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Has Taxation Contributed to the Crisis?

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9.1 Introduction

A broad consensus has emerged on the view that tax policy was not a direct cause of the financial meltdown during 2008.[1] Yet tax distortions—by providing incentives for higher leverage, risk taking, and the use of tax arbitrage through complicated financial instruments—may well have exacerbated its severity and prolonged its duration.[2] Recently, implemented and planned policy initiatives also point to the fact that tax policy reform is an essential part of the broader macroeconomic strategy for addressing the adverse consequences of the crisis in several countries.

This chapter surveys and discusses the different, and often very complex, channels through which current tax policy is believed to have distorted the savings and financing behavior of individuals and businesses in the run-up to the recent financial crisis. Most such channels have been long recognized, but few countries have actively sought to address them in a sustained and effective manner. While a survey of this nature is primarily backward-looking, the discussion here acknowledges the key role for tax policy in the aftermath of a crisis—to restore and maintain fiscal sustainability. The chapter therefore presents and discusses tax policy options for achieving the dual objectives of mitigating or eliminating distortions, particularly those that encourage excessive leverage—thus making tax structures more conducive to growth—and mobilizing additional revenue. Meeting both objectives is a prerequisite for effectively returning to fiscal sustainability over the medium term. Given the central role of the financial sector in the recent crisis, a section is devoted to the possible adoption of financial taxes on a broader international scale. This area is currently high on most policy agendas and warrants special attention including from the point of view of preventing future financial crises.

In discussing these issues, the chapter synthesizes a large body of recent analytical work carried out within the IMF's Fiscal Affairs Department,[3] supplemented where relevant with work by the EC, OECD, other institutions, and academe. It also highlights shortcomings in our current understanding of the role of tax policy in

generating vulnerabilities—or addressing them—in the broader financial markets, and thus provides some guidance concerning potential areas where future research could generate a high return.

Section 9.2 reviews the key channels through which tax distortions are believed to have contributed to excessive leverage and other financial market problems that surfaced during the crisis, and policy measures available to remedy these distortions. Section 9.3 outlines the key tax policy options open to governments to reorient their tax systems toward growth and improved revenue-raising, while mitigating risks of future crises. In this regard, taxation of the financial sector is central, and is discussed in section 9.4. Section 9.5 concludes.

9.2 Key Channels of Tax Distortions

9.2.1 Debt Bias in Corporate Finance

Income tax systems affect corporate financing decisions as they typically treat debt and equity financing in different ways.[4] While interest payments are usually deductible from the corporate income tax (CIT) base, returns on equity—such as dividends paid to shareholders or capital gains on shares—are not. This asymmetry introduces a bias toward debt financing by providing an incentive for firms to issue debt up to the point where tax savings are offset by an increased cost of capital from a higher risk of default. Overborrowing by banks in turn implies further distortions to the financial sector.

Personal income taxes (PIT) on interest, dividends, and capital gains may also influence the choice between debt and equity financing. Taxing interest income at the personal level reduces the debt bias at the corporate level. Financing by retained earnings raises share prices, which may trigger capital gains tax (CGT) at the personal level; high CGT rates therefore discourage this type of financing. Dividend taxation, however, increases the cost of financing by new equity. Nevertheless, with mobile capital the impact of PIT may be unclear and most analyses focus only on CIT.

Table 9.1 shows the required before-tax return on an investment that a company needs to earn in order to meet the after-tax return required by investors. Cost of capital is presented for the three alternative financing sources—retained earnings, new equity, and debt—in the United States, Japan, and EU27 (unweighted average and range of lowest and highest in the group) in 2007. The cost of capital for equity differs for PIT-taxed and PIT-exempt investors and reflects differing tax consequences of the assumed alternative of investing in risk free debt, which is subject to PIT on interest.

Keen et al. (2010) show that the tax advantage to debt finance has declined since 1990, in line with a decreasing trend of the CIT rate. As De Mooij (2011) points out,

Table 9.1
Cost of capital for alternative sources of finance

	PIT-exempt investor			PIT-taxed investor at top rate		
	Retained earnings	New equity	Debt	Retained earnings	New equity	Debt
United States	9.2	9.2	4.8	5.8	6.5	4.9
Japan	10.4	10.4	5.6	9.5	15.4	5.6
EU-27 average[a]	6.8	6.9	4.6	5.6	6.4	4.7
<range>	<5.0; 9.0>	<5.6; 9.0>	<3.9; 5.3>	<3.5; 6.9>	<3.0; 9.3>	<4.0; 5.6>

Source: De Mooij (2011)
Note: The after-tax return is assumed to be 5 percent and inflation 2 percent. The numbers are unweighted averages of calculations for five different assets featuring different depreciation rates: intangibles, buildings, machinery, financial assets, and inventories. Data refer to 2007.
a. Unweighted average.

several countries have made efforts to limit this bias by regulation and introduced rules in recent years that do not allow the deduction of interest payments over a certain threshold of the debt–equity ratio (thin capitalization rules).

However, divergence of the CIT rates across countries also increased over the last decades, which has strengthened the incentive of multinationals to shift debt into high-tax countries. The spread of leveraged buyouts has contributed to high levels of indebtedness, further eroding CIT receipts (see box 9.1 for further discussion).

High levels of leverage make firms more vulnerable to economic shocks and increase the probability of bankruptcy. Therefore, while leverage in itself is not necessarily a problem, in times of financial distress excessive debt levels—of financial as well as nonfinancial companies—can contribute to escalating the crisis by raising the probability of default. While exact welfare costs of excessive debt financing are difficult to quantify, the recent crisis has demonstrated that they can be substantial.

9.2.2 Addressing the Debt Bias[5]
There are no compelling economic arguments for treating debt more favorably than equity for tax purposes.[6] A broadly accepted benchmark is tax *neutrality* according to which tax provisions should be designed not to impact corporate financing decisions. Along this line of thinking, tax-induced distortions of corporate financing structures will ultimately generate efficiency losses. Hence an argument in favor of the present unequal treatment of debt and equity would be valid only in the case where clearly identified externalities would rationalize the use of less equity and more debt finance. Existing externalities, however, seem if anything tilted in the opposite direction: when corporations borrow, they are likely to internalize expected

bankruptcy costs that they themselves would incur but not the impact of their own failure on others—a negative externality that in principle could be corrected by a *tax penalty* on borrowing. An externality that is particularly large for systemically important financial institutions.[7] Other government policies could conceivably exacerbate the effect of interest deductibility such as guarantees on deposits or corporate debt.[8]

While hard to quantify accurately, existing evidence does seem to support the notion that high leverage—for example, as measured by high *debt–equity ratios*—is associated with greater output losses in post-crisis periods.[9] Although this may provide further support to the idea of a penalty on debt, setting the appropriate penalty level under existing circumstances would be fraught with difficulties—leaving a move toward neutrality as a more pragmatic and realistic policy objective.[10]

Elimination of the debt bias could conceptually be realized through two different routes, both of which have been tried (in some form) in practice: first, the present favorable tax treatment of interest could be curtailed or eliminated, thus treating interest for tax purposes more like dividends; and second, keeping full interest deductibility as it is now but introducing a notional deduction from taxable profits for return to equity, thus basically treating dividends as interest.

Limiting or eliminating full deductibility of interest can be implemented in different fashions:

- Many countries apply already *thin capitalization* or *earnings stripping provisions* that, respectively, deny deductibility for (excess) interest payments in case the debt–equity ratio exceeds a certain level (e.g., 3:1), or for interest payments exceeding a certain limit measured as a percentage of before-tax profits. While fairly straightforward to administer, such "one-size fits all" limitations do not always take account of borrowing needs and capacities of individual companies.

- A particular model, originally developed by the US Treasury, the *comprehensive business income tax* (CBIT),[11] would disallow interest deductibility altogether (but eliminate its taxation at the investor level), but has not been adopted by any country so far.

- *Real-base cash-flow corporate income taxes* allow—in different forms—a full and immediate deduction for investment while disallowing a deduction for interest. This type of corporate taxation, which would tax only excess profits, imposes a zero marginal tax rate on new investment, and does not distort financing decisions. It has so far been adopted only in East Timor (in 2008) and, as a minimum CIT, in Mexico.

Many governments have been trying, also recently, to better counter the abuses that interest deductibility may invite, while at the same time attempting to ensure that their countries remain attractive destinations for multinational corporations to

Box 9.1
Recent restrictions on interest deductions[12]

The behavior of private equity funds with respect to buying domestic companies, frequently using so-called debt push-down, was the impetus for the Dutch and Danish interest deduction reforms.[13] In *Denmark*, new rules came into force in July 2007 with the objective of preventing future use of leveraged acquisitions financing structures: interest deductions above a threshold were capped as a percentage of operating assets, and with a second cap set at 80 percent of before-tax earnings. In the *Netherlands*, interest deduction restrictions aimed specifically at takeovers of Dutch companies came into effect on January 1, 2013, covering both related-party and third-party debt. The interest deduction will be limited to the filing group's profits after deduction of the target's profit, with some further restrictions.

New strict interest deductibility rules—broader in their applicability than just to acquisitions—came into force in *Germany* in 2008 aimed at stimulating the use of equity capital (and prompted by a European Court of Justice ruling that resident and nonresident companies be treated equally in this respect). They would deny deductibility of interest on *all* (not just intra-group) debt in excess of 30 percent of income before consideration of interest payable (with exemptions for smaller enterprises and specific circumstances), but interest expenses denied can be carried forward indefinitely.

Italy subsequently introduced provisions similar to the new German rules, and *France* is considering doing so, possibly phasing-in the cap for interest deductions starting at 80 percent of earnings with a final target of 30 percent. Furthermore the French Finance Law 2012 extended present thin capitalization rules by introducing limits on interest rates and debt–equity ratios for certain acquisition debt (applied on a separate entity basis). In the same vein, *Ireland's* Finance Act 2011 disallowed deduction of debt for acquisitions by a related-party as well as some intra-group lending (Ireland has no thin capitalization rules). In *Sweden*—having one of the most "liberal" interest deduction regimes with no thin capitalization or debt–equity rules—a proposal for new interest deduction restrictions is expected in November 2013.

invest in, or at least channels through which to route income. While policy initiatives in this domain are related to interest deductibility, they also typically address more specific individual country concerns as illustrated by the examples in box 9.1.

An alternative option, as noted, is to maintain deductibility of interest but allow a notional deduction for the "normal" return to equity finance, also called an *allowance for corporate equity* (or ACE).[14] A CIT in the form of an ACE taxes only profits in excess of the required rate of return of investors and is therefore fully neutral.[15] A number of countries have adopted in recent years different versions of the ACE,[16] mostly with some positive experience, although its design and effects are not completely unproblematic.

By eliminating the debt bias at corporate level (and thereby moving the CIT closer to a tax on economic profits), introduction of an ACE would be expected to lead

to reduced debt–equity ratios—a presumption that is, indeed, supported by some empirical evidence.[17] Furthermore, specifically relating to banks,[18] an ACE could provide an incentive for accumulating additional capital reserves and thus help re-capitalize banks.

There are two key difficulties associated with the introduction of an ACE. First, a choice must be made regarding the notional "normal" rate of return to equity, with strong arguments, including that of simplicity, favoring a single, uniform proxy for a risk-free rate of return (e.g., the interest on long-term government bonds).[19] Second, and perhaps more important under present circumstances, introducing an ACE implies a decline in CIT revenue—an effect that has been estimated to be poten-tially quite significant;[20] and with considerations of tax competition constraining the scope for recuperating any loss through (unilateral) CIT rate increases. This adverse revenue effect could, however, be mitigated by two important second-order effects.[21] Removal of the debt bias will reduce the subsidy to debt finance, and to the extent that the incidence of the CIT falls on labor,[22] eliminating the tax on the normal rate of return to equity should increase labor income. The additional wages may be taxed directly in order to compensate for the loss in CIT revenue while still leaving labor better off.[23] Moreover the immediate revenue impact of an ACE could be mitigated by providing relief only for equity generated after some initial date.

9.2.3 Complexity, Tax Havens, and Risk Taking

Besides corporate finance, taxation of other instruments potentially contributed im-portantly to the crisis. This subsection considers specific tax attributes that may have contributed to exacerbating risk taking and the opacity of financial arrangements, with four features being of particular interest.

Innovative financial instruments, the design and use of which are in some cases driven by tax considerations as well as the primary aim for an improved (re)al-location of risks. Examples include a spectrum of derivatives such as swaps and securitized financial instruments. Securitization—or the pooling of loans into an in-vestment vehicle and then selling securities (e.g., mortgage-backed securities (MBS)) backed by the repayments of these loans—allows investors to offset capital losses from high risk investment against ordinary income, while also allowing banks to share part of this tax advantage through a lower cost of borrowing.[24] A more uni-form tax treatment of capital income would appear to be the appropriate policy response to address this issue involving, inter alia, levying CGT on an accrual rather than a realization basis.

The prevalence of low-tax jurisdictions, including tax havens, that tax in particu-lar mobile capital income at low rates, could also have encouraged excessive leverage and thus contributed to the crisis, by creating incentives for avoidance and evasion schemes. Profit-shifting operations of this nature could also be affected through oth-

er devices such as transfer pricing and location decisions for corporate headquarters. Companies can also take advantage of double-tax treaties providing favorable tax rates, through low-tax jurisdictions. Measures to address these issues would include often technically complex and politically sensitive full information exchange agreements[25] and, even more challenging and unprecedented, a much stronger tax cooperation to reduce or eliminate the potential for tax arbitrage of this nature.[26]

A long-known effect of taxation is that it may lead to *higher investment in risky assets*[27]—an effect that is discouraged if loss offset is imperfect, as is the case in most countries. Such asymmetries in the treatment of losses could create arbitrage opportunities and may also hamper corporate restructuring in case a company acquiring a loss-making company is denied the use of the loss for tax purposes. The appropriate policy response to counter the effect of taxation in the form of *higher investment in risky assets* is in principle straightforward. While potentially costly in (immediate) revenue terms, a more "liberal" tax treatment of losses would be the right policy response, including facilitating corporate restructuring for which the potential revenue losses should be balanced against the costs of corporate failures that may follow if acquisitions are not forthcoming because of restrictive loss provisions.[28]

High executive compensation, in part performance related (bonuses and stock options), has attracted considerable attention in the wake of the crisis, in part because the structure of compensation may well have induced higher risk taking (particularly the prevalence of stock options). Generally, however, tax reliefs appear to have been fairly limited in most countries relative to the tax treatment of the salary component, with some exceptions.[29] High executive compensation, with the potential for higher risk taking (particularly the prevalence of stock options) that it entails, should be addressed by not providing any special tax reliefs for executive pay packages relative to the tax treatment of the salary component.[30]

A central question regarding the role that tax measures should be accorded in addressing risk taking and excess leverage—particularly as it relates to the role of financial institutions—is the appropriate balance between financial regulation versus financial taxation, a question to which there are no easy answers and one that clearly deserves further research.

9.2.4 The Tax Treatment of Housing

Most accounts of the 2008 financial crisis present the dynamics of the US housing market and the related financial structure as a key trigger of the crisis (e.g., Hemmelgarn et al. 2011). Tax provisions, in addition to loosening monetary policies in the wake of the dot-com bubble and lax regulatory provisions, contributed to a housing bubble that ended in a credit crunch. Between 2001 and 2005 the number of houses sold in the United States increased by 41.3 percent, the average price rose by 39.3 percent, and the proportion of subprime mortgages soared from 7.2 to over 20 percent

(Hemmelgarn and Nicodème 2010). While the number of transactions sharply decreased after 2005, housing prices continued to increase. Higher volatility, together with the formation of expectations for continued increases in housing prices, can detach prices from fundamentals and generate a housing bubble.

Favorable tax treatment of homeownership is likely to be reflected in house prices. In the short term, when the physical stock of housing is virtually fixed, most taxes will be fully captured by housing prices. For example, a reduction in the capital gains tax on housing is expected to increase house prices. In the longer term, supply will adjust to the new tax rules, but important effects can remain. Furthermore distortions affecting one part of the market more directly may induce substitution effects, leading to further distortions in other segments. Tax effects can also substantially affect the user cost of housing and subsequently demand. In the United States, for example, mortgage interest deductibility and other tax features on average provide a tax reduction equivalent to around 19 percent of the user cost, the difference greater for high-income households (Poterba and Sinai 2008).

While governments might have socially motivated preferences for promoting home ownership, from an economic point of view the expected cost of owning a house in equilibrium should be equal to the cost of renting it. Therefore the tax system should seek neutrality in the owner/renting dimension. This means full taxation of imputed rents and capital gains on housing, and deductibility of mortgage interest payments. Table 9.2 summarizes tax treatments for a subset of European countries and the United States.

Table 9.2
Taxation of owner-occupied houses in Europe and the United States

	Taxation of imputed rents	Mortgage interest tax relief	Capital gains tax
Belgium	Yes	Tax deductibility with limit	No
France	No	Tax credit for the first 5 years with a limit	No
Germany	No	No	No
Ireland	No	Tax credit for the first 7 years with a limit	No
Italy	No	Tax credit with a limit	No
Netherlands	Yes	Tax deductibility without limit	No
Spain	No	Tax credit with a limit on the amount of housing costs	No
United Kingdom	No	No	No
United States	No	Tax deductibility with a limit on the amount of mortgage principal ($1 million)	No (if CG<$500,000)

Source: Hemmelgarn et al. (2011)

In practice, this neutrality of tax treatment is hardly ever present. In most countries imputed rents and capital gains on primary residences are untaxed. Few countries tax imputed rents (e.g., Belgium and the Netherlands; in Italy, while imputed rent is taxable, an offsetting deduction is provided) and some countries tax capital gains on owner-occupied housing (e.g., Republic of Korea, not included in table 9.2), but usually under favorable provisions (e.g., a high threshold or low rate). Tax relief for mortgage interest costs is given in all countries except Germany and the United Kingdom. In the Netherlands, Belgium, and the United States interest expense is deductible from the tax base, so the tax advantage depends on the marginal tax rate of the owner. In the other countries the tax relief mainly takes the form of a tax credit (for a detailed discussion of country examples, see Hemmelgarn et al. 2011). Distortions make investment in housing more favorable than in other assets. This generates a bias toward ownership over renting, and also provides incentives for greater leverage than under a neutral tax system.

Attempts to scale back generous tax provisions for home ownership are generally met with fierce political opposition, in part because a neutral tax treatment would—fully or partly—be capitalized in property prices resulting in a one-off capital loss for present owners. The United Kingdom, however, provides a good example of tapering off these tax advantages gradually. An alternative policy route that could achieve broadly similar objectives would be to strengthen recurrent property taxation based on property market values. These taxes are considered less distortionary than other taxes (including property transfer taxes) with an incidence that rests mainly on the well-off.[31]

A more neutral tax treatment of housing markets would improve efficiency and help avoid macroeconomic imbalances, but it could also in the short term result in reduced house prices and possibly construction activity, and so should be carefully designed and sequenced. Potential reform measures in this area that should be coordinated with broader tax reform efforts include in particular the following:

- Removal of *transaction taxes* could be a shorter term measure with a number of positive effects: it would remove an impediment to efficient trading, increase prices, potentially speed up clearance of any excess supply, support labor mobility, and remove an incentive for collusion between buyers and sellers to under-declare sales prices. Transaction taxes are, however, easy to collect and a potential source of buoyant revenue, and they have been claimed to counter housing price volatility although this effect has not yet been validated.

- Strengthening *recurrent property taxes*, while efficient in its own right, could also help offset the revenue losses from phasing out transfer taxes. These taxes are appealing, since they serve in part as user charges reflecting the location-specific value of local public goods, and are therefore neutral with regard to saving and financing decisions of individuals and businesses.

- *Taxing imputed rent as well as capital gains* would remove substantial sources of distortions in the housing market, but strong political opposition persists in many places.
- If the exemption of imputed rent is maintained, *phasing out mortgage interest relief* should be implemented, as was done in the United Kingdom.
- *Taxing first sales of residences under the VAT* (already in place in some countries) would remove distortions of consumption decisions and could also serve as a proxy for income taxation of imputed rent.

9.3 Tax Policies for Fiscal Consolidation and Growth

Tax policy will play a central role in addressing the adverse consequences of the crisis. Two recent developments illustrate this point: first, the debate on ways to tax financial institutions and financial transactions to generate revenue and correct for distortions, is ongoing and intense, as clearly reflected in section 9.4; and second, efforts by many countries to strengthen taxation in order to bring down budgetary deficits, for example, by increasing VAT rates and broadening the VAT base in the wake of the crisis.[32] The primary means for regaining fiscal sustainability in many countries will be to secure economic growth in tandem with continued deficit reductions. The two subsections that follow discuss different but interrelated aspects of the role that tax policy may play in achieving these objectives.

9.3.1 Developing Efficient and Growth-Friendly Tax Structures

Aside from eliminating the possible distortions and incentives inherent in most current tax systems as discussed in section 9.2, it is useful to revisit more generally those elements of a tax system that have the strongest impact on economic growth. The link between taxation and economic growth is, however, both controversial and complex. The overall burden of taxation, as well as the way different taxes are designed and combined (the "tax structure"), can have a number of implications for both the level and growth rate of GDP per capita.

Growth theory provides fairly strong yet somehow conflicting predictions about the effects of taxation on growth and against this opaque theoretical backdrop, the empirical evidence on the strength and direction of tax effects on growth is not much clearer.[33] The traditional theoretical framework for analyzing tax policy has been the "neoclassical" growth model, and subsequently models of "endogenous growth." The former provide only external factors as the primary driver of long-run growth, while the latter allow for certain key characteristics of the technology process assumed for producing goods to generate long-run growth automatically, for example, through spillovers and increasing returns to scale. Endogenous growth models have

been particularly important, since modeling the processes by which growth is generated has allowed the effects of taxation upon individual decision-making to be traced. As a result these models have provided the basis of key results in optimal taxation, for example, that capital income should be taxed at a zero rate (Lucas 1990). However, if the results from optimal taxation are accepted as ideal, then actual tax systems are typically far from what optimal policy prescribes. The possibility for tax reform to raise the rate of growth should therefore exist even once the distortions discussed earlier have been corrected.[34]

In view of the relatively limited guidance that growth theory offers for operational policy, the question is what *empirical evidence* can be brought to bear on policy formulation. Most empirical studies focus, however, on advanced economies with ambiguous results, much like the theory.[35] The preference within the empirical literature has been for "tax regressions" which suffer the same pitfalls as the ubiquitous "Barro growth regressions" upon which they are based.[36] Nevertheless, within the context of cross-country growth regressions, the tax regression literature has raised its own set of issues, leading to various different avenues of research.

The measure used to represent tax rates is an important issue in empirical work. The implication of standard microeconomic theory is that the marginal tax rate is more relevant to an individual's decision-making than the average tax rate, since optimal choices are determined at the margin.[37] Therefore using the average tax rate to understand growth does not capture this distortionary feature of taxation. However, obtaining an estimate for marginal tax rates is more complex than estimating average tax rates. Easterly and Rebelo (1993) review growth regressions using 13 different measures for marginal tax rates, yielding coefficients that are not significant save for one negative significant coefficient on the tax rate. This suggests that the effects of marginal tax rates on growth are inconclusive. The public finance literature remains divided.[38]

The OECD (2010) examined more generally taxes and their impact on the primary drivers of growth, such as employment, total factor productivity, and investment, ranking taxes on the basis of their distortionary effects on per capita GDP. Broadly, the report concluded that broad-based consumption taxes and property taxes appear to be—as theory would suggest (since they do not reduce the return to saving and investment)—less harmful to growth than income taxes.[39]

Corporate income taxes are considered the most harmful for growth, by discouraging investment in capital and productivity improvements, both of which are important for growth. In particular, Lee and Gordon (2005) identify entrepreneurial activity as a major driver of growth and investigate the effects of the top marginal personal and corporate income tax rates on growth. They show that lower corporate income taxes, relative to personal taxes, can encourage risk taking by providing an incentive to incorporate, whereas a progressive tax schedules can discourage risk

taking, harming growth prospects. However, excessive risk taking has been cited as one of the key distortions in the run-up to the recent crisis (see section 9.2 on key channels of tax distortions), so that this aspect of the role of the corporate income taxes needs to be re-examined.

Broadly consistent with OECD's work on the tax structure, some research has suggested that the tax mix—the balance between direct and indirect taxation—is important in driving growth. Empirical results of Martinez-Vazquez, Vulovic, and Liu (2010) suggest that a higher ratio of direct taxes to indirect taxes is harmful to growth in developed economies (thus supporting the OECD results), but the results are not significant for developing countries.[40]

Governments find themselves dealing increasingly with relatively more mobile tax bases. Tax policy can therefore have implications for growth due to international competitiveness, for example, in the case of fiscal devaluation.[41] Though tax is clearly not the only factor feeding in to where a company determines the location of its operations, corporate income taxes are key for some countries as a means of securing capital and business.

When thinking of fiscal consolidation, studies have shown different impacts of growth to changes in taxes and/or expenditure. Taking the government's fiscal stance as given, Alesina and Ardagna (2010) find that fiscal stimuli based upon tax cuts are more likely to increase growth than those based upon spending increases. However, the IMF (2010b) found that episodes of consolidation are clearly contractionary: a fiscal consolidation equivalent to 1 percent of GDP leads on average to a 0.5 percent decline in GDP after two years, and to an increase of 0.3 percent in the unemployment rate.[42]

Ultimately the issue of a lack of structural modeling in growth regressions comes back to haunt tax regressions. Simultaneity and reverse causality can cause bias in the estimated coefficients. For example, in the standard regressions of growth (left-hand side) on the tax ratio (right-hand side), theory and experience provide convincing arguments that causality can run in the opposite direction; countries that grow rapidly tend to experience rapid growth in tax collection, as well as government spending (another possible right-hand side variable).

The growth effects of tax policy are wide-ranging and—perhaps with the exception of the proposed ranking order of different taxes with respect to their growth effect—broadly inconclusive. Despite this, there remains an entrenched belief that taxes must be damaging for growth and that the evidence will eventually confirm this fact. What is clear is that tax policy cannot operate in a vacuum, given its obvious interaction with compliance, administration, and politics. Any strategy for consolidation will require an understanding of the nature of taxes available and their potential for mobilizing revenue with the least impact on efficiency and growth—an issue to which we turn next.

9.3.2 Options for Mobilizing Revenue[43]

It is important to gauge which instruments are best placed to help mobilize revenues for the purposes of reducing fiscal deficits. The means for raising revenues should ideally adhere to some broad principles of sound tax policies that in addition to addressing the distortions discussed above would include the following:

- A fair distribution of the tax burden is essential, not least because equity concerns have increased in recent years as inequality within countries has grown but also owing to the risks of avoidance in countries with weak compliance structures.

- Strengthening of internationally coordinated tax setting is also required since lack of coordination can lead to collectively inefficient outcomes and lower revenue collection given the mobility of capital, goods, and labor.[44] In its absence, the case for higher reliance on taxing relatively immobile bases, in particular consumption, real estate and natural resources, is further strengthened.

- Finally, alongside international collaboration, enhanced simplicity of tax systems is essential to strengthen compliance and tax administrations.

Raising those taxes with the lowest marginal cost of public funds (MCPF) is the natural choice for raising revenue.[45] There is no consensus on the precise MCPFs of alternative tax instruments, but there is nevertheless, broad consensus on those taxes that could be further exploited in the move toward fiscal consolidation, such as consumption-based taxes over income taxes, as discussed earlier.

The *VAT* is one of the most important taxes across almost all G20 and emerging countries. However, exemptions and excessive rate differentiation continue to compromise its effectiveness and implementation and there remains substantial scope for improving its revenue performance in almost all countries in which it has been deployed, even without increasing the standard rate. In general, the scope for administrative improvement in the VAT is especially large in emerging countries, while that for policy improvement (unifying rates and removing exemptions) is greater in advanced countries.[46]

Excises are also relatively underexploited in many advanced economies. And they can represent an important means of raising revenues in many countries in a period of consolidation. Excise receipts are lower in the emerging G20, where the arguments for cigarette taxation, in particular, may be especially strong. In advanced economies, their yield is in trend decline reflecting not just changing consumption patterns but also falling real tax rates. Policy makers have moderated rate increases partly for fear of triggering excessive cross-border shopping and smuggling. In addition, the low level of fuel taxation in some advanced countries means that the potential revenue gains from more efficient tax levels, as well as excise types (e.g., congestion charges), are substantial.[47]

In developing countries, consumption taxes generally present much greater opportunities for revenue mobilization relative to other taxes, notably trade taxes on which low income countries (LICs) are particularly dependent. The purpose of replacing trade taxes with domestic consumption taxes is principally to improve macroeconomic stability and to introduce the benefits of free trade to developing economies without jeopardizing competitiveness.

Environmental taxes fall within the same sphere as excises. While the primary role of such taxes may not be revenue mobilization, but the correction of negative externalities, the use of environmentally related taxation and emission trading systems is growing in the OECD. An expanding number of jurisdictions are using taxes and charges in areas like waste disposal and on specific pollutants. Moreover governments are making their existing environmental taxes more efficient. The issue, however, is that the tax base is typically narrow and so not much revenue (with a few exceptions) is mobilized. Tax rates can also be low but the potential for revenue particularly from carbon taxes and emissions trading schemes is large over the medium term.[48]

Property taxes remain a promising source of increased revenue for some countries, but there can be many practical obstacles.[49] Efficiency and fairness are strong arguments for the use of property taxes: they are relatively benign for growth, as discussed above; they raise few issues of international coordination; and while their incidence is still not fully understood, they fall disproportionately on the wealthy. Administrative complexities and costs (including the development of efficient cadastre and valuation mechanisms) limit their use, as do unpopularity due to their high visibility. However, significant progress has been made in recent years in developing a range of administrative arrangements that allow stronger reliance on property taxation even in middle- and low-income countries.[50] Assigning property taxes predominantly to lower levels of government may pose challenges for increased revenue-raising. This, though, is another area with clear potential for significant and relatively efficient medium-term revenue enhancement in several countries.[51]

Concerning *direct taxes*, corporate income taxes remain one of the largest sources of revenue (particularly in developing countries) and a natural candidate for reform in any fiscal consolidation as the business environment deteriorates. However, the strength of CIT revenue particularly in developed countries also reflected a large contribution from the financial sector that has now shrunk substantially, and could be further compressed by regulatory reform. While there remains scope for base-broadening in many countries, potential revenue gains from this seem fairly modest.

In addition, out of all of the taxes, the *corporate income tax* is relatively more hostage to trade-offs: a sound corporate income tax needs to encourage an appropriate amount of risk taking and innovation, but also raise sufficient revenues, while not being uncompetitive relative to rates elsewhere. The corporate income tax also

serves as a backstop to PIT and remains a relatively efficient tax on economic rents. However, given the ease with which profits can be shifted to low-tax jurisdictions, it can play this role fully only if policies are coordinated across countries.

Personal income taxes are generally considered key to the pursuit of equity in the tax system, though the effectiveness of this is tempered by its incentive effects on both real activity, compliance, and labor and capital mobility. There is a significant scope in some countries, however, for base-broadening and simplification, which could raise substantial revenue. And in those countries that are heavily reliant on the personal income tax and in need of large fiscal adjustment, there may be little choice but to raise intermediate marginal rates in the personal income tax schedule. Furthermore countries are increasingly looking to taxpayers at the top of the wealth or income scale who make a significant economic contribution to society and account for a large part of total income tax. Targeting this segment through wealth taxes is an increasingly popular measure as part of consolidation.

9.4 Financial Sector Taxation

The 2008 financial crisis and its aftermath have caused policy makers to scrutinize not only financial sector regulation but taxation as well. New financial sector taxes could be designed to correct existing distortions either in tax codes, such as the CIT debt bias, or in financial markets, such as the "too big to fail" externality. Also the explosive growth in financial sector profits and compensation since the 1980s suggests that the sector could provide a fair and efficient source of revenue.[52] This section reviews the major tax instruments proposed since the crisis to raise revenue and/or improve incentives in the financial industry.

9.4.1 Bank Levies

The most common form of new financial sector tax enacted since the 2008 crisis has been a charge on bank balance sheet leverage.[53] Twelve countries have thus far introduced such levies, predominantly in Europe, where the taxes raise an average of 0.2 percent of GDP.[54] In addition to counteracting the debt bias introduced by the CIT, bank levies can help internalize the social cost of bank failure, which likely exceeds the private cost to the bank's owners and directors, particularly for larger, systemically important financial institutions (SIFIs). They also help correct the lower borrowing costs that markets extend to the largest SIFIs owing to their implicit government guarantee: the so-called "too big to fail" externality. IMF (2010c) estimates this funding advantage at 20 to 65 basis points.

Addressing the social cost of failure and too-big-to-fail externalities prescribes certain design features for bank levies. Because these problems are likely to be more acute for larger institutions, a significant asset size threshold and a progressive rate

structure above the threshold appear appropriate. The base of the tax should comprise all debt liabilities not subject to an (adequate) insurance scheme. The appropriate rate for each type of liability should take into account its duration vis-à-vis the bank's assets, with more stable and longer term liabilities like (insured) deposits taxed at a lower rate than potentially volatile short-term liabilities, such as interbank loans (repos).

Enacted bank levies vary widely in their features. The top rates are generally low relative to the IMF-recommended rate of 10 to 50 basis points; Germany, for example, charges 2 to 4 basis points and Sweden 3.6 basis points. Liability caps, which have the effect of reducing the marginal tax rate for affected banks to zero,[55] also undercut the tax's desired behavioral effects. While most bank levies apply to uninsured liabilities, a wide variety of bases is used, including deposits (Belgium and Denmark) and risk-based assets (France). Hungary and Sweden exempt interbank loans, excluding an important source of short-term debt. Two countries, the United Kingdom and Korea, vary their tax rate according to the term of the liability.

A major concern regarding bank levies is the potential for double taxation of cross-border institutions. Because bank levies are not income taxes, existing networks of tax treaties do not apply. All existing European levies tax domestic subsidiaries of foreign banks and foreign branches of domestic banks; however, some countries (Austria, Hungary, and the United Kingdom) tax domestic branches of foreign banks, while other countries (France and the United Kingdom) tax foreign subsidiaries of domestic banks, creating risk of double taxation. The European Union has proposed bank levy harmonization in which countries would limit their tax bases to entities that they regulate. France and the United Kingdom have pioneered a tax treaty that gives the home country tax primacy, with a credit issued for host country taxes—the opposite treatment from most double income tax treaties.

9.4.2 Financial Activities Tax

Another tax proposed to raise revenue and correct distortions in the financial sector is the financial activities tax (FAT), a value-added tax levied on financial institutions' wages and profits. Since many credit-invoice VATs, particularly those within Europe, exempt financial services, a low-rate, broad-based FAT can be seen as correcting the undertaxation of financial services. A more narrowly based FAT could be targeted at taxing financial sector rents and/or discouraging excessive risk taking (IMF 2010c).[56]

The broadest-based version (FAT1) would apply to all financial sector value added—the sum of wages and profits at the firm level. In contrast to a credit-invoice VAT, FAT credits would not be given to financial service purchasers, so like the VAT exemption it would increase the net cost of financial inputs for business purchasers, causing some cascading. However, this increase in costs would be appropriate for consumer purchases of financial services, which are undertaxed under VAT exemp-

tion. Several examples of FAT1-type taxes predate the financial crisis, including a subtraction-method VAT on financial services in Israel and a payroll tax in VAT-exempt sectors (largely financial services) in France, Denmark, and Iceland.

Two narrower versions of the FAT are aimed at taxing excess profits and curbing risk-taking incentives. "FAT2" would apply only to labor compensation above some (high) level, as well as to total financial sector profits; ideally the compensation base would include all financial sector returns to labor above what could be earned in the next most lucrative profession. "FAT3" would apply only to profits in excess of normal equity returns in nonfinancial industries, as well as to high remuneration. Such excess profits earned in good years likely represent high-risk bets placed with a view to putting the resultant losses to the taxpayer in bad years. Taxing away these abnormal returns would help neutralize the incentive for too-big-to-fail financial firms to assume excessive risk.

In 2012 Iceland introduced the first FAT, levying a 5.45 percent tax on financial sector wages and a 6 percent tax on profits above ISK 1 billion.[57] Three other countries—Italy, France, and the United Kingdom —have introduced financial sector bonus taxes that can be viewed as partial FATs. The British and French taxes were temporary and did not significantly curb financial sector compensation. Italy in 2011 introduced a permanent surtax of 10 percent to be applied to financial sector bonuses in excess of 300 percent of wages. The EU has also proposed restrictions on financial sector bonuses,[58] according to which 50 percent of any bonus should be deferred for three to five years in order to discourage excessive tail risk assumption.

9.4.3 Financial Transactions tax

One of the most controversial proposals for taxing the financial sector that has emerged from the crisis is a securities transactions tax (STT): a tax levied on the principal amount of securities and/or derivatives each time they are sold.[59] STTs have been promoted by a broad range of civil society organizations as well as some governments and the European Union, who believe that—apart from being conceptually very simple—it has the power to both raise substantial revenue and reduce market risks by curbing short-term trading.

The EC has put forward a proposal for a broad-based STT that would impose a minimum tax rate of 10 basis points on stock and bond trades and a 1 basis point tax on the notional value of derivatives trades.[60] Revenues from the tax would be shared between country governments and the European Union. Currency spot market trading would be exempt, but foreign exchange derivatives would be taxed; loans and the initial issuance of stock and bonds would also be exempt. All transactions in which an EU-headquartered bank participates would be included in the base. The EU estimates that this proposal would raise EUR 57 billion in revenue and reduce GDP by 0.5 percent. The United Kingdom, home to Europe's largest and most

liquid financial market, opposes the STT, along with Sweden and the Netherlands. In addition to raising revenue from the financial sector, the EC posits reduction of financial market risk as a principle rationale for the STT. While simple in concept, the EU proposal demonstrates that the STT is not without inherent administrative complexities.

In August 2012 France unilaterally introduced an STT of 10 bps on all purchases of stock in French-headquartered corporations with a market capitalization of at least EUR 1 billion, as well as an STT of 1 basis point on sovereign credit default swaps and high-frequency computerized trading. Expected revenues from the new tax are estimated at EUR 1.1 billion per year.

As a means of raising revenue, an STT offers the advantage of simplicity and administrability. Automation of most modern securities trading allows an STT to be easily collected by financial intermediaries.[61] However, the automation and integration of international financial markets also makes it easy for trading to migrate offshore in response to a national-level STT; this is a major consideration prompting the European Union to seek a multilateral STT.

The effectiveness of STTs as quasi-regulatory instruments is uncertain. While clear evidence exists that STTs reduce turnover (trading volume) and liquidity, the relationship between turnover and volatility is unclear. Some studies show that turnover is directly related to price volatility,[62] but other studies show that an increase in transaction costs raises price volatility.[63] The relationship may indeed be nonlinear: increased transaction costs raise volatility in thin markets but lower it in highly liquid markets.[64] A very low-rate tax on highly liquid market, as attempted by France, could in theory reduce volatility, but further empirical evidence is needed. Both theory and empirical evidence show that an increase in securities transaction costs, by reducing liquidity, increases the cost of capital.[65]

Though the STT is promoted as a tax on the financial sector, it is a controversial point whether its burden would actually fall on banks' shareholders and employees. Imposition of the STT would result in an initial drop in securities prices that would reduce the wealth of current capital owners. Going forward, issuers would pay a higher price for raising capital and/or investors would reap a lower rate of return, resulting in some combination of reduced investment and consumption. Financial intermediaries would likely be able to pass on the higher transaction costs of a broad-based STT to their customers; however, the resulting reduction in trading activity would in turn reduce profits and compensation for brokers and dealers, but many segments of financial activity will likely be unaffected.

In conclusion, if the goal is to raise revenue from financial sector profits and compensation, a broad-based FAT is arguably a better instrument than an STT. The financial taxation literature responding to the crisis—for example, Vella et al. (2011) and Shaviro (2011), as well as the European Commission's own analysis—tends to

conclude that a FAT is a better instrument to raise revenue from financial sector profits than an STT. Where the goal is to reduce risk taking, a narrow-base FAT and/or a bank levy are likely better instruments.

9.5 Concluding Remarks

This survey has discussed the role of tax policy in shaping the 2008 financial crisis as well as the central role that tax policy reform is playing—and will continue to play—in the aftermath of the crisis. It reflects the overall emphasis in the literature—but perhaps less so in policy circles—on the need to focus on eliminating "old" distortions, while introducing "new" taxes to address current shortcomings and encourage appropriate risk-taking behavior, such as bank levies and the financial activities tax. These will be key elements in a post-crisis tax reform strategy aimed at regaining fiscal sustainability—with prominent objectives being the adoption of more equitable and less distortive tax structures in support of economic growth and improved revenue mobilization, while assisting in the reduction of budgetary deficits.

Notes

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1. See, for example, IMF (2009), Keen, Klemm, and Perry (2010), Shackelford, Shaviro, and Slemrod (2010), Alworth and Arachi (2012), and Ceriani et al. (2011).

2. Hemmelgarn and Nicodème (2010) provide a broad narrative of the monetary and regulatory policy loosening that amplified the effect of emerging new financial instruments (securitization in particular) in generating the property bubble in the run-up to the crisis.

3. As reported in three recent Fund Board Papers (IMF 2009, 2010a, 2011) and in IMF's report to the G20 (2010c).

4. For a formal derivation, see the appendix in Keen et al. (2010).

5. The discussion here focuses on corporate taxation; broader income tax reform aimed at removing all distortions to financial decisions would need to include also personal taxation of capital income.

6. A legalistic argument could be made that while lenders are considered as third parties to a corporation, with interest a "true" cost that should be deductible, shareholders are so entwined with the corporation that return to them in the form of dividends should not.

7. Keen and De Mooij (2012) provide some evidence that taxation does affect leverage also of banks.

8. Governments have traditionally limited the amount of leverage and other forms of risks assumed by financial institutions through regulation rather than taxation. Whether taxation or regulation is a better tool to internalize financial sector externalities will not be discussed further here (e.g., see Keen 2011 for a discussion).

9. See discussion in Keen et al. (2010, p. 53).

10. Although some limited moves in this direction in the form of bank levies are discussed in more detail in chapter 3, section 3.5, of this volume.

11. See US Department of the Treasury (1992).

12. An early discussion of such measures is provided in Norregaard and Khan (2007) while more recent examples are given by Sheppard (2011). See also De Mooij (2011) for a discussion of these policy measures.

13. According to Sheppard (2011), the use by multinationals of intra-group interest deductions to strip income out of European companies has been common, but when private equity funds started buying domestic companies, rules were tightened. "Debt push-down" has, according to Sheppard, been a common vehicle that private equity funds use to ensure that the operating companies that they buy do not pay tax to their countries of residence: purpose debt borrowed by a special-purpose acquisition vehicle is pushed down to the level of the target by means of a merger or restructuring. Some European governments (e.g., France, Italy, and Spain) have been taking these structures to court with varying levels of success.

14. See Griffith, Hines, and Sørensen (2010) for a discussion.

15. See De Mooij (2011) for a discussion of the ACE.

16. Croatia had an ACE from 1994 to 2001, Belgium adopted one in 2006; and variants were also applied in Brazil, Austria, and Italy.

17. Klemm (2007) and Keen and King (2002).

18. For which an ACE would be very similar to a deduction for a notional return on Tier 1 capital.

19. See Bond and Devereux (2003).

20. De Mooij and Devereux (2009) estimate that a unilateral adoption of an ACE by EU members would reduce corporate tax revenues by an average of 44 percent. For Croatia, the ACE may have reduced revenue by a third.

21. See Keen et al. (2010, pp. 55–56) for a discussion.

22. The argument being that in an open economy with highly mobile capital, the after-CIT rate of return to capital is fixed on world markets, and a tax on the normal return will then require a higher before-tax rate of return, which in turn will suppress the return to immobile factors such a labor (e.g., see Arulampalam, Devereux, and Maffini 2008 for a survey of the empirical evidence of this effect).

23. See also discussion in Keen et al. (2010, p. 56).

24. Hemmelgarn and Nicodème (2010) provide an account of the processes of—and different types of derivatives involved in—securitization. Using a formal model called Tax Arbitrage Feedback Theory, Eddins (2009) shows how differential tax treatment of market participants produce incentives that lead to instability and possible market bubbles.

25. As supported by OECD's harmful tax practice project and the Global Forum, which has seen some success in promoting exchange of information agreements.

26. For residence countries, perhaps a more promising measure would be to eliminate tax deferral, which is considered a key reason for the use of low-tax jurisdictions by multinationals.

27. If fully symmetric (i.e., with full and immediate deductibility for losses), tax reduces the variance of after-tax returns and will induce risk adverse investors to hold more of the risky asset—an effect that would be mitigated with a progressive tax.

28. Although a major reason why loss treatment tends to be restrictive is to prevent abuse.

29. The cap on the deductibility of salaries in the United States, for example, has provided a strong incentive for the use of performance-related pay.

30. See also the section on the financial activities tax (FAT) for discussion of bank bonus taxation.

31. The issue of strengthening recurrent property taxes as opposed to property transaction taxes is discussed in more detail in section 9.3.

32. For example, 14 OECD countries have increased their standard rate of VAT since 2010 with most of these countries also increasing reduced VAT rates.

33. The Solow (1956) growth accounting framework is the starting point for understanding how taxes can affect growth, where taxes should have no impact on long-term growth rates, but total factor productivity defines long-term potential growth and short-term distortions caused by tax policy are temporary. Changes to the tax structure can reduce the short-term growth rate. In the "endogenous growth" models steady state growth path can change over time owing to tax and expenditure policies, and as a results taxes can impact growth by distorting choices (see Stokey and Rebelo 1995). Theoretical papers using endogenous growth models usually find that reducing the distortionary effects of the current tax structure would permanently increase economic growth (see Engen and Skinner 1996 for a survey), but the magnitude of the increase is sensitive to key parameter assumptions. For example, on the one hand, Lucas (1990) reported that the tax effects on growth of revenue-neutral tax reforms that remove capital income taxes while increasing labor income taxes leaves growth rates broadly unchanged. On the other hand, Jones, Manuelli, and Rossi (1993) found that by lifting all distortionary taxes, average annual growth rates would increase by 4 to 8 percent.

34. Tax policies in developing countries are potentially further away from the recommendations of optimal tax policy in certain respects, and so if the conclusions from developed economies were to carry over to developing economies, then the potential benefits of tax reform in LICs should be even greater.

35. The literature on the empirical effects of tax on growth in developing economies is generally much sparser.

36. "Barro regressions" are growth regressions that were designed to test for convergence by regressing output growth on initial conditions for output and a number of other determinants of potential output. Durlauf, Johnson, and Temple (2005) survey the literature on such regressions.

37. As applied to labor markets, strictly speaking this is only true for the intensive margin (working hours), but not for the participation decision, and macro models tend to assume the participation margin is the more important one.

38. Aggregate time-series analysis provides differing conclusions, as do cross-country regression analysis and sector-specific studies of taxation and growth (see Engen and Skinner 1996).

39. Taxing consumption is equivalent to taxing accumulated assets, excess profits, and labor income: so it falls partly on a completely inelastic base—previously existing assets—and partly on a base less internationally mobile than capital income.

40. The results suggest that if the tax ratio of direct taxes to indirect taxes were to increase by 10 percent, then growth would fall by 0.56 percent. The same results apply for FDI flows: the panel of developed countries reports statistically negative effects of the ratio on FDI flows, while developing economies produce insignificant results.

41. Fiscal devaluation is discussed in De Mooij and Keen (2012).

42. This chapter does not discuss multiplier effects of tax incentives as this is discussed in another chapter of the book.

43. This section draws from IMF (2010a).

44. The discussion of financial sector taxation is a clear example.

45. At the margin, the welfare cost of changing some tax instrument to raise an additional dollar of revenue—its marginal cost of public funds (MCPF)—must be the same for all instruments; otherwise, welfare could be increased without loss of revenue by shifting from the instrument with a higher MCPF to one with a lower one.

46. For example, IMF (2010a) estimates that more efficient VAT policies (by reducing the exemption/rate "policy gap" by half) could raise nearly 2 percent of GDP for both emerging and advanced economies.

47. IMF (2010a) estimates that strengthening tobacco, alcohol, and fuel excises could on average (unweighted) raise an extra 0.6 percent of GDP in revenue in advanced G20 countries.

48. Globally efficient carbon pricing could raise US$50 to 660 billion annually, see IMF (2010a).

49. A general discussion of property taxes is provided in Norregaard (2013).

50. Such as Computer Assisted Mass Appraisal (or CAMA) systems that have significantly improved the basis for market value based property taxation.

51. IMF (2010a) estimates a potential average (unweighted) revenue gain from strengthened property taxation among advanced G20 countries of around 0.7 percent of GDP.

52. IMF (2010c).

53. The most common base for the tax is nondeposit debt liabilities. However, there is some variation: Hungary, for example, levies the tax on total assets less interbank debt liabilities.

54. The median tax raises 0.14 percent of GDP. Austria, Cyprus, France, Germany, Hungary, Iceland, Korea, Portugal, Romania, Slovenia, Sweden, and the United Kingdom have all enacted bank levies; Slovakia and the United States have also proposed versions of this tax.

55. Cyprus caps the liability at 20 percent of taxable profits; Germany caps it at 15 percent of net income; and Slovenia caps it at 0.167 percent of the loan balance.

56. Keen et al. (2013) and European Commission (2011) define three different types of FAT aimed at achieving these various goals.

57. The Iceland tax differs from an ideal FAT in that its profit tax base is accounting profits for which investment is depreciated, rather than cash flow profits for which investment would be expensed.

58. Directive 2010/76/EU. The US Federal Deposit Insurance Commission has proposed similar deferral rules for financial sector bonuses.

59. For a more in-depth discussion of FTTs, see Matheson (2012). For discussion of their administrative feasibility, see Brondolo (2011).

60. The STT would be levied on both purchaser and seller, for a total tax rate of 20 or 2 basis points in most trades.

61. For a more in-depth discussion of administrative issues regarding STTs, see Brondolo (2011).

62. For example, French and Roll (1986) and Barclay et al. (1990).

63. Hau (2006) and Jones and Seguin (1997).

64. Haberer (2004).

65. For a review of this literature, see Amihud et al. (2005).

References

Alesina, A., and S. Ardagna. 2010. Large changes in fiscal policy: Taxes versus spending. *Tax Policy and the Economy* 24: 35–68.

Alworth, Julian S., and Giampaolo Arachi. 2012. Introduction. In Julian Alworth and Giampaolo Arachi, eds., Taxation and the Financial Crisis. Oxford: Oxford University Press.

Amihud, Y., H. Mendelson, and L. H. Pedersen. 2005. Liquidity and asset prices. *Foundations and Trends in Finance* 1 (4): 269–364.

Barclay, M., R. Litzenberger, and J. Warner. 1990. Private information, trading volume and stock return variances. *Review of Financial Studies* 3 (2): 233–53.

Bond, S. R., and M. P. Devereux. 2003. Generalised R-based and S-based taxes under uncertainty. *Journal of Public Economics* 87 (5–6): 1291–1311.

Brondolo, J. 2011. Taxing financial transactions: An assessment of administrative feasibility. Working paper 11/185. IMF, Washington, DC.

Ceriani, Vieri, Stefano Manestra, Giacomo Ricotti, Alessandra Sanelli, and Ernosto Zangari. 2011. The tax system and the financial crisis. Occasional paper 85. Banca D'Italia, Rome.

De Mooij, R. A. 2011. Tax biases to debt finance: Assessing the problem, finding solutions. Staff discussion note 11/11. IMF, Washington, DC.

De Mooij, R. A., and M. Devereux. 2009. Alternative systems of business tax in Europe: An applied analysis of ACE and CBIT reforms. Taxation studies, 28. Directorate General Taxation and Customs Union, European Commission, Brussels.

De Mooij, R. A., and M. Keen. 2012. Fiscal devaluation and fiscal consolidation: The VAT in troubled times. Working paper 12/85. IMF, Washington, DC.

Easterly, W., and S. Rebelo. 1993. Marginal income tax rates and economic growth in developing countries. *European Economic Review* 37: 409–17.

Eddins, S. T. 2009. Tax arbitrage feedback theory. March 9. Available at: http://ssrn.com/abstract=1356159.

Engen, E. M., and J. Skinner. 1996. Taxation and economic growth. Working paper 5826. NBER, Cambridge, MA.

European Commission. 2011. Proposal for a Council Directive on a common system of financial transaction tax and amending directive 2008/7/EC. Staff working paper impact assessment accompanying the document COM 594, SEC 2011 final. EC, Brussels.

French, K., and R. Roll. 1986. Stock return variances: The arrival of information and the reaction of traders. *Journal of Financial Economics* 17: 5–26.

Gordon, R., and W. Li. 2009. Tax structures in developing countries: Many puzzles and a possible explanation. *Journal of Public Economics* 93: 855–66.

Griffith, R., J. Hines, and P. B. Sørensen. 2010. International capital taxation. In J. Mirrlees, S. Adam, T. Besley, R. Blundell, S. Bond, R. Chote, M. Gammie, P. Johnson, G. Myles, and J. Poterba, eds., Dimensions of Tax Design: The Mirrlees Review. Oxford: Oxford University Press, 914–1027.

Haberer, M. 2004. Might a securities transaction tax mitigate excess volatility? Some evidence from the literature. Discussion paper 04–06. CoFE, University of Konstanz.

Hau, H. 2006. The role of transaction costs for financial volatility: Evidence from the Paris Bourse. *Journal of the European Economic Association* 4 (4): 862–90.

Hemmelgarn, T., and G. Nicodème. 2010. The 2008 financial crisis and taxation policy. Taxation paper 20. EU, Brussels.

Hemmelgarn, T., Nicodème, G., and E. Zangari. 2011. The role of housing tax provisions in the 2008 financial crisis. Taxation paper 27. EU, Brussels.

International Monetary Fund. 2009. Debt bias and other distortions: Crisis-related issues in tax policy. Prepared by the Fiscal Affairs Department, June 12. Available at: https://www.imf.org/external/np/pp/eng/2009/061209.pdf.

International Monetary Fund. 2010a. From stimulus to consolidation: Revenue and expenditure policies in advanced and emerging economies. Fiscal Affairs Department. IMF, Washington, DC.

International Monetary Fund. 2010b. Will it hurt? Macroeconomic effects of fiscal consolidation. *World Economic Outlook* (October). Washington, DC: IMF

International Monetary Fund. 2010c. A fair and substantial contribution: A framework for taxation and resolution to improve financial stability. Report to the G20. IMF, Washington, DC.

International Monetary Fund. 2011. Revenue mobilization in developing countries. Fiscal Affairs Department. IMF, Washington, DC.

Jones, C., and P. J. Seguin. 1997. Transactions costs and price volatility: Evidence from Commission deregulation. *American Economic Review* 87 (4): 728–37.

Keen, M. 2011. Rethinking the taxation of the financial sector. *CESifo Economic Studies* 57 (1): 1–24.

Keen, M., and Ruud de Mooij. 2012. Debt, taxes, and banks. IMF Working paper 12/48. IMF, Washington, DC.

Keen, M., and J. King. 2002. The Croatian profit tax: An ACE in practice. *Fiscal Studies* 23 (3): 401–18.

Keen, M., A. Klemm, and V. Perry. 2010. Tax and the crisis. *Fiscal Studies* 31 (1): 43–79.

Keen, M., R. Krelove, and J. Norregaard. 2013. The financial activities tax. IMF Working paper, forthcoming.

Klemm, A. 2007. Allowances for corporate equity in practice. *CESifo Economic Studies* 53 (2): 229–62.

Lee, Y., and R. H. Gordon. 2005. Tax structure and economic growth. *Journal of Public Economics* 89: 1027–43.

Lucas, R. 1990. Supply-side economics: An analytical review. *Oxford Economic Papers* 42 (2): 293–316.

Martinez-Vazquez, J., V. Vulovic, and Y. Liu. 2010. Direct versus indirect taxation: Trends, theory and economic significance. Working paper 10–14. International Studies Program, Andrew Young School of Policy Studies, Georgia State University, Atlanta.

Matheson, T. 2012. Securities transaction taxes: Issues and evidence. *International Tax and Public Finance*. doi:10.1007/s10797-012-9212-5.

Norregaard, J. 2013. Taxing immovable property: Revenue potential and implementation challenges. Working paper 13/129. IMF, Washington, DC.

Norregaard, J., and T. Khan. 2007. Tax policy: Recent trends and coming challenges. Working paper 07/274. IMF, Washington, DC.

OECD. 2010. *Tax Policy Reform and Economic Growth*. Paris: OECD.

Poterba, J. M., and T. M. Sinai. 2008. Income tax provisions affecting owner-occupied housing: Revenue costs and incentive effects. Working paper 14523. NBER, Cambridge, MA.

Shackelford, Douglas A., Daniel N. Shaviro, and Joel Slemrod. 2010. Taxation and the financial sector. *National Tax Journal* 63: 781–806.

Shaviro, D. 2012. The financial transaction tax vs. the financial activities tax. Unpublished manuscript. New York University.

Sheppard, L. A. 2011. New restrictions on interest deductibility. *Tax Notes International* 64 (10): 684–87.

Stokey, N. L., and S. Rebelo. 1995. Growth effects of flat-rate taxes. *Journal of Political Economy* 103: 519–50.

US Department of the Treasury. 1992. Integration of the individual and corporate tax systems. US Treasury, Washington, DC.

Vella, J., C. Fuest, and T. Schmidt-Eisenlohr. 2011. The EU Commission's proposal for a financial transaction tax. *British Tax Review* 6: 607–21.