

**International Emissions Trading
Design and Tax Shifting
By Multinational Corporations**

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International Emissions Trading Design and Tax Shifting by Multinational Corporations

Carolyn Fischer*

1. Introduction

In this paper we explore how taxation by different countries of income generated by multinational corporations might impact an international program of emissions permit trading, and vice versa.¹ Two questions are asked: First, how can multinational taxation affect the location and efficiency of emissions reductions? Second, can one mitigate these efficiency losses through judicious policy design? In particular, we consider how emissions offsets arising from activities conducted abroad should be treated for environmental compliance and for tax purposes.

These questions are important when designing a domestic environmental policy to combat a global pollutant like greenhouse gases. If lower-cost opportunities for emissions abatement exist elsewhere, provisions for letting activities undertaken abroad offset domestic emissions requirements can create tremendous gains from trade if cheaper abatement. However, for multinational firms, allowing for international offsets can also create opportunities for tax avoidance that may affect real decisions regarding compliance and may diminish some of those efficiency gains, not to mention affect public revenues.

The fundamental problem is that multinational corporations can save on their tax bills by realizing more of their profits in low-tax countries. This profit shifting can be achieved by relocating real activities or by transferring goods between a parent corporation and one of its subsidiaries at favorable prices. Tax rules for transfer pricing are designed to limit some of this behavior, and the issue is whether or not emissions offsets will be recognized as transfers of valuable property and subject to appropriate pricing rules.

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¹ This brief is based closely on Fischer (2001).

For example, suppose firms can use abatement efforts in other countries to directly offset reduction requirements in the United States, without treating the transfer as a permit sale. A U.S. parent could then shift costly abatement activities to its subsidiary in a high-tax country, reducing the more heavily taxed foreign-source income; the offsets then allow less abatement at home, increasing profits in the lower-tax country.

A formal international emissions permit trading program would make such transfer-pricing games transparent: the subsidiary could create or buy permits at the market price and sell them to the parent at a loss, effectively transferring profits from the high-tax to the low-tax country. A market-price rule for permit transfers would limit (though not eliminate) such problems, particularly with the advent of a thick market for emissions permits and a clear spot price. On the other hand, any room for interpretation can create leeway for profit shifting. For example, if emissions permits are allocated gratis to firms, a precedent for a zero price exists—a particular problem if cost basis is allowed to represent market value.

Limitations on trade between separate permit systems can also interact with tax incentives. Having distinct prices available at home and abroad can create some bounds for transfer pricing games, but to the extent that they differ, leeway may still exist for the firm to exploit them. The appropriate transfer-pricing rules to cut off such games can differ according to the type of trade limitation imposed.

Thus, international offset systems, such as those being envisioned in current discussions, raise numerous questions regarding tax treatment and the efficiency of the allocation of abatement effort within multinationals, across countries, and across firms according to their tax status. These effects must be understood and taken into account when choosing policy instruments and their design.

Section 2 of this paper reviews the existing literature on national tax policies and multinational activities. Section 3 develops the basic framework for emissions abatement decisions in the presence of corporate income taxation for likely treatments of offsets and permits. Four types of potential offset policies are considered, and their implications for tax revenues, trading program efficiency, and abatement location are discussed. The conclusion addresses the methods by which an international emissions trading policy, as well as its corresponding tax treatment, may be designed in order to minimize distortions.

2. Taxes and Multinationals

Almost every country levies tax on corporate income; in the United States, the rate is 35%.² Multinational corporations pay these taxes around the world on income generated by their subsidiaries and foreign branches. However, in their home country of operation, they are generally liable for domestic income tax on their worldwide income. To avoid double taxation, most countries give credits for income taxes paid abroad. The idea is to implement “residence-based taxation”: multinational corporations face the same tax rate, that of their country of incorporation, regardless of where their income is generated. In theory, they would then have no incentive to relocate profits and would equalize their marginal returns to capital around the world—in other words, they would choose their investment opportunities efficiently. However, in practice, two critical aspects keep corporate income taxation from being truly residence-based and neutral toward firms’ production location decisions.

The first is a concern when the foreign country’s tax rate is higher: the tax credits are generally not unlimited. In the case of the United States, foreign tax credits are capped by the amount of domestic taxes the firm is liable for on that foreign income.³ So if the company paid a higher rate to the foreign government, tax credits cover what the home tax authority requires from that foreign income, but no more. A multinational firm constrained by this cap is said to be in a position of “excess credits.” The corporation then does not face residence-based taxation but rather “source-based” taxation, since it effectively pays the foreign rate on income generated in that country and the domestic rate on income made at home. While some countries, like the United States and Japan, use overall foreign income to calculate tax credits (“worldwide averaging”), others, like the United Kingdom, determine credits on an activity-by-activity basis.⁴

A multinational firm in an excess-credit situation then has incentives to engage in nonproductive activities to reduce its tax burden. One response is to invest less in the foreign country, reflecting the lower after-tax rate of return. Another response is to move some of those

² Many states also tax corporate income at a rate up to 10.8%, which is deductible against federal income taxes. However, it is the federal government that grants the foreign income tax credits.

³ Separate foreign tax credit limitations do exist for particular categories of income, such as passive income, high withholding tax income, financial services income, shipping income, and certain types of dividends and distributions.

⁴ In the United States, from 1932 to 1976, per-country tax limitations were in force.

foreign-source profits to lower-tax jurisdictions (either back to the parent in the home country or toward subsidiaries in lower-tax foreign countries), thereby lowering the tax bill.

The second aspect affects corporations with subsidiaries in foreign countries with lower tax rates. The theory of equalized returns under residence-based taxation requires that income from foreign sources be taxed as it accumulates. In actuality, home-country taxation is not taxed on accrual but rather deferred until profits are repatriated. Thus, if the host-country tax rate is lower, the parent has an incentive to transfer profits to the subsidiary, retaining and reinvesting them in the host country. The earnings are allowed to accumulate there at the lower tax rate, delaying the higher home-country taxes until a later or more advantageous time for repatriation.

Thus, some incentive usually exists to shift taxable income to the lower-tax country, whether it is the home or the host country of the multinational corporation. The effects of these incentives are wide ranging. Economists have studied the impacts on such activities as foreign direct investment, corporate borrowing, transfer pricing, dividend and royalty payments, research and development activity, exports, bribe payments, and location choices (see Hines, 1996, for a thorough overview). Given these pervasive impacts, it seems likely that multinational taxation can have a significant impact on the location of environmental compliance activities. With global pollutants coming to the fore of environmental policy concerns, it seems important to account for multinational tax issues in concert with the design of international emissions reduction strategies.

3. Taxes and Emissions Permit Systems

The damaging effects of global pollutants are the same regardless of the precise location of the emissions source. Since the advantages of abatement are the same wherever they are undertaken, the best determinant of location is then the cost of abatement. However, any international effort to combat a global pollutant is inevitably going to consist of individual national environmental policies rather than a single international one. Each set of domestic policymakers will have a range of choices to consider: Will policies be regulatory or market based? Will national actors be allowed to use abatement activities in foreign countries to offset their domestic requirements? If so, to what extent?

The effort to reduce greenhouse gases provides a case in point. The Kyoto Protocol is an international agreement to reduce worldwide emissions of greenhouse gases, struck by 159 nations attending the Third Conference of Parties to the United Nations Framework Convention on Climate Change (held in December 1997 in Kyoto, Japan). In the protocol, the parties enumerated in Annex B (primarily the developed nations and the countries in transition to market

economies) each committed to a cap on their greenhouse gas emissions, on average 5% below their 1990 emissions levels. The protocol leaves the methods of compliance up to the parties, but it allows for joint implementation and for international emissions reduction projects to help satisfy domestic requirements (Article 4). The transfer of emissions reductions between parties is explicitly allowed (Article 6), and the establishment of the Clean Development Mechanism provides for abatement projects in non-Annex B countries (primarily developing countries) to count toward domestic efforts (Article 12).

How these international offsets are accounted for in the domestic compliance system is important in determining how susceptible the environmental policies are to manipulation for tax purposes. Most policies, even forms of command-and-control regulation, are potentially compatible with offsetting; however, for the purposes of this paper, the focus is on permit systems. The significant assumption is that environmental compliance decisions are decentralized, with offsetting actions taken by individual firms rather than national governments.

Four types of plans are considered in this paper:

1. a single domestic permit system with international offsets;
2. separate national permit systems without trade;
3. an international permit trading system; and
4. separate national permit systems with limited offsets.

The interaction of corporate income tax regimes with each plan will be analyzed using a simple example of two countries. Some notation will help in the presentation: Let E_i represent baseline emissions for the firm's operations in country i . Abatement activity A_i reduces net emissions in location i at a corresponding cost of $C(A_i)$. Those costs can be thought of as encompassing both direct costs, like investment in new, energy-saving equipment, and the indirect costs of forgone profits, such as those from reduced activity. Marginal abatement costs $MC(A_i)$ are the additional costs of reducing emissions by one more unit in location i , given that A_i units are already being performed. We assume it becomes costlier to find more opportunities for emissions reduction the more abatement is being conducted.

Corporate income tax rates in country i are denoted by τ_i . Since the relevant excess-credit situation occurs only when the foreign subsidiary faces higher tax rates by the host than does the parent by the home country, we will generally assume throughout the paper that $\tau_F > \tau_H$.

Let π_H and π_F denote baseline pretax profits in the home and foreign countries, respectively. These profits form a natural constraint on the multinational firm's ability to conduct

tax arbitrage. In our example, the firm wants to shift profits from the subsidiary to the parent; the limit to this transfer is the profits of the subsidiary. Once the profits are nonpositive, the effective marginal tax rate is that of the home country.⁵

Although the world is simplified to two countries here, the intuition still holds for the shifting of income between tax jurisdictions in worldwide averaging. Deferral incentives are also similar; if the host country had a lower tax rate, the incentives for shifting would be reversed. Their scale would also be smaller, since the tax savings are from deferral rather than avoidance. The important point is that some incentives to shift income to lower-tax countries are always present. We choose to focus on the straightforward example of firms that have excess foreign tax credits due to higher rates abroad.

Domestic Program with International Offsets

A domestic emissions permit program for greenhouse gases would cap total emissions generated within the home country and issue permits for those emissions rights. The market price for permits (P_H) that arises from competition for the right to emit indicates the marginal cost of abating emissions in the home-country economy.

A domestic trading program can let firms take advantage of cheaper abatement opportunities abroad by allowing them to use those activities to offset their domestic requirements. For example, if a firm conducts A_F units of abatement abroad, then it needs to buy only $E_H - A_H - A_F$ permits at home (or it can sell the surplus). The multinational corporation chooses the amount and location of its abatement to maximize its after-tax profits, inclusive of environmental compliance costs. However, to a certain extent, firms may take advantage of the offsets not just to lower compliance costs but also to shift their taxable income. Providing for direct offsets—without recognizing emissions reductions as property transferred between subsidiary and parent—sets the transfer price at zero, creating opportunities for tax shifting.

For the firm facing a single domestic tax rate on all income,⁶ profits are taxed and costs and permit expenditures are deducted all at the same tax rate. The firm then abates as long as the

⁵ In a multicountry context, excess credit status is determined according to a basket of taxable profits. Since each subsidiary creates one item in the basket, its profits may not have to be driven to zero to bring average tax rates for the basket in line with the home country's rates; π_F can then be thought of as the level of profits that must be transferred to arrive at this point.

after-tax cost of doing so is less than the after-tax cost of a permit. At the chosen level, the marginal cost of another unit of abatement at home just equals the home permit price; similarly, the marginal cost of abatement by the subsidiary just equals the home permit price. The after-tax marginal abatement costs are then the same, and since the tax rate is the same for domestic and foreign abatement activity, the pretax abatement costs are also equalized.

However, if the firm is in a position of excess credits, while domestic profits net of environmental compliance costs are taxed at the home-country rate, the activities of the subsidiary face the foreign rate. In this case, a little more abatement abroad costs $MC(A_F)(1 - \tau_F)$, while abatement at home costs $MC(A_H)(1 - \tau_H)$. Either kind of additional offset saves the firm $P_H(1 - \tau_H)$ at home. Thus, if the firm continues to abate as long as it is profitable, marginal abatement costs at home will equal the price of another permit, whereas marginal abatement costs in the host country will be higher in proportion to the tax differential. In other words, excess abatement effort is being performed abroad in order to incur more costs in the higher-tax country and more income in the lower-tax home country.

However, if the total abatement costs outweigh the subsidiary's profits ($C(A_F) > \pi_F$), the firm is no longer in an excess-credit position, and the effective marginal tax rate for the subsidiary is the home-country rate. We then return to the initial scenario, in which marginal abatement costs are equalized. Although this means efficiency for the location and amount of abatement, there are distributional consequences. As the subsidiary's profits are fully shifted home, tax revenues are also being transferred from the higher-tax to the lower-tax jurisdiction.

Consider an equilibrium in a domestic cap-and-trade emissions program in which a significant number of the actors are multinationals. To the extent that many are in excess-credit situations, too much abatement effort would be sent abroad relative to efficiency: the lower equilibrium domestic permit price would mask a higher overall cost of compliance. Meanwhile, to the extent that profits are shifted home, corporate tax revenues are siphoned from the foreign country to the home country via the offset system. On the other hand, if tax rates are lower abroad, too little abatement effort will be performed abroad and tax revenues will tend to flow in the other direction.

⁶ This may occur either because the foreign tax rate is lower (ignoring deferral issues) or because total abatement costs for the subsidiary exceed foreign pretax profits.

An important assumption in this process is that the parent company gets credit toward its emissions obligations for the abatement activities of its subsidiary. In other words, the subsidiary incurs the costs but does not get paid for these actions. In this manner, more costs are shifted to the subsidiary and thereby more profits are shifted to the parent. Suppose instead that transfer-pricing rules are instituted, such that the subsidiary must sell the abatement offsets to the parent at the market value, rather than zero. In this case, the costs to the subsidiary are offset by a transfer payment T , as are the gains to the home company. From the parent's perspective, a little more abatement abroad now costs $(MC(A_F) - T)(1 - \tau_F)$, while it saves the firm $(P_H - T)(1 - \tau_H)$ at home. If $T = P_H$, the latter nets to zero, and the firm will focus on maximizing the profits of the subsidiary, which means marginal abatement costs will be equalized at the home permit price. This transfer-pricing rule thus removes the opportunity for tax arbitrage, as the marginal profit from abatement before (and after) taxes will be zero in both countries. Alternatively, the parent could be required to pay the costs of foreign abatement to the subsidiary. Either of these rules could eliminate the firm's ability to transfer profits using offsets.

Separate Permit Systems

Suppose now that both the domestic and the foreign host country have permit systems, but no international trading is allowed. The parent and the subsidiary must each comply with the separate systems.

Abatement can change permit needs only in the country where it is performed. For the multinational firm in an excess-credit situation, a little more abatement abroad costs $MC(A_F)(1 - \tau_F)$ and saves the firm $P_F(1 - \tau_F)$, while abatement at home costs $MC(A_H)(1 - \tau_H)$ and saves the parent $P_H(1 - \tau_H)$. Thus, in each country, the firm will abate until the marginal costs equal the local permit price, and tax rates are irrelevant.⁷ Both the parent and the subsidiary want to maximize pretax profits, and no vehicle exists for transferring profits back to the parent before tax. However, if the relevant emissions have global consequences, and permit prices differ at home and abroad, potential gains from trade are being left unexploited.

⁷ This analysis assumes that the tax base is pure profits. If, for example, some portion of capital is taxed due to imperfect depreciation rules, and abatement activity requires capital inputs, then tax rates can matter. However, these types of cases are ignored here so that we can focus on the basic effects of the tax differential.

International Permit Trading with Transfer Pricing

In a regime of true international permit trading, the parent (as well as the subsidiary) can freely buy permits either at home or abroad. As a result (in the absence of transaction costs), those prices must be equalized. Otherwise, traders in the assets (who do not have foreign operations and tax differentials) would conduct unlimited arbitrage. Everyone would buy permits in the country with the lowest price and sell at the highest price; but it cannot be that the other countries' permits would go unused, so the only equilibrium can be a single price.

Allowing permit trading across programs means tax arbitrage does not occur with abatement; rather, the arbitrage is accomplished through the buying and transferring of permits. We thus consider the decision to transfer permits separately from the abatement choices. If the firm has the subsidiary buy one more permit and send it homeward at a transfer price of T , the parent raises its profits by $(P - T)(\tau_F - \tau_H)$. Since permit prices and tax rates do not change for the firm, these net savings are always positive if $P > T$ and negative if $P < T$. Transfers of permits will thus occur until subsidiary profits are effectively shifted back to the parent and no excess credits remain. If $T < P$, the subsidiary will buy permits and sell them at a loss to the parent. If $T > P$, the parent sells permits to the subsidiary at a gain.

However, if a transfer-pricing rule were to require that $T = P$, this tax arbitrage option would be closed. The multinational firm would be indifferent to transferring permits and would abate in each country until the marginal costs equal the international price of emissions permits. Then profit shifting does not occur, international permit prices and marginal costs are equalized, and the worldwide emissions target is met at the least cost.

Limited Offsets between Permit Systems

As evidenced by discussions surrounding the Kyoto Protocol, certain countries or policymakers may be hesitant to allow unlimited permit trading between systems. Part of the reason is a desire that each country perform some amount of its own reductions; another concern regards the extent to which permits acquired from other countries represent actual reductions in emissions.⁸ However, in restricting trade in permits, the policymakers might allow a kind of

⁸ This aspect includes "hot air," the excess permits available from the countries of the former Soviet Union, whose emissions have fallen well below 1990 levels because of economic decline rather than abatement effort.

hybrid between the first two systems presented, whereby multinational firms could use overcompliance in one system to offset undercompliance in the other.

Consider a rule that would prohibit a firm from buying foreign permits directly but would allow a multinational to use emissions credits actively generated through abatement in one country to offset emissions liabilities in another. For example, the subsidiary could buy permits in the foreign country for its own emissions, but it could not transfer to the parent more than it actually abated. Such a restriction places a limit on the export of permits from a subsidiary or parent to the other; importantly, that limit would be dependent on the firm's behavior.⁹

Again, we can separate the decision to transfer offsets from the abatement choices. If the firm sends one more offset homeward, the parent saves $P_H(1 - \tau_H)$ at a cost to the firm of $P_F(1 - \tau_F)$, since one less permit is needed at home but the subsidiary must buy one more. Since permit prices and tax rates do not change for the firm, these net savings will always be positive or negative. Therefore, all abatement is going to be used to offset emissions in one country or the other.

Given that the firm wants to transfer as much as possible, but is limited by actual abatement in the exporting country, the firm's decision regarding abatement in that country will be affected by the corresponding change in its ability to shift profits. Whether it is the parent or the subsidiary that does the exporting depends on where permits, after tax considerations, are more expensive.

Suppose first that after-tax permit prices are higher at home: $P_H(1 - \tau_H) > P_F(1 - \tau_F)$. This situation can occur when foreign permit prices are lower or higher than domestic ones, just not high enough to dominate the tax differential. Then the multinational firm transfers all the subsidiary's abatement credits for the parent to use. In this case, the effective permit price for the parent is the actual home price, since a little more abatement saves the cost of a home permit. This situation mimics that of the single permit system in the home country with offsets from emissions reduction projects in a foreign country with a higher tax rate. The subsidiary will abate until the marginal costs of further reducing emissions equal the home-country price multiplied by

⁹ This type of limitation requires knowledge of the baseline emissions for the subsidiary to determine the actual amount of abatement. One could also envision a policy in which the transfer limits are the extent of local obligations, whereby a multinational firm could use foreign permits acquired by its subsidiary to offset its own domestic emissions requirements (or vice versa), but they are otherwise not freely tradable (e.g., the firm cannot sell foreign permits on domestic markets).

the tax differential: $P_H(1 - \tau_H)/(1 - \tau_F)$. Marginal abatement costs abroad will actually be higher than both the foreign and the home permit prices, reflecting the value of transferring profits to the lower-tax jurisdiction. Meanwhile, marginal abatement costs at home will remain equal to the opportunity costs of emissions in the domestic market.

Suppose now that the price of emissions permits in the foreign country is not only higher than the domestic price, but also high enough to offset the tax differential:

$P_H(1 - \tau_H) < P_F(1 - \tau_F)$. Then all the parent's abatement credits get sent to the subsidiary and the parent uses E_H permits to cover its domestic emissions. Now the relevant permit price for the multinational is the foreign permit price, since additional abatement reduces its need for foreign permits. The subsidiary then abates until the marginal cost equals the local opportunity cost of emissions. However, the value of a permit transferred from home reflects not only the permit price but also the tax cost for sending profits to the higher-tax jurisdiction: $P_F(1 - \tau_F)/(1 - \tau_H)$. The parent thus pushes marginal abatement costs above the domestic permit price, though not as high as the foreign price (and the subsidiary's marginal abatement costs).

In a situation of no excess credits, the domestic tax rate applies to activities both home and abroad, and the before-tax permit prices are what matter. If domestic permit prices are higher, all the subsidiary's abatement credits are transferred home, while if foreign prices are higher, emissions credits are transferred to the subsidiary.¹⁰ When profits are fully transferred home before the limits on offsets are reached, marginal abatement costs will be equalized within the firm at the higher of the national permit prices.

In summary, limiting emissions offsets to actual abatement renders the program identical (from the multinational firm's perspective) to a separate permit system with offsets in which the higher after-tax price dominates. Regardless of which price is higher, in an excess-credit situation, marginal abatement costs are always higher for the subsidiary facing a higher tax rate: $MC(A_F)/MC(A_H) = (1 - \tau_H)/(1 - \tau_F) > 1$.

Normally, permits will flow from the lower-price country to the higher-price one. However, in one case—when the foreign country has a higher permit price before but not after

¹⁰ The situation where the firm is buying permits at home and transferring credits to the subsidiary does nothing to repatriate profits; in fact, it does the opposite. It should thus be noted that this situation can occur only if subsidiary profits net of abatement costs are already negative.

the tax deduction—transfers will occur in the opposite direction from what one would expect from observing just the permit price differential.

In an equilibrium with many multinational firms, many of which remain in excess-credit situations, allowing these limited offsets would cause the after-tax price differential to shrink. Still, this tendency toward equalization does not necessarily mean that actual (before-tax) permit prices will tend to converge. In fact, if prices were initially close, they would tend to *diverge* according to the tax differential.

Of course, if foreign permits are treated not as pure offsets but as internal trades, transfer pricing becomes an issue. Thus far, we have assumed a transfer price of zero. Allowing the firm discretion in setting permit prices can enable the parent to repatriate fully its subsidiary's profits by setting below-cost prices for transfers from the subsidiary and high prices for transfers to the subsidiary. Then the no-excess-credits case would be the relevant one. On the other hand, transfer prices may also have bounds put on them, in which case it is still possible to have the transfer limits bind before the tax-arbitrage constraint. The effects of transfer pricing will be discussed in more detail in the next section.

Alternative Limitations: Domestic Obligations

Another type of trade limitation might allow firms to use foreign permits acquired by the operational entity in one country to offset emissions requirements in the other (or some share thereof), but they would not otherwise be freely tradable (e.g., a firm cannot sell foreign permits in domestic markets). Abatement effort in a county then helps determine how many permits may be imported into it, rather than how many the multinational may export from it.

If the after-tax permit price is lower in the foreign country, all the permits will be bought there. However, the firm will not equalize all of its marginal abatement costs to the foreign permit price; less abatement will be performed at home to reflect the value of transferring profits to the lower-tax jurisdiction. Marginal abatement costs at home will then be lower than both the foreign and the home permit prices.

If the after-tax permit price is lower at home, permits will be purchased there and transferred to the subsidiary. The parent will abate until its marginal costs equal the home permit price. However, marginal abatement costs for the subsidiary, though lower than the foreign permit price, will not fall completely to the home price, reflecting the additional tax cost of incurring costs in the low-tax rather than the high-tax jurisdiction.

If the firm has no excess foreign tax credits, the parent and subsidiary will purchase all the permits they need in the country with the lower permit price. Each will reduce emissions until its marginal costs of abatement equal that price, the cost to the firm of an additional unit of emissions.

Transfer-Pricing Rules with Limited Offsets

In a system of separate permit policies and limited offsets, transfer-pricing rules can mitigate, though not always eliminate, tax-arbitrage distortions to abatement activities. Different types of transfer-pricing rules can be envisioned, such as using the price of permits in the home country or in the importing country as the appropriate valuation. However, different rules can have different interactions with the constraint on offsets. This section lays out the incentives for offsets restricted to actual abatement; we then consider the effects under a regime limiting permit transfers to emissions obligations.

Consider the case where after-tax profits when offsets are limited to actual abatement and a positive transfer price T is imposed. It remains profitable to transfer offsets from the subsidiary to the parent as long as the after-tax savings to the latter are greater than the net costs to the former; that is, $(P_H - T)(1 - \tau_H) > (P_F - T)(1 - \tau_F)$. Otherwise the parent will send offsets to the subsidiary. This arbitrage will continue until either all the offsets or all the profits are transferred. The transfer-pricing rule is then important to determining the direction and feasibility of tax arbitrage.

Suppose first that the foreign price is the designated transfer price ($T=P_F$). If the foreign price is higher than the home price, then the multinational wants to transfer permits from the parent to the subsidiary. Since the subsidiary is “charged” the actual marginal cost of the transferred permits, there is no room for tax-induced profit shifting in that direction, and both the parent and the subsidiary take the foreign price as the opportunity cost of emissions. However, if the home price is higher, the multinational wants to transfer permits from the subsidiary to the parent, and the transfer price does not reflect the true value of emissions to the firm. The subsidiary increases abatement such that marginal costs are not only greater than the host-country price but also greater than the parent’s price, with the premium reflecting the tax gain from repatriating profits.

Now suppose that the transfer-pricing rule uses the home country price ($T=P_H$). If home prices are higher, then the subsidiary abates to transfer permits to the parent, and the transfer price it receives reflects those costs. If foreign prices are higher, then the multinational transfers

permits from the parent to the subsidiary. The parent increases abatement in response to the higher prices abroad, but not to the full extent. The differential reflects the tax cost of shifting rents into the higher-tax jurisdiction.

Left to their own devices, firms will choose a transfer price to their advantage, not to reduce distortions. Thus, when a single market price is not available, the tax policy maker should look for the least distorting transfer price rule. That rule will follow either import or export prices, depending on how offsets are limited.

When the limit to offsets is actual abatement effort, an importing country transfer-pricing rule ensures that the multinational will equalize marginal abatement costs across countries to the higher national permit price. However, the same transfer-pricing rule would have a different effect in another offset limitations regime. If firms cannot import more permits than they can use for themselves, a rule mandating use of the exporting country price would ensure that marginal abatement costs are equalized, and the lower national permit price would dominate.

4. Conclusion

Corporate income tax rates vary significantly across countries (see Table 1). U.S. rates exceed those in many of the developed countries and in almost all the developing countries. Tax considerations may be important for offsets generated in developing countries (such as the system foreseen in the Kyoto Protocol's Clean Development Mechanism): all else equal, the desire to keep profits in lower-tax countries would make multinational firms more reluctant to incur more abatement costs in those countries (unless compensated with higher transfer prices). Without explicit and appropriate transfer-pricing rules, as well as a clear price for emissions, many of the efficiency gains from flexible abatement location mechanisms may be lost to inefficient tax shifting.

Furthermore, some of the sectors most likely to be impacted by potential international environmental policies like the Kyoto Protocol are the very ones with the most foreign tax obligations. U.S. manufacturers reported 71.1% of foreign taxes and 70% of the total foreign tax credit in 1994 (implying an excess-credit status). Furthermore, of these companies, U.S. manufacturers of petroleum and coal products led the industry groups with the most foreign-source taxable income—reporting 19.6% of the total foreign taxes and an average foreign tax rate of nearly 41% (well above the 35% rate of the United States). Other leaders were corporations within the industry groupings of pharmaceuticals and drugs, and of motor

vehicles.¹¹ Thus, many of the industries poised to engage in greenhouse gas emissions reduction activities are likely to be quite sensitive to tax provisions and rate differentials.

The policy question at hand is then how to design an emissions reduction policy with rules allowing for the performance of abatement activities abroad. The treatment of emissions offsets within tax policy will need to be sensitive to the design of the emissions policy, and perhaps vice versa.

As is well known, limits on trading across countries restrict the efficiency gains from reducing greenhouse gas emissions, given the negotiated cap. But those limits can also make abatement activities susceptible to incentives to shift taxable income. If offsets are limited to actual abatement activity, then the multinational firm will choose its abatement everywhere not just according to the highest price for emissions permits among the countries of its operations, but also according to relative tax rates. If offsets are free, the firm prefers to incur more abatement costs in higher-tax countries in exchange for valuable permits in lower-tax countries. If the subsidiary in a higher-tax country faces higher emissions prices, the parent will not take full advantage of abatement opportunities, as sending permits would also be sending profits to face higher taxes.

In an equilibrium with many multinationals, the collective effect of allowing international offsets would tend to raise effort in countries where permit prices are relatively low and loosen the reduction requirement in countries where they are high. As a result, permit prices that differ widely across separate countries would tend to move closer together. However, if offsets are limited to some amount determined by actual abatement behavior, the convergence of international permit prices may be limited to the range of the tax differential.

Only in a system of unlimited international trading would abatement be efficiently allocated across countries. However, even in this regime, tax shifting can still be achieved through intrafirm transfer pricing. For efficiency in both environmental and tax policies, the best design is an international permit trading system with transparent, enforceable transfer-pricing rules.

If other policy goals mandate the use of restrictions to international trade in emissions permits, those limits should be designed with an eye toward minimizing tax shifting. One option

¹¹ IRS 1998.

would be to disallow direct offsets and require international trade to be conducted through a national clearinghouse; governments would either act as brokers or set and auction import quotas for permits. Abatement decisions and permit purchases would then follow the prices in the particular country of operation, but prices would tend to converge through the pressures of the clearinghouse. On the other hand, constraints to offsetting might be imposed on the multinationals themselves. Limiting offsets to actual abatement activity would make the treatment of joint implementation projects (in countries with their own permit or other regulatory system) consistent with those under the Clean Development Mechanism (in countries without a national emissions permit program). However, restricting the share of net emissions that can be covered by foreign offsets creates difficulties in choosing an appropriate transfer-pricing rule. The former limitation would suggest using the importing country's price; the latter would lean toward using the price in the country of export. The answer depends on which constraint is binding, and that can vary from firm to firm.

In the absence of an environmental policy that creates a clear price for emissions, transfer pricing will be much easier to manipulate. The general standard is that appropriate transfer prices equal those prices that unrelated parties would have used in a transaction.¹² Without an international market price for emissions, such a price will be hard to determine and harder to enforce. However, even in the best of circumstances, valuation may be a challenge. At what point is the transaction deemed to take place—when abatement effort occurs, when the reductions are realized, or when the permits or offsets are actually redeemed or sold? Market prices can vary over time, and firms might choose to time the reporting of their transactions accordingly, with tax avoidance in mind. Does the home price or the foreign price prevail if differences exist? Can cost basis be used to measure value? This latter option would be especially problematic if emissions permits are allocated gratis to firms, creating a precedent for a zero price.

A “right to pollute” is an unorthodox asset, but recognizing the value of emissions is important to using flexibility in environmental compliance to its best advantage. The designers of emissions trading systems must work together with tax policy designers to provide good incentives for using the new asset. International trade in abatement offers great opportunities to lower the costs of reducing global pollutants. It also raises the importance of not just regulating,

¹² This standard is used throughout the countries in the Organisation for Economic Co-operation and Development.

but also defining, allocating, and taxing emissions permits in a manner consistent with the treatment of other valuable assets—for the sake of the environment, the economy, and government finances alike.

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Table 1. Comparison of Effective Corporate Tax Rates of Annex B Countries

<i>Country</i>	<i>Effective rate</i> ¹³	<i>Federal rate</i>
United States	40	35
Japan	48	34.5
Canada	44.6	29.1
Germany (distributed / retained earnings)	43.6 / 52.31	30 / 45
Italy	41.25	37
Belgium	40.17	
France	40	33.33
Greece	40	
Luxembourg	37.45	30
Portugal	37.4	34
Australia	36	
Czech Republic	35	
Netherlands	35	
Spain	35	
Austria	34	
Poland	34	
New Zealand	33	
Turkey	40.3 / 33	
Denmark	32	
United Kingdom	31	
Iceland	30	
Finland	28	
Ireland	28	
Norway	28	21.25
Sweden	28	
Switzerland	25.1	
Hungary	18	
Average	35	

¹³ Effective tax rates include statutory national rates plus other relevant taxes, including state, provincial, or municipal income taxes (incorporating deductibility) and withholding taxes. Source: KPMG 2000.