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A Destination-Based Allowance for Corporate Equity

by Shafik Hebous and Alexander Klemm

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A Destination-Based Allowance for Corporate Equity

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Abstract

Following renewed academic and policy interest in the destination-based principle for taxing profits—particularly through a destination-based cash flow tax (DBCFT)—this paper studies other forms of efficient destination-based taxes. Specifically, it analyzes the Destination-Based Allowance for Corporate Equity (DBACE) and Allowance for Corporate Capital (DBACC). It describes adjustments that are required to turn an origin into a destination-based versions of these taxes. These include adjustments to capital and equity, which are additional to the border adjustments needed under a DBCFT. The paper finds that the DBACC and DBACE reduce profit shifting and tax competition, but cannot fully eliminate them, with the DBACE more sensitive than the DBACC. Overall, given the potential major political cost of switching from an origin to a destination-based tax system, we conclude that advantages of the DBCFT are likely to outweigh the transitional advantages of the DBACE/DBACC.

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I. INTRODUCTION

The idea of taxing corporate income based on the location of final consumption, i.e., the destination rather than the origin, has recently gained prominence not only in academia but also in the policy arena. Destination-based consumption taxes, such as the value-added tax, have been successfully implemented for decades in many countries. However, the extension to taxing business profits—and specifically rents, i.e., supernormal profits—based on the location of consumption remained long an academic topic. This changed in 2016 when the House of Representatives released a blueprint for a tax reform in the United States. The Blueprint, which ultimately was not adopted, envisaged a destination-based cash-flow tax (DBCFT). While the DBCFT has received much recent attention, it is not the only possible destination-based tax on rents. In this paper, we consider how the destination principle would apply to other rent taxes and what are their advantages and disadvantages relative to the DBCFT.

In public finance, there are two broad types of the corporate income tax (CIT) that are efficient (falling on economic rent only) and neutral with respect to financing choices (notably debt versus equity):²

- cash-flow taxes (CFT), including the most common R-Base (real) version, in which all capital expenditure is expensed, while financial flows are ignored. Other implementations include the R+F-Base (real and financial) version, which covers financial flows, too, and the S-Base version, which is based on distributions (Meade, 1978).
- allowances for normal profits, including the allowance for corporate equity (ACE), which has been, in some forms, implemented in a few countries (Appendix Table A1). The ACE introduces a deduction for a notional return on equity, maintaining the interest deduction. A related concept is the allowance for corporate capital (ACC), which allows deduction of a notional return on all capital (debt and equity), and therefore disallows deduction of interest. It is further away from the current tax system and has not been implemented anywhere, but it corresponds to the theoretical model for such an allowance by Boadway and Bruce (1984), which was later developed into the ACE by IFS (1991).³ Henceforth, when not distinguishing between both allowances we will use the acronym ACE/C (or DBACE/C if destination based).

Both, CFT and ACE/C systems are efficient and neutral in a domestic setting. They are, however—like a standard CIT—vulnerable to tax competition and base erosion including cross-border profit shifting. While they achieve a marginal cost of capital of zero, countries may be competing also for discrete, rent-earning investment decisions by multinationals. These may even be particularly important in terms of generating positive technological spillovers. In this case, effective average

² See Auerbach, Devereux, and Simpson (2010) for an overview of issues in the design of taxes on corporate income and a summary of major CIT systems. See Weichenreider and Klautke (2008) and Sørensen (2017) for estimates of the deadweight loss associated with debt bias.

³ The ACE/C is also neutral with respect to the chosen depreciation allowance. It therefore encompasses the cash flow tax as a special case: if an asset is fully depreciated on purchase it does not represent equity, so in that case there is automatically no allowance.

tax rates are also important for location decisions as investors will consider the remaining rent after taxation (Devereux and Griffith, 2003). Hence, there will be downward pressure on tax rates, even if only rents are taxed. Profit shifting is in any case determined by statutory tax rates, as any profit shifted that goes beyond available allowances, will be subject to the full tax rate.

The destination-based cash-flow tax (DBCFT) addresses these concerns through border adjustments, whereby business export revenues are not taxed and expenditure on imported goods is not deductible (or equivalently, taxed at the border). It was first proposed in Bond and Devereux (2002) and several of its attractive features are discussed and analyzed in some recent papers (e.g., Auerbach and others (2017a, 2017b)). Notably, if adopted worldwide, the DBCFT would remove all (known) profit-shifting opportunities and incentives for the reallocation of real capital for tax purposes. The debate and literature on the destination principle for the business tax has also mentioned the possibility of a destination-based version of the ACE, but there is no detailed analysis of how it would work or its implications yet.

This paper considers a destination-based ACE (DBACE) and the closely-related destination-based ACC (DBACC). We compare the different destination-based rent taxes in terms of their economic efficiency, revenue implications, transitional requirements, and incidence.

The source of efficiency and neutrality of the DBACE/C (shorthand for DBACE and DBACC), just like in case of the CFT, is the definition of the tax base, which ensures that only economic rents are taxed. The implications for tax planning and avoidance result from the destination principle. Under the DBACE/C, however, certain additional complications arise in defining the interaction between the tax base definition and the destination principle. Notably, it is necessary to define a concept of domestic equity, taking into account investment abroad and adding repatriation of foreign profits. Table 1 summarizes tax systems and acronyms (some of which are explained more fully later).

Table 1. Acronyms and Tax Systems

	Acronym	Meaning	Key Features
Tax Base	CIT	Corporate income tax	Traditional tax on profit, allowing capital to be depreciated over time, and interest to be deducted as a cost.
	CFT	Cash-flow tax	Full expensing of capital and no interest deduction
	ACE	Allowance for corporate equity	Deduction of notional equity return in addition to interest deduction
	ACC	Allowance for corporate capital	A notional return on all capital (debt and equity)
Geographical scope	<i>No prefix</i>	Origin based	Profits taxed where production tax place
	DB (i.e., DBACE etc.)	Destination based	Profits taxed where sales take place.
Implementation of border adjustment	BT	Border tax	Imported goods are consistently taxed on entry but are deductible at their tax-inclusive price as a business expense.
	ND	No deductibility	Imported goods are not allowed to be deducted from profits
Source: Authors' Compilation			

This paper is structured as follows. As a background, Section II provides a description of neutral taxes, with special attention to the ACE/C. Section III presents an extension of the ACE/C to a destination base and discusses the corresponding adjustments to the tax base. Section IV compares the DBACE and DBACC to the DBCFT to assess their properties in terms of efficiency, revenue generation, strategic interactions, administrative ease, and incidence. Section V briefly concludes. An Appendix lists country experiences and empirical evidence on ACE systems.

II. BACKGROUND: THEORY OF NEUTRAL TAXES WITHOUT BORDER ADJUSTMENT

A. The Theory of the ACE

Before turning to the DBACE/C, this section serves as a reminder of the main features and properties of an ACE/C and introduces the notation used later.

The base of the ACE is the total book value of the stock of equity (based on tax accounting, in countries where this differs from financial accounting). When it is introduced for the first time, it is appealing to define the base as new equity (incremental regime) relative to a reference year. This preserves efficiency properties while avoiding losing revenues on past investments, which have already been made without the allowance and are sunk costs for firms. Over time, as firms go out of business, the base of the incremental system evolves toward the total stock of equity.⁴

Theoretically, the notional interest rate should be the rate at which shareholders discount the tax savings from the company's future ACE, and as shown by Fane (1987), this is achieved by applying the risk-free rate. Bond and Devereux (2003) extend this result and show that if bankruptcies lead to a loss of outstanding unused allowances, then the risk of such loss should be reflected in the interest rate. However, this should not be confused with the company's or a projects discount rate, as only the risk of not obtaining the expected tax relief is concerned. In practice, the rate granted is typically approximated with the yields on long-term government bonds.

Consider the following specific algebraic representation of an ACE:

$$T_t^{ACE} = \tau[S_t - C_t - dK_{t-1}^T - iB_{t-1} - \hat{i}E_{t-1}], \quad (1)$$

where T is tax revenue, τ is the tax rate, S is sales, C is costs (labor and intermediate goods), d is the depreciation allowance rate, K^T is the tax-written-down capital stock, i is the interest rate on debt B , and \hat{i} is the notional interest rate on equity E . The subscript t denotes time.

The dynamics of equity are given by:

$$E_t = E_{t-1} + S_t - C_t - dK_{t-1}^T - iB_{t-1} - T_t + N_t - D_t, \quad (2)$$

⁴ By the same argument there is an incentive to change the base against which to count new equity occasionally to focus always on investment going forward without losing revenues on past investment. This is a classical time-inconsistency issue, and such changes would erode the credibility of the system.

where N is new equity issued and D are dividends, which are determined by the flow of funds:

$$D_t = S_t - C_t - I_t - iB_{t-1} - T_t + N_t + B_t - B_{t-1}, \quad (3)$$

where I is investment.

Using equation (3) and the dynamics of the capital stock ($K_t^T = K_{t-1}^T(1 - d) + I_t$), the value of equity can be simplified to:

$$E_t = K_t^T - B_t. \quad (4)$$

Plugging equation (4) into equation (1) yields:

$$T_t = \tau[S_t - C_t - (d + \hat{i})K_{t-1}^T - (i - \hat{i})B_{t-1}]. \quad (5)$$

Equation (5) reveals that if the notional interest rate equals the interest rate on debt, the financial structure has no impact on taxes.

To see the neutrality of the ACE with respect to depreciation, consider the net present value (NPV) of depreciation allowances. Assume a firm undertakes a one-off investment of $I_t = 1$ (with $I_{t+i} = 0 \forall i \geq 1$). Plugging the expression for investment into equation (5) and discounting by rate r yields:

$$\text{NPV} = \tau(d + \hat{i}) \left(\frac{1}{1+r} + \frac{1-d}{(1+r)^2} + \frac{(1-d)^2}{(1+r)^3} + \dots \right) = \frac{\tau(d + \hat{i})}{r + d}. \quad (6)$$

If the notional interest rate matches the discount rate, then (6) simplifies to τ . This means that, irrespective of the chosen or prescribed tax depreciation rate, the firm will obtain a deduction worth as much as full expensing.

Expensing implies tax neutrality with respect to investment, but to demonstrate this more formally, we replace the arbitrary sales and costs, by a return that is more directly linked to investment. Specifically, assuming a net return of p and a true economic depreciation rate of δ , the return would be $(p + \delta)K_{t-1}$, with capital following this path: $K_t = K_{t-1}(1 - \delta) + I_t$. Consider again a one-off investment as above. The NPV of tax on such investment, assuming the notional interest rate matches the interest rate on debt and the discount rate is:⁵

$$\text{NPV} = \tau \left[\frac{p + \delta}{r + \delta} - \frac{d + \hat{i}}{r + d} \right] = \tau \frac{p - r}{r + \delta}. \quad (7)$$

Equation (7) shows that for a project that earns exactly the required rate of return ($p = r$), no tax is payable.

⁵ If debt-financed, $-\tau \frac{i - \hat{i}}{r + \delta}$ would need to be added, but this would be zero under the assumption of the notional rate matching the interest rate on debt.

In case of an ACC, a minor adjustment is made to replace actual by notional interest for debt.

$$\begin{aligned} T_t^{ACC} &= \tau[S_t - C_t - dK_{t-1}^T - \hat{i}(B_{t-1} + E_{t-1})] \\ &= \tau[S_t - C_t - (d + \hat{i})K_{t-1}^T] \end{aligned} \quad (8)$$

In equation (8), the debt-equity neutrality holds automatically, but the independence of depreciation allowances still requires the notional interest rate to equal the firm's discount rate.

III. DEFINING DESTINATION-BASED ALLOWANCES

A. The DBCFT

Before turning to the DBACE/C, recall the definition of the DBCFT. The DBCFT raises tax revenue by applying the tax rate to local (indicated by superscript L) sales, i.e., sales net of exports, and allows a deduction for real local costs (labor and intermediates) and local investment. For the DBCFT there is no need to distinguish intermediate and investment goods, but as this will be required under the ACE, we introduce the distinction here. Financial costs and depreciation are irrelevant under the DBCFT. Tax revenue is therefore given by:

$$T^{DBCFT} = \tau(S^L - C^L - I^L). \quad (9)$$

To avoid confusion, we use the term "local" to refer to any goods or services that exclude exports or imports, while we use "domestic" for anything that occurs in the home country. Hence investment can be split into three categories: domestic investment in local investment goods (I^L), domestic investment in imported investment goods (I^M), and foreign investment (I^F). Foreign investment here refers to investment abroad by resident firms; foreign investment by non-residents in the economy would be counted as local or imported investment, as the case may be. In other words, it is the location of the investment, not the ownership that matters.

Under the DBCFT, there are two equivalent treatments of imports (be they intermediate or investment goods):

- (i) Non-deductibility (ND): imported goods are not allowed to be deducted from profits.
- (ii) Border taxes (BT): imported goods are consistently taxed on entry but are deductible at their tax-inclusive price as a business expense. Suppose the foreign tax-exclusive cost (in domestic currency) is I^M (or equivalently C^M if it is an intermediate good). The tax-inclusive price to the importing firm is then raised to $\frac{I^M}{1-\tau}$. However, as this is deductible, it provides a tax saving of $\tau \frac{I^M}{1-\tau}$, leaving the same net cost I^M to the firm, as if it were untaxed and non-deductible.

Equation (9) would be unchanged by adding and deducting $\tau \frac{I^M}{1-\tau}$

Under the DBCFT there is therefore nothing much to say on theoretical grounds about the choice between both methods. The optimal implementation can be made purely based on considerations of tax administration and risks of tax avoidance. It is likely that implementing a tax

at the border is the more robust approach, because this would help enforce tax payments on any goods imported that are used for final consumption rather than as inputs.

B. The DBACE

To transform the ACE into a DBACE, we consider all parts of the ACE definition in equation (1) to ascertain whether and how to adjust them to a destination base.

Sales and intermediate goods

For sales and the cost of intermediate goods, this can be done analogously to the transformation from a CFT to a DBCFT by simply replacing total by local sales and intermediate costs.

Investment and depreciation

As discussed in the context of the DBCFT, there are two ways to achieve a destination base. However, while they were perfectly equivalent in case of goods that are expensed (i.e., all goods in case of the DBCFT), this does not hold for goods that are depreciated. Consider first the non-deductibility case, which is analytically simpler, though possibly more difficult to enforce. In this case, because investment goods are depreciated, it is not the investment, but the depreciation that has to be restricted to local investment goods and exclude imports. The destination-based version of equation (1) is then:

$$T_t^{DBACE(ND)} = \tau[S_t^L - C_t^L - dK_{t-1}^{TL} - iB_{t-1} - \hat{i}E_{t-1}^L]. \quad (10)$$

Equity would also have to be adjusted in this case to maintain consistency: if only local depreciation is allowed, then equity should also only reflect local, but not imported capital. To analyze equity more systematically, we go through the dynamics of the equity stock (equation (2)).

The first issue that arises is whether sales and intermediate costs need to be restricted to domestic values. It turns out that this is not the case, despite the restriction of the tax base to domestic values of these variables. To see this, think of a profitable export. The resulting profit can be used for example to fund local investment or dividends. If used for local investment, clearly equity of the firm must rise, and this means that export sales must be counted. Similarly, if used for dividends, equity must stay the same, and this means again that export sales must be counted to offset the dividend outflow.

Depreciation, is restricted to local investment goods. Hence to maintain consistency, and avoid including capital that is never depreciated, we need to deduct imported capital goods from equity. Similarly, any investment abroad should also not count toward equity and must therefore be deducted. If foreign investment is sold or profits are repatriated, this in turn would boost equity. Intuitively, an investment abroad is equivalent to a distribution, as it reduces the equity in the domestic operation. It creates equity elsewhere instead. So, we define foreign investment to be the net of any new foreign investment financed by the firm and any repatriated returns on foreign investment.

Taxes need to be replaced by the tax liability under the DBACE. However, as they are also part of dividends, the tax payment will ultimately wash out. Dividends need no other adjustment. Debt also need not be adjusted: if a firm issues debt to finance local investment, local equity will stay constant, but if it finances imported investment goods or foreign investment, then local equity falls. Hence the resulting definition of domestic equity is written as:

$$E_t^{L(ND)} = E_{t-1}^L + S_t - C_t - dK_{t-1}^{TL} - I_t^M - I_t^F - iB_{t-1} - T_t + N_t - D_t. \quad (11)$$

substituting dividends (equation (3) is unchanged, investment there encompasses all three components) in equation (11) and simplifying yields:

$$T_t^{DBACE(ND)} = \tau[S_t^L - C_t^L - (d + \hat{i})K_{t-1}^{TL} - (i - \hat{i})B_{t-1}]. \quad (12)$$

As noted, this implementation may not be the most robust one to prevent tax evasion, as imported consumption goods could escape taxation by being declared business inputs. Moreover, it could also be quite complicated for firms to maintain separate accounting for imported and domestically purchased capital goods. We therefore turn now to the border tax case. In this case, equation (10) changes to allow depreciation of imported capital goods, and to account for the revenue raised at the border:

$$T_t^{DBACE(BT)} = \tau[S_t^L - C_t^L - dK_{t-1}^{TL} - dK_{t-1}^{TM} - iB_{t-1} - \hat{i}E_{t-1}^D] + \tau \frac{I_t^M}{1 - \tau}. \quad (13)$$

The imported capital stock follows this path $K_t^{TM} = K_{t-1}^{TM}(1 - d) + \frac{I_t^M}{1 - \tau}$, i.e., it rises with the tax-inclusive cost of imported investment goods, implying that the border tax is capitalized into the price and depreciated over time. This is not the only possible treatment, but it is within the spirit of a border adjustment tax, under which a firm has a choice between a taxed imported good at a depreciated exchange rate or a local good. It also achieves equal treatment between a firm that directly imports a capital good and one that purchases it from a local importer who would also have to raise the price of the good by the border tax to break even. Moreover, allowing expensing of the border tax would make calculations quite complicated, as this part would then also have to be deducted from equity to maintain consistency.

Note that the superscript on equity changed from L to D , to reflect that equity now includes all domestic investment, whether locally purchased or imported. Equation (11) is thus adjusted by replacing the capital stock with domestic capital, and by not deducting imported investment goods. Dividends need to be adjusted to take the tax-inclusive cost of imported investment goods into account. With these changes and the usual rearrangements, the tax liability in the border tax case turns out as:

$$T_t^{DBACE(BT)} = \tau \left[S_t^L - C_t^L - (d + \hat{i})(K_{t-1}^{TL} + K_{t-1}^{TM}) - (i - \hat{i})B_{t-1} + \frac{I_t^M}{1 - \tau} \right]. \quad (14)$$

Comparing equations (12) and (14), or remembering the general result that the ACE is neutral to depreciation, it is clear that the present value of tax revenues under both approaches is the same, as long as the notional interest rate matches the discount rate. If the notional interest rate is too low, firms would prefer the non-deductibility option, because they save the upfront tax cost and lose less from their equity being lower and vice versa. Formally, under non-deductibility the tax consequences of importing one unit of capital are zero (no deductibility and no depreciation), but under the border tax implementation the NPV of importing one unit of capital that is maintained until fully depreciated is:

$$\Delta T_{I^M=1}^{DBACE(BT)} = \frac{\tau}{1-\tau} \left(1 - \frac{d+\hat{i}}{d+r} \right) \begin{cases} < 0 & \text{if } \hat{i} > r \\ = 0 & \text{if } \hat{i} = r \\ > 0 & \text{if } \hat{i} < r \end{cases} \quad (15)$$

In both cases, foreign investment does not count toward equity. That aspect may, however, not be so different from existing ACEs, which often exclude equity stakes in other firms (including subsidiaries abroad) to avoid a potential double allowance. Also, many territorial countries would disregard foreign investment and related allowances anyway. However, some countries may also purposefully allow it, because it makes a country attractive as a place for international holding companies who effectively receive dividends tax free if matched by equity holdings. So, while under an ACE capital located abroad can be included or excluded, depending on a country's preferences, under a DBACE, it must be excluded.

C. The DBACC

As in the origin-based case, the DBACC can be easily derived from the DBACE by replacing the actual interest on debt with the notional rate. Putting this into equations (12) and (14) simplifies to:

$$T_t^{DBACC(ND)} = \tau[S_t^L - C_t^L - (d + \hat{i})K_{t-1}^{TL}] \quad (16)$$

and

$$T_t^{DBACC(BT)} = \tau \left[S_t^L - C_t^L - (d + \hat{i})(K_{t-1}^{TL} + K_{t-1}^{TM}) + \frac{I^M}{1-\tau} \right]. \quad (17)$$

IV. PROPERTIES AND IMPLICATIONS OF DESTINATION-BASED ALLOWANCES

A. Domestic Neutrality

The neutrality features of the ACE/C are retained in their destination-based versions. Specifically, both are neutral to investment and the depreciation rate, provided the notional interest rate matches the discount rate. The ACC is neutral to the debt-equity ratio, the ACE only if the notional rate matches the interest rate on debt. The ACC therefore is slightly more robust to company choices.

While the destination-based aspects of the DBACE/C are new, at least for a corporate tax, origin-based ACE variants have been implemented in various countries. These studies typically find that an ACE reduces leverage but only has a small impact on investment—which may not be so surprising, given that the cost of capital for equity is reduced, but for debt often increases

compared to a standard CIT system. Further details on empirical evidence and country experiences can be found in the Appendix.

B. Profit Shifting

Transfer Price Manipulations

Countries that adopt a DBCFT will not be affected by profit shifting through transfer pricing, because exports are untaxed and imports non-deductible, so their prices are irrelevant (see Auerbach and others, 2017b). This is mostly true also for the DBACE/C. For intermediate goods, this raises no issue: transfer price manipulation may affect the tax collected at the border, but this will wash out as a result of the later deductibility. The only—minor—way in which transfer prices could play a role is for investment goods under a border tax implementation, unless the notional interest rate matches the discount rate (see equation (15)), because the tax that is capitalized into the investment good is depreciated over time. Specifically, a firm would have the incentive to understate the import price of a capital good in countries where the notional interest rate is below the discount rate and vice versa. This incentive is particularly strong if the tax rate is high. The intuition for this is that the lower initial tax payment on importation, would have a minor advantage in net present value terms over the loss in the allowance for corporate equity. This is most likely to occur in case of intangible goods, which can be moved without transportation costs, and where arm's length prices are hard to determine. The scope for revenue losses from transfer price manipulation is, however, much smaller than in an origin-based system, because any tax underpayment is eventually recovered over time, even with interest. An impact on net present values occurs only to the extent that notional interest rates do not match discount rates.

While countries adopting destination-based taxes will be immune to—or in case of DBACE/C(BT) at least partially protected from—transfer price manipulation, this is not true of countries maintaining origin-based taxes. They will face increased profit shifting out of their economies, because destination-based systems apply no tax on profits shifted inwards.⁶

Thin Capitalization

The DBCFT, which does not allow interest deductibility also prevents this type of profit shifting. The same is true of the DBACC, which is robust to changes in the debt-equity ratio.

Under a DBACE, however, some profit shifting through interest deductions remains feasible, if the notional interest rate is different from the rate paid on debt. In case of unrelated-party debt, a firm can reduce its tax bill by choosing where to issue debt. Suppose a firm changes the geographical distribution of its debt by raising the debt stock in country *A* by some amount ΔB

⁶ If a firm in a DBACE/C(BT) country with the notional interest rate below the discount rate imports from an origin-based country, there is an unambiguous incentive to understate the import price, which reduces tax liabilities in both countries. If importing from a destination-based country, the export has no tax implications, and only taxes in the importing country need to be considered.

and reducing it in country *B* by the same amount. Using equation (12) (or equivalently equation (14)) and marking the two countries by superscripts, shows that the resulting tax effect is:

$$\Delta T_t = (\tau_t^A(i - \hat{i}^A) - \tau_t^B(i - \hat{i}^B))\Delta B_{t-1}. \quad (18)$$

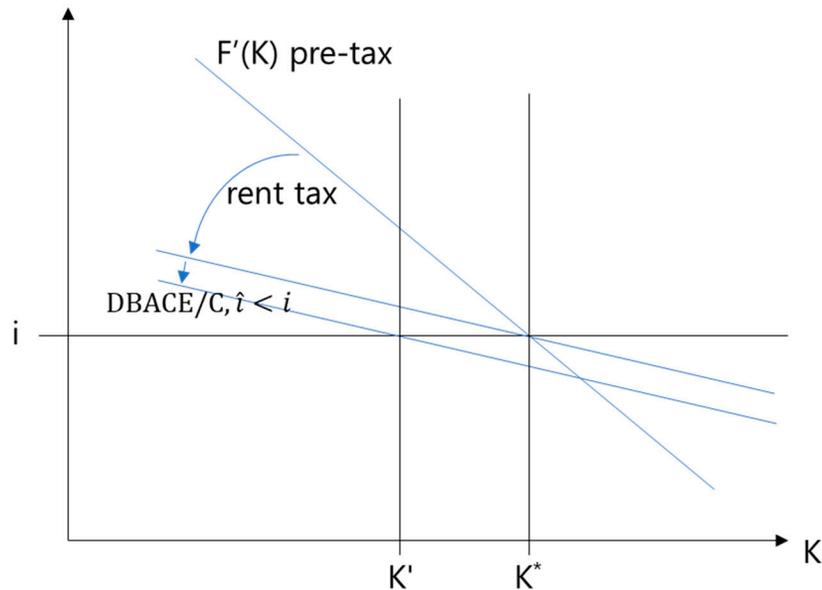
Hence, there is a tax saving, provided that the product of tax rate and the difference between debt and notional interest rates is higher in country *A* than in *B*. There is certainly a tax saving if the tax rate in country *A* is higher and the notional interest deduction lower.⁷ The tax saving rises with the debt interest rate.

More extreme profit-shifting opportunities arise in case of intercompany loans. In this case, there is additionally an incentive to charge an artificially high interest rate to maximize the tax savings.

C. Strategic Interactions

Unilateral adoption of a destination-based tax system would strongly affect all other countries. Profits shifted into a destination-based country would avoid taxation completely, and the destination-based country would have no (or little, in the cases discussed above) incentive to verify transfer prices. Similarly, it is attractive to shift rent-earning investment that relies on exports into a destination-based country. Even if the appreciation negates the tax advantage of incurring costs in such country, the non-taxation of the rent remains attractive. Hebous, Klemm, and Stausholm (2018) estimate the size of these effects and discuss possible reactions by countries. These include, for most countries, strong incentive to reduce tax rates, or more effectively also to adopt a DBCFT.

Figure 1. The Marginal Return to Capital Before and After Tax



⁷ This would include countries with a traditional CIT system, which is equivalent to a notional rate of zero percent.

(continued)

Under global DBCFT adoption, however, there should be no strategic interaction over tax rates,⁸ as rates will not affect optimal location decisions. To see whether this result follows through under a DBACE/C, consider the marginal return to capital as depicted in Figure 1. In a given country, the world required rate of return (i) and the marginal return of capital determine the optimal capital stock. Introducing a tax on rents, reduces the marginal return on rent-earning investment, but not on marginal investment, hence the curve pivots, rather than shifting down as under a standard CIT. As everything is destination based, there is no competition over infra-marginal investment, hence there are no further implications, and the capital stock remains at an unchanged level.

However, if a DBACE/C is universally implemented with an inadequately low notional interest rate, then capital is still taxed at the margin. The post-tax return is thus shifted down (in case of a DBACC by $i - \tau(i - \hat{i})$, less in case of a DBACE, depending on debt ratios). Hence, investment is discouraged resulting in a lower capital stock. In this situation, the capital stock is again a function of the tax system, such as the tax rate and depreciation allowances, so that it may lead again to strategic interactions. Moreover, the notional interest rate becomes an additional tool of strategic interaction. A country could boost its capital stock by granting an excessively high notional rate.⁹ This could reduce capital elsewhere (e.g., with inelastic world savings, the interest rate would rise). Thus, the tax rate and the notional ACE rate remain tax competition policy tools even under a universal DBACE.

D. Revenue

The DBACE/C, like the DBCFT, is a tax on economic rent, and thus in terms of net present value, the amount of the tax liability of an investment under both systems is identical as long as notional interest rate matches the discount rate and—in case of the DBACE—the interest rate on debt.

However, in any individual year, the tax collection from a DBACE/C can be very different from a DBCFT. Equation (19) compares the revenue of a DBACE(ND) with a DBCFT to reveal when a DBACE(ND) may raise more (for a DBACC(ND), simply ignore the debt term).

$$\begin{aligned} T^{DBCFT} &< T^{DBACE(ND)} \\ \tau(S^L - C^L - I^L) &< \tau(S^L - C^L - (d + \hat{i})K_{t-1}^{TL} - (i - \hat{i})B_{t-1}) \\ I^L &> (d + \hat{i})K_{t-1}^{TL} + (i - \hat{i})B_{t-1} \end{aligned} \quad (19)$$

Based on this comparison we can conclude that, even with a notional interest set at the perfect level:

- The DBACE/C(ND) raises more revenue in years of exceptionally high investment.

⁸ There could still be strategic interactions over other aspects of the tax system, if the tax base can deviate from a pure cash flow definition, e.g., if countries offer super deductions for some assets.

⁹ Such policy would be inefficient and lose revenue, but some countries may perceive positive externalities from additional investment.

- The DBACE/C(ND) is a more stable revenue source, as the stock of capital will adjust more slowly than investment, which is a flow variable.
- The DBACE/C(ND) raises greater revenues initially, if implemented on an incremental base, as only capital created after implementation will count toward the allowance.
- The DBACE/C(BT) would raise even more initially, as tax on imported goods would be collected at the border and then depreciated over time.

Relaxing the assumption of all discount and interest rates matching, there are additional differences. In practice, discount rates are unlikely to be the same for all actors, and notably not for the government and the private sector. For the efficiency results, the private firms' discount rates need to match the notional rate. For equality of revenues, however, it is the government's discount rate that needs to match the notional rate. If the notional rate exceeds the government's discount rate, then the DBACE/C(ND) raises less revenue, even in present value terms, and vice versa. In case of the DBACE/C(BT) it depends also on the share of imported investment goods.

Moreover, in case of the DBACE, even a notional interest rate set at the government's discount rate is insufficient to achieve equality of revenues, because the interest rate on private debt is likely to be higher, reducing revenue compared to a DBCFT. Moreover, under a DBACE, irrespective of the discount rate, revenue will depend on the debt-equity ratio. They will also depend on any changes to this ratio, which could be quite sudden, for example in case of an exchange rate adjustment when firms hold foreign currency debt.

Having compared the revenue to a DBCFT, the remaining question is how revenues would compare to the current tax system. Hebous, Klemm, and Stausholm (2018) calculate DBCFT revenues for a large panel of countries and compare them to current CIT revenues. They find that on average across countries, revenues are not very different, which the generous expensing being counteracted by the loss of effectively subsidized debt-financed investment in current systems. However, while average revenues are similar, there are large differences in some countries, and notably trade-surplus countries tend to lose revenues if moving to a DBCFT. Patel and McClelland (2017) use data on tax returns to simulate the DBCFT base in the United States. They find that the domestic cash-flow tax base is similar to the existing CIT base in the United States. However, border-adjustments imply significantly higher DBCFT revenues than CIT revenues, which is in line with the result in Hebous, Klemm, and Stausholm (2018), given that the United States is a country with a trade deficit.

Finally, while these comparisons focused on taxes at the corporate level, assessing the impact on aggregate revenues also requires an assessment of the effect on other tax revenues, notably interest receipts. In countries that tax interest receipts at rates higher than dividends, the implications of revenue losses from interest deductibility are mitigated.¹⁰ In turn, in such countries, any reduction in debt as a result of moving to a DBAC/C would lead to loss of some

¹⁰ The relevant rate is not the statutory rate, but the effective one, which may be zero if debt is held by tax-exempt investors.

personal income tax revenue. However, realistically such countries would have to revise their taxation of interest and dividends to ensure that the efficiency properties of the DBACE/C are not negated by the personal income tax.

In the long run, revenues could also be affected by the behavioral response to moving to a more efficient tax system. For example, in countries that currently tax investment at the margin, the capital stock should rise, which would boost incomes and tax revenues.

E. Exchange Rate and Trade

Theoretically, a DBCFT should not affect real trade, because change in relative prices would undo the impact of any border adjustment, as discussed particularly clearly in Auerbach (2017). Some authors have claimed that in practice, the real exchange rate adjustment can be more complex due to nominal rigidities and other effects.¹¹ Abstracting from any such effects, are there any reasons why the DBCFT result may not hold in case of a DBACE/C?

Given the identical treatment of exports and most imports, the impact of a DBACE/E should be very similar. The exception—like in the case of transfer price manipulation—is linked to the different possible implementations regarding investment goods. If there is a border tax and deductibility, the firm remains indifferent between a local and an imported investment good: both will be discouraged if the notional interest rate is below the discount rate or subsidized if it is above, but the relative choice between both is unaffected. If, however, the foreign investment good is non-deductible, then purchasing it has no tax consequence. Hence, a firm will prefer imported investment goods if the notional interest rate is too low, and local investment goods if it is too high, and will only be indifferent if it matches the discount rate. It is not possible for the exchange rate to adjust to undo this effect, because then it would not be neutral anymore in the market for current goods.

F. Incidence

As discussed in Auerbach and others (2017a) and Auerbach and Devereux (2018), a DBCFT is incident on consumption financed out of non-wage income.¹² To see whether this result holds also in case of the DBACE/C, Figure 1 is again instructive. As discussed above, if the notional interest rate does not match the world required rate of return, the capital stock will differ from the efficient one. This in turn will shift some of the incidence on labor, with labor bearing some of the burden if the notional interest rate is too low, and labor receiving a subsidy if the rate is too high. Still, compared to the current CIT systems, where the notional rate is effectively zero, the amount of tax borne by labor should be much smaller.

¹¹ Barbiero and others (2018), in a dynamic general equilibrium analysis, find that an unanticipated DBCFT leads to appreciation of the US dollar by almost the amount of the tax adjustment. However, the dynamics are complex (depending on anticipation and exact implementation, inter alia), and eventually adjustment can be incomplete. See also Buiters (2017).

¹² Auerbach and others (2017a) also discuss subtle differences that depend on whether adjustment is through the price level or the exchange rate.

G. Sector-Specific Issues

Financial Sector

The DBCFT (or indeed any R-based CFT) disregards interest flows so that the financial sector is not taxed on many of its activities—although fee-based income would be covered. The economic implications of disregarding interest flows are different depending on whether funds are lent to corporations or households.

In case of lending to corporations, as explained in Auerbach and others (2017a), the rent earned by the financial sector is effectively taxed already in the hands of the borrower and reflected in the interest rate. Hence the financial sector is effectively taxed, despite the interest exemption.¹³ However, for political reasons, the appearance of no tax being paid in the often highly profitable financial sector could be problematic. The DBACE would resolve this issue, as it retains interest deductibility and symmetrically taxes interest receipts. The DBACC would be in between both cases: only the notional interest on debt (or equity—the distinction becoming irrelevant) would be taxable (see Kleinbard, 2005).

In case of lending to households, any rents earned would indeed go untaxed under the DBCFT.¹⁴ Under a DBACE, this problem is avoided, as interest is fully taxable. Under a DBACC it is mitigated, as at least the notional interest rate is taxed.

Extractive Industries

The extractive industries sector is marked by often significant location-specific rents. Taxing these rents at the origin country is attractive and efficient, as location-specific rents cannot be exploited elsewhere. As destination-based taxes would forgo such taxation, governments' will need to take other measures to ensure that they are able to extract a share of the location-specific rent. This could include additional taxes on this sector, as is already now the case with counties often having a special regime, including royalties and/or special taxes on profits or rents from natural resources. Equivalently, production-sharing agreements remain possible, as well as auctioning of exploitation licenses.

While such additional taxes or mechanisms are useful to raise the share of rent taxed at the origin, it is worth pointing out that even destination-based taxes will raise revenues from this sector, provided the resource is owned by domestic residents. This is because the current account must ultimately balance and any additional export revenue from exploiting natural resources should boost imports, which are taxed. Only if resources are foreign-owned, this does not occur, because then the current account balances through an equal increase in export

¹³ Auerbach and others (2017a) also point out some subtleties, in particular that if banks' cost of capital is lower than borrowers' discount rates, that part of the rent would go untaxed, unless an R+F cash flow tax is implemented.

¹⁴ As long as there is a personal income tax, which does not allow an interest deduction, this would still not go entirely untaxed.

revenues and incomes due to non-residents, i.e., the trade account will strengthen, but the income account weaken.

None of these considerations, which apply to the DBCFT would be fundamentally different under a DBACE/C.

V. CONCLUSIONS

The ACE/C is often suggested as a neutral tax to which it is easier to transition than to a cash-flow tax. Notably, it allows maintaining existing depreciation rules and interest deduction and avoids the likely greater volatility of revenues under a cash-flow system. The DBCFT has been suggested as an option for fundamental tax reform, doing away with profit shifting and tax competition.

This paper has looked at a DBACE/C to examine its property and assess whether it can combine the beneficial features of an ACE/C and a DBCFT. Our most policy-relevant findings are as follows:

Implementing a DBACE/C does not appear to cause any major technical difficulties beyond those related to an origin-based ACE/C and a DBCFT. The adjustment to a destination basis is similar to the one used for the DBCFT, with border-adjusted imports and tax-exempt exports. One additional adjustment is needed: any investment abroad should be treated as reducing corporate equity (or capital), while any repatriated profits would boost it.

In a destination-based setting, the advantages of an ACC versus an ACE are even greater than in an origin-based implementation. Notably, only the DBACC removes the possibility and incentives for profit shifting through the debt structure. Both the DBACE and DBACC remove most possibilities of profit shifting through transfer price manipulation, although if they are implemented through a border tax on imported investment goods, rather than non-deductibility, a small scope for such manipulation would remain. Unfortunately, a border tax is otherwise the more convenient implementation, preventing tax evasion on imported goods that can be used both as business capital and consumer durables. Hence the very strong robustness of the DBCFT with respect to profit shifting, does not completely apply in case of the DBACC, and even less in the case of a DBACE. Nevertheless, all these options are far more robust than origin-based taxes.

Revenues of a DBACE/C are likely to be initially higher and permanently less volatile than those of a DBCFT. The initially higher revenues can be achieved by making the system incremental, i.e., counting only equity (or capital) that is acquired after the implementation. The lower volatility is explained by the absence of expensing of investment. Depreciation is much smoother, as derived from a stock rather than flow variable.

The DBACE/C also offers administrative advantages due to being closer to the current tax system, reducing the number of transitory arrangements.

- Maintaining the familiar depreciation schemes is unlikely to be a significant advantage. Expensing of investment—while novel in many countries—should not cause any technical

difficulties but rather be a simplification, especially in countries that currently have very complicated depreciation rules. Many countries, including currently the United States and in the past the United Kingdom, have allowed expensing, sometimes for short periods without causing major accounting or international issues. The legacy stock of capital can simply continue to be depreciated. Based on a tradeoff between revenue considerations and ending a complicated dual system, acceleration of remaining depreciation can be contemplated.

- Dealing with existing debt would be far easier. Under a DBACE, this raises no issue whatsoever. Under a DBACC, some transitional arrangement might be required, as firms took on debt assuming deductibility of full rather than notional interest. But this is still a smaller difficulty than the one faced by a DBCFT, where the treatment of financial flows would change fundamentally. Tightening thin capitalization rules in many countries suggest, though, that interest deductibility on old debt could be phased out without major disturbances to most firms.
- The DBACC and especially the DBACE would allow for a more similar taxation of the financial sector as achieved by the current system. While the difference with a DBCFT is not so much one of economic substance, it may be politically more convenient to have the financial sector continue remitting taxes.

Tax competition—or strategic interactions on features of the tax system—would be reduced under a DBACE/C, but not eliminated as under a DBCFT. If the notional interest rate deviates from the world required rate of return, the tax rate will remain a relevant feature in decisions of where to locate capital. Moreover, the notional rate of return could itself be an instrument over which countries can compete to attract capital. Still, under global adoption, the scope for competition would be much reduced compared to the current origin-based systems, as firms will not be able to determine the location of where rents appear (be it through profit shifting or production location). There would only be small differences affecting the marginal cost of capital.

Putting all these considerations together, it seems that compared to a DBCFT, the DBACE/C systems do have some administrative advantages, especially regarding the transition from the current system, but they also exhibit important weaknesses in terms of robustness to profit shifting and tax competition. There appears to be a general tradeoff between transition difficulties and the ultimate neutrality and robustness of the system. The DBACE is the closest to the current system, but also the least robust, especially if implemented with a border tax. The DBACC removes all profit shifting through debt but requires a more fundamental change. The DBACC with non-deductibility and DBCFT are the only taxes to remove all profit shifting opportunities, but they are also the most fundamental deviation from the current system.

The shift from an origin to a destination-based system of taxation is the most fundamental aspect of all three tax systems. If implemented unilaterally, it would have major spillovers on other countries. Even under global implementation, it would lead to a redistribution of tax revenues that would make it controversial. If, however, agreement on such fundamental reform can be reached, the advantages are also potentially significant, and the tax system would be

much more robust than the current one. It would also combine well with other potential future reforms, such as residence-based taxation of normal returns to capital.

Considering these major difficulties and potential benefits from destination-based taxation, it would seem that the differences among the various destination-based systems are relatively minor. Therefore, if agreement on moving to a destination base can be achieved, then it would also seem possible to agree on a CFT, which would be the most efficient and robust option. However, if a DBACE is easier to agree on—not least because of initially higher revenues—it would still be a more efficient tax than the current system. Moreover, it could play a useful role in transitioning toward a DBCFT, as an ACE is almost neutral to the depreciation rate (except to the extent that the notional interest rate deviates from the discount rate). Over time it would turn into a full DBACE, and then depreciation rules could be changed increasingly toward expensing, at which point the transition to a DBCFT would be relatively easy. As long as there were agreement on a destination base, countries could even make different choices about the precise rent tax. While this would be less efficient than global cash flow taxation, it would be much more robust to tax competition than the current origin-based systems.

Appendix 1. Country Experiences with Rent Taxes

There is no real-world experience with a DBCFT or DBACE/C. The 2017 US tax reform has some weak destination-based elements (e.g., in applying lower tax rates for certain export revenues). Proposal of implementing a formula apportionment system based on sales also have a destination-based nature. And consumption taxes, such as VAT or sales taxes have always been on a destination basis.

A few countries, however, currently implement an origin-based ACE system, including Belgium, Cyprus, and Italy (Table A2). All existing ACE systems have an incremental base. Belgium has had the total book value of equity as the base until 2017 but switched to an incremental base starting in 2018. The rates are all linked to the yields on government bonds. Countries such as Austria, Croatia, Latvia, and Portugal abolished their ACE regimes.¹⁵

Appendix Table A1. Empirical Evidence on the ACE

Study	Reform	Data	Findings	
			Debt	Investment
Hebous and Ruf (2017)	Multiple ACE countries, special focus on Belgium	Administrative data (MiDi data)	Negative	Zero for active investment Positive for passive investment
Klemm (2007)	Brazil	Thomson Financial	No big effect	Weakly Positive
Panteghini, Parisi, and Pighetti (2012)	Italy	AIDA database	Negative	
Branzoli and Caiumi (2018)	Italy	Tax return data (ISTAT)	Negative	
Petutschnig and Runger (2017)	Austria	AMADUES data	Negative	
Princen (2012)	Belgium	AMADUES data	Negative	
Van Campenhout and Van Caneghem (2013)	Belgium	KeFiK survey on SME financing 2008	No impact	
Studies on Banks				
De Mooij, Hebous, and Hrdinkova (2018)	Belgium	BankScope	Negative	
Schepens (2016)	Belgium	BankScope	Negative	
Martin-Flores and Moussu (forthcoming)	Italy	Banks	Negative	
C�el�erier, Kick, and Ongena (2017)	Belgium	Bank and loans data	Negative	Positive effect on the supply of credit

Source: Authors' Compilation

Table A1 provides an overview of empirical studies of current and past ACE regimes. Overall, studies find:

- an ACE reduces corporate leverage (e.g., Hebous and Ruf, 2017; Petutschnig and Runger, 2017; Princen, 2012)—including of banks (Schepens, 2016)

¹⁵ Keen and King (2002) discuss the Croatian experience with the ACE. Denmark is considering an ACE (see Klemm, Hebous, and Hillier, 2018).

- mixed evidence on the effects of an ACE on investment (Hebous and Ruf, 2017)

appropriate-anti tax avoidance measures are important to accompany the adoption of the ACE (Hebous and Ruf, 2017; IMF, 2016)

Appendix Table A2. Experiences with ACE Systems

Country	Base	Rate	Notes
Austria, 2000-2004	Incremental book value of equity	Average secondary market government bond rate plus 0.8 p.p.	Notional return taxed at a reduced rate of 25 instead of 34%.
Belgium, Since 2006	Until 2017: Full book value of equity. Since 2018: Incremental, base equal to 1/5 of the increase over 5 years.	Average monthly government bond rate of 2 years ago. Rate cap of 6.5%; change limited to 1 p.p. per year. SME rate 0.5 p.p. higher.	Since 2013 no carry forward of unused allowances, tax on distributed dividends of large firms introduced.
Brazil, Since 1996	Book value of equity; only for distributions (closed companies: also credits to owners)	Rate applicable to long-term loans	Up to the level of the notional return, dividends can be paid as "interest on equity." This is deductible for CIT and subject to the usual tax on interest.
Croatia 1994-2000	Book value of equity	5% plus industrial goods inflation if positive.	
Italy, 1997-2003	Incremental book value of equity. 2000: 120% of new equity. 2001: 140%. From 2002: again 100%.	1997-2000: 7%, 2001-2003: 6%	Notional return taxed at a reduced rate of 19 instead of 37% (34% in 2003). Before 2001: 27% minimum average tax rate.
Italy, Since 2012 [†]	Incremental equity (over 2010 base)	2011-2013: 3%; 2014: 4%; 2015: 4.5%; 2016: 4.75%. From 2017: average public debt rate plus risk factor set by Finance Minister.	Excluding current year profits. May not exceed the company's equity at the end of the given fiscal year.
Latvia, 2009-2014	Retained earnings of accumulated since 2008	Weighted average interest rate on loans to nonfinancial enterprises. 5.05% in 2010, 4.37% in 2011.	
Liechtenstein Since 2011	Modified equity	Based on market developments (currently: 4%).	
Portugal, Since 2008	Incremental equity of SMEs; from 2014: limited to €2,000,000	2008-2013: 3%; 2014-2016: 5% From 2017: 7%.	
Cyprus, Since 2015	Incremental equity: issued share capital, fully-paid share premium	10-year Cypriot government bond yield, or if higher, yield of country where equity is invested; plus 3 p.p.	
Turkey, Since July 2015	Incremental cash capital	50% of weighted average bank loan interest rate	Not for: firms with high passive income / financial assets; subsidiaries or participations.
Malta, Since 2018	Share capital, including: share premium, interest-free debt, retained earnings and contribution reserves.	Yield on 20-year government bonds plus 5 p.p.	Limited to 90% of taxable income. Excess can be carried forward

Source: Authors' compilation. [†] Italy's draft budget for 2019 proposed abolishing the ACE.

There are also country experiences with R-base CFTs. They tend to be sector specific (e.g., natural resources) or applied only to small businesses. Hungary, for instance, applied a CFT to SMEs as a form of simplified small company system. Mexico had a tax (named IETU) with R-base cash flow features, but it served as a minimum tax under the standard tax regime, rather than a standalone tax. Estonia, Macedonia, and Georgia employ forms of S-Base cash flow taxes.

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