

# Destination-Based Taxation: A Promising but Risky Destination

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## INTRODUCTION

Country-specific origin-based profit taxes are marked by profit shifting and tax competition (see Chapter 6). Incentives for profit shifting can be mitigated, but not eliminated, by stricter rules and strengthening tax administration, while coordination can reduce the scope of tax competition but is hard to agree on (Chapter 11). Moreover, tighter anti-tax-avoidance rules often raise compliance and administrative costs and may intensify tax competition (Chapter 9).

The origin of a profit or “where value is created” is not only in practice but also conceptually a vague notion (Chapter 5). Even in the absence of tax-motivated profit shifting, “assigning” profit to a location is an imprecise science, especially in the case of complicated cross-border supply chains. If a profitable product is produced using many intermediate goods and services, it is not clear which ones give rise to routine profits and which ones allow earning supernormal profits.

Given these difficulties with origin-based taxation, a range of fundamental reform proposals contain a move away from this approach and toward destination-based taxation, with the aim to reduce or eliminate profit shifting and tax competition. This shift can be full, for example through a border adjustment, or it can be partial, for example if profits are allocated across countries through an agreed formula that contains destination elements, such as the destination of sales (see Chapter 14).

Under a border adjustment, a country taxes all domestic sales—with no requirement of a permanent establishment—allowing deduction of all local costs, such as labor and domestically purchased intermediates. A pure exporter would therefore obtain a tax refund, as only costs occur (tax would be paid in the country of sales). A pure importer would pay tax on all sales, with no deductions in the country of sale (but deductions and tax refunds in the producing country if that country also employs a destination-based tax). Any cross-border transactions become irrelevant for tax, which is a function only of sales and domestic costs. Conceptually, moreover, the location of sales is in most cases clear cut. An exception is the case of cross-border shopping, especially of small high-value consumer durables.

Destination-based consumption taxation is already common in the form of value-added and sales taxes. However, no country thus far applies the destination-based

TABLE 13.1.

<b>Location of Taxation for Major Taxes on Bases That Include Profits</b>			
<i>Labor Cost Deduction at</i>			
<i>Taxation of Sales at</i>	<i>Source</i>	<i>Destination</i>	<i>Nowhere</i>
<i>Source</i>	Standard corporate income tax		
<i>Destination</i>	DBCFT (and other border-adjusted taxes)	Formulary apportionment with sales factor	VAT, sales tax

principle to taxes of corporate profits or rents, with the key difference being the deductibility of labor costs. Various proposals for destination-based business taxes have been made, with the destination-based cash-flow tax (DBCFT) being the best-known example. Apart from being in the academic debate, a variant of it has also been proposed recently in the United States by Senators Brady and Ryan, although it was ultimately not implemented.

Table 13.1 classifies the main taxes paid by businesses by where sales are taxed and where labor costs are deductible.<sup>1</sup> For the existing corporate income tax, both take place at source.<sup>2</sup> For the VAT and sales taxes, there is no labor deduction. The DBCFT, or other border-adjusted taxes, would tax sales at the destination, but labor (and other cost) deductibility would remain in the country of origin—a point that has implications for revenues and trade effects, as will be discussed. The table also shows an example of a tax where all would take place at the destination country. This would be a corporate income tax with formulary apportionment, with sales as the only apportionment factor. If sales were one of various factors, the result would be partial apportionment of both costs and sales to the origin and destination countries.

To the extent that moving to a destination basis successfully reduces profit shifting and tax competition, this opens up new possibilities for tax reform. In particular, while tax competition pushes countries toward broad bases and low rates, in its absence a narrower base could be chosen, with revenue shortfall made up by a higher rate. This is why the destination base is often combined with taxation of economic rents, that is, on profits that exceed the normal rate of return (see Chapter 2).

This chapter is structured as follows: The next section discusses the DBCFT as the best-known example of a destination-based rent tax. The third section,

<sup>1</sup> Costs other than labor are also deductible; labor is shown in the table to allow a distinction between profit taxes (where it is deductible) and consumption taxes, such as VAT and sales taxes, where it is not.

<sup>2</sup> There may be additional taxation in the country of residence, but even if that occurs, it would typically allow the deduction of costs incurred at the source and it would credit the source tax. Moreover, it is typically restricted to repatriated profits.

“Destination-Based Allowances for Corporate Equity or Capital,” discusses other possible implementations of destination-based rent taxes. The fourth section, “Destination-Based Corporate Income Taxes,” analyzes options for implementing a more standard corporate income tax system on a destination basis and the likely problems to which this would lead, as well as the extent to which formulary apportionment could achieve a destination base. The fifth section, “Equivalent Reforms,” discusses equivalencies between different tax reform options and how they may facilitate reforms. The final section offers concluding remarks.

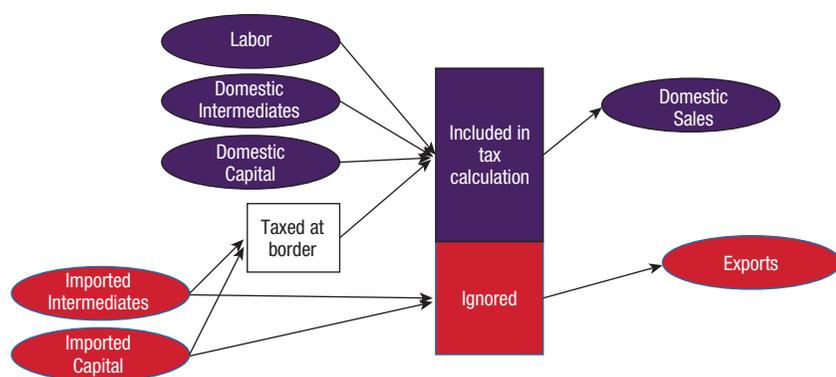
## THE DESTINATION-BASED CASH-FLOW TAX

### Design

The DBCFT is a simple implementation of a destination-based tax on rents. This tax, developed by Bond and Devereux (2002), combines a cash-flow tax with a destination base.

The DBCFT typically starts from an R-base cash-flow tax, which allows immediate deduction of all investment and taxing all proceeds from selling investment goods, while disregarding any financial flows, such as interest (see Chapter 2). To turn this tax into a DBCFT, the cash-flow component is combined with a border adjustment. This is illustrated in Figure 13.1: domestic sales are included in the tax base, while export sales are exempt. Domestic costs are deductible. Imported items can be handled in two equivalent ways: they can be taxed at the border and be deductible, or they can simply be treated as nondeductible.<sup>3</sup> The implementation is administratively simple but implies that some firms, such as those whose sales are predominantly exports, will systematically run tax losses. These firms will require tax refunds, as they would not benefit from loss carryforward.

**Figure 13.1. Destination-Based Taxation**



Source: IMF staff illustration.

<sup>3</sup> Goods imported by final consumers would have to be taxable at the border in any case.

## Economic Implications of a DBCFT

Despite the border adjustment, the DBCFT is not about trade or competitiveness. Unlike a tariff, a DBCFT does not create a difference between traded and non-traded goods: all sales to final consumers, whether imported or domestically produced, are taxed, while all domestic costs are deductible whether used to produce for exports or the domestic market. Hence, theoretically, a DBCFT does not affect competitiveness, because changes in the real exchange rate undo the border adjustment (for example, Auerbach and others, 2017a). In practice, sticky prices or pricing in the currency of a DBCFT-adopting country could cause temporary effects (Barbiero and others 2018; Buitert 2017), but these would be small and not last long: Barbiero and others (2018) show in a dynamic stochastic general equilibrium model that, while there is no impact under local currency pricing, under US dollar pricing, DBCFT adoption in the United States would depress exports and imports by up to 0.3 percent, though the impact would largely run out after 10 quarters. Notwithstanding the economic analysis, there is legal uncertainty about the border adjustment under DBCFT in relation to tax treaties and WTO rules.

A global move to a DBCFT would remove all known profit-shifting channels. Auerbach and others (2017b) show that under universal adoption profit shifting through transfer pricing, the use of debt and the location of intangible assets becomes impossible. Under a DBCFT, exports are untaxed, so their price becomes irrelevant. Similarly, as imports are not deductible (or taxed and deductible, which washes out), their price is equally of no relevance to determining the tax base. Without interest deductibility, the amount of debt and the interest rate equally play no role.

Tax competition would also be addressed by a DBCFT. When choosing where to locate a factory, a firm will not care about the tax rate, because exports are tax free and local sales are taxed irrespective of whether they are produced in or outside a given country. As shown in Table 13.1, costs would remain deductible in the source country. This could be feared to encourage production in high-tax countries, allowing enterprises to obtain large tax refunds while exporting tax free. This incentive would, however, be completely undone by the exchange rate adjustment: as noted, the exchange rate should adjust by the tax rate (or the tax differential between two countries) to undo any effect on trade. This would simultaneously address such an incentive: the higher tax refund in a high-tax country would be exactly equal to the higher production cost resulting from appreciation.

If, however, adoption is not global but by one or a subset of countries, profit shifting and tax competition would not disappear. Instead pressures for the remaining countries would intensify. Shifting profits from an origin-based corporate income tax to a DBCFT system would be extremely lucrative, as such profits would face a tax rate of zero: if done through transfer pricing, they would appear as higher exports by the DBCFT country, which are exempt; if done through debt, they would show up as untaxed interest income. The same is true of tax competition: if an activity that exports produces an economic rent, it is attractive to locate it in a DBCFT country, because this rent will go untaxed.

The incidence of the DBCFT is on consumption financed out of non-labor income (Auerbach and others 2017a). Hence, for countries that have both a VAT and

a DBCFT, the implication is that consumption financed out of labor income is taxed at a lower rate than consumption financed out of nonlabor income. Unlike a VAT, there is no concern about the tax being regressive, as low-income people, whose income source is typically labor, would not be affected.<sup>4</sup> In case of nonlabor income received from abroad or paid to capital owners in other countries, the effect is more complicated: resident capital owners bear the burden, irrespective of where in the world they hold assets, but foreign owners will not bear it (see the annex for details). This implies for natural resources that despite the destination base, revenues will be collected, provided they are owned by domestic residents. Otherwise, a special regime for the resource sector is needed to capture its location-specific rents. And in any case, another regime may be needed to ensure higher rates of tax in the resource sector.

### Impact on Revenue

Global DBCFT adoption would not change average tax revenues much but would lead to a major reallocation across countries. Hebou, Klemm, and Stausholm (2020) show that, at unchanged tax rates, on a global average calculated over 80 countries, DBCFT revenues would remain similar to the existing corporate income tax revenue. For any individual countries, revenues could be very different, though (Figure 13.2), with the move to a border adjustment having greater impact than the introduction of a cash-flow base.

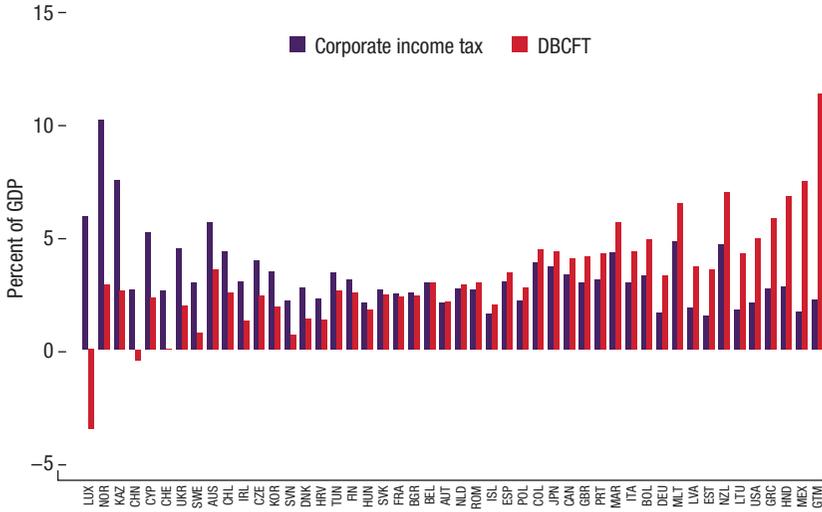
The following features increase the likelihood of gaining revenues from adopting a DBCFT:

- *Trade deficits:* As imports are taxed and exports exempt, trade deficits increase revenues (Figure 13.3). Intertemporally, these effects may be smaller as trade balances adjust. Countries with large positive initial international investment positions, who can finance future trade deficits, could gain even in the long term (Auerbach 2017).
- *Limited resource revenues:* Resources entail location-specific rents, so replacing an origin-based corporate income tax with a DBCFT can be expected to reduce revenues (Figure 13.4). For this calculation, any taxes beyond corporate income tax were held constant. In practice they could be increased to maintain the same level of origin-based taxation of resource rents.
- *Low income:* Countries with low incomes are more vulnerable to tax avoidance and evasion by companies and stand to gain more from a more robust system (Figure 13.5). One might also have expected such countries to lose, given their role as locations of production, but empirically the allocated rents to such production under the current system do not appear to outweigh the potential gains from a more robust system. Some countries can be expected to lose, though: those where foreigners own most of the capital, and trade surpluses finance income payments to nonresidents.

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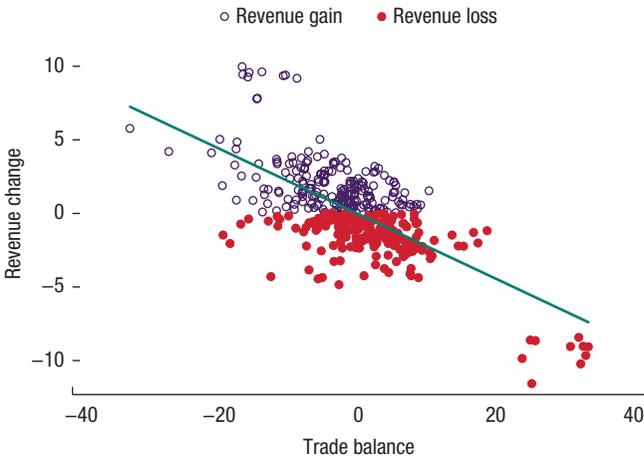
<sup>4</sup> An exception would be the case of benefit or pension recipients, if the real appreciation occurs through the price level rather than the exchange rate and benefits or pensions are not indexed.

**Figure 13.2. DBCFT and Corporate Income Tax Revenues**  
*(Averages over 2002–2011)*

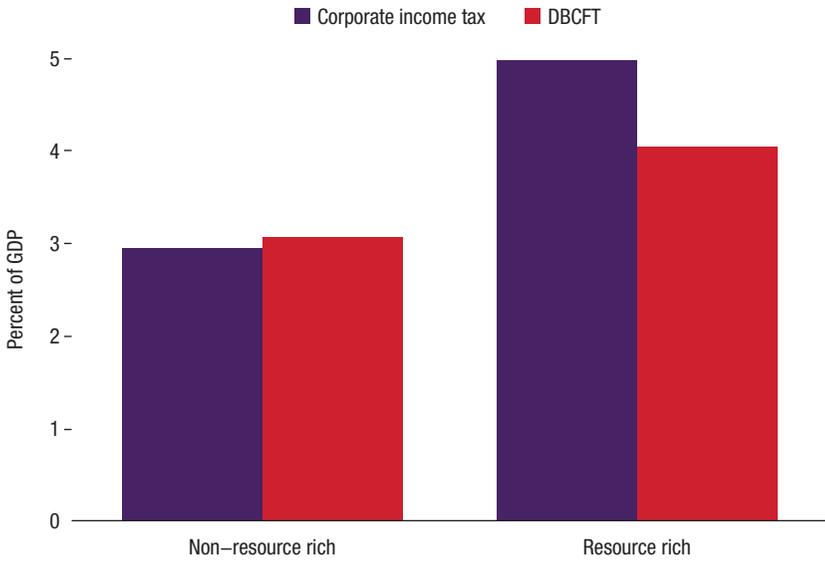


Source: Hebous, Klemm, and Stausholm (2020).  
 Data labels use International Organization for Standardization (ISO) country codes.

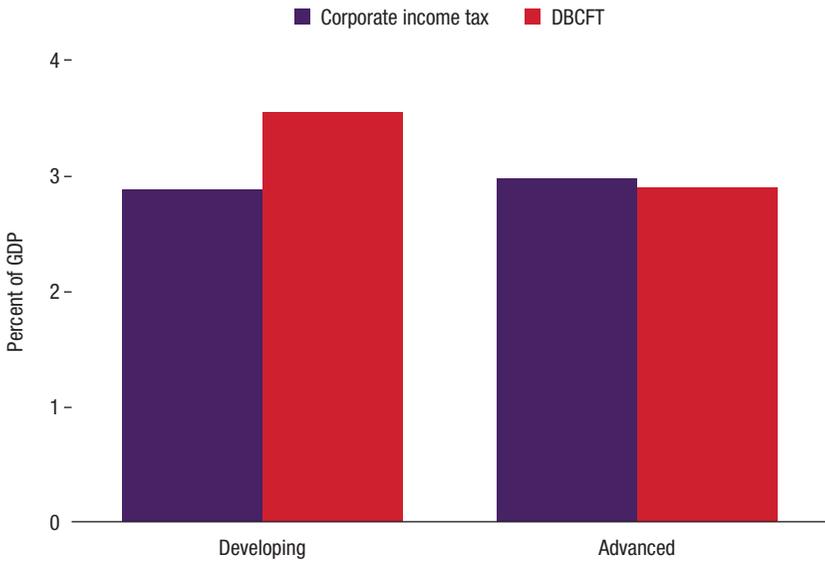
**Figure 13.3. Trade Balance and Revenue Change, Excluding Resource-Rich Economies**  
*(percent of GDP)*



Source: Hebous, Klemm, and Stausholm (2020).

**Figure 13.4. Revenue by Resource Dependence**

Source: Hebous, Klemm, and Stausholm (2020).

**Figure 13.5. Revenue by Income Group**

Source: Hebous, Klemm, and Stausholm (2020).

In many cases, revenue losses can be made up by changing the rate, given the absence of pressures from profit shifting and tax competition under a DBCFT. Countries with very high net exports, however, can even have a negative tax base—and there are two such cases in these estimates. If this holds up to more refined estimates using data available to tax authorities only, such countries are unlikely to support adoption of such a tax. As noted, intertemporally, some revenue losses and gains will be made up as trade rebalances.

DBCFT revenues would be more volatile than those of the current corporate income tax, which is already among the more volatile taxes. The DBCFT allows expensing of investment. Investment, which is a flow variable, will vary more over the cycle than depreciation, which is linked to a stock and averages out the flows of various past years. Another reason for greater volatility is the immediate refund of tax on losses, while most current corporate income tax systems merely allow carryforward (or very limited carryback) of losses, smoothing revenues over time. Empirically, Hebous, Klemm, and Stausholm (2020) confirm that the standard deviation of hypothetical DBCFT revenues is higher than the one for the current corporate income tax for most countries.

Revenue implications are very different if the DBCFT is adopted unilaterally rather than globally. As mentioned, there would then be strong incentives to shift profits and the production of rent-earning exporting activities into the DBCFT country. While this would not have direct revenue consequences for that particular country,<sup>5</sup> the outflow would reduce revenues elsewhere. Estimates by Hebous, Klemm, and Stausholm (2020) suggest that DBCFT adoption by a large integrated economy, such as the United States, could cause neighboring countries to lose about 40 percent of tax revenue from multinationals.

## The Natural Resources Sector

A separate solution will need to be found for the taxation of location-specific rents, such as natural resources (see also Chapter 15). For this type of rent, taxation at the origin is efficient. Moreover, it is likely politically important, as natural resources belong to the nations where they are located. This does not amount to an obstacle for introducing a DBCFT, though. Already currently, in most countries the resource sector faces a different tax and regulatory regime from the general economy. License fees, royalties, and any special resource revenue taxes could continue under a DBCFT and could even be raised to compensate from any shortfall that arises from shifting from a corporate income tax to a DBCFT (in countries where the resource sector pays corporate income tax in addition to other fees and taxes). This sector would then continue to face pressures from profit shifting and require maintaining relevant anti-avoidance rules.

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<sup>5</sup> There could be positive indirect effects if the increased capital stock raises employment or wages, thus boosting personal income tax revenue.

## R+F and S-Base Cash-Flow Taxes with a Destination Base

One issue that arises in cash-flow taxation (even in a closed economy) is how to ensure that the financial sector is covered. The financial sector can be directly included by implementing a real and financial (“R+F”) base (Chapter 2). Even under an R-base, which disregards financial flows, any economic rents earned by financial institutions in dealing with corporations are effectively taxed, but this occurs effectively in the hands of the borrower and is reflected in the interest rate (Auerbach and others 2017a). Only in the case of lending to households (or other DBCFT-exempt entities), any rents would indeed go untaxed, and hence Auerbach and others (2017a) discuss the option of using an R+F base for dealings with DBCFT-exempt entities, even if an R-base is used otherwise.

Another form of a cash-flow rent tax is the so-called S-base implementation (Chapter 2), meaning that only share transactions, which are defined as net distributions (roughly dividends less capital increases), are taxed. In an international context, this means that for a company to be liable for tax in a jurisdiction, it would not only need to have some permanent establishment, but it would have to be incorporated. An S-base cash-flow tax is therefore neither an origin nor a destination, but rather a country-of-incorporation-based system. It appears impossible to the authors to combine this with a destination base.

## DESTINATION-BASED ALLOWANCES FOR CORPORATE EQUITY OR CAPITAL

Cash-flow taxes are not the only possible rent taxes (see Chapter 2). Other rent taxes include the allowance for corporate equity, which is implemented by exempting a notional return on equity from tax. Previous analysis (IMF 2009; 2016) has stressed its neutrality and the reduction of debt bias. This can also be border adjusted, turning it into a destination-based allowance for corporate equity (DBACE). Hebus and Klemm (2020) analyze the DBACE finding that transition to a DBACE rather than DBCFT might be easier, because a DBACE would (1) initially raise higher revenues (as it can be implemented with an incremental base, counting only postreform equity); (2) generally entail less volatile revenues; and (3) avoid the need for transitional arrangements on the initial capital stock (as depreciation is maintained) and debt stock (as interest deductibility is maintained).

On the other hand, a DBACE reduces profit-shifting incentives and tax competition, but unlike the DBCFT does not eliminate them. Notably, intercompany loans at inflated interest rates remain possible. More subtly, if the notional interest rate is not set at the correct level, there would still be incentives to change the global distribution of debt. There may even remain an incentive to manipulate transfer prices in certain situations. Assume that the destination base is implemented by taxing goods at the border and then allowing deductions—which is generally the safer implementation, as it reduces risks of goods being imported

without paying tax and then diverted for final consumption. In that case, the tax collected at the border will depend on the reported import price. For intermediate goods, this does not matter much: any mispricing will wash out immediately. For capital goods, however, this is not necessarily the case (see bottom left of Figure 13.1): if the import price of a capital good is understated, it yields an instantaneous saving at the border. This also reduces the equity of the firm, so intertemporally there is theoretically no impact on tax payments. If, however, the notional interest rate is lower than the firm's discount rate, then there is an incentive for such underpricing of imported capital goods. This problem does not exist under the DBCFT, where capital goods are expensed, and any such effect washes out immediately. Overall, such a tax would be more complicated and less effective than a DBCFT, but still much more robust than the current system.

Closely related to the allowance for corporate equity, the allowance for corporate capital applies a notional return on all capital, including debt, but disallows deductibility of the actual interest cost (Kleinbard 2005). This means that debt neutrality is achieved, irrespective of the notional interest rate chosen, reducing the risks stemming from setting it at the wrong level. Hebus and Klemm (2020) also analyzed the destination-based version allowance for corporate capital (DBACC) and found that it eliminates all profit shifting related to changes in debt ratios. Like the DBACE it only eliminates transfer pricing manipulation and tax competition provided the notional interest rate is set at the correct level.

Both the DBACE and the DBACC have the advantage that no transitional arrangements are needed for the capital stock, as depreciation is maintained rather than replaced by expensing, as under the DBCFT. Regarding the debt stock, which was issued by firms assuming full deductibility of interest, transitional difficulties are: none with a DBACE, which maintains interest deductibility for debt, relatively small for the DBACC, where interest deductibility is reduced from the full to the notional return, and greatest for the DBCFT, where deductibility is abolished.

## DESTINATION-BASED CORPORATE INCOME TAXES

### Destination Base for Current Corporate Income Tax

In principle, the switch from an origin- to a destination-based approach to taxation could also be implemented without a change to a rent tax, but it would have disadvantages. Not only would it be a lost opportunity for moving to a more efficient tax, it would also fail to eliminate profit shifting. First, because interest would remain deductible, tax planning through international debt shifting would remain attractive. Second, there would be some incentives for transfer price manipulation, because underreporting the cost of capital goods would lower import taxes. While it would also lower future depreciation, there would be a net present value gain (which would be stronger than under the DBACE, where such

gain only occurs to the extent that there is a difference between the notional rate and the firm's discount rate).

### Formulary Methods

Another, related, reform would be the move to a consolidated unitary base for multinationals, which would be allocated to countries by formula (see Chapter 14). Typically, formulary apportionment proposals suggest allocation based on factors including the capital stock, employment, and sales. With sales as an apportionment factor, there is thus a destination-based element.<sup>6</sup> The greater the weight on sales, the stronger the link to the destination. In the United States, where formulary apportionment is used for subfederal taxes, the development over the last few decades has been toward increasingly high weights on sales.

However, even with sales as the only factor of apportionment, formulary apportionment would not be fully equivalent to a border adjustment. This is because costs would be deducted at the consolidated level (and hence also apportioned), rather than where they are incurred (see Table 13.1). As discussed in Bond and Devereux (2002),<sup>7</sup> this means that such a tax cannot be fully neutral to trade and investment choices, because the exchange rate cannot simply adjust to undo the effect of the tax. Nevertheless, this implementation has the advantage of allowing a gradual movement toward more destination-based taxation over time, with the weight on sales rising. This would possibly allow a later move to a full DBCFT or other such tax.

Moreover, formulary apportionment could be combined quite flexibly either with a tax base resembling the current one, or with a more efficient rent tax. As there is still tax competition under formulary apportionment (Chapter 14), the tax base could be kept broad while origin-based factors are important, and it could be narrowed toward a rent tax as the weight on sales rises.

Another partial implementation of the destination base would be through residual profit allocation. Under this proposal, a normal return is taxed in the country of origin using standard separate accounting, but residual profit is allocated by sales.<sup>8</sup>

## EQUIVALENT REFORMS

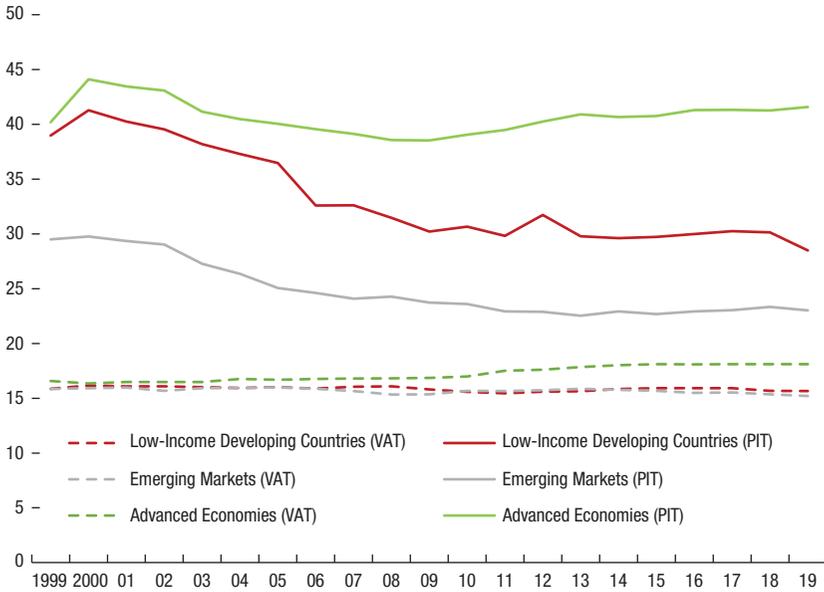
The DBCFT strongly resembles a VAT, except that it allows deduction of domestic labor costs. A DBCFT is a tax on consumption financed out of nonlabor income. Hence, an increase in the VAT combined with a reduction in labor

<sup>6</sup> Strictly speaking, sales could be defined on an origin or destination base, with the latter harder to observe, but more useful (and used in subnational applications, such as for US state taxes).

<sup>7</sup> In their terminology, the DBCFT is labeled "VAT-type DBCFT," while formulary apportionment based on sales is called "full DBCFT."

<sup>8</sup> If the tax rate on both types of profits is different, additional options arise. For example, if countries choose a tax rate of zero on the normal rate of return, then the system is close to a DBACC.

**Figure 13.6. Average Income Tax and VAT Rates, 1999–2019**  
(Percent)



Source: IMF FAD TP Rates database.

Note: PIT = personal income tax.

taxes (including social security contributions) can achieve an economically similar outcome. As neither the VAT nor reductions of labor taxes are internationally controversial, these reforms allow countries to have similar outcomes. Indeed, over the last few decades, there has been a relative rise in consumption and a decline in income tax rates (Figure 13.6), suggesting that such a move is already underway.

There are, however, reasons why in practice such a combination of reforms would not precisely match the introduction of a DBCFT. First, VATs tend to have exemptions and differentiated rate structures; similarly, labor taxes differ by labor income types and levels, with social security contributions often charged only up to an upper limit. Second, despite the economic equivalency, there could be differences in short-run effects depending on the legal incidence and how contracts are fixed. For example, a VAT increase would typically boost the price level, combined with a labor tax cut that would increase net earnings. This would represent a real appreciation. A DBCFT, however, collected from firms, would likely not affect the price level: firms would pay tax on sales less labor and capital costs. If they make a normal profit, there is no tax and no reason to raise prices. If they earn rent, they do pay tax, but only on the rent part. To prevent a relative increase

in the price of imported goods, it is likely that in this case the real appreciation would be achieved by nominal appreciation.

## CONCLUSION

Destination-based taxation has many attractive features. Most importantly, it reduces profit-shifting opportunities and softens tax competition. When combined with a rent tax, it is, moreover, neutral to investment, improving efficiency. The DBCFT, as the most well-known and studied version, has the advantage of fully removing all known profit-shifting and tax-competition channels, with cross-border shopping remaining as one of few avoidance risks.

Despite these advantages, the DBCFT and other destination-based profit taxes remain controversial. To some extent, this is likely due to suspicions that such a tax would distort trade, for example, because skeptics may not believe that the theoretical claims of full exchange rate adjustment hold in practice. This is hard to prove wrong, because no empirical observations are available as no country has yet undertaken such reform.

Even in the absence of an effect on trade, the diverging revenue impact of such a tax on countries would make it difficult to agree on a global adoption, as the revenue losers would be unlikely to support it. Countries with significant foreign-owned or licensed resources would stand to lose the most revenues, although this point should not cause undue concern, as they would be able to maintain an alternative taxation system for the resource sector. Moreover, countries with only small revenue losses could address them by simply raising rates, which would not drive away investment or reported profits.

Global adoption would be crucial to reap the full benefits. Unilateral adoption would entail major negative spillovers on countries maintaining origin-based taxation, whose tax bases would be strongly attracted by the DBCFT country so that tax competition and profit shifting for remaining countries would intensify. This would risk triggering political reactions, such as legal challenges and even trade wars. From a purely economic point of view, however, introducing a DBCFT is a stable choice for a country, because even if no other country follows, the benefits can be reaped, and a DBCFT adopter would not face incentives to revert to origin-based taxes.

Apart from the DBCFT, other implementations are feasible and may have transitional advantages. The DBACE would initially raise more, and generally less volatile, revenue, but it would remain susceptible to various profit-shifting schemes. The DBACC would be almost as robust as the DBCFT but would also require a more fundamental change than the DBACE. Finally, moving to formula apportionment with a sales factor would allow transitioning toward destination-based taxation by raising the weight on the sales factor over time. To reap the full efficiency impact and avoid distortions to trade, a shift to a DBCFT is, however, ultimately required.

Given that the options discussed in this chapter are unlikely to be considered, the question arises of why they are worth studying. One reason is that their

simplicity, combined with robustness with respect to a major issue in the current architecture, makes them very appealing. Understanding them sheds light on other reform proposals, that contain elements of these pure ones. Another reason is that they may occur through the back door, by countries raising VAT while reducing taxes on labor income.

## ANNEX 13.1: INTERNATIONAL REVENUE AND INCIDENCE IMPLICATIONS OF A DBCFT

This appendix provides a theoretical comparison of the incidence and revenue implications of DBCFT considering different company profiles. The results on incidence have been previously described (for example, Auerbach and others 2017a).

The following assumptions are made throughout: A country, labeled DB, introduces a DBCFT at rate  $t$ . There is one other country, labeled ROW, that does not change its tax system. The currency of country DB appreciates in textbook fashion by exactly  $\frac{t}{1-t}$ . Hence, there is no adjustment in prices.<sup>9</sup> Wages are unchanged: as prices are the same, labor supply is unaffected. As wages remain untaxed, labor demand is unaffected. As normal profits are untaxed, investors will not need to shift the DBCFT burden onto labor.

### First Experiment: Impact of Location of Sales and Production

As shown in Annex Table 13.1.1, the tax collection depends on whether firms are purely domestic operations, exporters, or importers. For now, all firms are assumed to be owned by residents. Domestic firms pay tax on sales less cost. Exporters pay no tax and get a refund on their costs. Importers pay tax on sales but are not allowed a deduction. As long as exports and imports balance, revenue from the external sector will mirror those from domestic operations.

The incidence aligns with the tax payment only in case of a purely domestic operation. For exporters, the appreciation means that their revenues from foreign sales decline. Because they get a tax refund on their costs, their normal profits remain tax free and the rent is reduced by the same amount as if they had sold domestically. Exporters therefore bear the same tax burden, even though they are net recipients of tax refunds. The mirror image applies to importers: while their sales are fully taxable, their costs decline thanks to the appreciation. Despite remitting very high taxes, they bear the same tax on rents as firms producing domestically.

To sum up: the tax is equally borne by all types of firms located in DB, irrespective of where they produce and sell their goods. No revenues are collected

<sup>9</sup> If the exchange rate were fixed and adjustment occurred through the price level, the same results would be obtained, but given the likely slow adjustment, there may be some time periods of disequilibrium. Going beyond the examples discussed here, which are all about firms, there would be further real differences, because of the impact on other nominal assets.

ANNEX TABLE 13.1.1.

Tax Payments and Incidence for Firms Located in DB			
	Domestic Operation	Exporter	Importer
Production	DB	DB	ROW
Sales	DB	ROW	DB
Sales	$p^{DB}$	$p^{ROW} = p^{DB}(1-t)$	$p^{DB}$
Costs	$c^{DB}$	$c^{DB}$	$c^{ROW} = c^{DB}(1-t)$
Tax Payment	$(p^{DB} - c^{DB})t$	$-c^{DB}t$	$p^{DB}t$
Net Profit <sup>1</sup>	$(p^{DB} - c^{DB})(1-t)$	$(p^{DB} - c^{DB})(1-t)$	$(p^{DB} - c^{DB})(1-t)$
Tax Borne	$(p^{DB} - c^{DB})t$	$(p^{DB} - c^{DB})t$	$(p^{DB} - c^{DB})t$

Source: Authors' calculations.

<sup>1</sup> Calculated as sales less costs less tax payment.

from exporters, but very high revenues from importers, evening out tax revenues, provided trade is balanced.

## Second Experiment: Impact of Ownership

Firms located in DB could be owned by resident or foreign investors. Moreover, residents of DB could own domestic and foreign firms.

The tax implications are shown in Annex Table 13.1.2. The first column shows a domestically owned firm in DB, that is, it condenses the information of Annex Table 13.1.11 into one column. The second column shows the tax consequences for DB residents of owning firms in ROW. Even though no DBCFT is payable when owning a firm abroad (as this analysis abstracts from any foreign tax), the owners still bear the incidence of the DBCFT, because the profits earned in foreign currency are worth less. The third column shows foreign investors owning firms in DB. The investors remit DBCFT just as domestically owned firms do (that is, depending on where sales take place). However, the foreign investors do not bear any tax burden, because the appreciation compensates them for the tax. Finally, for completeness, firms in ROW owned by ROW investors are not affected by the DBCFT.

To sum up: tax payments and refunds are only due to firms located in DB, with the tax payment/refund depending on the location of sales, and ownership not having a bearing. The tax incidence, however, depends only on the residence of the firms' owners, and is borne by DB residents.

## Untaxed Assets

DB residents owning assets denominated in ROW currency, such as bonds or land, also bear the burden of the DBCFT, because of appreciation of DB's

ANNEX TABLE 13.1.2.

Tax Payments and Incidence Depending on Ownership				
Residence of Owner	DB	DB	ROW	ROW
Location of Firm	DB	ROW	DB	ROW
Net Profit	$(p^{DB} - c^{DB})(1-t)$	$p^{ROW} - c^{ROW}$ $= (p^{DB} - c^{DB})(1-t)$	$(p^{DB} - c^{DB})(1-t)$ $= p^{ROW} - c^{ROW}$	$p^{ROW} - c^{ROW}$
Tax Borne	$(p^{DB} - c^{DB})t$	$(p^{DB} - c^{DB})t$	0	0
<b>Tax Payment</b>				
Domestic Operation	$(p^{DB} - c^{DB})t$	0	$(p^{DB} - c^{DB})t$	0
Exporter	$-c^{DB}t$	0	$-c^{DB}t$	0
Importer	$p^{DB}t$	0	$p^{DB}t$	0

Source: Authors' calculations.

currency. No tax is remitted, though. There is no difference between owning a foreign firm or a fixed asset.

DB residents owning assets denominated in DB currency (including pensions or benefit rights) do not bear any tax burden.

ROW residents do not bear any burden on assets denominated in ROW currency and enjoy a gain if they own assets denominated in DB currency, but are not subject to DBCFT.

### Putting It All Together

From a government perspective, taxes are collected from all firms located in DB, with tax losses by exporters compensated by revenue on importers, provided they are in equilibrium.

From a taxpayer perspective, however, the burden is borne by rent-earning investors resident in DB, with foreign residents unaffected.

This has the following implication: suppose DB's residents own relatively much foreign capital. At the time of DBCFT introduction they then bear a high burden. In the long term, this translates into high revenues: owning foreign capital entitles them to income streams from abroad, which can finance a trade deficit, which boosts revenues. Hence, countries with a strong international investment position will ultimately benefit in revenue terms from a DBCFT.<sup>10</sup> Even though this is collected on imports, the burden is still on residents.

Suppose there is a large location-specific rent earned by exporters in DB (for example, a natural resource, or a network benefit from Silicon Valley). If the asset is domestically owned, the burden of the DBCFT will be borne by owners

<sup>10</sup> Auerbach (2017) also points out that it will depend on the rates of return on assets. For example, a negative IIP need not require future trade surpluses, if income earned on the smaller foreign assets is higher than the financing cost of the larger foreign liabilities.

even though no tax is collected from the exporting firm. The owners will (ultimately) use their income from exports to finance imports, which are taxed. If the asset is foreign owned, however, there is no tax burden. There are revenue losses: the profits of nonresidents weaken the income balance, requiring trade surpluses.

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