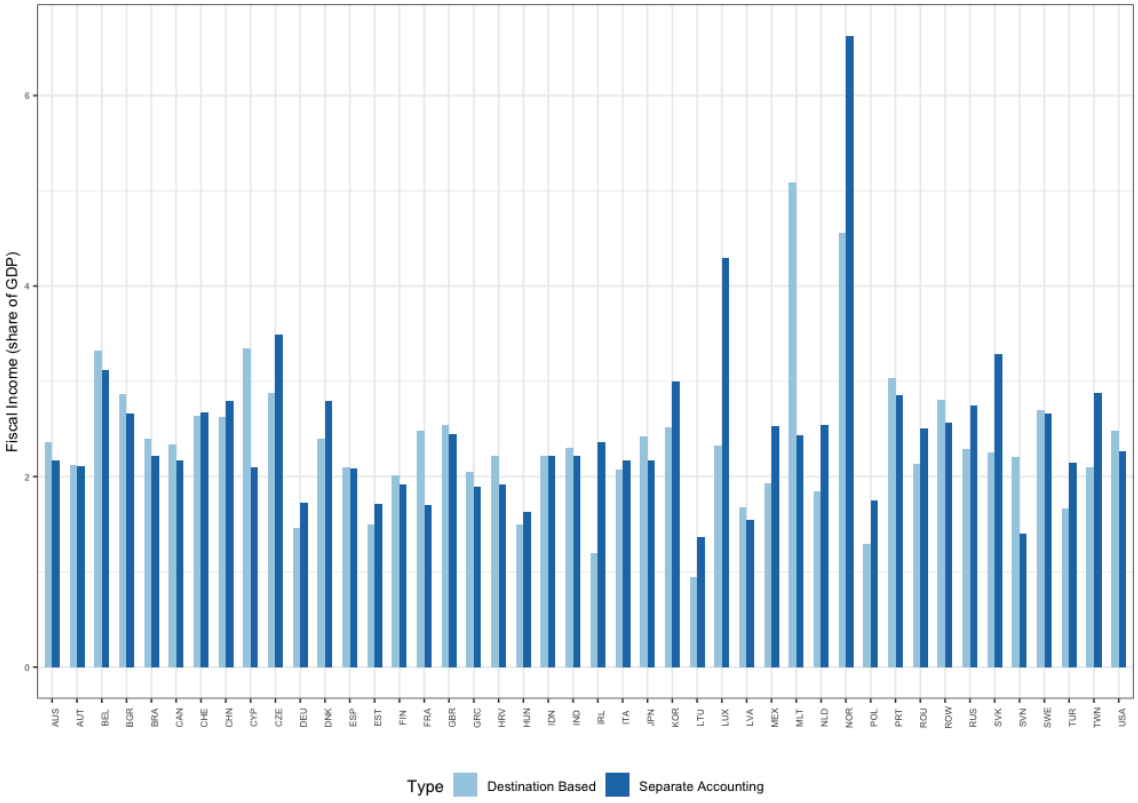
Together with the relatively low correlation between STRs and computed effective tax rates (see Figure 10), this suggests that governments are in a weak position when it comes to demanding that corporations pay the tax that they should remit at the official rate. This constitutes a third channel to the reduction of corporate tax revenues together with base erosion due to profit shifting and the lowering of corporate tax rates driven by tax competition.

3.3 Main Scenario — Destination Based Taxation

In this section, I explore the consequences of a move to a destination based tax system on the tax base and tax revenues of countries. It is important to recall that the shift from an origin based to a destination based system does not change the overall size of the tax base, it just reallocates taxing rights from producer country to consumer country. This means that if some countries see their tax base expand, others will mathematically see theirs shrink. The evolution of corporate tax revenues on the other hand is not necessarily a null sum game. If profits are reallocated to jurisdictions with a higher tax rate, total tax revenues in the new scenario can be higher than in the separate accounting one.

In the separate accounting scenario, corporate tax revenues are of $1,772 Billion, or 2.40% of global GDP. In the destination based scenario, corporate tax revenues are of $1,799 Billion, or 2.44% of global GDP. This represents a minor increase of 1.5%, which suggests that the reform is also close to a null some game when it comes to corporate tax revenue. However, only a minority of tax havens are represented in the WIOD database, with Ireland and Luxembourg being the only

Figure 3: Corporate Tax Revenues for Separate Accounting And Destination Based Scenarios



large ones for corporate profits. This means that some of the shifted profits are invisible in this estimate. Incorporating all tax havens would mechanically increase global corporate tax revenues.

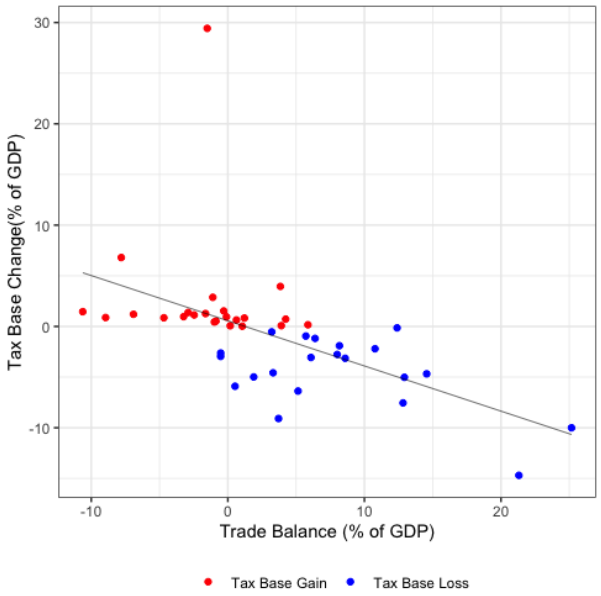
I call "profit balance" the difference between profits made abroad to serve the domestic market minus profits made domestically to serve foreign markets. It represents the tax base change : a negative profit balance means that there are more profits to tax in the destination based scenario and vice-versa. There are two drivers for the sign and magnitude of the profit balance. Firstly, a country will have a large profit balance if it has a a large trade balance. Secondly, a country will have a large profit balance if its profit rate is high compared to the ones of its main trading partners. Figure 3 shows corporate tax revenue for countries in the current separate accounting[9] system and in a destination based system. For a majority of countries, it only represent a minor change, but some countries are highly affected. Countries with the highest loss are tax havens (Ireland, Luxembourg) or countries with a disproportionately high profit rate (Mexico and Norway[10]). Cyprus and Malta see the most dramatic increase because their very small size and high openness means that they are more sensitive to changes. In larger economies countries with low profit rates and a trade deficit are the main winners, France and the US in particular.

Figure 4 shows the relationship between trade balance and the evolution of the tax base when switching to a destination based scenario. While the relationship is strong, profit rates also explain a large part of the final result. As mentioned before, the measured profit rates are likely partly driven by profit shifting by corporations. In the case of a destination based scenario, incentives to shift profits to low tax jurisdiction disappear so one should expect the distribution of profit rates to contract around its average, in turn increasing the role of the trade balance in shaping winner or losers of the reform. The trade balance is nonetheless also affected by tax competition and profit shifting, and therefore likely to change in the case of a switch to a destination based scenario. Fiscally attractive countries get a larger portion of production, in particular for capital intensive

[9]The values for the separate accounting tax revenues are derived from my calculations. They coincide with the values reported by OECD for most countries but for 6 countries there are sizeable differences. They mostly stem from the difficulty to compute effective profit rates. Table 14 in the Appendix presents a comparison of my estimates with OECD values. I chose to work with my estimate instead of OECD because the errors are the same for all tax systems, which makes my estimate more suited for comparison.

[10]In the case of Norway, the considerable amount of corporate profits booked in the country drives a very large separate accounting corporate tax income of 6.1%. This value is very much an outlier but matches the corporate tax income reported by the OECD. It could be that the definition of corporate profit is somehow defined differently in Norway.

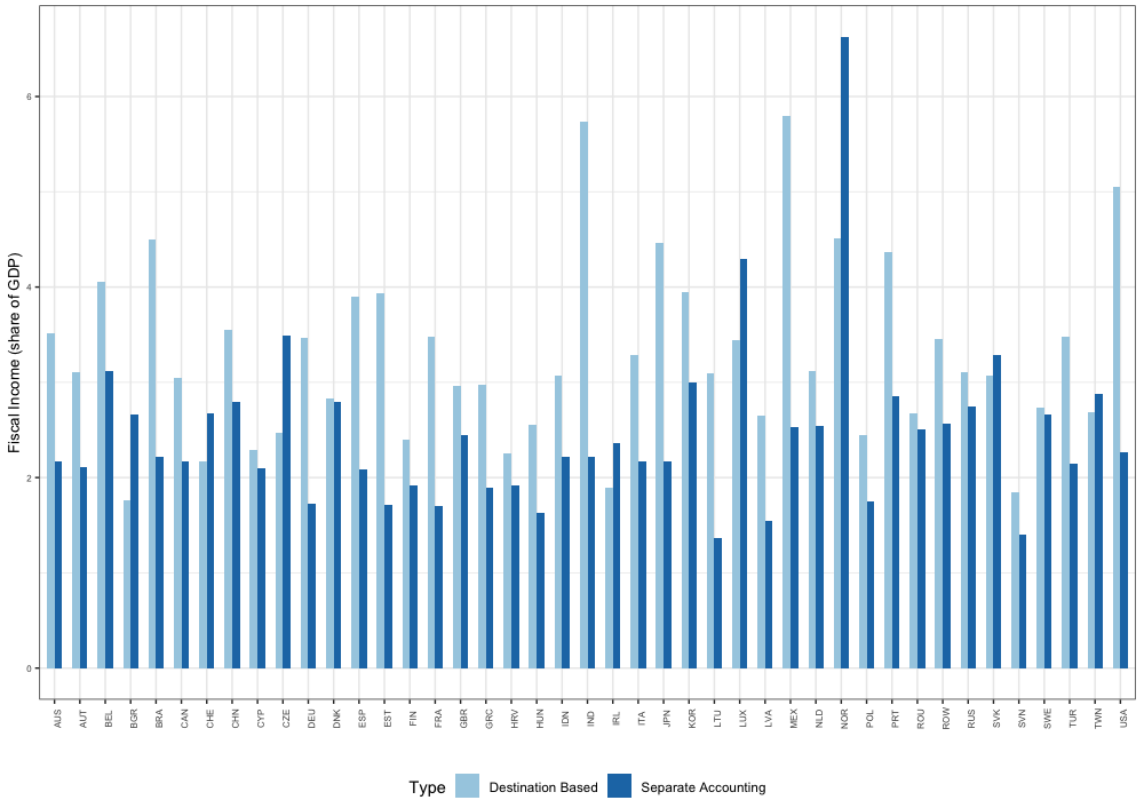
Figure 4: Tax Base Change and Trade Balance



activities. Profit shifting also leads to recording transaction that boost the trade balance in tax havens. This means that a shift to the new system should contribute to closing trade imbalances by limiting tax competition and disincentivising profit shifting.

As seen before, there is a significant gap between the statutory tax rate and the effective tax rate as computed in this dissertation. One reason for that is that the definition of the tax base is not perfectly aligned with the net operating surplus (see Section 2.2.3). Another reason is linked to tax competition and tax avoidance. Countries are not in a position of power to enforce their corporate tax rates (see Section 3.2. MNEs are for example able to navigate the system to obtain tax credits of different sorts and lower their effective corporate tax burden. In a destination based scenario, the immobility of the tax base shifts the balance of power back in favor of governments. In Figure 5, I present the corporate tax revenues in a destination based scenario for which countries country use their statutory tax rate. Current separate accounting revenues serve as a reference. In this scenario, total corporate tax revenues reach $2,928 Billion or 3.97% of global GDP. This represents a 65% increase of global tax revenues. Crucially, it also means that there are much fewer losers from such a change, which might contribute to make it more acceptable.

Figure 5: Corporate Tax Revenues for Separate Accounting And Destination Based Scenarios - STR as Reference



3.3.1 First Mover in a Destination Based Scenario

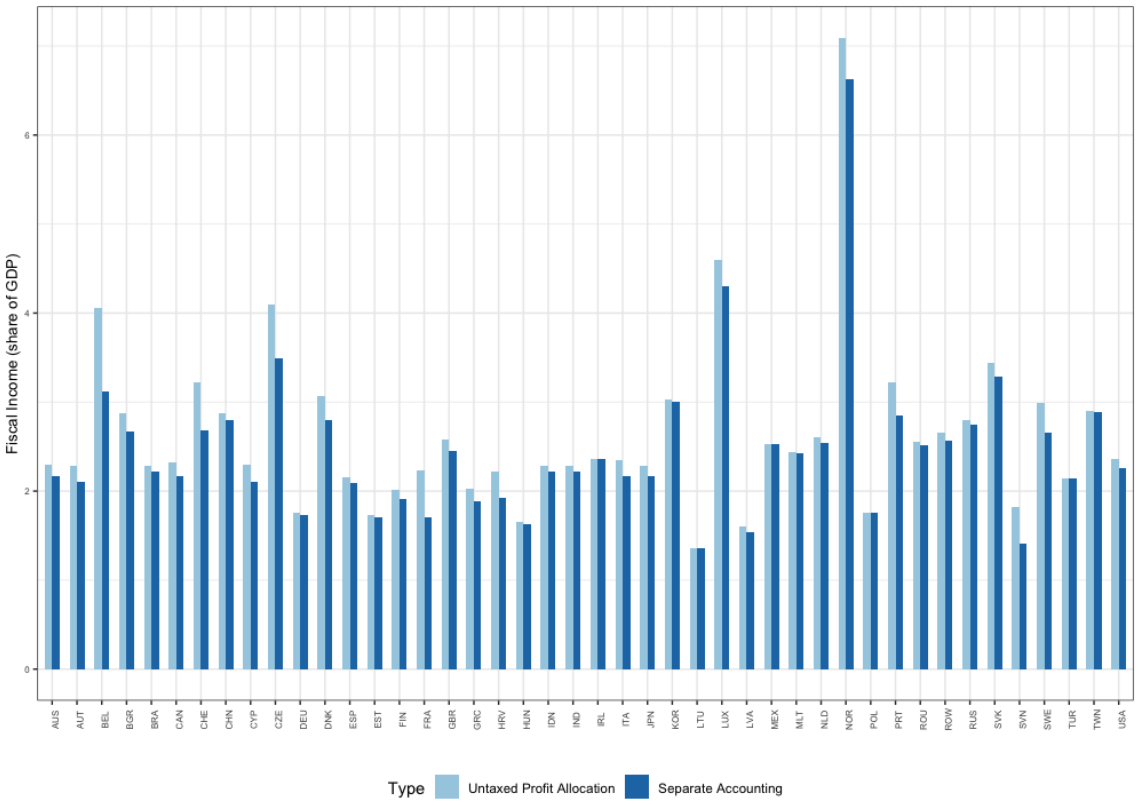
Countries could decide to make the first move to a destination based scenario. However unilaterally deciding to fully change the tax base from origin based to destination based poses a problem of double taxation for profits associated with home consumption and no taxation for the profits made at home or foreign consumption. Indeed, profits booked in a partner country for home consumption would be taxed first in the partner country as part of the origin based scheme and another time in the home country as part of the destination based scheme. Profits made at home for exports should not be taxed at home because their destination is foreign, but will not be taxed in the partner country either, which will lead to no taxation. A way to avoid such a situation would be to continue taxing profits linked with foreign consumption and to tax profits made abroad for domestic consumption at the differential rate between the home tax rate and the foreign tax rate. This is enough to benefit from the main advantages of a destination based system and to curb tax competition and profit shifting incentives.

From the perspective of a corporation selling in the country, the first mover case and the full destination based are similar. They will pay the market country tax rate on all profits made for sales in this country in both cases. However, in the first mover case part of these profits will accrue to the origin country and only the difference will be paid to the destination country. There is also a simple way to move from a first mover scenario to a full or partial destination based scenario. If a new country decides to move to a destination based system, trade between the two destination based countries can be treated in a full destination based way while external trade follows the first mover rule. It is also possible to have all countries choosing to behave in the first mover way without moving to a full destination based system. This is the Residual Profit Taxation system described in Section 2.1.2. In theory, the Residual Profit Taxation system could have two different tax rates for origin and destination based profits to share the tax revenue between origin and destination countries, but this would need to be negotiated because countries have no incentive to unilaterally lower their origin base tax rate[11].

Figure 6 shows the tax revenues in the Residual Profit Taxation system compared to the cur-

[11] Countries could agree to split the tax revenues equally between origin and destination countries. In the situation of trade between two countries which have the same destination tax rate (say 30%), this would mean that the origin rate should be set at 15% and tax revenues would be split equally between destination and origin (15% for origin and $30 - 15 = 15\%$ for destination. However, for trade between countries with different tax rates (one country H at 30% the other L at 20%), the same logic would yield a different distribution for profits made in L to serve H (10% for L and 20% for H) and profits made in H to serve L (15% for H, 5% for L).

Figure 6: Corporate Tax Revenue for Residual Profit Taxation



rent separate accounting system. It corresponds to the first mover to a destination based system revenues. By design, this system has only winners. Indeed the tax base of the separate accounting system is part of the of the tax base in the Residual Profit Taxation system. This makes this system particularly appealing because any country could make a first move towards it, see their tax revenue increase and benefit from the non fiscal positive features of the destination based system. In the Residual Profit system, the total tax revenue would be of $1,858, or 2.52% of global GDP. This represents a 4.8% increase in tax revenue. Figure 15 in Appendix shows the tax revenue in the case where untaxed profits would be taxed at the statutory tax rate. In that case total tax revenues would jump to $3,559.448 Billion or 4.8% of global GDP. It would represent a 100% increase of total corporate tax revenues.

3.3.2 The case of France

One of the strengths of this tax base model using world input output tables is that it allows to recover a profit balance by country pair. Because a switch to a destination based system is a null sum game for the tax base, the profit balance can serve as a measure of "stolen profits" on a bilateral basis. Table 2 shows the share of corporate value added and corporate profits for all products sold domestically for France and its main partners. While France accounts for 62.4% of all corporate value added[12], only 43.5% of profits are booked there. Assuming a constant profit rate, this means that close to 20% of profits are missing.

Table 2: VA and Profit Balance — The Case of France

Partner Country	Share of Corporate VA	Share of Corporate Profits
China	2.7%	3.7%
Germany	5.8%	8.1%
Spain	2.0%	2.8%
France	62.4%	43.5%
Great Britain	2.4%	3.3%
Ireland	0.4%	1.0%
Italy	2.5%	3.6%
USA	3.5%	4.3%

[12]This number is lower than France's 79% share of VA for domestic sales because non corporate value added is exclusively performed domestically, which means that the share of domestic corporate VA is lower than the total share of domestic VA.

Driven by its very low profit rate and a significant trade deficit, the profit deficit of France is very high. This means that France has much to gain from a switch to a destination based scenario. In the current separate accounting scenario, I estimate $43.2 Billion of tax revenue, or 1.7% of GDP[13]. In the destination based scenario, revenues would climb to $63.0 or 2.5% of GDP. This represents a 45.6% increase of tax revenues. The $19.8 Billion extra revenues compare to $13.3 Billion of missing profit tax for France computed by Tørsløv, Wier, and Zucman (2018) in 2017 and to the Barake et al. (2021) estimate of €40 Billion in the case of a 30% minimum tax rate on French owned corporations. In the first mover scenario, France would see revenues climb to $100.6 Billion or 4.2% of GDP. This represents an extra $56.8 Billion dollars and is the most lucrative scenario for France.

3.4 MNE Custom International Tax Systems

I used my input-output model to estimate tax base and corporate tax revenues for the three MNE custom international tax systems presented in Section 2.1.2: GFA with shares based on value added by market country, GFA on residual profits with the same apportionment system, and a minimum tax rate collected by the country in which the corporation is headquartered. These results are shown as a comparison to the main scenario but suffer from the fact that only a limited number of tax havens are present in the WIOD database. While this only represents a minor issue for destination based scenarios because they do not focus mainly on profit shifting but rather explores the impact of a change of tax base, it proves to be more of a problem for MNE custom scenario. MNE custom international tax systems are indeed mainly designed to put an end to tax base erosion and profit shifting by reallocating part of the profits booked in tax havens to non haven countries. In the absence of a lot of tax havens in the database, these estimates should all be considered as a lower bound of tax revenues in these scenarios.

Figure 7 shows tax revenues in the case of a GFA scenario. Most countries see their tax revenue increase or stay stable, with the main winners being large market countries, in a similar fashion to a destination based scenario. Unsurprisingly, the main losers are tax havens such as Ireland or Luxembourg, as well as countries with large current corporate tax revenues. The largest loser

[13]This value is sizeably different to the 2.3% in the OECD corporate tax data because as I recall in Section 2.2.3, the OECD reports corporate tax revenues gross of tax credits. Once adjusting for tax credits, the value matches exactly.

is again Norway because of the considerable amount of corporate profits booked in the country which drives a very large separate accounting corporate tax income of 6.1% (see footnote 10). Like in the destination based scenario, the overall tax base is unchanged by design, profits are simply reallocated to other jurisdictions. In this scenario, global corporate tax revenues are $1,808 Billion or 2.44% of global GDP. It represents a 2% increase compared to the current system. This number is comparatively low compared to profit shifting estimates. This is driven by the fact that I use computed effective tax rates instead of statutory tax rate. When using STRs for MNE profits, the total tax revenue jumps to $2,548 or 4% of GDP. The difference of $776 Billion between the separate accounting and this scenario represents my estimate of shifted profits for our set of countries. This figure is of the same magnitude as the existing estimates presented in Section 1.

Figure 7: Corporate Tax Revenue for GFA

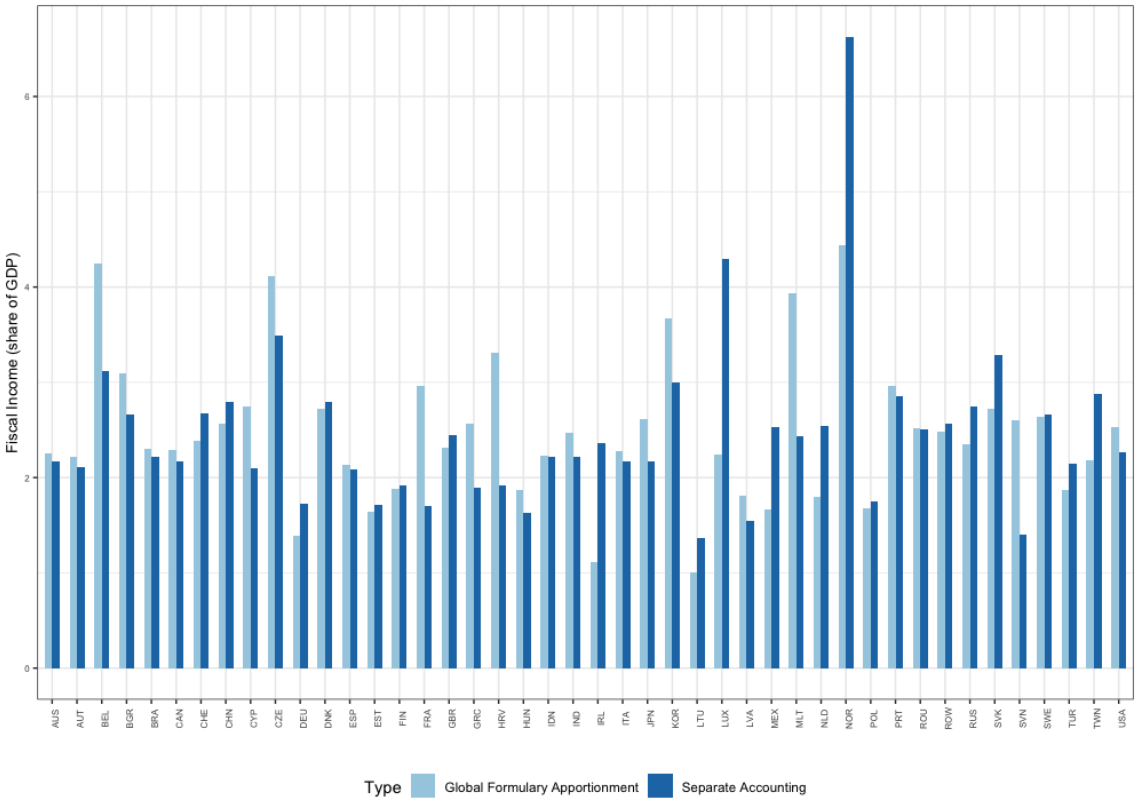


Figure 16 shows tax revenues in the case of a GFA scenario in which only profits booked by MNEs taxed under a reference rate are part of the GFA scheme. I chose this reference rate to be the French effective rate (27.1%). In such a scenario, countries can only see their tax revenue increase because the new tax base includes the separate accounting tax base. Furthermore, the increase is largely driven by the choice of a high reference tax rate, which implies that the tax base increases by a lot compared to the separate accounting scenario. In this scenario, total revenues reach $2,493 Billion or 3.4% of global GDP. Figure 16 in the Appendix shows the result of a GFA on untaxed profits in the case where all profits are taxed at STR rates. In this case, total tax revenues would climb to $2,979 Bn or 4.0% of global GDP.

Figure 8: Corporate Tax Revenue for GFA on Residual Profits - French Rate as Reference

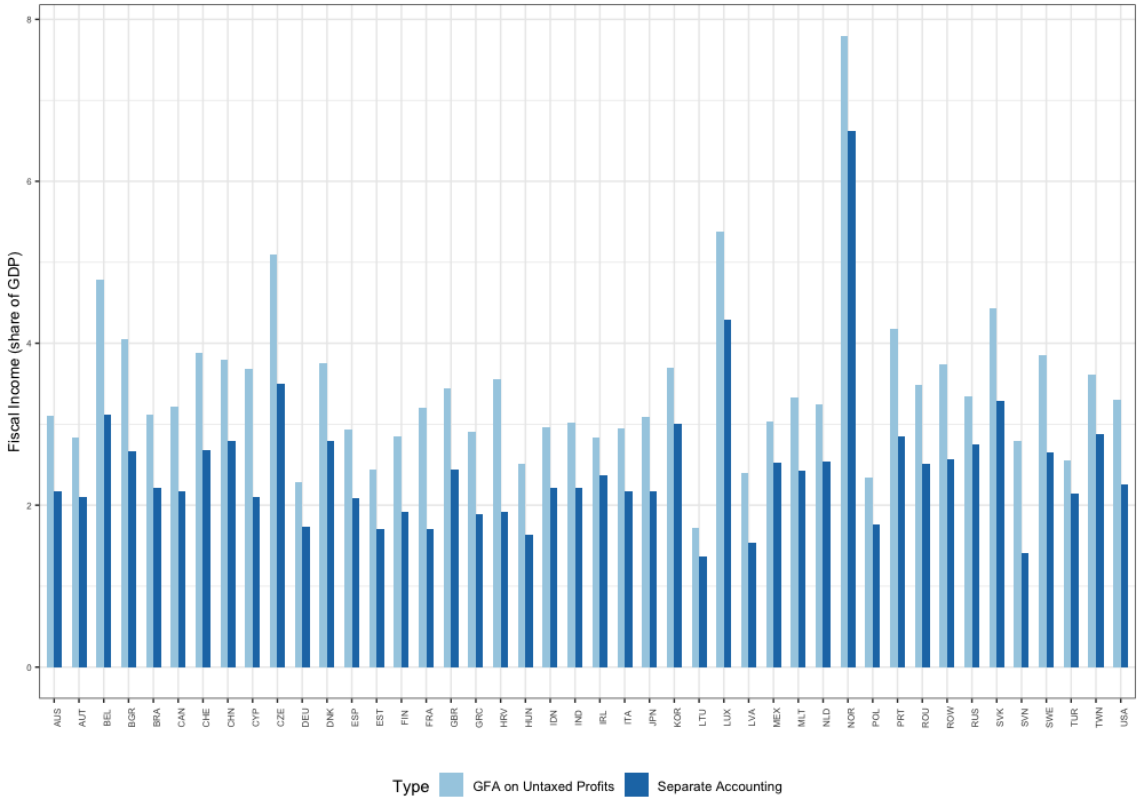


Figure 9 shows tax revenue in the case of a 15% minimum tax rate. In this scenario, tax revenues can only increase, but the increase is very low, mainly because a 15% rate is very low by the standard

of tax rates in most of the economies composing this database, so the amount of profits falling under the "untaxed profits" category is low. Since this scenario is mostly designed to counteract profit shifting, it suffers from the lack of tax havens in the database. The overall additional tax revenue is of $43 Billion, or a 2.4% increase of global tax revenues. This revenue nonetheless significantly increases if the minimum tax rate is raised to 21% as in the original Biden proposal. Under the 21% scenario, $222 Billion would be raised in addition to the current corporate income. A 25% rate brings this total to $376 Billion. Of these, $84.145 Billion should accrue to EU countries, a figure significantly lower than the €167.8 Billion estimated in Barake et al. (2021) for the year 2016. This is explained by the lack of coverage of tax havens in the database. Plots for country by country tax revenues in the 21% and 25% scenario are available in the Appendix (Figures 17 and 18).

Figure 9: Corporate Tax Revenue for 15% Minimum Tax Rate

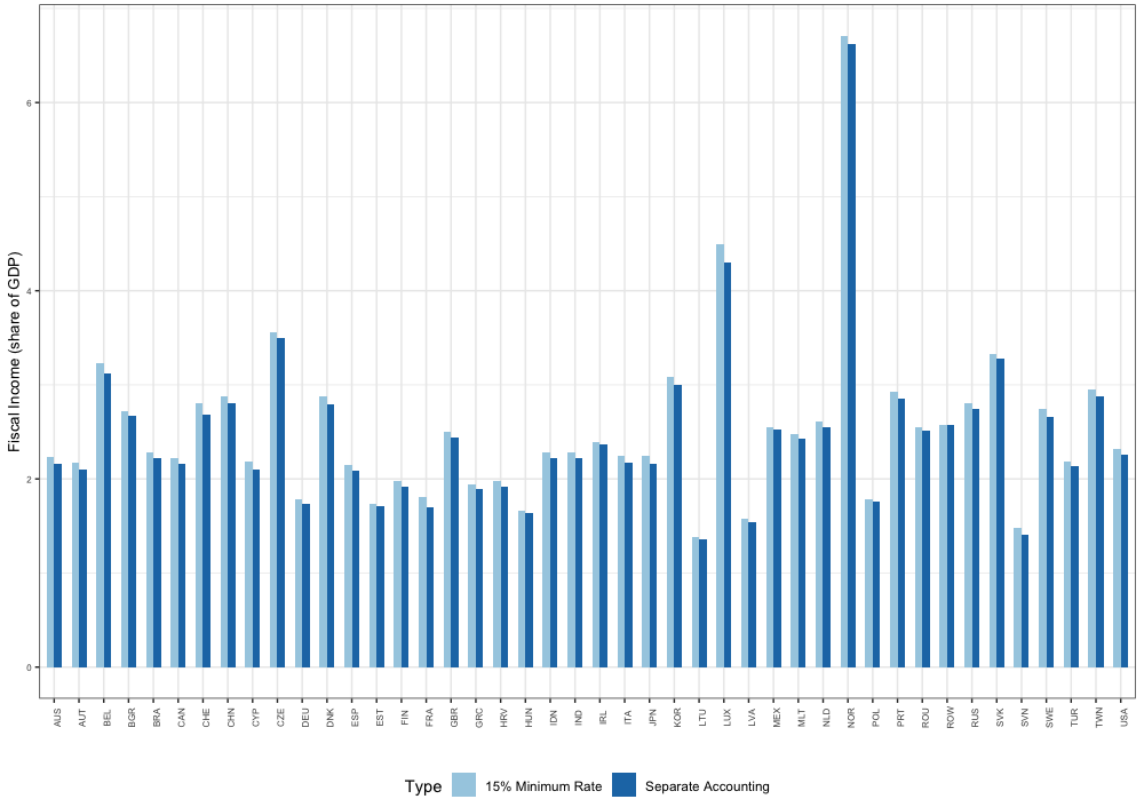


Table 15 in the Appendix provides a summary of tax revenues in all tax systems discussed in the dissertation for all countries. A summary plot of the main tax scenarios for France is available in Figure 19.

4 Conclusion

This paper explores the consequences of moving to alternative international corporate tax scenarios on the fiscal income of the 43 countries in the WIOD database. I find that the current tax system does not allow jurisdictions to recover tax revenues aligned with their official tax rates. Moving to a system in which profit shifting and tax competition are made more costly or impossible could allow most countries to considerably increase their corporate tax revenues by taxing their base at a rate aligned with their statutory tax rate. I estimate the evolution in tax base and tax revenues in the case of destination based scenarios, GFA scenarios as well as minimum tax rate for MNEs scenarios. Destination based and GFA systems create winners and losers, but the negative impact could be offset by the increased effective tax rates for almost all countries. I also find that these systems could be applied and enforced unilaterally or by small group of countries in ways that allow first movers to yield the positive effect of such systems on tax avoidance and tax competition while making everyone else as well off, in effect being Pareto-improvements of the international tax system.

These results contribute to the debate on international taxation by providing estimates of tax revenues for destination based scenarios that were lacking at the global level. They also demonstrate the interest of using supply and use tables for this kind of estimation. They could be extended by adding more countries to the framework, in particular tax havens which represent a large share of corporate profits booked at a global level. A study of the reaction of corporations a change of framework would help refine existing estimates and understand how to design fair and efficient systems.

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5 Appendix

5.1 Methodology and Sources — Tables and Figures

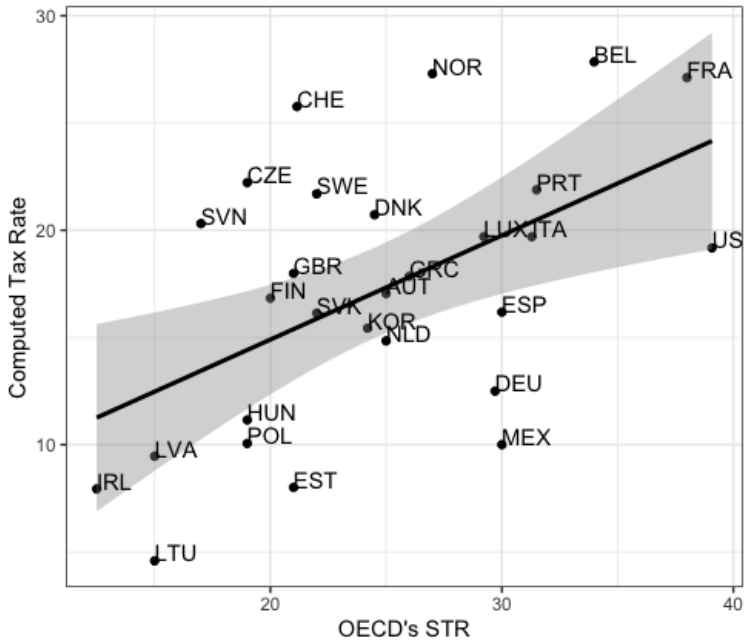
Comparison of Profit Rates

Table 3: Profit Ratios (%)

LOCATION	Net Profit to Gross Value Added (Computed)	Capital Share (Computed)	Capital Share (OECD)
AUT	21.980	27.560	27.560
BEL	17.450	22.350	22.350
CHE	11.636	15.172	15.172
CZE	25.420	33.305	33.305
DEU	22.445	27.267	27.267
DNK	22.847	28.385	28.385
ESP	23.394	29.152	29.152
EST	31.253	37.180	37.180
FIN	19.934	25.328	25.328
FRA	10.313	12.894	12.894
GBR	20.553	24.017	24.017
GRC	28.216	36.732	36.732
HUN	26.719	33.150	33.150
IRL	44.110	53.134	53.134
ITA	19.826	25.397	25.397
KOR	28.697	36.520	36.520
LTU	44.692	50.619	50.619
LUX	21.990	25.597	25.597
LVA	25.511	33.213	33.213
MEX	49.231	64.991	64.991
NLD	22.575	26.921	26.921
NOR	35.642	43.007	43.007
POL	34.429	40.846	40.846
PRT	24.348	29.653	29.653
RUS	29.293	32.672	32.672
SVK	26.083	32.787	47.064
SVN	12.216	15.948	15.948
SWE	17.645	21.859	21.859
USA	18.577	21.968	21.968

5.1.1 Comparison of Different Tax rate Measures

Figure 10: Computed Profit Rate as A Function of STR



The very low R-squared for the first two regression show the low explanatory power of ETRs and STRs when it comes to corporate tax burden. The third regression shows that the relationship between tax rate computed from net of lending corporate profits and gross of lending corporate profit is strong but not perfect. Furhtermore, one would expect the constant to be null or close to 0 and the slope to be close to one, which is clearly not the case here.

Figure 11: Computed Profit Rate as A Function of ETR

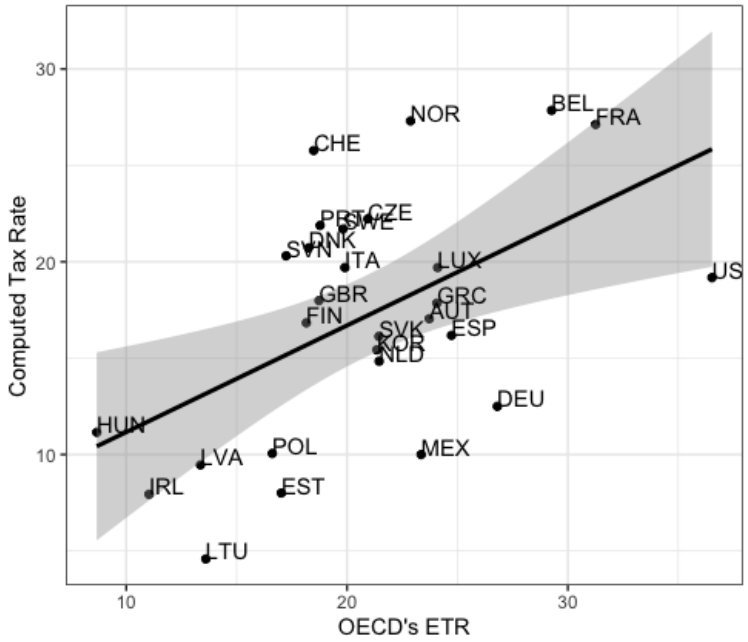


Figure 12: Computed Gross Profit Rate As A Function Of Net Profit Rate

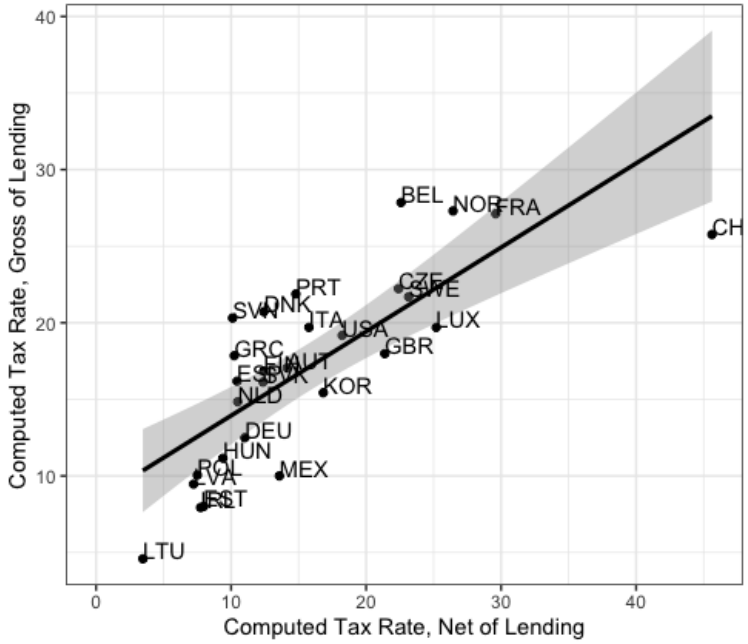


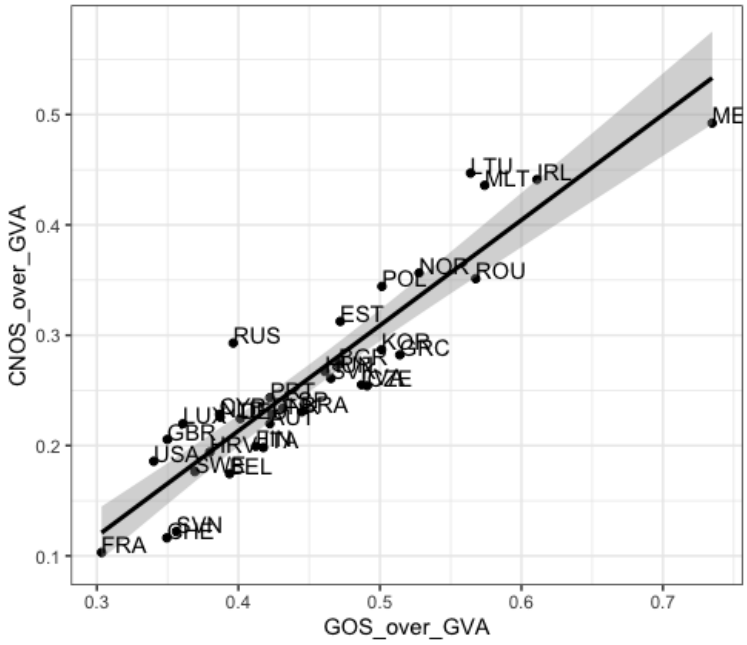
Table 4: Comparison of Tax Rate Measures

	Dependent variable:		
	Computed Tax Rate (Gross)		
	(1)	(2)	(3)
ETR	0.553***		
	(0.177)		
STR		0.485***	
		(0.154)	
Computed Tax Rate (Net)			0.549***
			(0.087)
Constant	5.633	5.192	8.442***
	(3.809)	(3.922)	(1.576)
Observations	28	28	28
R^2	0.274	0.276	0.603
Adjusted R^2	0.246	0.249	0.588
Residual Std. Error (df = 26)	5.430	5.421	4.015
F Statistic (df = 1; 26)	9.808***	9.933***	39.506***
Note:			*p<0.1; **p<0.05; ***p<0.01

5.1.2 Missing Data for Profit Rates

China and Turkey For China and Turkey, I use the strong relation between the Gross Operating Surplus to Gross Value Added ratio and the Net Operating Surplus to Gross Value Added ratio. Displayed in the following Figure.

Figure 13: Corporate Profit Rates — Financial and Total



Other Countries After that, I still lack data for Canada, Australia, Japan, Taiwan, India and Indonesia. I assigned values of the profit rate of comparable economies.

Table 5: Replacement Country for Missing Data

Missing Country	Replacement Country
Canada	USA
Australia	USA
Japan	USA
Taiwan	Korea
India	Brazil
Indonesia	Brazil

5.1.3 Missing Data for Tax Rates

Figure 2 shows the strong relationship between profit rate and tax rate. Profit rate is actually the best predictor for tax rate, before ETR and STR, and when combined, the only significant coefficient is for the profit rate. For this reason, I have used the profit rate to predict the tax rate in missing countries.

Table 6: Explaining the Effective Tax Rate

	Dependent variable:	
	Computed Tax Rate	
	(1)	(2)
Computed Profit Rate	-0.360^{***}	-0.442^{***}
	(0.097)	(0.096)
ETR	0.113	
	(0.293)	
STR	0.228	
	(0.253)	
Constant	0.183^{***}	0.283^{***}
	(0.049)	(0.026)
Observations	28	28
R^2	0.552	0.449
Adjusted R^2	0.496	0.428
Residual Std. Error	0.044 (df = 24)	0.047 (df = 26)
F Statistic	9.863^{***} (df = 3; 24)	21.221^{***} (df = 1; 26)
Note:		*p<0.1; **p<0.05; ***p<0.01

5.2 Results — Additional Table and Figues

5.2.1 Summary Statistics

Figure 14: Distribution of Value Added — France

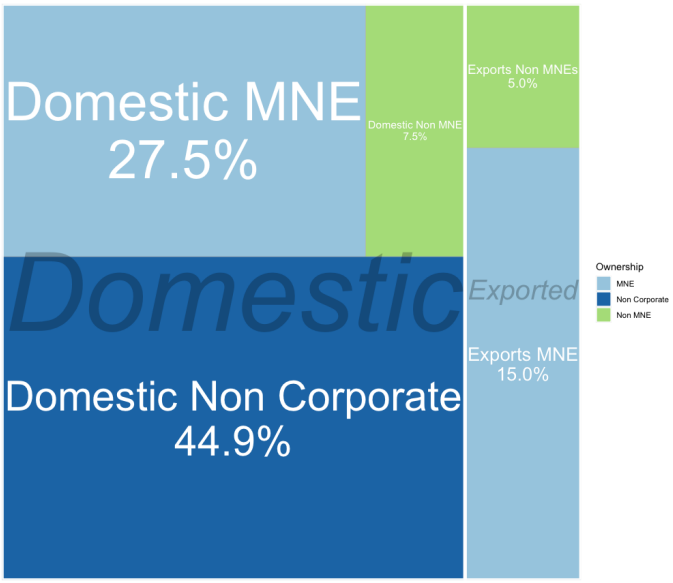


Table 7: Trade Balance in Value Added Term

Country	GDP ($ Billion)	VA for Domestic Market	VA for Foreign Markets	Imported VA
AUS	1,357.150	82.4%	17.6%	17.7%
AUT	389.664	67.2%	32.8%	28.9%
BEL	476.146	59.8%	40.2%	35.9%
BGR	49.341	63.5%	36.5%	43.4%
BRA	2,071.926	90.0%	10.0%	13.2%
CAN	1,675.521	75.3%	24.7%	23.5%
CHE	680.533	62.9%	37.1%	24.7%
CHN	10,283.980	81.3%	18.7%	13.0%
CYP	21.051	69.4%	30.6%	38.4%
CZE	186.073	57.2%	42.8%	34.8%
DEU	3,484.775	67.7%	32.3%	21.5%
DNK	299.878	66.4%	33.6%	25.4%
ESP	1,259.829	80.0%	20.0%	19.8%
EST	23.394	59.1%	40.9%	41.4%
FIN	234.731	74.0%	26.0%	25.4%
FRA	2,537.743	80.0%	20.0%	21.1%
GBR	2,666.096	78.6%	21.4%	22.2%
GRC	208.344	82.5%	17.5%	26.4%
HRV	48.160	67.4%	32.6%	32.9%
HUN	116.649	56.7%	43.3%	37.0%
IDN	868.869	80.4%	19.6%	18.5%
IND	1,994.314	86.5%	13.5%	14.4%
IRL	227.662	44.1%	55.9%	34.6%
ITA	1,925.309	78.8%	21.2%	18.0%
JPN	4,437.887	86.5%	13.5%	15.2%
KOR	1,287.093	67.6%	32.4%	23.8%
LTU	43.719	55.3%	44.7%	41.0%
LUX	58.245	34.6%	65.4%	40.2%
LVA	27.754	65.2%	34.8%	37.7%
MEX	1,227.752	80.7%	19.3%	18.7%
MLT	9.458	52.8%	47.2%	48.7%
NLD	792.656	56.7%	43.3%	28.7%
NOR	449.132	67.3%	32.7%	19.8%
POL	484.756	66.4%	33.6%	30.3%
PRT	201.500	76.4%	23.6%	28.2%
ROU	176.350	70.0%	30.0%	30.6%
RUS	1,623.896	73.9%	26.1%	20.0%
SVK	91.106	57.7%	42.3%	37.1%
SVN	42.819	58.1%	41.9%	38.1%
SWE	507.219	68.7%	31.3%	25.5%
TUR	710.919	76.8%	23.2%	21.3%
TWN	510.923	60.8%	39.2%	26.3%
USA	17,348.070	91.1%	8.9%	11.4%
ROW	10,688.520	75.9%	24.1%	34.7%

Table 8: Gross Domestic Product By Country

Country	GDP ($ Billion)	GDP as share of World GDP
AUS	1,357.150	1.8%
AUT	389.664	0.5%
BEL	476.146	0.6%
BGR	49.341	0.1%
BRA	2,071.926	2.8%
CAN	1,675.521	2.3%
CHE	680.533	0.9%
CHN	10,283.980	13.9%
CYP	21.051	0.0%
CZE	186.073	0.3%
DEU	3,484.775	4.7%
DNK	299.878	0.4%
ESP	1,259.829	1.7%
EST	23.394	0.0%
FIN	234.731	0.3%
FRA	2,537.743	3.4%
GBR	2,666.096	3.6%
GRC	208.344	0.3%
HRV	48.160	0.1%
HUN	116.649	0.2%
IDN	868.869	1.2%
IND	1,994.314	2.7%
IRL	227.662	0.3%
ITA	1,925.309	2.6%
JPN	4,437.887	6.0%
KOR	1,287.093	1.7%
LTU	43.719	0.1%
LUX	58.245	0.1%
LVA	27.754	0.0%
MEX	1,227.752	1.7%
MLT	9.458	0.0%
NLD	792.656	1.1%
NOR	449.132	0.6%
POL	484.756	0.7%
PRT	201.500	0.3%
ROU	176.350	0.2%
RUS	1,623.896	2.2%
SVK	91.106	0.1%
SVN	42.819	0.1%
SWE	507.219	0.7%
TUR	710.919	1.0%
TWN	510.923	0.7%
USA	17,348.070	23.5%
ROW	10,688.520	14.5%
Total	73,806.920	100.0%

Table 9: Corporate and Non Corporate Value Added

Country	GDP	Non Corporate VA	Corporate VA	(of which MNE)	(of which non MNE)
AUS	1,357.150	42%	58%	59%	41%
AUT	389.664	42%	58%	54%	46%
BEL	476.146	41%	59%	63%	37%
BGR	49.341	40%	60%	100%	0%
BRA	2,071.926	47%	53%	62%	38%
CAN	1,675.521	42%	58%	71%	29%
CHE	680.533	28%	72%	67%	33%
CHN	10,283.980	32%	68%	66%	34%
CYP	21.051	49%	51%	80%	20%
CZE	186.073	40%	60%	88%	12%
DEU	3,484.775	39%	61%	71%	29%
DNK	299.878	43%	57%	63%	37%
ESP	1,259.829	45%	55%	64%	36%
EST	23.394	34%	66%	80%	20%
FIN	234.731	46%	54%	83%	17%
FRA	2,537.743	45%	55%	77%	23%
GBR	2,666.096	40%	60%	71%	29%
GRC	208.344	64%	36%	88%	12%
HRV	48.160	50%	50%	80%	20%
HUN	116.649	45%	55%	80%	20%
IDN	868.869	47%	53%	55%	45%
IND	1,994.314	47%	53%	56%	44%
IRL	227.662	33%	67%	95%	5%
ITA	1,925.309	51%	49%	57%	43%
JPN	4,437.887	42%	58%	57%	43%
KOR	1,287.093	36%	64%	60%	40%
LTU	43.719	33%	67%	91%	9%
LUX	58.245	33%	67%	80%	20%
LVA	27.754	38%	62%	80%	20%
MEX	1,227.752	50%	50%	77%	23%
MLT	9.458	38%	62%	80%	20%
NLD	792.656	35%	65%	74%	26%
NOR	449.132	35%	65%	65%	35%
POL	484.756	51%	49%	81%	19%
PRT	201.500	49%	51%	71%	29%
ROU	176.350	44%	56%	93%	7%
RUS	1,623.896	39%	61%	48%	52%
SVK	91.106	46%	54%	80%	20%
SVN	42.819	45%	55%	80%	20%
SWE	507.219	37%	63%	76%	24%
TUR	710.919	47%	53%	58%	42%
TWN	510.923	36%	64%	67%	33%
USA	17,348.070	42%	58%	67%	33%
ROW	10,688.520	42%	58%	79%	21%

Table 10: Corporate and Non Corporate Value Added — Domestic Market

Country	Domestic Use VA	Non Corporate VA	Corporate VA	(of which MNE)	(of which non MNE)
AUS	1,118.477	51%	49%	57%	43%
AUT	261.885	62%	38%	49%	51%
BEL	284.875	68%	32%	80%	20%
BGR	31.330	63%	37%	80%	20%
BRA	1,864.769	52%	48%	65%	35%
CAN	1,261.705	56%	44%	69%	31%
CHE	428.252	45%	55%	53%	47%
CHN	8,360.365	39%	61%	63%	37%
CYP	14.617	71%	29%	80%	20%
CZE	106.498	71%	29%	80%	20%
DEU	2,358.557	58%	42%	67%	33%
DNK	199.204	65%	35%	74%	26%
ESP	1,008.079	56%	44%	73%	27%
EST	13.833	58%	42%	80%	20%
FIN	173.725	62%	38%	87%	13%
FRA	2,029.839	56%	44%	79%	21%
GBR	2,096.684	50%	50%	68%	32%
GRC	171.984	78%	22%	80%	20%
HRV	32.466	74%	26%	80%	20%
HUN	66.085	79%	21%	80%	20%
IDN	698.518	58%	42%	54%	46%
IND	1,726.053	54%	46%	59%	41%
IRL	100.300	74%	26%	80%	20%
ITA	1,516.939	65%	35%	62%	38%
JPN	3,837.336	48%	52%	54%	46%
KOR	870.551	53%	47%	54%	46%
LTU	24.161	60%	40%	80%	20%
LUX	20.151	96%	4%	80%	20%
LVA	18.109	58%	42%	80%	20%
MEX	991.087	62%	38%	81%	19%
MLT	4.990	72%	28%	80%	20%
NLD	449.455	61%	39%	73%	27%
NOR	302.453	53%	47%	58%	42%
POL	322.011	77%	23%	80%	20%
PRT	154.043	64%	36%	99%	1%
ROU	123.397	63%	37%	80%	20%
RUS	1,199.815	53%	47%	47%	53%
SVK	52.602	79%	21%	80%	20%
SVN	24.877	78%	22%	80%	20%
SWE	348.382	53%	47%	75%	25%
TUR	545.935	61%	39%	63%	37%
TWN	310.710	59%	41%	70%	30%
USA	15,803.320	46%	54%	67%	33%
ROW	8,112.022	55%	45%	90%	10%

Table 11: Corporate Value Breakdown — Foreign Market

Country	Exported VA	MNE Export Share of VA	Non MNE Export Share of VA
AUS	238.674	64%	36%
AUT	127.779	57%	43%
BEL	191.270	43%	57%
BGR	18.010	64%	36%
BRA	207.157	51%	49%
CAN	413.816	74%	26%
CHE	252.281	79%	21%
CHN	1,923.618	74%	26%
CYP	6.434	62%	38%
CZE	79.575	51%	49%
DEU	1,126.218	75%	25%
DNK	100.673	55%	45%
ESP	251.749	48%	52%
EST	9.561	72%	28%
FIN	61.007	79%	21%
FRA	507.904	75%	25%
GBR	569.411	75%	25%
GRC	36.360	33%	67%
HRV	15.694	63%	37%
HUN	50.565	67%	33%
IDN	170.350	56%	44%
IND	268.261	49%	51%
IRL	127.363	78%	22%
ITA	408.371	51%	49%
JPN	600.551	66%	34%
KOR	416.543	65%	35%
LTU	19.557	65%	35%
LUX	38.094	82%	18%
LVA	9.645	67%	33%
MEX	236.665	69%	31%
MLT	4.468	77%	23%
NLD	343.201	75%	25%
NOR	146.680	73%	27%
POL	162.744	50%	50%
PRT	47.457	39%	61%
ROU	52.953	51%	49%
RUS	424.081	49%	51%
SVK	38.504	74%	26%
SVN	17.942	78%	22%
SWE	158.837	77%	23%
TUR	164.984	51%	49%
TWN	200.213	65%	35%
USA	1,544.752	67%	33%
ROW	2,576.502	64%	36%

Table 12: Corporate and Non Corporate Value Added

Country	GDP	Non Corporate VA	Corporate VA	(of which MNE)	(of which non MNE)
AUS	1,357.150	42%	58%	59%	41%
AUT	389.664	42%	58%	54%	46%
BEL	476.146	41%	59%	63%	37%
BGR	49.341	40%	60%	100%	0%
BRA	2,071.926	47%	53%	62%	38%
CAN	1,675.521	42%	58%	71%	29%
CHE	680.533	28%	72%	67%	33%
CHN	10,283.980	32%	68%	66%	34%
CYP	21.051	49%	51%	80%	20%
CZE	186.073	40%	60%	88%	12%
DEU	3,484.775	39%	61%	71%	29%
DNK	299.878	43%	57%	63%	37%
ESP	1,259.829	45%	55%	64%	36%
EST	23.394	34%	66%	80%	20%
FIN	234.731	46%	54%	83%	17%
FRA	2,537.743	45%	55%	77%	23%
GBR	2,666.096	40%	60%	71%	29%
GRC	208.344	64%	36%	88%	12%
HRV	48.160	50%	50%	80%	20%
HUN	116.649	45%	55%	80%	20%
IDN	868.869	47%	53%	55%	45%
IND	1,994.314	47%	53%	56%	44%
IRL	227.662	33%	67%	95%	5%
ITA	1,925.309	51%	49%	57%	43%
JPN	4,437.887	42%	58%	57%	43%
KOR	1,287.093	36%	64%	60%	40%
LTU	43.719	33%	67%	91%	9%
LUX	58.245	33%	67%	80%	20%
LVA	27.754	38%	62%	80%	20%
MEX	1,227.752	50%	50%	77%	23%
MLT	9.458	38%	62%	80%	20%
NLD	792.656	35%	65%	74%	26%
NOR	449.132	35%	65%	65%	35%
POL	484.756	51%	49%	81%	19%
PRT	201.500	49%	51%	71%	29%
ROU	176.350	44%	56%	93%	7%
RUS	1,623.896	39%	61%	48%	52%
SVK	91.106	46%	54%	80%	20%
SVN	42.819	45%	55%	80%	20%
SWE	507.219	37%	63%	76%	24%
TUR	710.919	47%	53%	58%	42%
TWN	510.923	36%	64%	67%	33%
USA	17,348.070	42%	58%	67%	33%
ROW	10,688.520	42%	58%	79%	21%

Table 13: Corporate Profit Share (% of GDP)

Country	MNE Profits	Non MNE Profits	Total Profits
AUS	7.4%	3.4%	10.8%
AUT	6.5%	5.9%	12.3%
BEL	5.9%	5.3%	11.2%
BGR	11.6%	4.8%	16.5%
BRA	7.8%	4.5%	12.3%
CAN	8.1%	2.7%	10.8%
CHE	8.9%	1.5%	10.4%
CHN	10.2%	5.0%	15.1%
CYP	10.9%	0.6%	11.5%
CZE	9.2%	6.5%	15.7%
DEU	10.1%	3.7%	13.9%
DNK	8.0%	5.5%	13.5%
ESP	8.3%	4.6%	12.9%
EST	16.1%	5.3%	21.4%
FIN	9.5%	1.9%	11.4%
FRA	4.6%	1.7%	6.3%
GBR	10.0%	3.6%	13.6%
GRC	5.7%	4.9%	10.6%
HRV	6.7%	3.0%	9.7%
HUN	10.9%	3.7%	14.6%
IDN	6.7%	5.5%	12.3%
IND	6.0%	6.3%	12.3%
IRL	25.5%	4.3%	29.8%
ITA	6.0%	5.1%	11.0%
JPN	5.4%	5.4%	10.8%
KOR	3.1%	16.4%	19.4%
LTU	20.9%	8.9%	29.8%
LUX	19.6%	2.2%	21.8%
LVA	12.1%	4.2%	16.3%
MEX	17.0%	8.2%	25.2%
MLT	0.0%	26.9%	26.9%
NLD	12.9%	4.3%	17.1%
NOR	15.1%	9.2%	24.3%
POL	10.4%	7.1%	17.5%
PRT	9.6%	3.5%	13.0%
ROU	12.6%	7.0%	19.7%
RUS	9.3%	9.3%	18.6%
SVK	15.4%	5.0%	20.4%
SVN	5.4%	1.5%	6.9%
SWE	9.2%	3.0%	12.2%
TUR	10.1%	12.3%	22.4%
TWN	12.3%	6.1%	18.5%
USA	7.7%	4.1%	11.8%

5.2.2 Alternative Tax Systems — Additional Tables and Figures

Table 14: Tax Revenues (% of GDP) — OECD and Computed

Country	Tax Revenue OECD	Tax Revenue Computed	Relative Difference
AUS	4.5%	2.2%	-51.7%
AUT	2.1%	2.1%	0.0%
BEL	3.1%	3.1%	-0.7%
CAN	3.3%	2.2%	-35.3%
CZE	3.5%	3.5%	-0.7%
DNK	2.8%	2.8%	0.0%
FIN	1.9%	1.9%	-0.7%
FRA	1.7%	1.7%	0.0%
DEU	1.7%	1.7%	0.4%
GRC	1.9%	1.9%	0.7%
HUN	1.6%	1.6%	-0.5%
IRL	2.4%	2.4%	-0.2%
ITA	2.2%	2.2%	-0.3%
JPN	3.9%	2.2%	-44.6%
KOR	3.2%	3.0%	-4.9%
LUX	4.3%	4.3%	0.0%
MEX	2.5%	2.5%	-0.1%
NLD	2.5%	2.5%	0.0%
NOR	6.6%	6.6%	0.1%
POL	1.7%	1.8%	0.5%
PRT	2.8%	2.8%	0.0%
SVK	3.3%	3.3%	-0.2%
ESP	2.1%	2.1%	0.6%
SWE	2.7%	2.7%	-1.3%
CHE	2.8%	2.7%	-3.4%
TUR	1.6%	2.1%	35.5%
GBR	2.5%	2.4%	-1.0%
USA	2.3%	2.3%	0.0%
BRA	3.0%	2.2%	-25.2%
EST	1.7%	1.7%	-0.5%
IDN	2.9%	2.2%	-23.9%
LVA	1.5%	1.5%	0.1%
LTU	1.4%	1.4%	-0.1%
SVN	1.4%	1.4%	0.0%
BGR	2.0%	2.7%	31.8%

Figure 15: Tax Revenues under the Residual Profit system - STR as reference

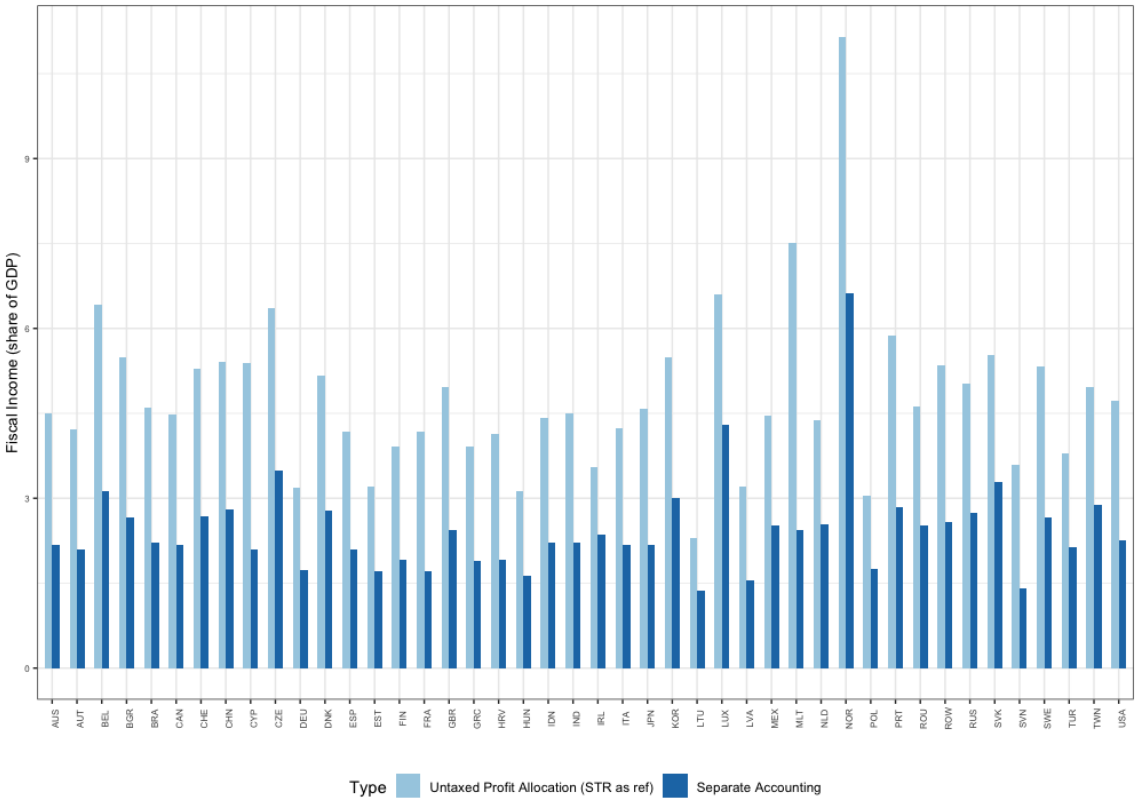


Figure 16: Corporate Tax Revenue for GFA on Residual Profits - French Rate as Reference and STR

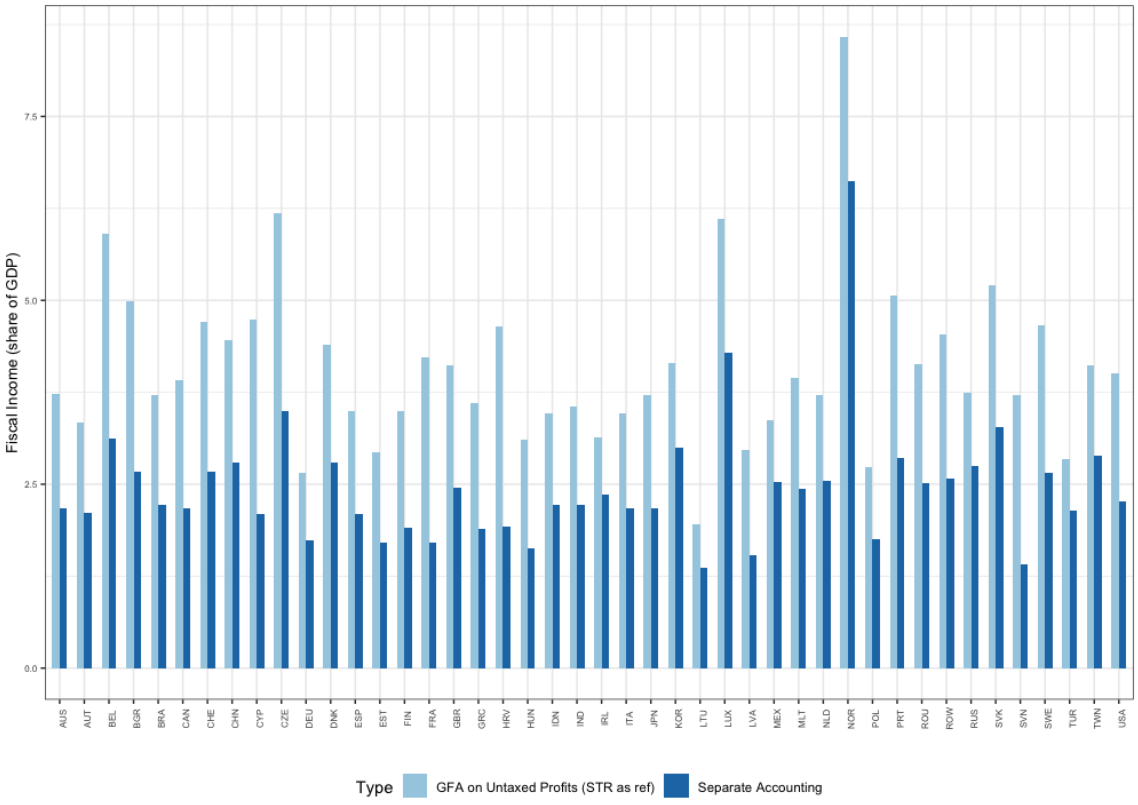


Figure 17: Corporate Tax Revenue for 21% Minimum Tax Rate

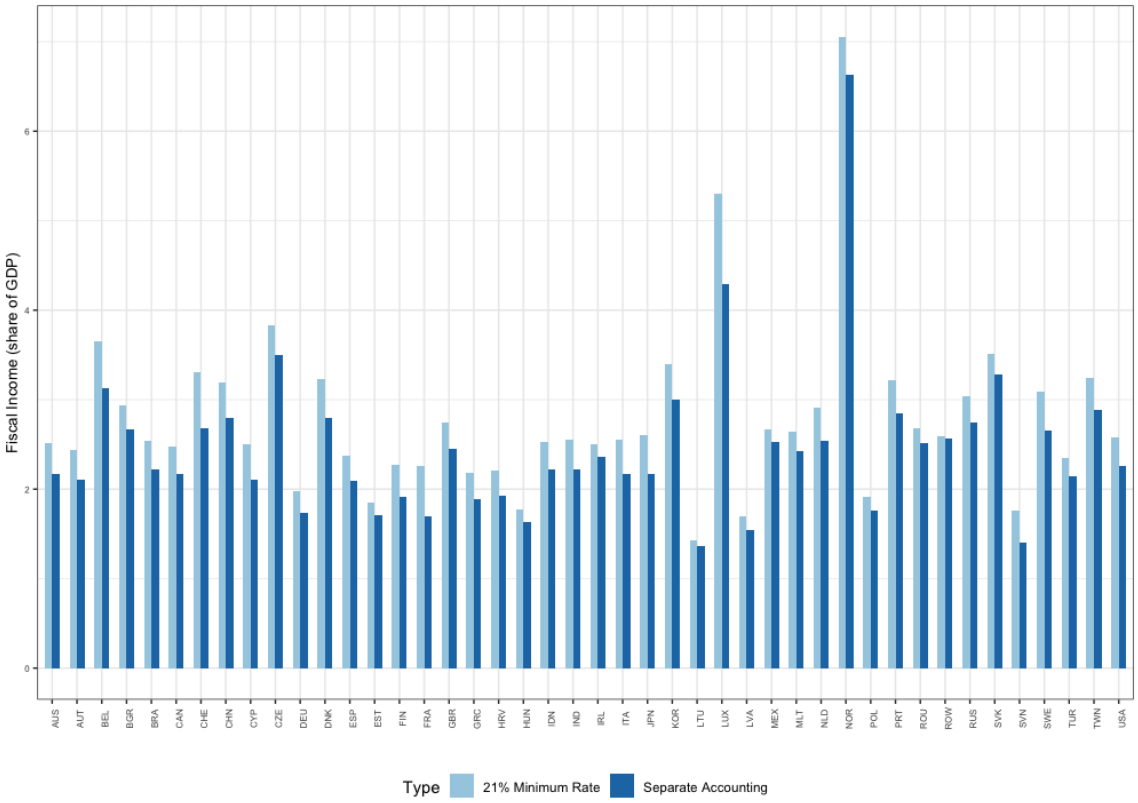


Figure 18: Corporate Tax Revenue for 25% Minimum Tax Rate

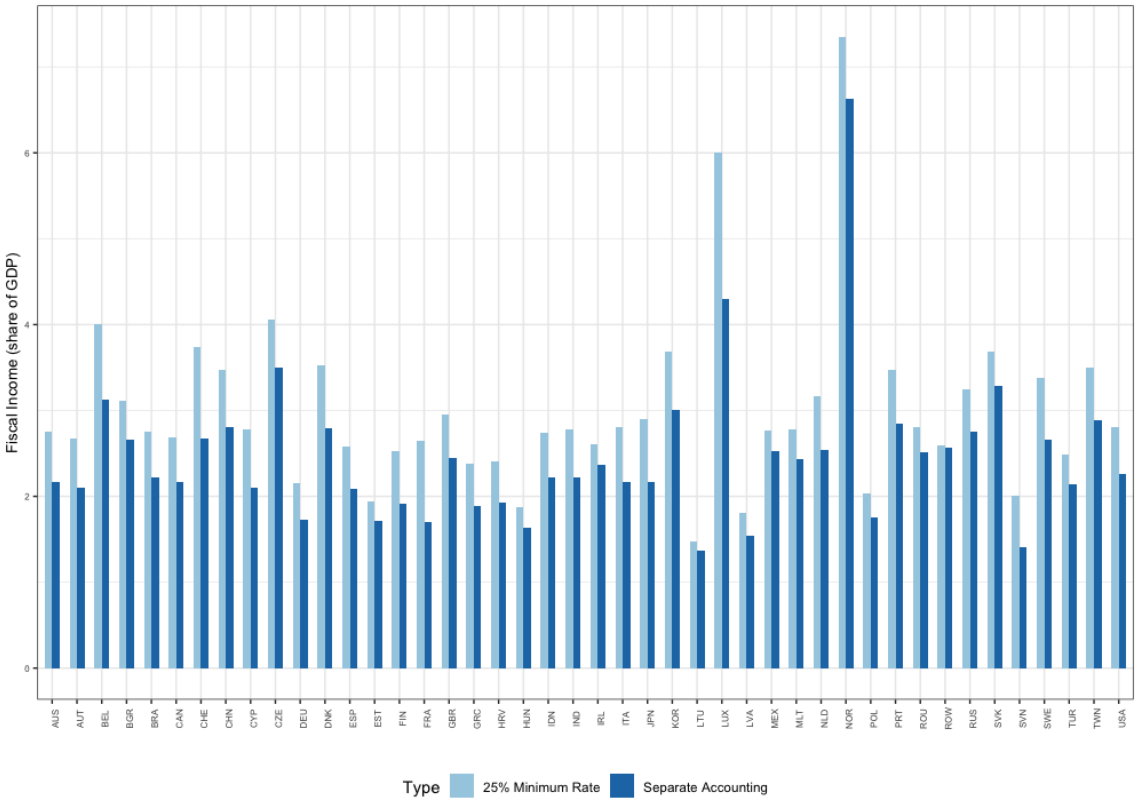


Table 15: Summary Table — All Scenarios

Country	SA	DB	DB STR	GFA	GFA STR	RP	RP STR	GFA RP	GFA RP STR	Min 15%	Min 21%	Min 25%
AUS	2.2%	2.4%	3.5%	2.3%	3.0%	2.3%	4.5%	3.1%	3.7%	2.2%	2.5%	2.7%
AUT	2.1%	2.1%	3.1%	2.2%	2.8%	2.3%	4.2%	2.8%	3.3%	2.2%	2.4%	2.7%
BEL	3.1%	3.3%	4.1%	4.2%	4.9%	4.1%	6.4%	4.8%	5.9%	3.2%	3.6%	4.0%
BGR	2.7%	2.9%	1.8%	3.1%	2.2%	2.9%	5.5%	4.1%	5.0%	2.7%	2.9%	3.1%
BRA	2.2%	2.4%	4.5%	2.3%	3.6%	2.3%	4.6%	3.1%	3.7%	2.3%	2.5%	2.8%
CAN	2.2%	2.3%	3.0%	2.3%	2.8%	2.3%	4.5%	3.2%	3.9%	2.2%	2.5%	2.7%
CHE	2.7%	2.6%	2.2%	2.4%	2.0%	3.2%	5.3%	3.9%	4.7%	2.8%	3.3%	3.7%
CHN	2.8%	2.6%	3.5%	2.6%	3.2%	2.9%	5.4%	3.8%	4.5%	2.9%	3.2%	3.5%
CYP	2.1%	3.3%	2.3%	2.7%	1.9%	2.3%	5.4%	3.7%	4.7%	2.2%	2.5%	2.8%
CZE	3.5%	2.9%	2.5%	4.1%	3.7%	4.1%	6.4%	5.1%	6.2%	3.6%	3.8%	4.1%
DEU	1.7%	1.5%	3.5%	1.4%	2.6%	1.8%	3.2%	2.3%	2.7%	1.8%	2.0%	2.2%
DNK	2.8%	2.4%	2.8%	2.7%	3.0%	3.1%	5.2%	3.7%	4.4%	2.9%	3.2%	3.5%
ESP	2.1%	2.1%	3.9%	2.1%	3.3%	2.2%	4.2%	2.9%	3.5%	2.1%	2.4%	2.6%
EST	1.7%	1.5%	3.9%	1.6%	3.6%	1.7%	3.2%	2.4%	2.9%	1.7%	1.8%	1.9%
FIN	1.9%	2.0%	2.4%	1.9%	2.2%	2.0%	3.9%	2.9%	3.5%	2.0%	2.3%	2.5%
FRA	1.7%	2.5%	3.5%	3.0%	4.0%	2.2%	4.2%	3.2%	4.2%	1.8%	2.3%	2.6%
GBR	2.4%	2.5%	3.0%	2.3%	2.6%	2.6%	5.0%	3.4%	4.1%	2.5%	2.7%	3.0%
GRC	1.9%	2.0%	3.0%	2.6%	3.3%	2.0%	3.9%	2.9%	3.6%	1.9%	2.2%	2.4%
HRV	1.9%	2.2%	2.3%	3.3%	3.4%	2.2%	4.1%	3.6%	4.7%	2.0%	2.2%	2.4%
HUN	1.6%	1.5%	2.6%	1.9%	2.9%	1.6%	3.1%	2.5%	3.1%	1.7%	1.8%	1.9%
IDN	2.2%	2.2%	3.1%	2.2%	2.7%	2.3%	4.4%	3.0%	3.5%	2.3%	2.5%	2.7%
IND	2.2%	2.3%	5.7%	2.5%	4.5%	2.3%	4.5%	3.0%	3.6%	2.3%	2.5%	2.8%
IRL	2.4%	1.2%	1.9%	1.1%	1.6%	2.4%	3.6%	2.8%	3.1%	2.4%	2.5%	2.6%
ITA	2.2%	2.1%	3.3%	2.3%	3.0%	2.3%	4.2%	2.9%	3.5%	2.2%	2.5%	2.8%
JPN	2.2%	2.4%	4.5%	2.6%	3.9%	2.3%	4.6%	3.1%	3.7%	2.3%	2.6%	2.9%
KOR	3.0%	2.5%	3.9%	3.7%	4.3%	3.0%	5.5%	3.7%	4.2%	3.1%	3.4%	3.7%
LTU	1.4%	0.9%	3.1%	1.0%	2.3%	1.4%	2.3%	1.7%	2.0%	1.4%	1.4%	1.5%
LUX	4.3%	2.3%	3.4%	2.2%	3.1%	4.6%	6.6%	5.4%	6.1%	4.5%	5.3%	6.0%
LVA	1.5%	1.7%	2.7%	1.8%	2.6%	1.6%	3.2%	2.4%	3.0%	1.6%	1.7%	1.8%
MEX	2.5%	1.9%	5.8%	1.7%	3.3%	2.5%	4.5%	3.0%	3.4%	2.6%	2.7%	2.8%
MLT	2.4%	5.1%	19.7%	3.9%	8.3%	2.4%	7.5%	3.3%	3.9%	2.5%	2.6%	2.8%
NLD	2.5%	1.9%	3.1%	1.8%	2.6%	2.6%	4.4%	3.2%	3.7%	2.6%	2.9%	3.2%
NOR	6.6%	4.6%	4.5%	4.4%	4.4%	7.1%	11.1%	7.8%	8.6%	6.7%	7.1%	7.4%
POL	1.8%	1.3%	2.4%	1.7%	2.5%	1.8%	3.0%	2.3%	2.7%	1.8%	1.9%	2.0%
PRT	2.8%	3.0%	4.4%	3.0%	3.9%	3.2%	5.9%	4.2%	5.1%	2.9%	3.2%	3.5%
ROU	2.5%	2.1%	2.7%	2.5%	2.9%	2.5%	4.6%	3.5%	4.1%	2.5%	2.7%	2.8%
RUS	2.7%	2.3%	3.1%	2.4%	2.7%	2.8%	5.0%	3.3%	3.7%	2.8%	3.0%	3.2%
SVK	3.3%	2.3%	3.1%	2.7%	3.4%	3.4%	5.5%	4.4%	5.2%	3.3%	3.5%	3.7%
SVN	1.4%	2.2%	1.8%	2.6%	2.2%	1.8%	3.6%	2.8%	3.7%	1.5%	1.8%	2.0%
SWE	2.7%	2.7%	2.7%	2.6%	2.7%	3.0%	5.3%	3.9%	4.7%	2.7%	3.1%	3.4%
TUR	2.1%	1.7%	3.5%	1.9%	2.6%	2.1%	3.8%	2.6%	2.8%	2.2%	2.3%	2.5%
TWN	2.9%	2.1%	2.7%	2.2%	2.5%	2.9%	5.0%	3.6%	4.1%	3.0%	3.2%	3.5%
USA	2.3%	2.5%	5.0%	2.5%	4.3%	2.4%	4.7%	3.3%	4.0%	2.3%	2.6%	2.8%
ROW	2.6%	2.8%	3.5%	2.5%	2.9%	2.7%	5.4%	3.7%	4.5%	2.6%	2.6%	2.6%

Figure 19: Revenue Comparison for France - Different Scenarios