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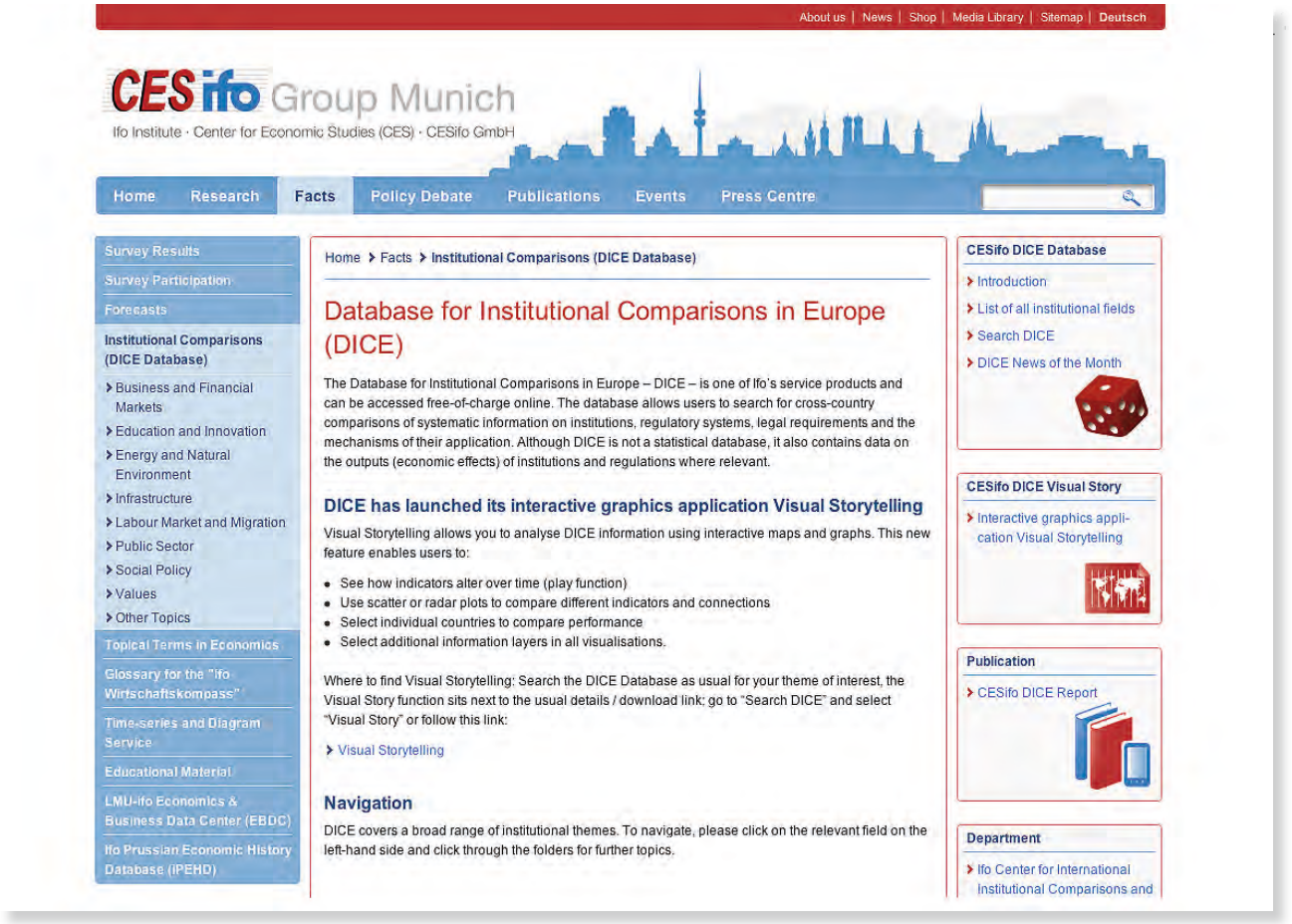
CESifo DICE REPORT

Journal for Institutional Comparisons

VOLUME 12, NO. 4 WINTER 2014

CESifo



CESifo DICE Report
ISSN 1612-0663 (print version)
ISSN 1613-6373 (electronic version)
A quarterly journal for institutional comparisons
Publisher and distributor: Ifo Institute
Poschingerstr. 5, D-81679 Munich, Germany
Telephone ++49 89 9224-0, Telefax ++49 89 9224-1462, e-mail ifo@ifo.de
Annual subscription rate: €50.00
Editors: Marcus Drometer, Christa Hainz, Romuald Méango
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Copy editing: Lisa Giani Contini, Sabine Rumscheidt, Daniela Wech

DICE Database: www.cesifo-group.org/DICE

CESifo DICE Report

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Profit Shifting

Are We Heading towards a Corporate Tax System Fit for the 21st Century?[1]

Michael P. Devereux and
John Vella[2]

Introduction

A long-standing criticism of the system for taxing multinationals' profit is that it distorts economic activity, affecting investment, financial and location decisions, and economic growth. However, it has been the recent growing realisation that multinationals are able to arrange their affairs to reduce their aggregate tax liabilities by taking advantage of deficiencies in the tax system that has generated a real momentum for reform. The need for reform rose to the top of the political agenda following extensive press coverage of the tax affairs of a few well-known multinational companies, including Starbucks, Google and Amazon. In response, the G20 (G20 2012) called on the OECD to undertake a project on "Base Erosion and Profit Shifting" (BEPS). The OECD published a report in February 2013 (OECD 2013a), an Action Plan in July 2013 (OECD 2013b), and since then has been engaged in developing proposals for reform of the system.

Whilst the BEPS project is still in progress, its general direction of travel is fairly clear. This paper argues that although the BEPS project will probably close some existing loopholes, it will not provide the radical reform that is required to produce a stable system for years to come.

Problems with the existing system

Before turning to the BEPS project, we begin by outlining the most significant problems with the existing system. These stem from two related sources. Firstly, the underlying framework is based on an inadequate compromise in allocating taxing rights between countries; and the system has become more complex and less suited to collecting an appropriate amount of tax as steps have been taken to shore up that compromise. Secondly, the system effectively invites countries to compete with each other in numerous dimensions, which undermines its fragile state. We briefly discuss each of these in turn.

When commercial activity moves beyond a purely domestic setting, many countries can potentially claim jurisdiction to tax the income from it. The international tax system seeks to address this by essentially allocating primary taxing rights between "residence" and "source" countries. Very broadly, the residence country is where a person who has the right to receive the profits of the activity resides, while the source country is where the economic activity takes place. And broadly again, in a "1920s compromise" (Graetz 2001) in the League of Nations, source countries were allocated primary taxing rights to the active income of the business, and residence countries the primary taxing rights to passive income, such as dividends, royalties and interest. Theoretical and practical arguments have been articulated in favour of this allocation, yet they do not stand up to much scrutiny.[3] The allocation is best viewed as an arbitrary compromise, albeit one which has come to be accepted by large parts of the international community.

This system is ill-suited to dealing with modern multinationals operating in a truly global business environment. A modern multinational can have shareholders scattered across the world, a parent company resident in one country, a potentially large number of affiliates undertaking an array of activities, such as research and development, production, marketing and finance that are located in many different countries[4] and consumers that may also be scattered across the world. In such a scenario, there is no clear conceptual basis for identifying where profit is earned; as all of those locations may be considered to have some claim to tax part of the company's profit. Conceptually, the residence/source distinc-

[1] This is an edited and shortened version of a paper by the same authors and the same title, published in *Fiscal Studies*, December 2014.
[2] Both authors: Oxford University Centre for Business Taxation.
[3] See the discussion in Schön (2009).
[4] See OECD (2013a), Chapter 3 on global value chains.

tion does not offer much help. In practice, applying this distinction in the context of intra-group transactions, where affiliated entities in different jurisdictions are assigned the status of "source" or "residence", gives rise to significant problems, not least those relating to transfer pricing. Following the logic of the residence/source and active income/passive income distinctions, specific international tax rules have been introduced that are hard to justify and that are easily manipulated, such as transfer pricing rules dealing with risk and Cost Contribution Agreements. Overall, the system is manipulable, distortive, often incoherent and unprincipled.

A second, important, source of problems is that the system invites countries to compete with one another in ways that destabilise the system itself. Countries compete to attract economic activity and to favour "domestic" companies, which has led to gradual reductions in effective rates of taxation of profit for at least thirty years. For example, the current UK coalition government has been explicit on its strategy in this regard; it came to office in 2010 with the declared "aim … to create the most competitive corporate tax regime in the G20" (Cabinet Office 2010) and it has acted on that aim. Such a goal is not easily reconciled with another goal often explicitly held by governments: ensuring that companies should pay to some country or countries a reasonable amount of tax on their global profits. This tension is particularly evident in the UK, where the goal of having the most competitive corporation tax regime in the G20 is held concomitantly with an active role in pushing forward the OECD's BEPS Action Plan. There may be competition not only with respect to rates, but also with regard to many other aspects of the tax base. For example, several countries have introduced rules – such as the US check-the-box rules and the UK Finance Company Partial Exemption – designed to gain a competitive advantage for domestic companies, but which facilitate the erosion of the tax base of both domestic and foreign jurisdictions.

This fundamental tension is at the heart of whether the existing international tax system can be reformed to provide a reasonable and stable system for taxing the profits of multinational companies in the 21st century. The issue is one of incentive compatibility. If countries acting in their own interests believe that they have an incentive to undermine the international consensus, then that international consensus cannot provide a stable long-run system. There is ample evidence that countries have been acting in precisely that manner.

What is the OECD BEPS project trying to achieve?

The OECD BEPS project focuses on the need to change the existing legal system. A first question is whether the reform being considered is as radical as the brief analysis in the previous section suggests it needs to be. A starting point is provided by the OECD's articulation of the central problem it is addressing: "double non-taxation, as well as cases of no or low taxation associated with practices that artificially segregate taxable income from the activities that generate it" (OECD 2013b, 13).

In the first document produced by the OECD in this process (OECD 2013a) it intimated a willingness to take a bold approach: "it is also important to revisit some of the fundamentals of the existing standards. Indeed, incremental approaches may help curb the current trends, but will not respond to several of the challenges governments face" (OECD 2013b, 8). The second document produced (OECD 2013b) also spoke of "a bold move by policy makers [being] necessary to prevent worsening problems" (OECD 2013b, 10). However, it made it clear that there was a limit as to how bold and fundamental the proposed reform would be. This document explained that its proposed actions "are not directly aimed at changing the existing international standards on the allocation of taxing rights on cross-border income" (OECD 2013b, 11).

The reforms proposed by the OECD are both less and more radical than the statements cited above make it out to be. It is less than a "fundamental" and "bold" reform because the Action Plan seeks to bring change within the existing international tax framework. The OECD is not setting out to change the framework itself. It is not even questioning the desirability or logic of a regime centred on the residence/source and active/passive income dichotomies in the 21st century. Indeed, it only mentions one alternative to the current framework, formulary apportionment, and gives it very short shrift.

On the other hand, it is more radical than might at first appear because whilst purporting not to be changing the current allocation of taxing rights, the changes proposed do depart from it to some extent. This is done by adding a qualification to the current allocation rules where abuse is perceived. Specifically, a number of the actions focus on 'economic activity', relevant substance' or 'value creation'. Indeed, the general principle guiding the reform proposals of the OECD is explained in

these terms "this Action Principle should provide countries with domestic and international instruments that will better align rights to tax with economic activity" (OECD 2013b, 11). We discuss this general principle first, and then consider problems of competition.

A principle based on the location of economic activity: some issues

The use of a new notion of economic activity raises at least six problems, which are discussed in turn.

First, the desired outcome of better "align[ing] rights to tax with economic activity" constitutes a departure from the current regime. Put simply, the international tax system does not currently allocate taxing rights to countries according to where "economic activity" takes place. When passive income is paid across borders it will be taxed in the recipient's country of residence solely by virtue of the recipient's residence in that country. No economic activity in the country of residence is required. This change thus overlays a new and completely different principle onto the existing structure. As the new principle points in a different direction the inevitable conclusion is that the OECD is proposing a shift in the taxation of certain forms of passive income from a residence basis to a "place of economic activity" basis. Whether this is a sensible policy is open to discussion. However, the OECD does not attempt a proper analysis of such a change.

Secondly, as the basic structure is being kept in place and the principle overlaid on top of it, the post-BEPS international tax regime will be even less coherent. In some situations taxing rights will be aligned with "economic activity", but in others it will not. Consider the following example. P, a company resident in State A, funds S1, a wholly-owned operating company resident in State B through debt. Under the current international tax regime interest paid by S1 to P is primarily taxed in State A. Generally, interest payments are deductible from S1's taxable profits, meaning that to the extent that they are covered by the interest payments, profits generated by S1 are taxed by State A and not State B, where the economic activity might be deemed to have taken place.

Action 4 addresses base erosion via interest deductions and other financial payments, although how this might be done is still under discussion. The Action Plan does, however, shed some light on the perceived problem created by inbound financing of this nature:

"From an inbound perspective, the concern regarding interest expense deduction is primarily with lending from a related entity that benefits from a low-tax regime, to create excessive interest deductions for the issuer without a corresponding interest income inclusion by the holder" (OECD 2013b, 16).

This explanation suggests that the options for change the OECD might consider could include making S1's ability to deduct interest paid in State B dependant on whether State A taxes the interest and at what rate.[5] Taxing rights would be aligned with economic activities if State A has no or low taxation but not otherwise. This might address the problem of profit shifting through the use of debt, but it does not appear to be principled and also introduces further incoherence into the system. As discussed below, competitive pressures might also undermine this change altogether.

Action 3 of the BEPS Action Plan concerns the strengthening of Controlled Foreign Company (CFC) rules. Their operation, in conjunction with the limitations on interest deduction rules, raises further questions. Let us suppose now that P has another subsidiary S2, resident in State H, a tax haven, and that P funds S2 through equity, which, in turn, funds S1 through debt. Let us assume also that State A, where P is resident, has robust CFC rules in place. Action 4 implies that the deduction in State B for the interest paid by S1 to S2 ought to be addressed given that State H is a low tax regime. This could be done, perhaps, by allowing State B to limit the interest deductions available to S1. However, the CFC rules of State A might make the interest received by S2 taxable in the hands of P in State A, so that the rules resulting from Action 4 addressing the interest paid by S2 to S1 would not be required. Note however, that if this were the case, and by "economic activity" the OECD here means more than funding through debt or equity, the taxing rights would again not be aligned with "economic activity". State A would have taxing rights despite the fact that no economic activity takes place there, other than P owning shares in S2.

For these reasons the post-BEPS international tax system is likely to be more incoherent, with taxing rights being aligned with economic activity in some cases, but not in others. There does not appear to be any principle

[5] Note that the primary response recommended under Action 2 to deal with hybrid mismatch arrangements which produce deduction/no inclusion outcomes is to deny the deduction in the payer's jurisdiction. If the payer's jurisdiction does not adopt such a rule, the defensive response recommended is for the income to be included as ordinary income in the payee's jurisdiction. See OECD (2014b, 36).

for distinguishing between the two; at best, reliance will be placed on vague and arbitrary tests such as "artificial" and "excessive".

Thirdly, if applied too narrowly an "economic activity" test might wrongly identify instances of low or no taxation. Consider the following example. P is a parent company resident in State A, a high tax jurisdiction operating an IP Box regime which taxes royalty income at five percent. S is a wholly-owned subsidiary of P, resident in State B, a high tax jurisdiction. S develops intellectual property which it sells to P for a fair price; and S pays tax in State B on the transfer. P grants a licence over the intellectual property to T, an independent company resident in State C, another high tax jurisdiction. T pays royalties to P which it can deduct from its taxable profits; P pays tax on the royalties at the low tax rate of five percent.[6]

As a result of this arrangement, royalties that might otherwise have been taxed at a high rate in State B, where the IP was developed, are taxed at a low rate in State A. Focusing narrowly on the royalty payments. one could reach the conclusion that there is low taxation as a result of taxable income (in State A) having been segregated from economic activity (in State B). However, if the transfer of the intangible to P were priced correctly, with State B collecting appropriate tax on that transfer, single taxation on the intangible would have already taken place.[7] This is not therefore a case in which there is "no or low taxation … associated with practices that artificially segregate taxable income from the activities that generate it" (OECD 2013b, 10). But to identify this, one cannot focus only on the royalty payment and ignore the tax paid on the transfer of the intangible. By contrast, the OECD's approach does not appear to consider any tax paid in B in the transfer of the IP (OECD 2014c, 33); indeed, the example given above appears to fall foul of the regime proposed by the OECD in relation to Action Plan 5 dealing with harmful tax practices.

Fourthly, the focus on economic activity suggests a misdiagnosis of the problem in some situations. In the last example given above, if P paid S less than the fair price for the intangible, there would not have been single taxation of the intangible and the concern over low or no taxation would be warranted. However, this problem is not due to a lack of economic activity in State A. The problem here stems from the inability to price inter-company transfers such as that between P and S. If this is the real cause of the problem it should be addressed directly.[8] If it is not possible to remedy that situation, then the soundness of a system which relies on the correct pricing of such transfers should be questioned. If the real problem here is that the system itself is unsound then a stable, long-run solution cannot rely on keeping the system, but amending one part to correct for the failure of another part.

Fifthly, the proposed solutions are likely to be undermined by tax planning and to create real economic distortions. While it is unclear what "substantial activity" will be required for preferential regimes, one can safely predict that as long as the cost of satisfying this test is less than the resulting tax saving, multinationals will satisfy it by moving real activity to low tax jurisdictions. This will undermine the OECD's solution and, more importantly, it will also create a real economic distortion where there was none.

Sixthly, from a conceptual perspective, a system that seeks to align taxing rights over income with the "economic activity" that created it is questionable because it is not at all clear where such economic activity actually takes place. Thus far, we have side-stepped the issue by assuming that the OECD means an activity which goes beyond simply holding a debt or equity instrument or an intangible. However, these concepts are elusive and thus constitute a critical weakness in the OECD's project. Numerous factors contribute to the creation of income, including finance, research and development, head office functions, manufacturing, marketing and sales. In the context of a multinational, these factors might be spread over a number of countries thus making it impossible to pinpoint where the relevant "economic activities" which created the income took place.

Problems of interaction with tax competition

Even if all the problems with the approach proposed by the OECD were solved, however, there remains the problem that the system will be undermined by national governments competing with each other. To illustrate this, let us return to the last example given above where P, resident in State A, acquires intellectual property from its wholly owned subsidiary, S, resident in State B.

[6] The tax base would be net of any allowances relating to the purchase of the intellectual property; but unless the full purchase price was immediately deductible, then P would face a positive tax liability in present value terms.

[7] From an economic perspective there is no difference between S licensing the intangible to T in return for a royalty and S selling the intangible to P which then licenses it to T in return for a royalty. A neutral tax system should treat both in the same way.

[8] At the time of writing the OECD's work on transfer pricing has not been finalised. The OECD is considering the introduction of special measures to address hard to value intangibles. Whether such measures will be adopted and how successful they will be, is, of course, not known. See OECD (2014d).

T, resident in State C acquires a licence over the IP and pays a royalty to P in return. The perceived problem here arises because State A taxes the royalty income at a low rate.

It might be argued that the relevant economic activity took place in State B where the intangible was created. However, State B might decide not to tax that income or to tax it at a very low rate, because taxing the income would raise the effective tax rate on R&D in State B, thereby deterring real economic activity from taking place there. Alternatively, it might be argued that the relevant economic activity took place in State C, where the operating company's activities took place. However, State C might also decide not to tax that income or tax it at a low rate because taxing the income would raise the effective tax rate in State C, thereby deterring real economic activity from taking place there. There is no evidence that under the existing system either State B or State C would wish to tax the income associated with the royalty payment to State A. On the contrary, many examples of various forms of tax competition suggest that neither State B nor State C would wish to do so since if they did, they would worsen their competitive position with respect to other countries.

If one of the three states agreed to tax the income (above a certain rate) for the foreseeable future, there would be nevertheless a concern that this could not be the basis of a stable tax system. This is because there would always be an underlying incentive for a future government in these states to gain a competitive advantage by switching to not taxing the income (or cutting the tax rate).

Even if it were successful on its own terms, the BEPS project would not contain the power of existing competitive forces. The outcomes resulting from the project are expected to take different forms. Some changes will be enshrined in legally binding international treaties. This should limit, although probably not eliminate, states' ability to compete in the areas covered. However, these treaties will be limited in scope. In other areas, the expected outcome is a recommendation for domestic legislation. Here the hope is that states adopt legislation effectively limiting their ability to compete in these areas. Whether steps will or can be taken against states that refuse to meaningfully follow these recommendations is unclear. Furthermore, if their interests so dictate, future governments might not feel constrained from changing their domestic law and recommencing competition in these areas. Other factors, such as tax rates, are outside the scope of the BEPS project altogether, and thus competition on these factors will continue unhindered. Finally, whilst the BEPS project includes a broad group of countries, it is not truly global. Again, it is unclear whether steps can be taken to encourage countries that are not part of the BEPS process to adopt the recommendations resulting from the project.

Conclusion

Even if the actions proposed by the OECD are successfully implemented, the international tax regime will still not be fit for purpose. The regime will consist of a confused, complex mass of arcane, arbitrary and sometimes illogical rules, competition will still drive rates down and reliefs up, location of real economic activity will remain distorted, and cross-country arbitrage opportunities are likely to persist. More radical reform is required if we are to have a stable system for the taxation of multinational companies for the longer term.

References

Cabinet Office (2010), *The Coalition: our programme for government*.

G20 (2012), *Leaders Declaration*, Los Cabos, Mexico.

Graetz, M. J. (2001), "Taxing International Income: Inadequate Principles, Outdated Concepts, and Unsatisfactory Policies", *Tax Law Review* 54, 261–336.

OECD (2013a), *Addressing Base Erosion and Profit Shifting,* OECD Publishing, Paris.

OECD (2013b), *Action Plan on Base Erosion and Profit Shifting,* OECD Publishing, Paris.

OECD (2014a), *Explanatory Statement, OECD/G20 Base Erosion and Profit Shifting Project,* OECD Publishing, Paris.

OECD (2014b), *Neutralising the Effects of Hybrid Mismatch Arrangements,* OECD Publishing, Paris.

OECD (2014c), *Countering Harmful Tax Practices More Effectively, Taking into Account Transparency and Substance,* OECD Publishing, Paris.

OECD (2014d), *Guidance on Transfer Pricing Aspects of Intangibles,* OECD Publishing, Paris.

Schön, W. (2009), "International Tax Coordination for a Second-Best World (Part I)", *World Tax Journal* 1 (1), 67–114.

Base Erosion and Profit Shifting: A Simple Conceptual Framework[1]

Dhammika Dharmapala[2]

Introduction

The taxation of multinational corporations (MNCs) is an arcane topic that has traditionally been of interest only to a small coterie of specialists. Recently, however, it has attracted an unprecedented level of political attention and public interest. The leaders of the G-20 group of nations issued a communiqué following their meeting in Los Cabos, Mexico in June 2012, stating that: "We reiterate the need to prevent base erosion and profit shifting and we will follow with attention the ongoing work of the OECD [Organization for Economic Cooperation and Development] in this area."[3] This "ongoing work" – the OECD's initiative on "base erosion and profit shifting" (BEPS) – has led to a major report issued in February 2013 (OECD 2013a) and to an action plan produced in July 2013 (OECD 2013b). The latter consists of fifteen specific action items that are intended to facilitate multilateral cooperation among governments with regard to the taxation of MNCs, with the general objective of seeking to "better align rights to tax with economic activity" (OECD 2013b, 11). In September 2014, the OECD released a set of recommendations to address seven of these action items (OECD 2014).

The aim of this paper is to present a simple conceptual framework that illuminates aspects of the BEPS phenomenon and governments' responses. In particular, the paper seeks to clarify the types of circumstances in which multilateral initiatives – such as that currently being pursued by the OECD – may enhance the welfare of nations. A companion paper (Dharmapala 2014) surveys the empirical literature seeking to estimate the magnitude of tax-motivated income-shifting (i.e. BEPS) within multinational firms. A major conclusion from this survey is that the more recent empirical literature uses new and richer sources of data to find a magnitude of BEPS that is much smaller than that found in earlier studies. A representative "consensus" estimate from the recent literature is a semi-elasticity of reported income with respect to the tax rate differential across countries of 0.8. This implies that a ten percentage point increase in the tax rate difference between an affiliate and its parent (for example, because the tax rate in the affiliate's country falls from 35 percent to 25 percent) would increase the pretax income reported by the affiliate by eight percent (for example, from USD 100,000 to USD 108,000). Dharmapala (2014) also provides a framework for interpreting the implications of these findings for policy towards BEPS, and highlights the importance of existing legal and economic frictions as constraints on BEPS.

Perhaps the most fundamental of the conceptual issues raised by the BEPS initiative are the questions of *why* and *for whom* BEPS constitutes a problem. The G-20 communiqué noted above takes as self-evident the "need to prevent BEPS". Yet, national governments have a wide variety of legal instruments available to reduce or prevent BEPS. If the "need to prevent BEPS" is so pressing, some explanation is required as to why governments have not unilaterally taken more extensive steps in this direction. The OECD's (2013a, b) answer is that BEPS arises primarily because of inconsistencies between the tax laws of different jurisdictions; these inconsistencies create (largely unintended) opportunities for firms to reduce tax liabilities. This is a variant of the "double nontaxation" problem – i.e. that MNCs may generate income that is not taxable under the laws of any jurisdiction – that has long exercised the minds of international tax scholars. This perspective certainly

[1] This paper is a revised and extended version of Section 2 of "What Do We Know About Base Erosion and Profit Shifting? A Review of the Empirical Literature" (CESifo Working Paper no. 4612). I wish to thank Tom Brennan, Mihir Desai, Jim Hines, Ruth Mason, Peter Merrill, Helen Miller, Matt Slaughter, Alan Viard, and participants at the International Tax Policy Forum (ITPF) meetings, the ITPF/AEI conference in Washington on "The Economic Effects of Territorial Taxation", the Waterloo Tax Symposium in Toronto, the Oxford University Centre for Business Taxation Summer Conference on "Tax Competition and BEPS", and the Workshop on Current Research in Taxation in Münster, Germany for their helpful comments. I also acknowledge the support of the ITPF. Any remaining errors or omissions are, of course, my own.

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[3] The full text of the G-20 communiqué is available at: http://www.telegraph.co.uk/finance/g20-summit/9343250/G20-Summit-communique-full-text.html

captures a significant element of the BEPS phenomenon, but arguably it underemphasizes the role of governments' strategic incentives in favor of stressing the limitations of governments' technical and legal capacities.

With regard to the question of *for whom* BEPS is a problem, the OECD (2013a) points, unsurprisingly, to governments and to other taxpayers, including purely domestic firms that lack access to the BEPS opportunities open to MNCs. It is worth noting, however, that the impact on other taxpayers of greater tax burdens on MNCs depends, in part, on the incidence of the corporate tax – i.e. whether workers bear a substantial share of the burden in the form of reduced wages. This issue is the subject of an ongoing debate in the empirical literature on this subject (e.g. Arulampalam, Devereux and Maffini 2012) that is unlikely to be resolved within the timeframe of the BEPS action plan. It is also important to clarify that the asymmetries between MNCs and purely domestic firms are harmful only to the extent that they give rise to distortions in ownership patterns that reduce productivity. It is difficult to argue that these asymmetries have any implications for fairness, as shareholders can generally purchase shares in MNCs, as well as in purely domestic firms. More surprisingly, the OECD (2013a) also claims that MNCs themselves may be harmed by BEPS, for instance, if there are reputational costs to tax avoidance. However, it is not entirely clear why MNCs would fail to internalize purely private costs of tax planning, such as reputational losses.[4]

The following section presents a simple framework that addresses some of these conceptual issues. Its implications for understanding the potential gains from the BEPS initiative are discussed in the subsequent section, while the last section concludes.

A simple conceptual framework

The OECD's (2013b) proposed solutions to BEPS focus on various forms of multilateral coordination and cooperation. Implicitly, it takes the view that multilateral cooperation can make countries collectively better off. It is thus helpful to seek to understand more precisely the circumstances in which multilateral cooperation can enhance countries' welfare. This paper presents a simple example that illustrates one such set of circumstances. It emphasizes countries' incentives to maximize national welfare, rather than unintended interactions between different countries' tax laws (important though such interactions may be in many respects).

The distinction between "residence" (or "home") countries and "source" (or "host") countries is fundamental to international taxation. The former are countries in which MNC parents are headquartered. The precise criteria for determining the residence country of an MNC vary depending on the laws of the relevant jurisdiction. Most commonly, MNC residence is based on the jurisdiction in which the MNC parent is incorporated, or on the location of its management activities. Source countries are those in which MNC affiliates (including the parent as well as its subsidiaries) undertake business activity. The income generated by normal business operations in the source country is referred to as "active" business income, whereas income received from other sources unconnected to normal business operations (such as interest income) is referred to as "passive" income. In general, both residence and source countries may claim the power to tax the same income, and many of the principles of international taxation have the aim of avoiding or mitigating such "double taxation".

Residence countries with "worldwide" tax systems impose tax on the active foreign business income of resident MNCs (generally with a credit for taxes paid to the source country). It is more common, however, for residence countries to use "territorial" (or "exemption") systems, in which the "active" foreign income derived by resident MNCs from foreign business operations is exempt from residence country taxation (so that this income is only taxed by the source country). Even territorial residence countries may, however, tax the passive foreign income earned by their resident MNCs in low-tax foreign jurisdictions. The tax law provisions that impose such taxes are known as "controlled foreign company" (CFC) rules, because they pertain to foreign affiliates in which the resident MNC parent holds an ownership stake that exceeds some specified level (such as 50 percent).

In general, corporate tax systems permit deductions for interest payments on debt, and this principle applies to source countries' treatment of interest payments made by local affiliates of MNCs. However, these deductions may be limited in certain circumstances, for example if the ratio of the local affiliate's debt to assets exceeds some specified threshold. Source countries often impose limitations of this type, which are known as "earnings

[4] In principle, MNCs may become trapped in a tax avoidance "arms race", but it seems likely that reputational losses would depend on a firm's behavior *relative* to other firms, and so would not be incurred in these circumstances.

stripping" (ES) rules because they are intended to prevent the shifting (or "stripping") of income from the source country to a tax haven through the use of debt. In the absence of ES rules, a local affiliate in a high-tax country could borrow from a haven affiliate of the same MNC group, thereby generating interest deductions that reduce its taxable income in the high-tax country. ES rules pertain especially to inter-affiliate debt (within the same MNC group), but may also apply more generally.

Table 1

Payoffs of countries A and B

		Country B	
		CFC rule	No CFC rule
Country A	CFC rule	100,100	90,106
	No CFC rule	106,90	96,96

Source: The author.

Let us assume a world with four countries. Two of these – countries A and B – are residence countries of MNCs, and also serve as source countries for MNC operations. One of the countries (C) is purely a source country with no resident MNCs, while the fourth country is a tax haven (H). However, only the governments of countries A and B and the MNCs resident in those countries are assumed to make strategic choices; countries C and H play only a passive role. There are two assets located in country A (denoted a1 and a2), and two assets located in country B (denoted b1 and b2). There are two MNCs – Firm A (resident in country A) and Firm B (resident in country B); MNC residence is assumed to be fixed.

Firm A can generate USD 50 of (pretax) profits in each of countries A and B by owning both a1 and b1, while Firm B can generate USD 50 of (pretax) profits in each of countries A and B by owning both a2 and b2. Each asset generates zero profit if owned by any other owner. These assumptions reflect the ownership effects on productivity that are strongly emphasized in the general literature on MNCs, and that have been introduced into the literature on international taxation by Devereux (1990) and Desai and Hines (2003). There is a supply of assets in C that (for the same cost of acquisition as each of a1, a2, b1 and b2) generate pretax profits of USD 45 each; assume these are domestically owned by country C firms as the default scenario. There are no "real" assets located in H, but H can be used (if the relevant tax laws permit) to shift income from any of the other jurisdictions,[5] at a cost of USD 2 (incurred for each affiliate that shifts income out). Countries A, B and C all have a (fixed) corporate tax rate of 20 percent, while H has a zero tax rate. All countries are assumed to have territorial tax systems.

[5] For discussions of the role of tax havens, see, for example, Dharmapala (2008) and Dharmapala and Hines (2009).

A natural characterization of national welfare for countries A and B in this framework is that it is the sum of the after-tax profits of the resident MNC and tax revenue from all sources. For example:

> National welfare of country A = After-tax profit of Firm A + Tax revenue of country A

The government may care about its resident MNC's after-tax profits because the firm is primarily owned by domestic shareholders, consistent with the familiar "home bias" in equity holdings. For simplicity, the weight placed by the government on revenue is assumed to be the same as that on the after-tax profits of the resident MNC. More generally, the government could place, for instance, greater weight on tax revenue.

The policy choices available to governments in this example are the following. Residence countries (A and B) can impose controlled foreign corporation (CFC) rules that pertain to their resident MNCs, while source countries (A, B and C) can impose earnings stripping (ES) rules on local affiliates (including parents' domestic operations). As discussed above, CFC rules impose residence country taxation on passive foreign income earned in low-tax foreign jurisdictions, while ES rules limit the deductibility of interest payments.

Firstly, consider a scenario in which there are no CFC rules or ES rules. An efficient pattern of ownership will prevail, where Firm A owns a1 and b1 and generates USD 100 of pretax profit, while Firm B owns a2 and b2 and generates USD 100 of pretax profit. Each affiliate shifts all income out to H (for instance, by injecting equity into its H affiliate, which then lends the money to the A and B affiliates, with the latter receiving interest deductions that eliminate taxable income in A and B). As shown in Table 1, each firm has after-tax profit of USD 96 (USD 100 minus the USD 2 cost of profit-shifting at each affiliate), while revenue is zero for each country.

Now, let us suppose that country A unilaterally introduces a CFC rule. This entails that country A taxes interest income earned by Firm A in its H affiliate. Firm A will no longer shift income, so it generates USD 100 of pretax profit, incurs zero tax planning costs, and pays tax of USD 10 to A and USD 10 to B. Note that ownership patterns are not distorted here. An alternative possibility for Firm A is to invest in country C. However, country A's CFC rule eliminates any incentive for Firm A to shift income out of C; thus, investing in C would generate pretax income of USD 90 and after-tax income of USD 72, which is less than the USD 80 earned after-tax by owning assets a1 and b1.

Country A's payoff from unilaterally introducing a CFC rule is USD 90 – the sum of the after-tax profit of Firm A (USD 80) and the USD 10 in revenue that it collects from Firm A's domestic operations – whereas its payoff from not doing so is USD 96 (see Table 1), so it is clear that countries do not have any incentive to unilaterally introduce CFC rules. Country B's payoff increases to USD 106 (the after-tax profit of Firm B is still USD 96, while country B now receives USD 10 of revenue from Firm A's affiliate in country B). By unilaterally imposing a CFC rule, country A is, in effect, transferring revenue to a foreign treasury (thereby reducing national welfare), without any offsetting increase in the revenue it derives from the local affiliates of foreign MNCs. Moreover, the CFC rule does not result in revenue for the residence country from taxing foreign income, as its firm (Firm A) prefers to forego tax planning and pay tax to the foreign treasury (rather than shifting income from country B to H and then paying tax to A under the CFC rule). This is because tax planning entails a positive cost, and it is assumed that Firm A cares only about its after-tax profits, and not about which government receives its tax payments. As the CFC rule generates no revenue from taxing foreign income, country A will not unilaterally introduce a CFC rule even if it places somewhat greater weight on tax revenues than on Firm A's after-tax profits (although for a sufficiently large weight on tax revenue, a CFC rule may become unilaterally optimal).

Let us suppose that countries A and B find some mechanism through which to cooperate, and that both countries simultaneously impose CFC rules of the type described above. In such a case, ownership patterns will continue to be efficient. Firm A will earn USD 100 of pretax profit, incur zero tax planning costs, and pay USD 10 tax to each of countries A and B. Firm B will do likewise. Thus:

Country A's payoff = Firm A's after-tax payoff (80) + Revenue (10 + 10) = 100

Country B's payoff = Firm B's after-tax payoff (80) + Revenue (10 + 10) = 100

As shown in Table 1, both countries are better off if they can each commit to introducing a CFC rule.

This conclusion may seem to contradict the well-established notion that countries seeking to maximize national welfare should encourage their resident MNCs to avoid foreign taxes, as tax payments to foreign governments reduce national welfare. Indeed, Shaviro (2011) has recently developed a critique of the foreign tax credit in US tax law, partly on the grounds that it disincentivizes US MNCs' avoidance of foreign taxes. However, the crucial difference here is that multilateral cooperation entails that the CFC rules generate revenue from the local affiliates of foreign MNCs at the same time that they entail higher tax payments by resident MNCs to foreign governments. Thus, this simple example takes account of the contemporary reality that most large economies are *both* residence and source countries. Multilateral adoption of CFC rules transfers money from a country's MNCs to foreign treasuries, but also from foreign-owned MNCs to its treasury. In the example, these effects balance out exactly, with the savings in tax planning costs generating a global surplus from multilateral cooperation.[6]

The reasoning for why unilaterally introducing an ES rule is not in each country's interest is more complex, although also intuitively straightforward. Let us suppose that country A were to unilaterally impose an ES rule that is sufficiently strong to preclude all earning stripping (for instance, by completely denying deductions for interest payments to the H affiliate). This affects all affiliates located in country A (i.e. the owners of a1 and a2). If Firm A continues to own a1 and b1, then it will earn USD 48 after-tax (as before) from b1. However, it will not be able to shift earnings out of a1, so its after-tax profit from a1 is USD 40 (paying USD 10 tax to country A, but incurring no tax planning cost). Instead, if it were to buy an asset in country C, it would earn USD 45 pretax, incur USD 2 in tax planning costs, and shift all income to H, making its after-tax profit USD 43. Thus, Firm A will choose to buy assets in country C, and will have only a notional presence in its country

[6] This outcome can be viewed as an example of Shaviro's (2006) general argument that global welfare norms may sometimes promote national welfare if adopted multilaterally.

of residence (A). Similarly, Firm B will buy an asset in country C instead of buying asset b1 in country A, earn USD 45 pretax, incur USD 2 in tax planning costs, and shift all income to H, earning an after-tax profit of USD 43. This represents an inefficient pattern of ownership from a global perspective, as Firms A and B are the most productive owners of assets a1 and b1, respectively. Country A's payoff from unilaterally introducing an ES rule is USD 91 (the after-tax profit of Firm A (48 + 43), with revenue of zero), whereas it receives a payoff of USD 96 from not unilaterally introducing an ES rule. Thus, countries do not have any incentive to unilaterally introduce ES rules.

If countries A, B and C were all to cooperate in imposing (source-based) ES rules, it would be possible to replicate the "good" outcome in Table 1. However, this would require that country C is also part of the multilateral agreement, entailing broader international cooperation than required for (residence-based) CFC rules. The OECD (2013b) appears to favor a combination of residence-based and source-based solutions. For example, action item 3 of the BEPS action plan is for residence countries to strengthen CFC rules (OECD 2013b, 16). On the other hand, Fuest et al. (2013) point to difficulties with residence-based taxation and argue instead for extending source-based taxation to reduce BEPS.

This example, of course, is purely illustrative, and a number of important caveats apply. Firstly, it is not intended as a description of reality, but as an illustration of a set of circumstances that would explain the BEPS phenomenon and the current BEPS initiative in a coherent way. Whether or not conditions in the real world correspond to the assumptions required to render multilateral cooperation beneficial remains very much an open question.[7] Secondly, the optimality of CFC rules in the example depicted in Table 1 is not intended to serve as an argument for worldwide, rather than territorial taxation. There may well be compelling reasons for exempting active foreign income from residence-based taxation (see e.g. Desai and Hines 2003) that do not necessarily apply to the types of passive foreign income that are subject to the CFC rules contemplated in the example above.

[7] An alternative perspective on BEPS is that it may be optimal for governments to permit BEPS activities as a way of differentially taxing firms that are more and less mobile or tax-sensitive, where this characteristic is unobservable to governments (see Hines (2007) and Dharmapala (2008) for discussions of this possibility, and Hong and Smart (2010) for a formal theoretical model). Within this perspective, it is less clear than in the example above whether there would be substantial gains from multilateral cooperation.

The potential gains from the BEPS initiative

It is clear from the political discourse surrounding BEPS that much of the public concern about this issue stems from the perceived potential revenue losses from BEPS activity,[8] from concerns about how BEPS activity affects the distribution of tax base and tax revenue across countries, and from perceptions regarding fairness across different taxpayers. While these concerns are understandable, for economists the primary potential gains from the BEPS initiative arise instead from the prospect that it may reduce deadweight costs associated with MNCs' tax planning and compliance activities.

Two types of inefficiencies are especially relevant. The first relates to the real resources expended in tax planning and compliance. These represent a source of deadweight costs that perhaps should be understood primarily as a misallocation of talent – for example, where someone who could have been another Mozart or could have found a cure for cancer instead toils away producing transfer pricing documentation. Reducing these deadweight costs can generate gains for all countries; in the example above, this is the source of the potential benefits from the BEPS initiative.

In addition, when MNCs have differential access to BEPS opportunities, it is possible that the ownership of assets by MNCs may be distorted by tax considerations (see e.g. Devereux 1990; Desai and Hines 2003). One such possibility – involving one country imposing ES rules while the other does not (albeit off the equilibrium path) – has already been discussed above. In circumstances more complex than those in the example above, it is possible that some residence countries may unilaterally impose CFC rules while others do not. Then, MNCs resident in the former countries may be at a competitive disadvantage in acquiring assets relative to those resident in the latter countries; this may, in turn, lead to ownership of assets by firms that are not (in pretax terms) their most productive owners. Harmonizing tax rules (so that, for instance, all residence countries adopt similar CFC rules) may eliminate the inefficiencies from differential access to BEPS opportunities, and so enhance global welfare.

Compared to these unambiguous potential gains from reducing deadweight costs, the benefits of increasing or redistributing tax revenues *via* the BEPS initiative

[8] Consider, for example, the statement that: "In a context of severe fiscal consolidation, the G20 leaders have identified the need to address BEPS as one of their priorities." (OECD 2014, 4).

are much less clear. Corporate tax revenues represent a relatively small fraction of total revenues for the governments of most developed countries – for instance, 7.4 percent of total revenue for the UK in 2012.[9] Moreover, this has been true for a substantial period of time, with corporate tax revenue measured as a fraction of GDP being relatively stable over time (see e.g. Hines 2007; Dharmapala 2008; OECD 2013a, 16). Thus, it is unlikely that BEPS activity by MNCs is a major factor in determining the overall level of tax revenue in developed economies.[10] Alternative sources of revenue that are much less mobile than the income of MNC affiliates – such as personal income tax and VAT – are readily available. While there may be distributional consequences of switching to different sources of revenue, these partly depend on the still empirically unresolved issue of corporate tax incidence (e.g. Arulampalam, Devereux and Maffini 2012).

For similar reasons, it is unlikely that BEPS activity substantially affects the distribution of tax revenue across the governments of (non-haven) developed countries. On the other hand, developing countries typically derive a substantially larger fraction of tax revenue from the corporate tax, and may have limited ability to switch to other forms of taxation. Indeed, it is sometimes claimed that developing countries are especially vulnerable to BEPS activity. This situation may give rise to a distribution across countries of tax base and tax revenues that could be viewed as being normatively undesirable. In a context characterized by bilateral and multilateral aid flows across countries, however, there may be rather more direct solutions than the BEPS initiative. If the perceived problem is that OECD governments end up with "too much" tax revenue, then increasing aid flows can directly address this. If the perceived problem is instead that MNCs (with shareholders residing predominantly in developed countries) end up with "too much" after-tax profit, this can be addressed by the governments of developed countries imposing higher personal taxes on these shareholders and transferring the proceeds in the form of aid.[11]

One might doubt the political feasibility of such increases in direct transfers. However, it is then unclear why achieving similar redistribution *via* the BEPS initiative should be viewed as being politically more feasible.

In the stylized example above, the cooperative imposition of CFC rules results in higher tax revenues. However, it is important to emphasize that the cooperative surplus is *not* due to this increase in revenue (as MNCs' after-tax profits are assumed to be just as socially valuable as tax revenue), but rather from the reduction in deadweight costs that occurs because MNCs no longer incur costs of tax planning. This underlines the point that the potential gains from the BEPS initiative should be viewed as arising primarily from the reduction of deadweight costs.

Conclusion

The unprecedented attention being paid to the issue of base erosion and profit shifting creates opportunities for important reforms. This paper provides a simple conceptual framework that helps to clarify aspects of governments' responses to the BEPS phenomenon and the potential role of the OECD initiative. An important implication of this framework is that multilateral cooperation of the type envisaged in the BEPS initiative has the potential to reduce the deadweight costs of MNCs' tax planning and compliance activities, thereby enhancing global welfare.

References

Arulampalam, W., M. Devereux and G. Maffini (2012), "The Direct Incidence of Corporate Income Tax on Wages", *European Economic Review* 56, 1038–54.

Desai, M. A. and J. R. Hines, Jr. (2003), "Evaluating International Tax Reform", *National Tax Journal* 56, 487–502.

Devereux, M. P. (1990), "Capital Export Neutrality, Capital Import Neutrality, Capital Ownership Neutrality and all that", working paper.

Dharmapala, D. (2008), "What Problems and Opportunities are Created by Tax Havens?", *Oxford Review of Economic Policy* 24 (4), 661–79.

Dharmapala, D. (2014), "What Do We Know About Base Erosion and Profit Shifting? A Review of the Empirical Literature", *Fiscal Studies,* forthcoming.

Dharmapala, D. and J. R. Hines, Jr. (2009), "Which Countries Become Tax Havens?", *Journal of Public Economics* 93, 1058–68.

Fuest, C., C. Spengel, K. Finke, J. Heckemeyer and H. Nusser (2013), "Profit Shifting and 'Aggressive' Tax Planning by Multinational Firms: Issues and Options for Reform", *ZEW Discussion Paper* no. 13–078.

Hines, J. R., Jr. (2007), "Corporate Taxation and International Competition", in A. J. Auerbach, J. R. Hines, Jr. and J. Slemrod, eds., *Taxing Corporate Income in the 21st Century*, Cambridge University Press, 268–95.

[9] See "A Survey of the UK Tax System" IFS Briefing Note BN09, 5: http://www.ifs.org.uk/bns/bn09.pdf

[10] It is possible that the counterfactual pattern of corporate tax revenues (in the absence of BEPS activity) may involve a rising fraction of corporate tax revenue to GDP. However, given the stability of this fraction over a fairly long period of time, it is difficult to argue that such a counterfactual increase would have been so large as to make a dramatic difference to overall tax revenue.

[11] For example, suppose that Firm A (resident in developed country A) generates USD 50 in developing country D, all of which is shifted to a haven. Then, assume that country A introduces a CFC rule that leads Firm A to pay USD 10 of tax to country D. There will be an increase in global welfare due to reduced tax planning costs, but the inter-country distributional consequences – the extra USD 10 of revenue to country D – could be replicated by an increase in bilateral aid from country A to country D of USD 10 (assuming that Firm A's shareholders all reside in country A and that they bear the full incidence of the tax). Thus, the BEPS initiative seems an unnecessarily complicated mechanism through which to achieve this distributional objective.

Hong, Q. and M. Smart (2010), "In Praise of Tax Havens: International Tax Planning and Foreign Direct Investment", *European Economic Review* 54, 82–95.

OECD (2013a), *Addressing Base Erosion and Profit Shifting*, OECD Publishing, Paris.

OECD (2013b), *Action Plan on Base Erosion and Profit Shifting*, OECD Publishing, Paris.

OECD (2014), *Explanatory Statement*, OECD/G20 Base Erosion and Profit Shifting Project, OECD Publishing, Paris.

Shaviro, D. (2006), "Why Worldwide Welfare as a Normative Standard in US Tax Policy?", *Tax Law Review* 60, 155–78.

Shaviro, D. (2011), "The Case Against Foreign Tax Credits", *Journal of Legal Analysis* 3, 65–100.

What Do We Know about the Tax Planning of German-based Multinational Firms?

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Alfons Weichenrieder[2]

Introduction

Amazon, Caterpillar, Google, and Starbucks are just a few examples of multinational firms that recently managed to make headlines with creative tax avoidance strategies.[3] Abundant anecdotal evidence supports the result of rigorous research that confirm the existence of various forms of international tax planning by multinational firms.

While the above examples are all US-based firms, the increasing availability of administrative data for research purposes has enabled researchers to study not only the behavioural responses of US-based firms to taxation, but also those of European and other multinationals. For example, researchers have analysed European financial data such as Amadeus (from Bureau van Dijk), tax return data, and the German MiDi dataset. The MiDi is a confidential database available at the research centre of the *Deutsche Bundesbank* and it includes all German enterprises investing abroad and satisfying the reporting requirements (Lipponer 2011).

As shown in Figure 1, the German statutory corporate income tax rate has halved from 60 percent in 1981 to some 30 percent in 2014, although it remains above the simple OECD average. The survey of Leibrecht and Hochgatterer (2012) suggests that the pattern of declining corporate tax rates of OECD members is driven by tax competition between countries that compete for corporate tax base and foreign firms. In spite of declining tax rates, the ratio of revenues from corporate income to GDP in Germany has been rather stable in the last few years at around two percent (five percent of total revenues). This stability of corporate tax revenues is, in part, due to an increase in the share of the incorporated sector (Fuest and Weichenrieder 2002).

Germany, like most developed countries except the US, uses an exemption system. In essence, this implies that the relatively high German rate on profits applies to German plants, but not to foreign investments abroad, leaving potential gains for tax planning. Indeed, taxation and tax differentials can affect multinational firms' decisions in various ways. What did we learn from recent studies on tax avoidance strategies by multinational firms in general, and on German multinationals in particular?

The location choice of FDI projects

Table 1 displays the top five locations of reported after-tax-profit generated by German affiliates abroad in 2012. China is at the top of the list with about €19 billion, followed by the Netherlands. In terms of total (tangible and intangible) assets, the top three locations are the US, the UK and China.

While taxation is just one of many country characteristics, international differences in tax systems affect location choices for new FDI projects. Empirical studies addressing this issue typically specify a discrete choice model to estimate how a change in taxes influences the probability of receiving a new FDI project. The analysis can rely on cross-section observations or on a panel structure allowing for controlling for unobserved time-invariant heterogeneity at the firm-level by using a parent-firm-fixed effect. However, in the panel analysis, the computation and interpretation of an average partial effect is not straightforward since predicted probabilities are estimated for each group as a whole, and not for individual observations. Büttner and Ruf (2007) use a fixed-effect logit model and find that the statutory corporate tax rate has a higher predictive power than the effective average tax rate.

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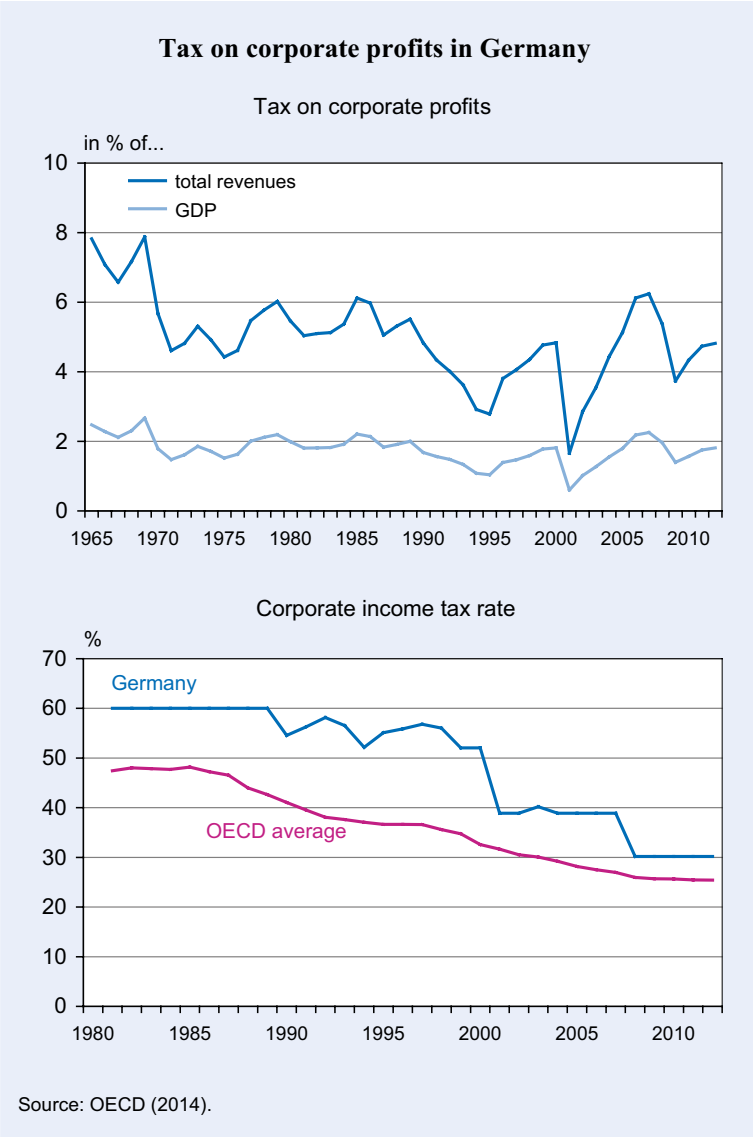
[3] See for example, Walsh (2014) and BBC (2013).

Figure 1



Source: OECD (2014).

Investment in old capital, in the form of acquiring an already existing firm (M&A activities), may be expected to have a lower elasticity with respect to taxes than the establishment of new structures (Greenfield). The argument is that high taxes reduce the expected future cash flows of the firm and thus will, at least partially, be capitalised in the acquisition price. Typically, this is not a viable option in the case of Greenfield investments. Hebous, Ruf and Weichenrieder (2011) estimate a conditional logit model including all new outbound FDI projects for the years 2005–2007 and explicitly distinguishing between Greenfield and M&A investments. The evidence indicates that location decisions related to M&A investments are less sensitive to differences in statutory corporate income tax rates than location decisions related to Greenfield investments. The estimated elasticity suggests that an increase in the rate of ten percent reduces the probability of choosing a country to host a Greenfield investment by about 6.4 percent. However, the tax elasticity for M&A investments seems significantly smaller.

The above mentioned studies focus on the extensive margin of FDI, i.e., completely focusing on new FDI entries. A number of studies consider the effects of taxation on the intensive margin of FDI, i.e., the values of investments. This is related to the broader issue of the effects of the user cost of capital on domestic investment in general (not only FDI). Most of these studies are based on a panel of cross-countries. A recent example is Bond and Xing (2013). This study documents the significant reactions of capital stocks to changes in the user cost of capital in a panel of OECD members.

The ownership structure and holding companies

About 15 percent of outbound German FDI affiliates in 2012 are held via an intermediate company in a third country. For German investors, the Netherlands is the most important location of the so-called conduit entities. Other important locations are Switzerland and Hong Kong. By using several conduit entities, the ownership chain may become arbitrarily complicated (Mintz and Weichenrieder 2010, ch. 4).

In cases where a high withholding tax on dividends on direct participations applies, stepping stone FDI, i.e., channelling investments through an intermediate country, is a strategy that may reduce the effective tax rate by taking advantage of preferential bilateral agreements elsewhere. This strategy is called treaty shopping. Table 2 presents withholding tax rates as applied by Germany for selected foreign investor countries. While under the Parent-Subsidiary Directive (2003/48/EC) dividend payments to EU companies may be exempt from div-

Table 1

Top five locations of profits and assets of outbound German FDI

Rank	Country	Profit	Country	Fixed and intangible assets
1	China	18,900	US	199,000
2	The Netherlands	17,200	UK	47,400
3	US	15,800	China	45,800
4	Luxemburg	7,683	France	34,900
5	Austria	7,120	Austria	26,400

Source: MiDi Data. Numbers are in million Euros and correspond to 2012.

Table 2

Selected withholding tax rates applied by Germany

Investor	Withholding tax rate on dividends
Australia	15
Brazil	21.1
Canada	5
China	10
EU	0
India	10
Japan	15
Mauritius	5
New Zealand	15
Norway	0
Russia	5
Saudi Arabia	21.1
Singapore	5
South Africa	7.5
Switzerland	0
Turkey	15
United Arab Emirates	5
United States	0
Non-treaty countries	21.1
Note: Rates refer to cases in which an incorporated investor holds at least 25% of a German affiliate.	

Source: Deloitte, Worldwide Corporate Tax Guide 2012; double tax treaties.

idend withholding taxes, other investors, like those in Australia, Brazil, or Japan, are subject to German dividend taxes in cases of direct participations.

Mintz and Weichenrieder (2010, ch. 4) study the pattern of treaty shopping and the tax incentives of establishing holding companies in the case of inward FDI in Germany. The findings indicate that foreign investors confronted with high German withholding taxes in the case of direct ownership are indeed more likely to own their German affiliates via third countries.[4] Using MiDi data, Dreßler (2012) provides confirming evidence for such treaty shopping.

Financial structure

In most countries around the world, interest payments on loans are deductible from the corporate tax base, while dividends are not. There are an extensive number of studies that indicate a debt-bias in corporate financial structure that results from tax asymmetries. Evidence from German firms is cited by a large number of authors, including Hebous and Weichenrieder (2010), Fuest, Hebous and Riedel (2011), and Mintz and Weichenrieder (2010). When it comes to multinationals, intra-group loans can be a simple tax-sparing strategy. Affiliates in low-tax jurisdictions grant loans to group members located in high-tax countries. Hence, interest payments in high-tax countries are deductible from taxes, whereas interested earned on loans are taxed at lower rates.

However, despite a variety of estimates reported in the literature, as surveyed by Feld, Heckemeyer and Overesch (2013), the magnitude of the estimated elasticity of corporate debt with respect to the tax rate tends to be moderate. For example, the results of Büttner and Wamser (2013) suggest that profit shifting by means of internal debt conducted by German firms, while statistically significant, is of limited importance. This finding is also in line with the survey of de Mooij and Ederveen (2008). Overall, most papers suggests that an increase in a country's corporate tax by ten percentage points will lead to an increase in the debt-to-asset ratio of foreign owned affiliates by two–three percentage points. A consensus has emerged from the empirical literature that there is significant debt shifting, but other tax planning instruments, including the transfer pricing strategies of affiliated companies, are more important for tax base shifting (e.g., Heckemeyer and Overesch 2013).

[4] In addition, FDI affiliates with ultimate owners located in countries with credit systems are more likely to route their FDI to Germany through a third country.

A few countries, notably Belgium and Italy, recently endorsed tax systems that offer Allowances for Corporate Equity (ACE). In addition to interest on debt, these systems also allow a deduction for the use of equity; and thereby reduce (or eliminate) tax incentives that favor debt over equity. Hebous and Ruf (2014) evaluate the effects of ACE on the leverage of German affiliates and find evidence that the introduction of ACE succeeded in lowering the debt ratio.

The literature on this topic is largely silent as regards the size of the social welfare costs engendered by distorting the financial structure. An attempt to address this issue is made by Weichenrieder and Klautke (2008). Back-of-the-envelope calculations suggest that a ten-percentage point difference between the corporate tax and the personal income tax may lead to yearly efficiency costs of around 0.1 percent of the invested capital. In addition, de Mooij (2012), among others, emphasizes that excessive levels of corporate debt, especially in the financial sector, can exacerbate the consequence of macroeconomic crises.

Location of intangibles, transfers pricing, and intra-firm trade flows

The UK has recently embraced an *Intellectual Property Box regime*. This is one example of policies offering reduced *effective* tax rates applied to income from patents, copyrights, and other similar sources of income such as trademarks. In July 2013, the current German finance minister, Wolfgang Schäuble, called for a ban on the patent box tax break offered by the UK, the Netherlands and some other EU members arguing that such tax breaks generate unfair competition over foreign investment.[5]

A number of studies based on European data provide evidence to support the hypothesis that firms tend to locate intangible assets in low tax jurisdictions (e.g., Karkinsky and Riedel 2012). However, Baumann, Knoll and Riedel (2014) suggest that the overwhelming majority of the R&D activity that a country may induce by giving preferential tax treatment to R&D is generated at the expense of other countries' research, instead of inducing additional R&D.

Hebous and Johannesen (2014) examine German data and find that international trade with certain services, such as R&D related categories, is disproportionately higher when the German firm is present in a tax haven. This piece of evidence is based on flow variables in contrast to most available evidence from stock (balance sheet) variables.

A long-standing concern is the ability of multinational firms to set transfer prices on intra-company transactions that shift taxable profits to low-tax jurisdictions. While the strategic setting of transfer prices is not restricted to the trade in intangibles, it is obvious that the uniqueness of intangibles makes it particularly difficult for tax authorities to determine an arm's-length price, i.e., the hypothetical price that two unaffiliated companies would have agreed on; and empirical results confirm this view (Beer and Loeprick 2014).

Tax havens

About 12 percent of outbound German FDI affiliates are located in tax havens according to the list in Hines (2010). However, the term tax haven lacks a universal definition. While most tax-haven lists agree that the Cayman Islands is a tax haven, other countries, such as Ireland, appear only in selected lists (see Hebous (2014) for an overview).

What determines demand for tax haven locations? Hebous and Lipatov (2014) find that firms that are present in high tax countries or highly corrupt countries are more likely to own an affiliate in a tax haven. Secrecy is a distinctive characteristic that distinguishes a tax haven from simply being a low (or zero) tax country. Intuitively, concealment services are very relevant for personal tax evasion by the wealthy, but it is not completely clear why locating a member of a corporate group in a tax haven should be influenced by secrecy provision unless the motive is illegal, e.g., bribery related activities and obscure ownership structure for tax evasion purposes.

In its effort to counter offshore tax evasion, since 2008, Germany has signed a number of bilateral Tax Information Exchange Agreements (TIEAs) with jurisdictions such as Bermuda, Cayman Islands, Jersey, Liechtenstein, and Monaco. Braun and Weichenrieder (2014) suggest that the formation of TIEAs has had detrimental effects on the use of the respective jurisdictions by German multinationals when compared to other tax haven countries.

[5] See for example Breidthardt (2013).

Shifting channels and firm heterogeneity

The design of anti-tax avoidance measures benefits from a sound understanding of how different types of firms employ different strategies and from a knowledge about the relative importance of the various tax-planning instruments for various industries. While there is scope for more research on comparing responses of firms to taxation, there are several contributions on this front. For instance, Heckemeyer and Overesch (2013) find that transfer pricing and licensing seem to be among the leading profit-shifting channels as compared to intra-company debt policy. Overesch and Wamser (2009) report that the reaction of vertically integrated FDI in the manufacturing sector to corporate taxation is more pronounced than that of horizontal FDI.

Certainly, international tax planning is not only limited to the aspects listed above. Corporate taxation can affect the additional margins of decisions and may trigger several other behavioural responses of firms. For example, Dreßler and Overesch (2013) use the MiDi data to study international differences in the treatment of losses. They find that, inter alia, a group-tax-regime gives incentives to offset current taxable profits with losses carried forward and minimize the overall tax bill.

While several studies examine the exact channel of international profit shifting, one route to provide indirect empirical evidence of profit shifting is to look directly at the reaction of reported corporate profits to international differences in corporate tax systems. Weichenrieder (2009) considers partially owned affiliates as a control group and reports that wholly owned German affiliates react more strongly to changes in the host country corporate taxes.

What are the costs of tax avoidance?

It is not straightforward to quantify the cost of tax avoidance. These tax strategies operate within the legal framework. Clearly, tax loopholes and the existence of tax havens cause an erosion of the tax base in non-haven countries. However, for example, Dharmapala (2008) stresses that tax planning can increase the efficiency of firms and alleviate the intensity of tax competition. It has been argued that institutions that allow a differentiated tax policy towards internationally mobile and immobile tax bases can increase welfare even for high-tax countries (Hong and Smart 2010; Keen 2001).

Anti-avoidance measures and German experiences

Controlled foreign companies (CFC) rules

According to CFC rules, passive income of a foreign affiliate (e.g., derived from the holding of bonds or lending activities) may be part of the taxable income of the German resident shareholders if it accrues to a German majority-owned corporation in a low-tax country. Ruf and Weichenrieder (2012) document evidence suggesting that German CFC rules are effective in limiting the relocation of passive investments by German affiliates.

While there is evidence that unilateral measures can help to restrict the tax planning of MNEs, in the EU several court rulings have covered the applicability of tax-avoidance measures. In its Cadbury-Schweppes decision of 12 September 2006, the European Court of Justice decided that British CFC rules implied a discrimination against investment in Ireland and a restriction of the freedom of establishment when applied with respect to affiliates in EU countries. Consequently, many EU countries had to change their CFC rules to make a distinction between EU and non-EU affiliates. The Cadbury-Schweppes case provides a nice opportunity to test for an asymmetric effect on the allocation of passive assets. Ruf and Weichenrieder (2014) show that the preferences of German multinational firms for locating passive investments in low tax countries within the EU have indeed significantly increased the following of the verdict as compared to locations outside the EU.

Thin capitalisation rules (TCR)

Thin capitalization rules place a limit of the deduction of interest payments from the corporate tax bill if the value of the loans is deemed excessive. Weichenrieder and Windischbauer (2008) discuss the evolution of the German TCR. The study exploits the 2001 reform of TCR that considered an interest payment as a dividend if the loans granted by an investor exceeded her share of the corporate equity by 50 percent. This requirement, however, did not apply to holding companies. The evidence suggests that the reform limited the attractiveness of intra-company loans for international debt shifting purposes, but at the same time may have increased the demand for holding companies as a tool to shift intra-company loans. Büttner et al. (2012) examine the MiDi data and find that German-owned affiliates abroad reduced their leverage in response to tight TCR in the host country. Again, this provides evidence that unilat-

eral measures can be effective in curbing multinationals' tax-planning activities.

Transfer pricing rules

In recent years, several countries have tried to restrict the strategic setting of international transfer prices and Germany is no exception. Again, empirical research suggests that countries can reduce profit shifting by implementing anti-tax avoidance measures: the effect that changes in corporate tax have on the reported profitability of foreign owned affiliates seems to be smaller in countries with strict documentation requirements for transfer prices (Beer and Loeprick 2014).

European and international actions

Most loopholes are rooted in asymmetric national rules. Although unilateral anti-avoidance measures can be successful to some extent, the highly integrated global economy may require multilateral actions to combat tax avoidance and tax evasion practices, particularly when anti-avoidance measures have positive spillover effects on partner countries.

The European Commission suggested installing a Common Consolidated Corporate Tax Base (CCCTB) in the EU. In such a scenario, the tax base of a consolidated group of companies would be distributed among members based on a formula containing tangible assets, workers, payroll and the sales of the affiliated firms. The CCCTB proposal entails a wide range of aspects, and it is discussed in several papers (e.g., Fuest 2008). Among other things, a CCCTB would greatly reduce the incentives for shifting debt into high-tax countries and for using transfer-pricing strategies. At the same time, it is unclear whether location decisions would become more efficient as the choice of tax rates would stay in the domain of member states (Wissenschaftlicher Beirat beim Bundesfinanzministerium 2008).

In its St. Petersburg meeting in 2013, the G20 called on the OECD to develop an action plan to address Base Erosion and Profit Shifting (BEPS). The plan identifies 15 key area (actions). These include, inter alia, addressing tax challenges of the digital economy, strengthening CFC rules, and preventing tax treaty abuse (OECD 2013). On the 16th of September 2014, the OECD released its first recommendation addressing seven actions. A key issue of this recommendation is avoiding double non-taxation (OECD 2014).

Experiences with national anti-tax avoidance measures suggest that BEPS measures should be able to curb tax-planning activities by multinationals, including double non-taxation. A trickier question is whether a partial harmonization of BEPS measures is beneficial given that tax rates continue to be set at the country level.

References

Baumann, M., Knoll, B. and Riedel, N. (2014), "The Global Effects of R&D Tax Incentives – Evidence from Micro Data, Ruhr-Universität Bochum", *Working Paper.*

BBC (2013), BBC News UK Politics, http://www.bbc.com/news/uk-politics-23019514.

Beer, S. and Loeprick, J. (2014), "Profit Shifting: Drivers of Transfer (Mis)pricing and Potential Countermeasures", *International Tax and Public Finance* 21.

Breithard, A. (2013), "Germany calls on EU to ban 'patent box' tax breaks", *Reuters,* 9 July 2013, http://uk.reuters.com/article/2013/07/09/uk-europe-taxes-idUKBRE9680KY20130709.

Büttner, T. and Wamser, G. (2013), "Internal Debt and Multinationals' Profit shifting - Empirical Evidence from Panel Data", *National Tax Journal* 66, 63–95.

Büttner, T. and Ruf, M. (2007), "Tax Incentives and the Location of FDI: Evidence from a Panel of German Multinationals", *International Tax and Public Finance* 14, 151–64.

Büttner, T., Overesch, M., Schreiber, U. and Wamser, G. (2012), "The Impact of Thin-Capitalization Rules on Multinationals' Financing and Investment Decisions", *Journal of Public Economics* 96, 930–8.

Braun, J. and Weichenrieder, A. (2014), "Does Exchange of Information between Tax Authorities Influence FDI into Tax Havens?", *Mimeo.*

Bond, S. and Xing, J. (2013), "Corporate Taxation and Capital Accumulation: Evidence from Sectoral Panel Data for 14 OECD Countries", *Oxford University Centre for Business Taxation Workingpaper* 10/15.

Dharmapala, D. (2008), "What Problems and Opportunities are Created by Tax Havens?", *Oxford Review of Economic Policy* 24, 661–79.

de Mooij, R. (2012), "Tax Biases to Debt Finance: Assessing the Problem, Finding Solutions", *Fiscal Studies* 33, 489–512.

de Mooij, R. and Ederveen, A. (2008), "Corporate Tax Elasticities: A Reader's Guide to Empirical Findings", *Oxford Review of Economic Policy* 24, 680–97.

Dreßler, D. (2012), "Form Follows Function? Evidence on Tax Savings by Multinational Holding Structures", *ZEW Discussion Paper* 57.

Dreßler, D. and Overesch, M. (2013), "Investment Impact of Tax Loss Treatment—Empirical Insights from a Panel of Multinationals", *International Tax and Public Finance* 20 (3), 513–43.

Feld, L., Heckemeyer, J. and Overesch, M. (2013), "Capital Structure Choice and Company Taxation - A Meta Study", *Journal of Banking and Finance* 37, 2850–66.

Fuest, C. (2008), "The European Commission's Proposal for a Common Consolidated Corporate Tax Base", *Oxford Review of Economic Policy* 24, 720–39.

Fuest, C, Hebous, S. and Riedel, N. (2011), "International Debt Shifting and Multinational Firms in Developing Economies", *Economics Letters* 113, 135–8.

Fuest, C. and Weichenrieder J. (2002), "Tax Competition and Profit Shifting: On the Relationship between Personal and Corporate Tax Rates", *IFO-Studien* 48, 611–32.

Hebous, S. (2014), "Money at the Docks of Tax Havens: A Guide", *FinanzArchiv/Public Finance Analysis* 70, 458–85.

Hebous, S. and Johannesen, N. (2014), "At Your Service! The Role of Tax Havens in International Trade with Services", *Mimeo*.

Hebous, S. and Lipatov, V. (2014), "A Journey from a Corruption Port to a Tax Haven", *Journal of Comparative Economics* 42, 739–54.

Hebous, S. and Ruf, M. (2014), "Evaluating the Effects of ACE Systems on Corporate Debt and Investments", *Mimeo*.

Hebous, S. and Weichenrieder, A. (2010), "Debt Financing and Currency Crises: Wholly vs. Partially Owned Multinational Affiliates", *Review of World Economics* / *Weltwirtschaftliches Archiv* 146, 281–302.

Hebous, S., Ruf, M. and Weichenrieder, A. (2011), "The Effects Of Taxation On The Location Decision Of Multinational Firms: M&A Versus Greenfield Investments", *National Tax Journal* 64, 817–38.

Heckemeyer, J. and Overesch, M. (2013), "Multinationals' Profit Response to Tax Differentials: Effect Size and Shifting Channels", *ZEW Discussion Paper* no. 045.

Hines, J. (2010), "Treasure Islands", *Journal of Economic Perspectives* 24, 103–26.

Hong, Q. and Smart, M. (2010), "In Praise of Tax Havens: International Tax Planning and Foreign Direct Investment", *European Economic Review* 54, 82-95.

Karkinsky, T. and Riedel, N. (2012), "Corporate Taxation and the Location of Patents within Multinational Firms", *Journal of International Economics* 88, 176–85.

Keen, M. (2001), "Preferential Regimes Can Make Tax Competition Less Harmful", *National Tax Journal* 54, 757–62.

Leibrecht, M. and Hochgatterer, C. (2012), "Tax Competition as a Cause of Falling Corporate Income Tax Rates: A Survey of Empirical Literature", *Journal of Economic Surveys* 26, 616–48.

Lipponer, A. (2011), *Microdatabase Direct Investment – Midi a Brief Guide*, Deutsche Bundesbank, Frankfurt am Main.

Mintz, J. and Weichenrieder, A. (2010), *The Indirect Side of Direct Investment: Multinational Company Finance and Taxation*, MIT Press, Cambridge, Mass.

OECD (2013), *Action Plan on Base Erosion and Profit Shifting*, OECD Publishing, Paris.

OECD (2014), *First recommendations for a co-ordinated international approach to combat tax avoidance by multinational enterprises*, OECD Publishing, Paris.

Overesch, M. and Wamser, G. (2009), "Who Cares About Corporate Taxation? Asymmetric Tax Effects on Outbound FDI", *World Economy* 32, 1657–84.

Ruf, M. and Weichenrieder, A. (2012), "The Taxation of Passive Foreign Investment – Lessons from German Experience", *Canadian Journal of Economics* 45 (4), 1504–28.

Ruf, M. and Weichenrieder, A. (2014), "CFC Legislation, Passive Assets and the Impact of the ECJ's Cadbury-Schweppes Decision", *CESifo Working Paper* no. 4461.

Walsh, Mary. W. (2014), "Senate Report Says Caterpillar Used Swiss Subsidiary to Reduce Taxes", *The New York Times*, 31 March, 2014, http://www.nytimes.com/2014/04/01/business/report-says-caterpillar-used-swiss-unit-to-pare-taxes.html.

Weichenrieder, A. (2009), "Profit Shifting in the EU: Evidence from Germany", *International Tax and Public Finance* 16 (3), 281–97.

Weichenrieder, A. and Klautke, T. (2008), "Taxes and the Efficiency Costs of Capital Distortions", *CESifo Working Paper* no. 2431.

Weichenrieder, A. and Windischbauer, H. (2008), "Thin-Capitalization Rules and Company Responses Experience from German Legislation", *CESifo Working Paper* no. 2456.

Wissenschaftlicher Beirat beim Bundesfinanzministerium, (2008), *Einheitliche Bemessungsgrundlage der Körperschaftsteuer in der Europäischen Union*, Berlin.

Transfer Pricing Laws

Bodo Knoll and
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Tight government budgets and media reports on the international tax avoidance activities of Google, Apple, Amazon and other big multinational enterprises (MNEs) have reinforced public debates about the principles and regulations that govern the international tax system (see, for example, Reuters 2013).

The main challenge of taxing MNEs is to align the geographic distribution of economic and tax income. The long-standing international approach to addressing this problem relies on separate accounting (SA) regulations[2] and provisions which require intra-firm transfer prices (TP) to be set according to the arm's length principle (ALP) and thus to correspond to prices that would have been contracted between unrelated parties.

The Achilles' heel of the approach is that arm's length prices are often difficult to observe in practice, and MNEs thus have some leeway in choosing intra-firm prices such that income is relocated from high-tax to low-tax entities (Janeba 1996, Haufler and Schjelderup 2000). Empirical papers support the notion that MNEs systematically transfer income to low-tax locations by distorting intra-firm prices (Dharmapala 2014, Heckemeyer and Overesch 2013). The seminal work by Clausing (2003) reports that prices for US intra-firm trade decrease by 1.8 to 2.0 percent relative to non-intra-firm transactions if the tax rate in the host country of a delivering subsidiary rises by one percentage point. Her findings have been confirmed in Bernard et al. (2006), Cristea et al. (2013) and Davies et al. (2014).

To limit the outflow of MNEs' profits from their borders, many countries have augmented their tax law by transfer pricing legislations. While the scope and strictness of these legislations differ across countries, most rules (partly) follow the OECD's Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations, which have been provided and updated by the OECD over several decades.

The guidelines allow for five methods to determine whether prices for intra-firm transactions are in line with the ALP. There are three traditional transaction methods, namely the comparable uncontrolled price method (CUPM), the resale price method (RPM) and the cost plus method (CPM), which compare intra-firm transactions with prices or gross margins agreed by independent parties. The guidelines furthermore refer to two transactional profit methods: the transactional net margin method (TNMM) and the transaction-based profit split method (TPSM), which compare the profit of related parties to the profit earned by comparable uncontrolled parties. While the OECD had long given preference to transaction methods over transactional profit methods, this pecking order was removed in the 2010 revision of the TP guidelines. The "heart of the application" (OECD 2010, 33) of the ALP is thus to find comparable transactions between uncontrolled parties. The OECD identifies five factors that determine comparability: the characteristics of the property or service transferred, the functions performed by the parties, the contractual terms, the economic circumstances and the business strategies pursued by the parties.

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Implementing comparability analyses is often difficult in practice though (Durst and Culbertson 2003, Vidal 2009, Luckhaupt et al. 2012). In many modern MNEs it is far from straightforward to trace back core functions to certain locations as value drivers, risk taking and entrepreneurial functions may be spread across entities in different tax jurisdictions. Several core assets, like IP

[1] Ruhr-Universität Bochum (both).
[2] SA prescribes taxable income to be determined separately for each group affiliate.

and trademarks, are furthermore firm-specific in nature, and hence difficult to be compensated at arm's length. This creates considerable discretion in the pricing of intra-firm transactions and endows MNEs with opportunities to shift profits to low-tax jurisdictions.

To limit the scope for such mispricing behavior, more and more countries have augmented their TP regulations by provisions that require MNEs to produce contemporaneous transfer price documentation (Zinn et al. 2014). While TP documentation increases transparency in corporate price setting behavior and eases TP audits for tax authorities, it also puts a high compliance and administrative burden on firms. A survey among European MNEs indicates that TP documentation significantly raises tax compliance costs (European Communities 2004).[3] Anecdotal evidence moreover points to strict TP auditing of tax authorities in many countries. A recent survey among German inbound investors e.g. indicates that tax auditors challenged arm's length pricing in 75 percent of all tax audits (Deloitte 2010).[4]

Whether TP regulations are instrumental in limiting income-shifting behavior remains an empirical question. Systematic evidence is still scarce. A recent exception is Beuselick et al. (2009) who, based on data for European subsidiaries, present evidence which suggests that tax-motivated income-shifting is confined to cases where TP regulations are weakly enforced. The effectiveness of TP documentation rules and TP penalties in limiting shifting behavior is confirmed in Lohse and Riedel (2012), Saunders-Scott (2013) and Beer and Loeprick (2014). The latter study, however, also indicates that TP regulations hardly limit price distortions related to trade in intangible property, consistent with the lack of comparables for these transactions.[5]

One main element of the OECD's recent action plan against base erosion and profit shifting (BEPS) is thus to revise the application of the ALP for transfers of intangibles and other mobile assets (OECD 2013). Intertwined with this issue are group structures, where over-capitalized entities in low-tax countries obtain high returns because they have contractually assumed risks or provided capital in situations that would be unlikely to occur between unrelated parties.[6] New regulations may include tests whether group affiliates that contractually assume risk can financially bear and control that risk, the general strengthening of economic substance considerations over pure contractual arrangements[7], the endowment of tax authorities with the right to adjust prices for hard-to-value IP based on actual results, as enacted in Germany's law on the "transfer of functions" (*Funktionsverlagerung*), and the implementation of country-by-country reporting.[8]

The action plan furthermore aims to establish more efficient mutual agreement procedures (MAP) in case of transfer pricing disputes between authorities. Most importantly, double taxation treaties should be complemented by arbitration provisions, as under most of the current treaties tax authorities do not have to agree on a common price, which exposes tax payers to double taxation risk. Notable exceptions are the arbitration provisions in the European Union and the German-US double taxation treaty (Kroppen et al. 2012).[9]

Critics of the OECD's BEPS initiative, however, claim that incremental reforms within the SA system may not help to abolish income shifting to low-tax entities and do not remove the "absurdly" (Avi-Yonah 2010) high and "stupefying" (Taylor 2005) complexity of the arm's length system and the associated compliance costs for MNEs. They argue that the only credible long-term solution is "the defenestration of the arm's length

[3] Survey evidence suggests that tax compliance costs increase sharply when firms establish or increase foreign operations (Blumenthal and Slemrod 1995, Slemrod and Venkatesh 2002). Saunders-Scott (2013) furthermore shows that TP risk is associated with significant compliance costs for multinational groups. In particular, using micro data on MNEs, she finds that TP regulations reduce the reported earnings of the average multinational firm by a significant 1.5 percent.

[4] This exposes firms to significant tax risks and helps to explain why around 40 percent of tax managers in MNEs consider TP to be the most important tax issue for their group (Ernst and Young 2007). Constructing a survey-based indicator on the strictness of TP regimes, which among others accounts for the strictness of TP enforcement, Mescall and Klassen (2014) report rules to be particularly strict in Brazil, Canada, France, Germany, South Africa, the United Kingdom and the US.

[5] In line with these findings, several papers report indirect evidence that shifting opportunities are particularly large if groups have intangible property holdings (Grubert 2003, Dischinger and Riedel 2011).

[6] A common structure to transfer IP income to low-tax affiliates is to set up contractual arrangements where affiliates in low-tax countries finance research and development (R&D) activity undertaken at high-tax locations. The R&D unit in the high-tax country earns a fixed margin on its costs, while all residual income accrues with the financing entity in the low-tax country.

[7] One option might be to define specific cases where capital providers at low-tax locations are reclassified and treated as lenders rather than equity investors.

[8] Proponents of country-by-country reporting hope that requiring MNEs to report taxes payed and accrued, pre-tax profits and indicators for value-creating activity to tax authorities on a country-by-country basis allows for a better 'high-level' risk assessment and an improved allocation of auditing activity of tax authority ressources. While adminstrative ressources are scare in all countries, this holds true especially for developing economies, which have been reported to be particularly prone to income shifting behavior (Fuest et al. 2011).

[9] Given the lack of arbitration provisions, the elimination of the pecking order in TP methods additionally increases double taxation risk as authorities may now follow different TP methods. To reduce compliance costs, academics and practitionners have called for a more extensive application of safe-harbor-provisions and a more efficient implementation of advanced pricing agreements (APAs) (Kroppen et al. 2012). See Becker et al. (2014) for a recent contribution, which rationalizes APAs as an instrument to mitigate a hold-up-problem.

standard and its replacement with formulary apportionment [(FA)] methods" (Sullivan 2010), which consolidate income at the group level and apportion it to group affiliates based on fixed allocation keys designed to proxy for economic activity (commonly a combination of firm assets, payroll and sales). FA systems have been applied to subnational taxation in the US, Canada, Germany and Switzerland. In 2001, the European Commission proposed to implement an FA system within the European Union (European Commission 2001).

The major strength of FA is that income consolidation at the group level abolishes profit shifting incentives and FA thus overcomes the practical problems of finding comparable uncontrolled transactions when applying the ALP. Proponents of FA furthermore stress that it rids the international tax system of the various conceptual shortcomings of the ALP, most importantly of the "fiction" (Wilkie 2012) that different parts of a multinational group can be treated as if they were stand-alone entities. Firms, on the contrary, decide to form a multinational group in order to avoid costs and limitations, implying that rents are generated that are unique to the MNE. The ALP is not a helpful concept in subdividing this additional value (Wilkie 2012). Bauer and Langenmayr (2013), moreover, show that even a correct application of the ALP under SA may imply profit shifting and lower taxes for MNEs. In particular, as MNEs are more productive than stand-alone firms and have a better bargaining position vis-a-vis their suppliers than firms that obtain the input from an external source, they can receive inputs at significantly lower prices. The prices of uncontrolled transactions hence systematically exceed the marginal cost of input production within MNEs, which opens up shifting opportunities, even with a correct application of the ALP.[10]

Addressing income shifting under SA through a switch to FA rather than the implementation of TP laws may also be beneficial as transfer prices also serve a number of internal management functions like incentivizing local managers and acting as an instrument for the strategic delegation of decision-making under asymmetric information (Hirshleifer 1956, Holmstrom and Tirole 1991, Nielsen and Raimondos-Møller 2012). If firms also manipulate transfer prices under SA in order to minimize their tax burden, they face a trade-off in the choice of their optimal transfer pricing, which impairs efficiency (Elitzur and Mintz 1996, Smith 2002, Baldenius et al. 2004, Hyde and Choe 2006).[11] In addition, Devereux and Keuschnigg (2013) stress that profit shifting through manipulated transfer prices might be welfare-enhancing as it may help to reduce the financial frictions of group affiliates. If transfer price regulations effectively constrain transfer price distortions under SA, external funding and investment levels in foreign affiliates are reduced, which may trigger global welfare losses. Harris and Sansing (1998) and Sansing (1999) finally point out that the ALP may distort vertical integration decisions and thus harm production efficiency.

While these criticisms of the SA system and the ALP are certainly well taken, FA comes with its own problems. The OECD opposes the "mechanistic" nature of FA and stresses that it triggers incentives for MNEs to distort the location of the factors included in the formula towards low-tax jurisdictions (See Pethig and Wagener (2007) and Eichner and Runkel (2008) for theoretical contributions stressing factor distortions and Riedel (2010) for empirical evidence).[12] A move towards FA may hence just replace one set of inefficiencies (transfer price distortions and profit shifting) with another (distortions of apportionment factors). As shifting paper profits is, however, plausibly easier than reallocating real production or sales, inefficiencies are likely larger under SA (Runkel 2012, Luckhaupt et al. 2012). Mintz and Smart (2004) provide empirical evidence in line with this notion by showing that under the provincial corporate tax in Canada the profitability of firms subject to SA reacts more sensitively to tax changes than the profitability of firms taxed under FA.[13]

Nevertheless, it appears unlikely that political consensus for a global or regional switch to FA will be achieved in the near future. A pragmatic reform within the existing framework of the arm's length regulations by strengthening the profit split method, which shares similarities with FA rules. Nevertheless, it appears unlikely that

[10] Put differently, the ALP supposes that two identical firms, in practice, may make diverging decisions on whether to form an MNE or not. This is highly unlikely. On the contrary, given the economic reasons for internal coordination, all firms facing the same circumstances will make the same organizational choice.

[11] This tension could be eliminated by using a two-book system with two sets of prices for management and tax purposes. This comes with significant administrative costs though and may signal a "bookkeeping" game, which would neither be acceptable to local managers nor to tax authorities (Luckhaupt et al. 2012). Survey evidence thus suggests a striking prevalence of one-book systems, see Ernst & Young (2003).

[12] The introduction of FA also distorts investment through a tax base effect, i.e. an increase in one country's tax rate raises the average tax rate and gives multinationals the incentive to reduce their overall investment.

[13] The investment effects of profit shifting activities under SA are complex and depend on the shape of the firm's concealment cost function (see e.g. Nielsen et al. (2010) and Nielsen et al. (2014)). The little empirical evidence available on TP legislations and MNEs' investment behavior does not find a stable negative relationship (see Büttner et al. (2014)). Mescall and Klassen (2014), in turn, report that transfer pricing laws affect the premium rates in cross-border mergers and acquisitions.

political consensus for a global or regional switch to FA will be achieved in the near future. Several authors thus argue in favor of opting for a pragmatic reform within the existing framework of the arm's length regulations by strengthening the profit split method, which shares similarities with FA rules.

More specifically, profit splits allocate income from controlled transactions in two stages. In the first stage, each participant is compensated for its routine non-unique activities, whose price is determined on the basis of uncontrolled comparables using CUPM, RPM, CPM or TNMM. In the second stage, the residual profit is split based on how unrelated parties (would have) split the residual profit in the given situation and thus makes it possible to allocate profit, even if sufficiently comparable third party data for the specific transaction is unavailable. The share of residual profits received by each participant corresponds to its contribution to the transaction, which is approximated using one or more transaction-specific allocation factors (OECD 2010).

The conceptual difference between transactional profit splits and FA thus boils down to a case-specific apportionment formula in the former and a pre-determined formula in the latter case. In recent years, several authors suggested to move to a more 'formulary' residual profit split, see e.g. Avi-Yonah et al. (2009) and Luckhaupt et al. (2012).[14] While fixed factor apportionment is, to some extent, arbitrary and may override specifics of the value contributing factors in a given transaction, it comes with the benefit of removing discretionary power in MNEs' TP choices and thus helps to eliminate opportunities to relocate income to low-tax entities.[15] This especially holds true if the apportionment formula assigns a high weight to destination-based sales as firms lack vast discretionary powers over sales locations (Luckhaupt et al. 2012). Liberally interpreted, the ALP as currently defined in the OECD guidelines is also capable of encompassing FA, implying that such a reform could be implemented without major changes to the current system (Avi-Yonah et al. 2009, Avi-Yonah 2010, and Li 2002, 2003, 2012).

[14] The reduced complexity and discretion may also lower tax payer compliance costs (although we are not aware of studies that estimate compliance costs under FA). In response to concerns that FA assigns profit to group locations on an arbitrary basis, it has been pointed out that in the absence of comparables, any profit allocation is, in the end, arbitrary; and that the allocation factors under FA reflect the economic reality of multinational groups (Avi-Yonah 2010).

[15] Underpinning this point, a recent paper by Blouin et al. (2014), in the context of thin-capitalization rules, suggests that anti-shifting provisions are significantly more effective in limiting MNEs' shifting behavior if discretionary components are removed from the legislations.

In conclusion, this article briefly sketched the characteristics and shortcomings of current transfer pricing laws, and of the reform options discussed in the course of the OECD's current BEPS initiative. In general, it should be kept in mind that incentives for income shifting and price distortions relate to international tax rate differentials. The most direct – and from the compliance and enforcement perspective most cost-efficient – path to removing these incentives is thus to renew previous efforts to move towards a more harmonized corporate tax rate setting in the European Union (e.g. by considering the implementation of a minimum corporate tax rate or more comprehensive provisions against harmful tax practices).

References

Avi-Yonah, R., K. Clausing and M. Durst (2009), "Allocating Business Profits for Tax Purposes: A Proposal to Adopt a Formulary Profit Split", *Florida Tax Review* (5), 497–553.

Avi-Yonah, R. (2010), "Between Formulary Apportionment and the OECD Guidelines: A Proposal for Reconciliation", *World Tax Journal*, 2(1), 3–18.

Baldenius, R., N. Melumad and S. Reichelstein (2004), "Integrating Managerial and Tax Objectives in Transfer Pricing", *The Accounting Review* 79, 591–615.

Bauer, C. and D. Langenmayr (2013), "Sorting into Outsourcing: Are Profits Taxed at a Gorilla's Arm's Length?", *Journal of International Economics* 90(2), 326–36.

Becker, J., R. Davies and G. Jakobs (2014), "The Economics of Advance Pricing Agreements", paper presented at the Congress of the International Institute of Public Finance, Lugano.

Beer, S. and J. Loeprick (2014), "Profit Shifting: Drivers of Transfer (Mis)pricing and the Potential of Countermeasures, International Tax and Public Finance", *Mimeo*.

Bernard, A. B., J. B. Jensen and P. K. Schott (2006), "Transfer Pricing by U.S.-based Multinational Firms", *NBER Working Paper* no. 12493.

Beuselinck, C., M. Deloof and A. Vanstraelen (2009), "Multinational Income Shifting, Tax Enforcement and Firm Value", *Working Paper*.

Blouin, J., H. Huizinga, L. Laeven and G. Nicodème (2014), "Thin Capitalization Rules and Multinational Firm Capital Structure", *IMF Working Paper* 14/12.

Büttner, T., M. Overesch and G. Wamser (2014), "Anti Profit-Shifting Rules and Foreign Direct Investment", *CESifo Dicussion Paper* no. 4710.

Clausing, K.A. (2003), "Tax-motivated Transfer Pricing and US Intrafirm Trade Prices", *Journal of Public Economics* 87, 2207–23.

Cristea, A.D., R. Jørgensen and D. X. Nguyen (2013), "Transfer Pricing by Multinational Firms: New Evidence from Foreign Firm Ownerships", *Mimeo*.

Davies, R.B., J. Martin, M. Parenti and F. Toubal (2014), "Knocking on Tax Heaven's Door: Multinational Firms and Transfer Pricing", *Mimeo*.

Deloitte (2010), *German Income Tax Audits – Survey on the Experiences of Inbound Investors*, Deloitte Touche.

Devereux, M.P. and C. Keuschnigg (2013), "The Arm's Length Principle and Distortions to Multinational Firm Organization", *Journal of International Economics* 89(2), 432–40.

Dharmapala, D. (2014), "What Do We Know About Base Erosion and Profit Shifting? A Review of the Empirical Literature", *CESifo Working Paper* no. 4612.

Dischinger, M. and N. Riedel (2011), "Corporate Taxes and the Location of Intangible Assets within Multinational Firms, 2011", *Journal of Public Economics*, 95 (7-8), 691–707.

Durst, M. C. and R. E. Culbertson (2003), "Clearing Away the Sand: Retrospective Methods and Prospective Documentation in Transfer Pricing Today", *Tax Law Review* 57, 37–134.

Eichner, T. and M. Runkel (2008), "Why the European Union Should Adopt Formula Apportionment with a Sales Factor", *Scandinavian Journal of Economics* 110(3), 567–89.

Elitzur, R. and J. Mintz (1996), "Transfer Pricing Rules and Corporate Tax Competition", *Journal of Public Economics* 60, 401–22.

Ernst and Young (2003), *Transfer Pricing 2003 Global Survey*, International Tax Services.

Ernst and Young (2007), *Precision under Pressure - Global Transfer Pricing Survey 2007-2008*.

European Commission (2001), *Towards an Internal Market Without Tax Obstacles: A Strategy for Providing Companies with a Consolidated Corporate Tax Base for Their EU-Wide Activities*, COM(2001), 582 final (October 23).

European Communities (2004), *European Tax Survey, Working Paper 3/2004*, Office for Official Publications of the European Communities, Luxembourg.

Fuest, C., S. Hebous and N. Riedel (2011), "International Debt Shifting and Multinational Firms in Developing Countries", *Economics Letters*, 113 (2), 135–8.

Grubert, H. (2003), "Intangible Income, Intercompany Transactions, Income Shifting, and the Choice of Location", *National Tax Journal* 56(1), 221–42.

Harris, D. and R. Sansing (1998), "Distortions Caused by the Use of Arm's Length Transfer Prices", *Journal of the American Taxation Association* 20, 40–50.

Haufler, A. and G. Schjelderup (2000), "Corporate Tax Systems and Cross Country Profit Shifting", *Oxford Economic Papers* 52(2), 306–25.

Heckemeyer, J. and M. Overesch (2013), "Multinationals. Profit Response to Tax Differentials: Effect Size and Shifting Channels", *ZEW Discussion Paper* no. 13-045.

Hirshleifer, J. (1956), "On the Economics of Transfer Pricing", *Journal of Business*, 172–84.

Holmstrom, B. and J. Tirole (1991), "Transfer Pricing and Organizational Form, Journal of Law, Economics and Organization" 7, 201–28.

Hyde, C.E. and C. Choe (2005), "Keeping Two Sets of Books: The Relationship between Tax and Incentive Transfer Prices", *Journal of Economics and Management Strategy* 14, 165–86.

Janeba, E. (1996), "Foreign Direct Investment under Oligopoly: Profit Shifting or Profit Capturing?", *Journal of Public Economics* 60, 423–45.

Kroppen, H., D. Dawid and R. Schmidtke (2012), "Profit Split, the Future of Transfer Pricing? Arm's Length Principle and Formulary Apportionment Revisited from a Theoretical and a Practical Perspective", in Schön, W. and K.A. Konrad, eds., *Fundamentals of International Transfer Pricing in Law and Economics*, Springer, Munich, 267–94.

Li, J. (2002), "Global Profit Split: An Evolutionary Approach to International Income Allocation", *Canadian Tax Journal* 50(3), 823–83.

Li, J. (2003), *Reform Proposal: Uniform Source Withholding Tax and Global Profit Split, International Taxation in the Age of Electronic Commerce: A Comparative Study* ,Toronto.

Li, J. (2012), "Soft Law, Hard Realities and Pragmatic Suggestions: Critiquing the OECD Transfer Pricing", in Schön, W. and K.A. Konrad, eds., *Fundamentals of International Transfer Pricing in Law and Economics*, Springer, Munich, 71–90.

Lohse, T. and Riedel, N. (2012). "Do Transfer Pricing Laws Limit International Income Shifting? Evidence from European Multinationals", *FZID Discussion Paper*.

Luckhaupt, L., M. Overesch and U. Schreiber (2012), "The OECD Approach to Transfer Pricing: A Critical Assessment and Proposal", in Schön, W. and K.A. Konrad, eds., *Fundamentals of International Transfer Pricing in Law and Economics*, Springer, Munich, 91–122.

Mescall, D. and K. Klassen (2014), "How Does Transfer Pricing Risk Affect Premia in Cross-Border Mergers and Acquisitions?", *Working Paper*.

Mintz, J. and M. Smart (2004), "Income Shifting, Investment, and Tax Competition: Theory and Empirical Evidence from Provincial Taxation in Canada", *Journal of Public Economics* 88, 1149–68.

Nielsen, S., P. Riamondos-Møller and G. Schjelderup (2010), "Company Taxation and Tax Spillovers: Separate Accounting versus Formula Apportionment", *European Economic Review* 54(1), 121–32.

Nielsen, S. and P. Raimondos-Møller (2012), "Multiple Roles of Transfer Prices: One vs. Two Books", in Schön, W. and K.A. Konrad, eds., *Fundamentals of International Transfer Pricing in Law and Economics*, Springer, Munich, 25–46.

Nielsen, S., D. Schindler and G. Schjelderup (2014), "Abusive Transfer Pricing and Economic Activity", *NHH Discussion Paper* FOR 21 2014.

OECD (2010), *OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations 2010*, OECD Publishing, Paris.

OECD (2013), *Action Plan on Base Erosion and Profit Shifting*, OECD Publishing, Paris.

Pethig, R. and A. Wagener (2007), "Profit Tax Competition and Formula Apportionment", *International Tax and Public Finance* 14, 631–55.

Reuters (2013), Factbox: Apple, Amazon, Google and Tax Avoidance Schemes, May 22, 2013, http://uk.reuters.com/article/2013/05/22/us-eu-tax-avoidance-idUSBRE94L0GW20130522.

Riedel, N. (2010), "The Downside of Formula Apportionment - Evidence on Factor Demand Distortions", *International Tax and Public Finance*, 17(3), 236–58.

Runkel, M. (2012), "In Favor of Formulary Apportionment A Comment on Kroppen/Dawid/Schmidtke: 'Profit Split, the Future of Transfer Pricing? Arm's Length Principle and Formulary Apportionment Revisited from a Theoretical and a Practical Perspective'", in Schön, W. and K.A. Konrad, eds., *Fundamentals of International Transfer Pricing in Law and Economics*, Springer, Munich, 295–304.

Sansing, R. C. (1999), "Relationship-specific Investments and the Transfer Pricing Paradox", *Review of Accounting Studies* 4, 119–34.

Saunders-Scott, M. (2013), "How Does Transfer Pricing Enforcement Affect Reported Profits?", *mimeo*.

Smith, M. (2002), "Tax and Incentive Trade-offs in Multinational Transfer Pricing, Journal of Accounting", *Auditing and Finance* 17, 209–36.

Sullivan, M. (2010), "Quote in a hearing before the Committee on Ways and Means US House of Representatives", July 22, 2010.

Taylor, W. (2005), "Testimony before the President's Advisory Panel on Federal Tax Reform, March 31, 2005", in: Tax Notes Doc 2005-6654.

Vidal, J. (2009), "The Achilles' Heel of the Arm's Length Principle and the Canadian Glaxo-SmithKline Case", *Intertax* 37, 512–28.

Wilkie, S. (2012), "Reflecting on the 'Arm's Length Principle': What is the 'Principle'? Where Next?", in Schön, W. and K.A. Konrad, eds., *Fundamentals of International Transfer Pricing in Law and Economics*, Springer, Munich, 127–56.

Zinn, T., N. Riedel and C. Spengel (2014), "The Increasing Importance of Transfer Pricing Regulations: A Worldwide Overview", *Intertax* 42, 352–404.

Zeile, W. (2003), "Trade in Goods Within Multinational Companies: Survey-Based Data and Findings for the United States of America, Paper Prepared for OECD Committee on Industry and Business Environment Working Party on Statistics", *Session on Globalisation,* Paris, France, November.

Debt Shifting and Thin-capitalization Rules

Valeria Merlo and
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A large body of literature in corporate finance argues that the trade-off between the cost and benefit of debt financing determines a firm's optimal capital structure. One prominent benefit of debt relative to equity financing relates to the tax-deductibility of interest expenses. This asymmetry in tax treatment implies that, on average, firms' capital structures will be distorted in favor of too much debt financing (see Graham, 2003, for a survey). Additional incentives to use debt instead of equity financing relate to the operations of multinational enterprises (MNEs) whose activities across jurisdictions with varying tax rates allow for profit shifting and reductions in overall tax burdens. Differences in tax rates across countries usually make it attractive to thinly capitalize foreign affiliates in high-tax countries and rely instead to an excessive extent on debt financing. In order to minimize the overall tax burden, MNEs may particularly use internal (related-party) debt as a vehicle for shifting profits by injecting equity financing into a foreign affiliate facing a low tax rate. This affiliate then provides loans to related entities within the MNE in high-tax countries. For the latter countries the implication is a reduction of the tax base (and tax revenue) due to the deductibility of interest expenses.

While early empirical work on taxes and debt financing of MNEs provides evidence that higher taxes at foreign locations are related to higher debt-to-asset ratios of foreign entities of MNEs (Desai, Foley and Hines, 2004; Mintz and Weichenrieder, 2009, and Feld, Heckemeyr and Overesch, 2013, for a survey), theoretical work on debt shifting of MNEs makes the prediction that the affiliate facing the lowest tax rate within the group should lend to all other affiliates of the same MNE (Mintz and Smart (2004)). This pattern has been confirmed by Buettner and Wamser (2013) using data on German MNEs. Their estimates suggest that, ceteris paribus, a ten percent decrease in the tax faced by the lowest-tax affiliate within an MNE leads to an increase of about seven percent in internal borrowing at all other locations. Later work has shown that fundamentals in firm and country characteristics beyond taxes can explain internal debt usage (Egger et al., 2014), leading to more complex lending and borrowing flows within MNEs. It seems, however, that taxes are the most important determinant of internal debt financing. The paper by Huizinga, Laeven and Nicodème (2008) suggests that total debt financing (including external debt) of foreign subsidiaries exhibits a pattern consistent with tax rate differentials and not only internal debt is used to shift profits.

Although a large body of literature in economics has long discussed the implications of profit shifting within MNEs, the public debate about profit shifting gained fresh momentum when it became publicly known that MNEs like Amazon, Apple, Google or Starbucks can avoid taxes to a large extent and pay only around two to five percent tax on their income in most countries.[2] The recent OECD report on base erosion and profit shifting (BEPS) has recognized that profit shifting of MNEs is a "pressing and current issue for a number of jurisdictions" (OECD 2013). The report suggests that countries should intervene and reconsider the "tax treatment of intragroup financial transactions" (OECD 2013). The OECD becomes explicit in its "Action Plan" and suggests to "limit base erosion via interest deduction and other financial payments" (OECD 2014) by using so-called thin-capitalization rules (TCRs). These rules aim at preventing profit shifting by limiting the deductibility of interest payments for tax purposes.

Design and application of thin-capitalization rules

We can distinguish between three basic approaches to restrict interest deduction related to profit shifting through excessive debt financing: the arm's length

[1] University of Tübingen, CESifo and NoCet (both).

[2] See Reuters (2013) or The Telegraph (2012).

principle, so-called earnings stripping rules and fixed debt-to-equity rules.[3]

First, some countries apply arm's length methods by comparing the capital structure of a firm entity to a counterfactual capital structure under the assumption that no related parties were involved in the financing of the firm entity. As such a counterfactual is, of course, unobserved and firm-specific, an individual assessment of the capital structure including the specific terms of a loan is necessary. If the tax authority considers that a loan from an unrelated party would have been smaller or would have involved a lower interest rate, then the deduction of interest payments from the corporate tax base is denied. Common criteria to assess whether the loan was on arm's length terms are, for example, whether the equity of a company is sufficient to satisfy its solvency requirements, to what extent the average debt-to-equity ratio of the industry differs from that of the company, or whether the company is able to obtain loans from third parties. Examples of countries relying on the arm's length principle to restrict interest deduction related to profit shifting are Austria, or Norway until 2013.

Interest-barrier or earnings stripping rules (ESRs) impose a general restriction on the deductibility of interest payments that are excessive relative to income. Some countries, like, for example, Germany since 2008 and Spain since 2012, limit deductibility irrespective of whether interest is paid to a related party or an unrelated lender. In other countries, like Norway, Finland or Japan, the ESR limits only related-party debt interest deduction. Under an ESR, net interest expenses exceeding a given percentage of taxable income[4] are not deductible from the tax base in the year of their accrual.[5] In most countries there are various exceptions to the general applicability of ESRs to ensure that only debt financing with the purpose of earning stripping is constrained. Over the last couple of years, a growing number of countries have introduced ESRs, either in addition to, or often replacing, existing regulation on TCRs. This recent trend might be owed to the impression that existing TCRs were not sufficiently strict to prevent debt shifting by MNEs. On the other hand, many European countries had a need to reform their legislation after the 'Lankhorst-Hohorst' decision of the European Court of Justice (ECJ) in 2002. In that case, the ECJ came to the conclusion that the old German TCR violated the 'freedom of establishment' principle within the European Union as the old legislation discriminated against foreign investors. This led to various reforms of TCR legislation and finally to a number of new ESRs.[6]

The third approach, which is widely applied, is to set debt-to-equity rules following a "fixed ratio approach". The common feature under this approach is that interest deduction is denied if a firm's debt capital exceeds a certain proportion of its equity capital. The latter relation is fixed in countries' tax laws and often called safe haven or safe harbour debt-to-equity ratio, referring to the fact that interest remains fully deductible as long as the fixed proportion is not exceeded. Again, while some countries apply their safe haven rules only to related-party (i.e., internal) debt, others consider total debt. We provide a rich descriptive analysis of debt-to-equity rules around the world in the next section.

TCR legislation is often very complex and its applicability depends on many conditions. In practice, many countries apply rules that combine elements of these three approaches to limit the deduction of interest expenses. The United Kingdom (UK) applies the arms-length principle to stipulate the amount of "acceptable" debt, and in addition restricts the deductibility of interest (even if the debt level is at arm's length) if the amount of the group's net debt exceeds 75 percent of the consolidated worldwide gross debt. As another example, the United States (US) apply both a fixed debt-to-equity rule (1.5:1) and an ESR (total interest expenses in excess of 50 percent of adjusted taxable income are not deductible). Finally, in many countries applying a fixed ratio approach, related-party lending is not subject to the TCR if the taxpayer can prove that the loan was provided on arm's length terms.

The use of thin-capitalization rules around the world

For the purpose of this report, we collected data on the existence and scope of TCRs for 172 countries from 1996 until 2012. We focus on TCRs that follow a "fixed ratio approach". This approach is most comparable for the years this report has collected data for and has been used by most countries around the world. The fixed ra-

[3] Ruf and Schindler (2012) or Dourado and de la Feria (2008) distinguish between specific and non-specific TCRs where the fixed debt-to-equity approach falls under the first of those categories.

[4] For example, 30 percent of earnings before interest, tax, depreciation and amortization (EBITDA) in the case of Germany, Spain, or Norway as of 2014, 25 percent of EBITDA in the case of Finland, and 50 percent of adjusted taxable income in Japan.

[5] Most countries allow carrying forward the non-deductible amount of interest for several years and allowing deductibility in years where the earnings threshold is not reached. Countries differ substantially in the number of years for which carrying forward interest expenses is allowed (five years in Germany, seven in Japan, ten in Norway, 18 in Spain).

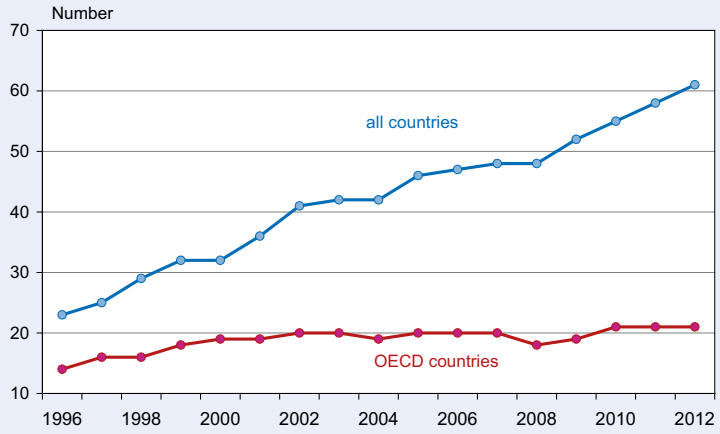
[6] For instance, Germany and Italy replaced their old TCR legislation with ESRs in 2008, Spain in 2012, Portugal in 2013 and Greece in 2014.

tio approach also seems to be the most straightforward way to limit the thin-capitalization of firms.

In order to make safe haven ratios comparable, we translate them into a threshold as follows. Let us take, for example, the Canadian safe haven ratio of 1.5:1 (debt to equity), which restricts the deductibility of interest paid on debt exceeding two times equity. This relation can be translated into a threshold $T_{CAN} = 2/(1.5+1) = 0.60$. Using this definition, higher values of T imply that a TCR is less strict. Lower values of T imply that a TCR is stricter. The extreme values are $T=0$ if interest is non-deductible for all debt *and* $T=1$ if interest deduction is never restricted. In 2012, relatively strict TCRs were applied by the US ($T_{US} = 0.6$), New Zealand ($T_{NZL} = 0.6$) or Portugal ($T_{PRT} = 0.66$). On the other hand, relatively lenient safe havens were applied in Luxembourg ($T_{LUX} = 0.85$), Denmark ($T_{DNK} = 0.8$), or the Czech Republic ($T_{CZE} = 0.8$).

Figure 1

Number of countries using a TCR over time



Source: Authors' calculations based on international tax guides by IBFD; Ernst&Young; PricewaterhouseCoopers; KPMG.

Our dataset shows that in 2012, 61 countries had enacted a fixed debt-to-equity rule, while 111 countries have not. On average in our data, the value of the safe haven ratio as measured by T_{ALL} equals 0.933. Conditional on having some form of restriction, $T_{T\neq 1}$ equals 0.733.

During the time period 1996 until 2012, 37 countries introduced a TCR. Figure 1 displays the total number of countries using a TCR over time (the blue line). It indicates that the number of countries relying on a TCR increased permanently. A TCR was only abolished in five cases over the time period.[7] 21 countries made their legislation stricter (excluding introductions), and only six countries relaxed their rules.[8] To see whether the countries introducing rules were mainly OECD countries, Figure 1 provides a separate line (the red one) for OECD countries only. Although almost half of OECD countries had already implemented a TCR in 1996, this share only increased slightly until 2012 to about 60 percent. It should be mentioned, however, that not only the number of OECD countries increased from 29 to 34, but also that countries like Germany or Italy appear in the data as having abolished their TCRs, although they replaced their rules with ESRs.

Many countries enacted their TCRs as part of comprehensive tax reforms. For example, in the German tax reform act from 2000 the government explicitly reasoned that taxes can be cut only if the tax base is broadened and tax loopholes are closed at the same time. Consistent with this view, Germany not only cut its statutory tax burden, but also set a stricter safe haven ratio implying a change in the threshold from 0.75 to 0.60. We may look at whether any systematic evidence of this tax-cut-cum-base-broadening can be found in our data. To do this, we define an indicator variable that equals unity if a country cut its statutory tax rate, and zero otherwise. We then define two indicator variables, one that takes the value one if a country made its TCR stricter, and one that takes the value one if a country introduced a TCR. We then run two pooled linear probability regressions of the tax cut dummy on the dummies capturing a TCR introduction or a TCR tightening. The results show that introducing a new TCR is associated with a 15 percent higher probability that the statutory tax rate is cut in the same year. Making existing TCR legislation stricter is even associated with a 22 percent higher probability that the TCR reform is combined with a tax cut.

While it would be beyond the scope of this report to provide a thorough analysis of which countries use TCRs, Figure 2 gives some insight into how TCRs relate to countries' statutory tax rates, conditional on countries having some TCR. There is a clear negative correla-

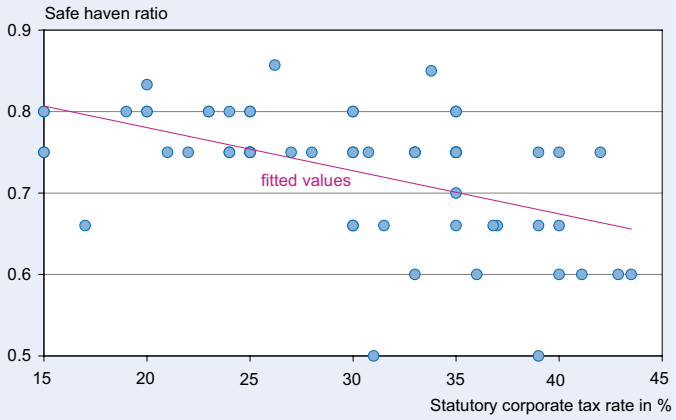
[7] Germany, Italy and Spain abolished their TCRs, but replaced them with so-called earnings-stripping rules in 2008 (Germany and Italy) and 2012 (Spain). The Slovak Republic and Botswana abolished their TCRs in 2004 and 2007, respectively.

[8] Australia, Bulgaria, Botswana, Czech Republic, Georgia, and Turkey relaxed their rules during the sample period.

tion between the statutory tax rate and the safe haven threshold. Countries with higher statutory tax rates seem to set stricter TCRs than countries with lower statutory tax rates. This is consistent with the pattern we would expect. Even though some countries with relatively low tax rates restrict interest deduction, the most restrictive safe haven ratios seem to be those of the US ($T_{US} = 0.60$) or New Zealand ($T_{NZL} = 0.60$), with statutory tax rates equal to $TAX_{US} = 0.38$, and $TAX_{NZL} = 0.28$ in 2012 (while the average tax rate in our sample is about 0.22 in 2012).

Figure 2

Correlation between safe haven ratios and statutory taxes in 2012



Source: Authors' calculations based on international tax guides by IBFD; Ernst&Young; PricewaterhouseCoopers; KPMG.

It might also be informative to take a look at whether countries using TCRs are also inclined to restrict transfer pricing (as the OECD action plan suggests to take comprehensive measures). We look at this issue by using and expanding the data from Lohse and Riedel (2013) to define a dummy variable that identifies countries with transfer pricing documentation requirements and others without. Using this indicator variable and regressing it on the debt-to-equity safe haven ratios shows that a more lenient TCR reduces the probability that a country's tax law stipulates transfer pricing documentation.

We can further distinguish between countries that apply their safe haven rules to internal debt, i.e., debt provided by related parties within the firm, or total debt, i.e., debt including external debt provided by external creditors. In our sample in 2012, 41 countries apply their TCRs to internal (related party) debt, and 20 countries apply them to total debt (including external debt).[9]

Consequences of thin-capitalization rules

A small, but growing number of papers in economics examine the consequences of anti-tax avoidance rules in general, and TCRs in particular. We may distinguish between three different strands of literature on the effects of TCRs: first, empirical studies analysing capital structure choice and TCRs; second, studies analysing the real investment effects of TCRs; and third, theoretical studies analysing how countries choose TCRs and the consequences of TCRs in the context of tax competition models.

Early papers on the consequences of TCRs studied how these rules affect the capital structure choice of MNEs. Up to this point, virtually nothing had been known about whether these rules bind and effectively reduce debt financing and profit shifting of firms. One obvious reason for introducing a TCR is a country's intention to restrict excessive debt financing by restricting interest deductibility. From a theoretical perspective, once a firm's debt-to-equity ratio exceeds the safe haven ratio set by a TCR, any tax incentive associated with interest deductibility to use debt instead of equity should be gone. Hence, the straightforward empirical prediction is that a binding TCR induces firms to reduce their internal (or total) debt-to-capital ratios after a stricter TCR has been introduced.[10] This has been confirmed in papers examining reforms of the German TCR (Weichenrieder and Windischbauer (2008); Overesch and Wamser (2010). Buettner et al. (2012) as well as Blouin et al. (2014) demonstrate that debt financing of foreign subsidiaries of German and US multinationals, respectively, responds to TCRs. A recent paper by Buettner, Overesch and Wamser (2014b) particularly emphasizes that, at the margin, internal debt financing no longer responds to taxes once foreign subsidiaries face a binding TCR. However, the results in Wamser (2014) suggest that TCRs specifying internal (related party) debt safe havens might be circumvented by substituting external for internal debt. Thus, even though TCRs on related party

[9] See Table 1 in the paper by Buettner et al. (2012), indicating which type of debt the safe haven ratios were referring to in 2005. Some countries also allow for a preferential treatment of financial services firms or holding companies (Buettner et al. 2012, p. 931, for some examples). Such preferential treatment is not considered in this report.

[10] Theoretically and empirically, we would expect that this is a one-time level effect.

debt seem to be effective in restricting internal debt financing for tax purposes, less clear predictions on how tax revenue and total debt is affected can be made.

Even fewer papers are concerned with the real consequences of TCRs. Schindler and Schjelderup (2012) show that restrictions on internal debt shifting increase the effective cost of capital at foreign affiliates of the MNE. Buettner, Overesch and Wamser (2014a) confirm this prediction by showing that investments of German MNEs in high-tax countries respond negatively to new or stricter TCRs.

Finally, some theoretical contributions explicitly model TCRs. Haufler and Runkel (2012) examine how countries compete for MNEs through taxes and TCRs. Assuming symmetric countries, their findings indicate that countries choose inefficiently low taxes and TCRs. Similar to models examining restrictions on profit shifting and tax competition, the paper also shows that a coordinated action to make TCRs stricter makes countries better off, but will intensify tax competition at the same time. When countries differ in size, their findings indicate that smaller countries (facing a more elastic tax base) set a more lenient TCR.[11] In a recent theoretical contribution, Mardan (2014) introduces TCRs in a model with credit constraint firms. The analysis shows that countries with weak financial markets will choose laxer TCRs.

Conclusion

This report has provided a survey on thin-capitalization rules (TCRs). In a growing number of countries, tax authorities see a need for such rules in their tax legislations, with the aim of reducing profit shifting by MNEs. Since the shifting of profits allows MNEs to avoid high taxes on corporate profits, policymakers across countries need to consider that uncoordinated measures against debt shifting will increase the effective tax burden of firms and lead to real investment responses, on average. Moreover, as the OECD report notes, "government actions should be comprehensive and deal with all the different aspects of the issue […]" (OECD 2013). Those actions should not only include measures against all channels of profit shifting (e.g., transfer pricing), but also attempts to increase cooperation with tax haven countries.

[11] Exploring the bivariate relationship between country size and TCRs confirms such a pattern.

References

Blouin, J., H. Huizinga, L. Laeven and G. Nicodème (2014), "Thin Capitalization Rules and Multinational Firm Capital Structure", *IMF Working Paper* no. 14.

Buettner, T., M. Overesch and G. Wamser (2014a), "Anti Profit-Shifting Rules and Foreign Direct Investment", *CESifo Working Paper* no. 4710.

Buettner, T., M. Overesch and G. Wamser (2014b), "Interest Deductibility and Multinationals' Use of Internal Debt Financing", *Mimeo*.

Buettner, T., M. Overesch, U. Schreiber and G. Wamser (2012), "The Impact of Thin-capitalization Rules on the Capital Structure of Multinational Firms", *Journal of Public Economics*, 96, 930–8.

Buettner, T. and G. Wamser (2013), "Internal Debt and Multinationals' Profit Shifting – Empirical Evidence from Firm-Level Panel Data", *National Tax Journal*, 66(1), 63-95.

Desai, M.A., C.F. Foley and J.R. Hines Jr. (2004), "A Multinational Perspective on Capital Structure Choice and Internal Capital Markets", *Journal of Finance*, 59, 2451–87.

Dourado, A. and R. de la Feria (2008), "Thin Capitalization Rules in the Context of the CCCTB, Oxford University Centre for Business Taxation", *Working Paper* no. 04.

Egger, P., Ch. Keuschnigg, V. Merlo and G. Wamser (2014), "Corporate Taxes and Internal Borrowing within Multinational Firms", *American Economic Journal: Economic Policy*, 6 (2), 54-93.

Feld, L.P., J.H. Heckemeyer and M. Overesch (2013), "Capital Structure Choice and Company Taxation – A Meta Study", *Journal of Banking and Finance*, 37 (8), 2850–66.

Graham, J.R. (2003), "Taxes and Corporate Finance: A Review", *Review of Financial Studies*, 16, 1075–129.

Haufler, A. and M. Runkel (2012), "Firms' Financial Choices and Thin Capitalization Rules under Corporate Tax Competition", *European Economic Review*, 56, 1087–103.

Huizinga, H., L. Laeven and G. Nicodème (2008), "Capital Structure and International Debt Shifting", *Journal of Financial Economics*, 88, 80-118.

Lohse, T. and N. Riedel (2013), "Do Transfer Pricing Laws Limit International Income Shifting? Evidence from European Multinationals", *CESifo Working Paper* no. 4404.

Mardan, M. (2014), "Why do Countries Differ in Thin Capitalization Rules: The Role of Financial Development", *Mimeo*.

Mintz, J. and M. Smart (2004), "Income Shifting, Investment, and Tax Competition: Theory and Evidence from Provincial Taxation in Canada", *Journal of Public Economics*, 88, 1149–68.

Mintz, J. and A.J. Weichenrieder (2009), *The Indirect Side of Direct Investment – Multinational Company Finance and Taxation*, MIT Press, Cambridge, MA.

OECD (2013), *Addressing Base Erosion and Profit Shifting*, OECD Publishing, Paris.

OECD (2014), *Action Plan on Base Erosion and Profit Shifting*, OECD Publishing, Paris.

Overesch, M. and G. Wamser (2010), "Corporate Tax Planning and Thin-capitalization Rules: Evidence from a Quasi-Experiment", *Applied Economics*, 42, 563–73.

Reuters (2013), "Factbox: Apple, Amazon, Google and tax avoidance schemes", *Reuters,* 22 May 2013, http://www.reuters.com/article/2013/05/22/us-eu-tax-avoidance-idUSBRE94L0GW20130522.

Ruf, M. and D. Schindler (2012), "Debt Shifting and Thin-capitalization Rules – German Experience and Alternative Approaches", Norwegian School of Economics (NHH), *Working Paper* 06.

Schindler, D. and G. Schjelderup (2012), "Debt Shifting and Ownership Structure", *European Economic Review*, 56, 635–47.

The Telegraph (2012), "Google's tax avoidance is called 'capitalism', says chairman Eric Schmidt", *The Telegraph,* 12 December 2012, http://www.telegraph.co.uk/technology/google/9739039/Googles-tax-avoidance-is-called-capitalism-says-chairman-Eric-Schmidt.html

Wamser, G. (2014), "The Impact of Thin-capitalization Rules on External Debt Usage – A Propensity Score Matching Approach", *Oxford Bulletin of Economics and Statistics*, 76 (5), 764–81.

Weichenrieder, A.J. and H. Windischbauer (2008), "Thin-capitalization Rules and Company Responses – Experience from German Legislation", *CESifo Working Paper* no. 2456.

Tax Havens in a World of Competing Countries

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Introduction

This paper discusses recent research on the theory of tax havens, with a special focus on their role in models of tax competition. One of the most important messages of literature on this topic is that the profit-shifting role of tax havens worsens the problem of tax competition among non-haven countries, leading to lower tax rates and welfare. However, there are counterarguments to this view, which I also highlight in this paper.

Tax havens are typically defined as countries that provide foreign investors with low or zero tax rates and attractive regulatory policies. They are typically small, and often not the final destination of foreign direct investment. Instead, they tend to serve as conduits for investment in foreign subsidiaries located in other countries. For example, an investment from the US to the UK might be routed through a tax haven to avoid taxes levied by the UK. Such activities represent a form of profit-shifting. A major method of shifting profits involves the use of debt. A foreign subsidiary of a US company could locate in the tax haven and invest in the debt of a subsidiary in the UK, in which case the interest payments would be deductible in the UK, but subject to little or no taxes in the haven. Table 1 and 2, taken from Gravelle (2009), illustrate the extent of this profit-shifting by showing US foreign country profits relative to GDP for larger and smaller tax havens. For G-7 countries, this ratio is 0.06 on average, but it is typically much higher for the larger tax havens, and rises to several hundred percent for some of the small island tax havens.

Tax havens have often been viewed as providing bank secrecy and thereby allowing tax evasion to occur. However, tax havens have recently come under strong international pressure to share information about cross-border deposits, and many of them have agreed to comply with the removal of bank secrecy. However, Schjelderup (2015) disputes the effectiveness of such agreements. One of his main arguments is that such information exchanges are costly for governments to implement; before they can occur, the particular firm using the tax haven must be identified, but ownership information is often difficult to obtain, partly because tax havens do not possess incentives to obtain and maintain accurate information. In any case, while secrecy is particularly important for the use of tax havens to evade taxes on portfolio investments,[2] much of the profit-shifting activities involving foreign direct investment by multinationals represent legal tax avoidance, and so can continue to flourish without information-sharing agreements. The main question in this paper is therefore: should tax havens be allowed to engage in such profit-shifting activities when countries compete for foreign investment, or is there a theoretical case for allowing these activities to flourish?

Tax competition in small versus large countries

Before getting into the main arguments concerning the welfare effects of tax havens, it is useful to first outline the basic model of tax competition developed by Zodrow and Mieszkowski (1986) and Wilson (1986); and to use it to explain why countries that are relatively small have an incentive to behave like tax havens by setting low tax rates. The basic model assumes a system of identical countries, with each country taxing mobile capital to finance a public good. Firms combine this mobile capital with an immobile factor (often interpreted as a labor input) to produce output, which is sold as a private good or transformed into the public good. Tax competition leads to inefficiently low tax rates, because countries treat the lost revenue from tax-induced outflows of capital as a cost. Since capital is assumed to be fixed for the entire system of countries in the basic model, a capital outflow

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[2] For a discussion, see Hines (2010).

Table 1

US foreign country profits relative to GDP
Larger countries (GDP > $10 bn) on tax haven lists and the Netherlands

Country	Profits of US controlled corporations as a percentage of GDP
Costa Rica	1.2
Cyprus	9.9
Hong Kong	2.8
Ireland	7.6
Luxembourg	18.2
Netherlands	4.6
Panama	3.0
Singapore	3.4
Switzerland	3.5
Taiwan	0.7

Source: Gravelle (2009).

Table 2

US foreign company profits relative to GDP
Small countries on tax haven lists

Country	Profits of US controlled corporations as a percentage of GDP
Bahamas	43.3
Barbados	13,2
Bermuda	645.7
British Virgin Islands	354.7
Cayman Islands	546.7
Guernsey	11.2
Jersey	35.3
Liberia	61.1
Malta	0.5
Marshall Islands	339.8
Mauritius	4.2
Netherland Antilles	8.9

Source: Gravelle (2009).

from one country represents a beneficial inflow for other countries; that is, it creates a positive fiscal externality.

Size differences between countries are often represented by differences in labor supplies. Since all production is characterized by constant returns to scale, the only implications of size differences involve incentives to set high or low taxes. A standard result in this literature, originally obtained by Bucovetsky (1991) and Wilson (1991), is that tax competition favors small countries, since they have a greater incentive to set relatively low taxes on capital and thereby attract capital away from large countries. The explanation is that small countries face a relatively elastic supply of capital, because they have no influence over the after-tax return that capital can earn outside their borders. In particular, Wilson (1991) shows that in a two-country model, if the size difference is sufficiently large, then the small country will be better off than in the absence of tax competition, whereas the large country will be worse off. The absence of tax competition is modeled as a world economy with efficient head taxes on immobile residents, rather than taxes on mobile capital.

This result offers an initial demonstration of how small countries can harm large countries when both are competing for a mobile tax base. The framework seems most relevant for countries like Ireland, where a significant amount of foreign direct investment occurs. But it does not address the use of tax havens to reduce taxable profits in other countries, independently of the final locations of foreign direct investment. Instead, a different approach is needed, rather than just viewing tax havens as small countries that tax capital at low rates because they are small. One such approach is developed by Slemrod and Wilson (2009), which I discuss below.

Parasitic tax havens

Slemrod and Wilson (2009) start with the standard tax competition model, as described above, where a large, but fixed number of identical countries compete for capital through reductions in capital tax rates. But they add "parasitic" tax havens to the model; that is, tax havens are "parasitic" on the tax revenues of the non-haven countries. The governments of the non-haven countries must now expend real resources to prevent taxable profits from being shifted to tax havens. These tax havens are modeled as effectively selling "concealment services" to firms in the non-haven countries, which enable the firms to reduce the shares of their capital income that are subject to taxation by the non-haven countries. But while this term suggests illegal tax evasion, no distinction is made between legal and illegal profit-shifting activities. Government enforcement ex-

penditures are modeled, but they would exist in either case.

In the absence of tax havens, investment in a country would occur until the value of the marginal product of capital equaled a required after-tax return for the owners of capital, *r*, plus the tax per unit of capital, *t*. The sum *r*+*t* is the gross return that capital must earn. But by using tax havens, firms avoid paying the full statutory rate, *t*. Instead, they face an effective tax rate, *T*. However, their expenditure on concealment services constitute both a private and social cost, and so should also be added to the required gross return. This cost, denoted *D*, is a pure "deadweight loss" for the economy. The gross return is then $R = r + T + D$.[3] If we now raise the statutory rate enough to increase the effective rate *T* by a unit, firms will respond by increasing their expenditure on concealment activities, causing *D* to increase. For this reason, a unit rise in the effective tax rate will cause the gross return to rise by more than a unit, creating a greater outflow of capital from the country than would otherwise occur. In this way, the presence of tax havens reduces the incentives for governments to raise their tax rates, thereby worsening the tax competition problem. Moreover, in an economy with mobile capital, the burden of the increased deadweight loss is passed on to immobile workers in the form of lower wages, further reducing incentives to raise taxes on capital.

Thus, the presence of tax havens increases the social costs that a country incurs when it raises its capital tax, thereby aggravating the tax competition problem. Eliminating tax havens raises the equilibrium taxes and public good supplies, leaving countries better off.

Slemrod and Wilson also endogenize the decision to become a tax haven, showing that the smaller countries are the ones that undertake this role. They then examine the partial elimination of tax havens. Eliminating the larger tax havens, which are close to indifferent about whether to become havens, drives up the equilibrium price of concealment services, thereby reducing their use. As a result of this higher price, all countries are better off, regardless of whether they are tax havens.

Johannesen (2010) provides a qualification to the Slemrod-Wilson analysis. He also considers a system of identical countries that compete for mobile capital, but now profit-shifting between these countries is allowed, rather than just profit-shifting involving the parasitic tax havens. In both cases, firms face an exogenous cost of shifting profits. In a symmetric equilibrium without tax havens, there would be no profit-shifting, but Johannesen shows that profit-shifting supports an asymmetric equilibrium, where some countries choose a high tax rate and others choose a low tax rate, although they are ex ante identical.[4] In contrast to the welfare-maximization objectives pursued by countries in the Slemrod-Wilson model, the objective now is the maximization of tax revenue. Both low- and high-tax countries must be indifferent about which tax to choose, meaning they obtain the same tax revenue from capital taxation. The high-tax countries lose tax base to the low-tax countries, via the shifting of capital investments to the low-tax countries, and also via the profit-shifting activities of firms. But once tax havens are introduced in a world characterized by an asymmetric equilibrium, the low-tax countries may no longer benefit from their low tax rate, because the rate is being undercut by the zero rate offered by tax havens. As a result, the economy may move to a symmetric equilibrium, where all countries offer the same tax rate. Although the shifting of profits to tax havens reduces tax revenue, the decision of low-tax countries to become high-tax countries may more than offset this revenue loss. This possibility is demonstrated in the case where competition for profits comes close to perfect, defined as the case where the lowest-tax country captures all of the taxable profits.

In Johannesen's model, the main distinction between tax havens and non-havens is that the latter tax capital at a positive rate and compete for real investment, whereas the only role of the former is to facilitate profit-shifting. For example, various small island havens might limit countries like Ireland from benefiting from profit-shifting activities of multinationals. However, unlike Johannesen's model, the countries that compete for real investment in practice are characterized by important differences that affect their incentives to reduce taxes. I have already mentioned size differences, for example. We would not expect tax havens to eliminate the tax rate differences among the competing countries that differ in size or other important characteristics. However, Johannesen's analysis suggests that countries with relatively low tax rates might be induced to raise their tax rates if they find that they are being outcompeted by tax havens for taxable profits.

[3] The government's expenditure on tax enforcement does not enter this expression, since it is not a cost for firms. However, Slemrod and Wilson define the effective tax *T* as net of such expenditure, and the deadweight loss *D* as inclusive of this expenditure (since it is a component of the economy's total deadweight loss). In this case, *T*+*D* is independent of enforcement expenditure.

[4] The possibility that ex ante identical countries or jurisdictions might choose different rates of taxation on mobile capital was originally demonstrated by Wilson (1987).

Tax discrimination via tax havens

One argument that has been advanced in favor of tax havens is that they allow governments to better discriminate between mobile and immobile capital. This view has been advocated by Hines (2010), who writes, "a more likely possibility is that the tax avoidance opportunities presented by tax havens allow other countries to maintain high capital tax rates without suffering dramatic reductions in foreign direct investment. Hence, the widespread use of tax havens may retard what would otherwise be aggressive competition between other countries to reduce taxes in order to attract and maintain investment. In effect, what tax havens do is to permit governments to distinguish investments, subjecting relatively immobile domestic investment to higher tax rates than the highly mobile international investment" (p. 120). Using a formal model, Hong and Smart (2010) demonstrate that tax havens may indeed induce a country to raise its corporate tax rate if initial tax rates are not too high. In fact, the increase may be so large that the effective tax rate on foreign capital rises.

This argument raises a basic question: if it is desirable to tax immobile domestic investment at higher rates than mobile international investment, then why does the country not do so directly? Hong and Smart (2010) respond by emphasizing the informational asymmetries involved in distinguishing between relatively mobile and immobile firms. One possible response would be to confront all firms with the same tax provisions, including the same tax rates, deductions and credits; and to design these provisions in such a way that those firms that are more mobile face the lower effective tax rates on capital when choosing their investment plans. Hong and Smart look specifically at the use of investment tax credits, but conclude that in an important class of cases, the use of a positive investment tax credit will reduce welfare. Osmundsen et al. (1998) allow for capital allowances that are nonlinear in capital investment. Although it is possible for the optimal tax system to feature less generous capital allowances for more mobile firms, they show that in the case where the firms' productivities at home and abroad are positively correlated, but their values are private information, the tax system should be designed so that the more mobile firms select the more favorable capital allowances.

Tax havens may also be viewed as serving the role of a self-selection mechanism. The more mobile firms can relatively easily choose where to place their foreign subsidiaries, and these are the firms that choose the profit-shifting services of tax havens. However, this method of reducing the effective tax burdens of mobile firms requires real resources, expended not only by firms on tax avoidance and evasion, but also by the government on enforcement activities designed to generate the optimal usage of havens.[5] Perhaps the use of tax havens may be justified by the costs involved in designing and administering a tax system that effectively taxes mobile capital relatively lightly. Alternatively, political constraints exist that prevent tax systems from being designed in a way that gives tax breaks to multinationals.

Another basic issue is whether the preferential tax treatment of relatively mobile tax bases is desirable when undertaken by the entire system of competing countries. This issue has been studied extensively, often using models that assume two tax bases, distinguished by mobility characteristics. The basic dilemma is that while preferential treatment allows governments to tax the relatively immobile tax base at a relatively high effective rate, the result may be more aggressive competition among governments for the mobile base, leading to lower tax rates on this base than would exist under a non-preferential system. In an early contribution, Keen (2001) analyzes this tradeoff, using a model in which two identical countries compete over two tax bases that exhibit different degrees of mobility. He finds that governments raise more revenue when the more mobile tax base gets preferential treatment. Janeba and Peters (1999) address the same question, using a model whereby the two countries differ in the sizes of their immobile tax bases, and these sizes depend on the rates at which they are taxed. Janeba and Peters also assume that the mobile base is infinitely elastic with respect to cross-country differences in tax rates, in contrast to the finite elasticity employed by Keen (2001). Under these assumptions, the elimination of preferential treatment leads to higher total tax revenue. The importance of tax-base elasticity is also apparent in subsequent papers that have generalized and extended the comparison between preferential and non-preferential regimes, including Wilson (2005a), Konrad (2008), and Marceau, Mongrain and Wilson (2010).[6]

[5] Hong and Smart demonstrate that multinationals prefer more tax planning than is socially optimal. In their model, tax planning occurs through the use of debt, which is limited by thin capitalization rules. Another way to limit this form of tax planning would be to impose withholding taxes on outbound interest payments. But Johannesen (2012) shows that tax competition among host countries eliminates these taxes in equilibrium. Gresik et al. (2014) allow multinationals to also shift taxable profits via transfer prices. But if a host country cannot sufficiently limit this second method of profit-shifting, then its use of permissive thin capitalization limits to attract FDI may lead to welfare losses, calling into question the desirability of tax havens.

[6] See also Janeba and Smart (2003), who investigate a more general model than is typically found in the literature on tax-base discrimination.

While this literature distinguishes between tax bases on the basis of their mobility characteristics, it does not distinguish between them based on whether they are "domestic" or "foreign." More recent literature suggests that the latter distinction is important. Haupt and Peters (2005), in particular, develop a model with two countries, where country *i* competes for the "domestic investments" of *i*'s investors, and the foreign direct investments (FDIs) of *j*'s investors in country *i*. A critical assumption is that there is a "home bias": if the two countries levy the same tax rate on *i*'s domestic investments, then more than half of these investments will locate in *i*. Haupt and Peters demonstrate that the non-preferential regime, where both domestic and foreign investments face a common tax rate, is preferable in this case. In particular, it leads to an increase in aggregate tax revenue, indicating less tax competition. The authors comment, "It is striking that our conclusions diverge from the result in Keen (2001), although we use an almost identical framework."

A recent paper by Mongrain and Wilson (2014) further investigates tax competition for domestic and foreign investment. Here, the assumption is that each of two competing countries starts with a given number of domestic firms. One country's domestic firms are foreign firms from the other country's viewpoint. The paper fills in the micro-foundations for the Haupt-Peters home bias effect by assuming that firms differ in their cost of relocating from one country to another. With this framework, the paper is able to relate the welfare ranking of the preferential and non-preferential regimes to the distribution of moving costs. In cases where these costs are uniformly distributed across firms, it is found that the non-preferential regime is preferable. If we employ the common assumption in this literature that governments seek to maximize revenue, then competition among identical countries under preferential treatment results in a level of total tax revenue that is only five-ninths of the level of total tax revenue under the non-preferential treatment.[7] Thus, the Mongrain-Wilson paper suggests that using tax havens to achieve preferential treatment can result in a substantial decline in tax revenue.

But Mongrain and Wilson qualify this result by showing that it is possible for the preferential regime to be preferred if there are a relatively large number of firms with low moving costs, implying that firms are highly responsive to small differences in the countries' tax rates. The basic idea is that in the symmetric equilibrium for the non-preferential case, each country has a strong incentive to reduce its tax rate by a small amount, since it can then obtain a large number of firms with low moving costs; that is, the tax-base elasticity is high. This undercutting drives down the common equilibrium tax rate. In contrast, a significant number of firms move between countries in the symmetric equilibrium for preferential case, because each country has an incentive to tax foreign firms at a lower rate than domestic firms, in an effort to induce some foreign firms to operate within its borders. Thus, the marginal firm is no longer a firm with small moving costs. Without a relatively large number of firms at the margin, there is less downward pressure on tax rates in the preferential case, leading to higher tax revenue.

This possible superiority of the preferential regime in the face of a highly elastic tax base should be reconciled with the results reported above that high elasticities actually favor the non-preferential regime. A crucial insight here is that the relevant responsiveness of firms to small changes in tax rates from their equilibrium levels can differ significantly between the two tax regimes. If there is a relatively large number of firms with low moving costs, then firm location is very sensitive to small tax changes around the symmetric equilibrium for the non-preferential regime. But this responsiveness is then relatively low at the margin in the preferential case, where each region sets different tax rates on domestic and foreign firms, implying that the marginal firm does not have a low moving cost. Thus, one cannot refer only to a single tax base elasticity; this elasticity may be significantly altered when going from one tax regime to the other.

Another consideration favors non-preferential regimes. In the Mongrain-Wilson model, firms switch countries only to reduce their tax burdens. Thus, mobility is wasteful. No firms move in the symmetric equilibrium for the non-preferential case, since all tax rates are the same. But firms do move in the preferential case, since each country's domestic tax exceeds its foreign tax. Thus, there is wasteful commuting in this case, but not in the non-preferential case.[8]

[7] Revenue maximization is a special case of a more general government objective used in the Mongrain-Wilson model. This objective places weight on both tax revenue and the "surplus" earned by private firms operating within the country, but tax revenue receives more weight. In this case, a change in tax regimes raises a country's welfare if its tax revenue rises and there is no change in the total number of firms within the country. The latter property holds when symmetric equilibria are considered, and also for special cases with asymmetric equilibria.

[8] Assuming uniform moving costs, wasteful commuting remains lower in the non-preferential case, even if differences in regional size cause equilibrium taxes to differ, thereby creating some mobility.

Finally, Mongrain and Wilson also examine how opinions on which regime is best differ across countries. Based on their behavior, tax havens certainly prefer preferential regimes. They employ different sets of legal and tax rules to foreign firms and investors than to local firms and residents. This is known as ring-fencing. For example, see Schjelderup (2015) for a detailed discussion of how these rules work. However, the analysis by Mongrain and Wilson suggests that non-haven countries that are relatively small also favor the preferential regime in cases where it is not preferred by large countries. Consider the case of uniform moving costs, where the non-preferential regime is preferred by both countries when they are of similar sizes. Mongrain and Wilson show that, regardless of size differences, each country's total number of firms in equilibrium (the sum of domestic and foreign firms) does not depend on which regime is in place. However, the equilibrium rates of taxation on firms do depend on the regime. In the preferential case, the tax rates on domestic and foreign firms are independent of the country's size. But in the non-preferential case, the tax rates chosen by both countries fall as the countries become more unequal. As a result, tax revenue drops, and the small country bears a disproportionate amount of the resulting welfare loss because its non-preferential tax rate is dropping more, although it is gaining foreign firms to replace its lost domestic firms. If the size difference in countries is large enough, then the small country will prefer the preferential regime. If small countries must rely on tax havens to lower their effective tax rates on mobile foreign firms, they will then favor the existence of tax havens.

Optimal discrimination

The previous section concerns the issue of whether preferential or non-preferential treatment of some types of capital is desirable. In practice, however, countries could conceivably commit to preferential treatment with limits. One might then ask whether there is some intermediate level of preferential treatment that is optimal from the viewpoint of the system of competing countries. Bucovetsky and Haufler (2008) study this issue using a multi-stage Nash game of tax competition between two countries. In the first stage, governments choose the degree of tax discrimination between mobile and immobile firms, represented by the share of capital income that mobile firms can shelter from taxes. One can imagine this choice representing a commitment to a tax enforcement policy determining the amount of profit-shifting to tax havens, but tax havens and tax enforcement are not explicitly modeled. In the second stage, the owners of firms choose whether to incur the costs needed to become multinational firms, allowing them to invest abroad and take advantage of tax havens and other tax-sheltering opportunities. Finally, these multinationals choose where to invest their mobile capital, and production and consumption occur. For the main model, countries are assumed to be identical.

The optimal level of discrimination in this model is limited by the distorting effect of tax discrimination on organizational form: if more tax sheltering is allowed, more firms choose the multinational structure. Without this behavioral response, governments would tax the return on the immobile domestic capital at one hundred percent. In fact, they might still do so if the elasticity of organizational form with respect to discrimination is sufficiently low. For the current discussion, let us assume that this is not the case. The model then yields a potentially surprising result. When a country increases its tax preferences for mobile firms in stage one of the game, it creates an incentive for it to raise its statutory rate in stage three, since the increased tax preferences reduce the investment disincentives from the higher statutory rate. In fact, it raises its statutory rate to such an extent that the effective tax rate on mobile capital actually increases. In other words, allowing more sheltering of income leads to a higher effective tax rate.

This conclusion lies in the authors' central finding that tax preferences are too low in the Nash equilibrium: a coordinated increase in these tax preferences would be welfare-improving for both countries. The basic idea is that when a single country increases its tax preferences, the result is a subsequent rise in its statutory tax rate and, therefore, in its effective tax rate on mobile capital. The other country then benefits from the additional capital investment that subsequently flows its way. This positive externality implies that tax preferences are inefficiently low from the viewpoint of both countries.

Given the sequential structure of decisions in this model, tax preferences serve a strategic role by allowing a government to unilaterally commit to a higher effective tax rate. In the standard model of preferential tax regimes, decisions on the taxation of mobile and relatively immobile capital are made simultaneously, so there is no such strategic use of tax preferences. Thus, how much importance we place on the Bucovetsky-Haufler argument for higher tax preferences depends on our view of the sequential structure of decision-making. Perhaps we can say that countries can commit to some aspect of

tax preferences, but some scope for altering firms' profit-shifting activities at a later date remains.

No such commitment is present in Slemrod and Wilson's (2009) model of tax competition with tax havens. Instead, they consider a Nash game in which tax rates and tax enforcement levels are simultaneously chosen. Here, the equilibrium enforcement level is found to be inefficiently high.

Concluding remarks

This paper has reviewed literature on how the profit-shifting activities of tax havens affect tax competition between countries. A major question in this literature is whether the inefficiencies associated with tax competition are reduced or increased by allowing tax havens to support a discriminatory tax system, where relatively mobile capital receives preferential treatment through the use of tax havens. Unfortunately, conflicting answers to this question remain, although the literature on this topic has made progress in identifying the information required to answer the question, including the relevant elasticities. As Mongrain and Wilson (2014) show, there are also potential conflicts between large and small countries, with small countries favoring a preferential regime. To the extent that tax havens are facilitators of preferential treatment, such conflicts might help explain the difficulties involved in reigning in the activities of tax havens. However, a continuing weakness in arguments in favor of tax havens is the lack of a fully convincing explanation for why governments need to use tax havens to discriminate between mobile and immobile tax bases, rather than designing their tax systems to achieve this discrimination at lower costs.

The models considered in this paper have the property that tax competition is welfare-reducing because it results in inefficiently low tax rates. But another strand of the literature on this topic argues that tax competition can be good, if it effectively constrains the behavior of self-interested government officials or legislators. For example, see Wilson (2005b) and Janeba and Schjelderup (2009) for models of this type. It would be useful to extend such models to explicitly include tax havens.

Finally, Schjelderup (2015) emphasizes the secrecy aspect of tax havens and argues that the detrimental effects of these "secrecy jurisdictions" extend beyond the profit-shifting activities addressed in the current paper, to include such disparate activities as illegal fishing, noncompliance with safety regulations for ships, and theft of government money by corrupt public officials. By facilitating corruption, tax havens may also lower economic growth in developing countries. To fully assess the welfare effects of tax havens, we need to consider the full range of their activities.

References

Bucovetsky, S. (1991), "Asymmetric Tax Competition", *Journal of Urban Economics* 30, 167–81.

Bucovetsky, S. and A. Haufler (2008), "Tax Competition When Firms Choose Their Organizational Form: Should Tax Loopholes for Multinationals be Closed?", *Journal of International Economics* 74, 188–201.

Gravelle, J.G. (2009), "Tax Havens: International Tax Avoidance and Evasion", *National Tax Journal* 62, 723–53.

Gresik, T.A., D. Schindler and G. Schjelderup (2014), „The Effect of Tax Havens on Host Country Welfare", unpublished manuscript.

Haupt, A. and W. Peters (2005), "Restricting Preferential Tax Regimes to Avoid Harmful Tax Competition", *Regional Science and Urban Economics* 35, 493–507.

Hines, J.R. (2010), "Treasure Islands", *Journal of Economic Perspectives* 24, 103–126.

Hong, Q. and M. Smart (2010), "In Praise of Tax Havens: International Tax Planning and Foreign Direct Investment", *European Economic Review* 54, 82–95.

Janeba, E., and W. Peters (1999), "Tax Evasion, Tax Competition and the Gains from Nondiscrimination: The Case of Interest Taxation in Europe", *Economic Journal* 109, 93–101.

Janeba, E., and M. Smart (2003), "Is Targeted Tax Competition Less Harmful Than Its Remedies", *International Tax and Public Finance* 10, 259–80.

Janeba, E., and G. Schelderup (2009), "The Welfare Effects of Tax Competition Reconsidered: Politicians and Political Institutions", *Economic Journal* 119, 1143–61.

Johannesen, N. (2010), "Imperfect Tax Competition for Profits, Asymmetric Equilibrium and Beneficial Tax Havens", *Journal of International Economics* 81, 253–64.

Johannesen, N. (2012), „Optimal Fiscal Barriers to International Economic Integration in the Presence of Tax Havens", *Journal of Public Economics* 96, 400–16.

Keen, M. (2001), "Preferential Regimes Can Make Tax Competition Less Harmful", *National Tax Journal* 54, 757–62.

Konrad, K. (2008), "Mobile Tax Base as a Global Common", *International Tax and Public Finance* 15, 395–414.

Marceau N., S. Mongrain and J.D. Wilson (2010), "Why Do Most Regions Set High Tax Rates on Capital?", *Journal of International Economics* 80, 249–59.

Mongrain, S. and J.D. Wilson (2014), "Tax Competition with Heterogeneous Capital Mobility" unpublished manuscript.

Osmundsen, P., K. P. Hagen, and G. Schjelderup (1998), "Internationally Mobile Firms and Tax Policy," *Journal of International Economics* 45, 97–113.

Schjelderup, G. (2015), "Secrecy Jurisdictions", *International Tax and Public Finance*, forthcoming.

Slemrod, J. and J.D. Wilson (2009), "Tax Competition with Parasitic Tax Havens", *Journal of Public Economics* 93, 1261–70.

Wilson, J.D. (1986), "A Theory of Interregional Tax Competition", *Journal of Urban Economics* 19, 296–315.

Wilson, J.D. (1987), "Trade, Capital Mobility, and Tax Competition", *Journal of Political Economy* 95, 835–56.

Wilson, J.D. (1999), "Theories of tax competition", *National Tax Journal* 52, 269–304.

Wilson, J.D. (1991), 'Tax competition with interregional differences in factor endowments', *Regional Science and Urban Economics* 21, 423–51.

Wilson, J.D. (2005a), "Tax Competition with and without Preferential Treatment of a Highly-Mobile Tax Base", in J. Alm, J. Martinez-Vasquez, and M. Rider, eds., *The Challenge of Tax Reform in a Global Economy*, Springer, 193–206.

Wilson, J.D. (2005b), "Welfare-Improving Competition for Mobile Capital", *Journal of Urban Economics* 57, 1–18.

Zodrow, G. and P. Mieszkowski (1986), "Pigou, Property Taxation and the Underprovision of Local Public Goods", *Journal of Urban Economics* 19, 356–70.

Incarceration and Crime: Lessons from California's Public Safety Realignment Reform

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Introduction

The use of incarceration as a tool to protect public safety varies substantially across countries. While in most European countries the incarceration rate is below 150 per 100,000 residents, and well below 100 in countries like Germany, the Netherlands and Sweden; the US, with roughly 2.2 million people currently in the nation's prisons or jails, incarcerate more people than any other country. With dramatic growth over the last three decades, the US incarceration rate now stands at more than 700 per 100,000 residents. A key question for policymakers in the US and elsewhere is; what is the crime preventive effect of incarceration?

The relationship between incarceration and crime is driven by three primary causal channels: firstly, prisons incapacitate the criminally active; secondly, the threat of prison may deter criminal activity; and finally, prison may be transformative, either through rehabilitation or through a hardening of prison inmates, factors likely to alter future offending by former prison inmates. While the first two factors theoretically induce a contemporaneous negative relationship between criminal offending and incarceration levels, the latter channel probably induces a distributed lagged effect of incarceration on crime that can be either positive or negative.

In this paper, we present recent findings based on perhaps the largest exogenous decline in a state's incarceration rate in US history on local crime rates.[3] We present and discuss the effects of a recent reform in California that caused a sharp and permanent reduction in the state's incarceration rate. These findings can be described as approximating the causal incapacitation effect of incarceration on crime. We also put the findings in the context of the existing literature and present some basic cost benefit analysis of incarceration.

California's public safety realignment reform

The 2011 legislation commonly referred to as public safety realignment (or AB 109) caused a substantial reduction in the population of California's overcrowded and expensive prison system. The reforms were forced by a federal court order to reduce the prison population; an order challenged by the state and upheld by the US Supreme Court in May 2011. With prison expenditure consuming ten percent of the state budget (more than doubling since the mid–1980s), and severe declines in state revenues caused by the Great Recession, the state was in no position to relieve overcrowding through new prison construction.

Realignment sought to reduce the prison population by reducing the rate at which parolees return to state custody and by sentencing lower-level offenders to county jails, rather than prison. The legislation transferred substantial responsibilities for monitoring paroled inmates and punishing lower-level offenders, from the state to its 58 counties. These new responsibilities also came with additional funding from the state and greater discretion for localities to decide how to implement realignment. The reforms went into effect on October 1, 2011 and quickly decreased the prison incarceration rate to a level not seen since the early 1990s. Although county jails absorbed many of the offenders affected by the legislation, recent analysis quite clearly shows that realignment markedly decreased the overall reliance on incarceration in California. Lofstrom and Raphael (2013a) show that on average, a county's jail population increases by one for every three felons no longer assigned to state prison. As realignment has caused a decline in the prison population of roughly 27,000, this translates into approximately 18,000 additional individuals in non-in-

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[3] For a more detailed discussion of the findings presented here, see Lofstrom and Raphael (2013b), available at http://www.ppic.org/main/publication.asp?i=1075.

stitutionalized settings who, in previous years, would have been either in prison or a local jail.

This large increase in "street-time" among former prison inmates raises obvious concerns over whether realignment has caused an increase in state crime rates. There are multiple avenues through which such a crime effect may occur. To the extent that prison incapacitates the criminally active by limiting "street-time", reducing the prison population may increase crime through reversing this incapacitation effect. Moreover, to the extent that potential offenders perceive a reduction in the severity of the punishment that they would receive if caught, the deterrent effect associated with the threat of prison may have been diminished. Moreover, this diminishing of the deterrence effect may be larger in localities where incarceration rates drop the most.

There are reasons to believe, however, that the effects of realignment on crime are likely to be small. Firstly, prior research on criminal incapacitation, or reduced "street-time", has shown that this effect varies considerably from inmate to inmate. Moreover, with the large increase in incarceration rates in the United States over the past three decades (with California charting pretty close to the national average), the average incapacitation effect has declined considerably as we incarcerate older and less serious offenders – that is to say, the crime-reducing benefits of incarceration are subject to diminishing returns to scale. Prior research on criminal incapacitation finds that diminishing crime-fighting returns set in at quite low levels of incarceration, with very small effects at the levels currently characterizing most US states, including California. As realignment was targeted at reducing the use of state prison for less serious felonies and for less serious violations (specifically, parole violations not involving a new felony), one may predict that the reverse incapacitation effect is likely to be modest.

Using California's reform to estimate crime effects

Any empirical study of the effects of the reform must be able to rule out the potential impacts of confounding factors that may be coincidentally impacting crime rates in California and other states, yet have nothing to do with the realignment reforms. Our empirical strategy makes use of the fact that the impact of realignment on county-specific incarceration rates varies considerably across counties. To be specific, counties that had very high pre-realignment incarceration rates (defined as the number of county residents in a state prison per 100,000 county residents) experienced the largest decreases in county-specific incarceration rates, and by extension, increases in the number of former inmates in their communities (Lofstrom and Raphael 2013a). Our empirical strategy essentially assesses whether crime rates increase more in counties that experience relatively large decreases in their county incarceration rates.

More specifically, using county level data on crime rates, prison incarceration rates, and jail incarceration rates, we measure changes in these three factors relative to the pre-realignment period for each month from October 2011 through September 2012 (effectively, the first twelve months following the reform). We adjust these change measures for county-specific seasonal patterns in crime and incarceration to make sure that cross-county differences in crime-seasonality that happen to coincide with the geographic distribution of realigned inmates are not biasing our results. Our estimates exploit the fact that there is substantial variation both within and between counties in the effects of realignment on the rates at which county residents are incarcerated. Hence, we can assess whether crime rates increase within a county as the number of realigned offenders residing within the county increases. We can also assess whether crime rates increase by relatively larger amounts in counties that experience relatively large increases in the number of former inmates residing in their communities.

Our preferred empirical estimates statistically control for three broad factors. Firstly, all of our estimates control at the county level for changes in the jail incarceration rate. As we ultimately seek to estimate the increase in crime rates for each one-person decrease in the rate at which county residents are incarcerated, we must be sure to control for any re-incarceration occurring at the county level through the jail systems.

Secondly, we adjust for broad county-specific trends coinciding with the implementation of realignment. There are a number of factors that may influence crime rates differentially across counties that may coincide with the number of realigned offenders, yet have nothing to do with the reform. One such potential factor is changes in the number of police officers. Many police departments have seen cuts to their staff in recent years, potentially exerting an upward pressure on crime trends. If the decline in the number of police officers coincides with the changes in incarceration, such a factor may lead to biased estimates of the crime effects of realignment.

Alternatively, the speed of the economic recovery may vary across counties, with counties experiencing slower recoveries perhaps having larger increases in crime in 2012. Allowing for county-specific trends in changes in crime and incarceration allows us to control for many such possibilities.

Thirdly, we control for the overall statewide trends in crime and incarceration rates. Since we observe substantial variation within counties over the course of the first post-realignment year, we are able to see whether counties that experience declines in their incarceration rate in excess of what happens on average, for a given month, also experience increases in crime that are in excess of what is observed on average for a given month. A look at cross-state trends reveals recent increases in crime, especially violent crime, in a number of other states throughout the country (Lofstrom and Raphael 2013b). This third set of control variables effectively adjusts for this broad trend.

One might contend that purging the data of the overall state-level trends may effectively throw out any general deterrent effects caused by realignment that are impacting crime statewide. To the extent that this is the case, our estimates controlling for state trends may be underestimating the effects of realigned offenders on crime. However, prior research on the prison-crime relationship has found that nearly all of the contemporaneous impact of prison on crime operates through incapacitation (see in particular, the discussion in Buonanno and Raphael 2013 and Raphael and Stoll 2013). Moreover, the violent crime trends in neighboring states strongly suggest the need for such controls. Finally, the estimated crime effects for the offense for which we see the strongest evidence of an effect of realignment (motor vehicle theft) exhibits little sensitivity to this control, suggesting that true realignment-induced impacts survive this statistical trend adjustment.

Our preferred estimates are those that adjust for all three factors discussed here. However, see Lofstrom and Raphael (2013b) for results from alternative empirical strategies which allow readers to view the sensitivity of the results to various specification choices.

We should note from the outset that the approach described above provides an estimate of the effect of realignment-induced changes in incarceration on crime rates, and that these estimates may differ from what one might expect from similar-sized reductions in other states or countries. There is a large body of research assessing the effects of changes in incarceration on crime that tends to find that incarcerating a convicted criminal offender does, on average, reduce crime through incapacitation (essentially reduced "street-time") and deterrence, with the lion's share of the reduction operating through incapacitation. However, this research also documents a decreasing crime-prison effect as incarceration rates increase (what economists refer to as a "diminishing returns to scale") at quite low levels of incarceration, and very small crime effects at the incarceration rates that currently characterize most US states, including California. Hence, the results presented here should be interpreted as the effects of a change in the incarceration rate on crime for a system with a pre-change rate hovering around 425 per 100,000 (roughly speaking, California's rate prior to September 2011).

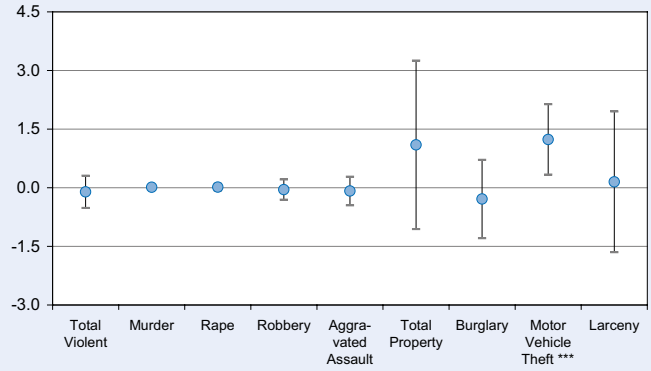
California's reform had limited and modest effects on crime

The estimates generated using our preferred model specification can easily be summarized in Figure 1, which is to be interpreted as follows. For each crime, the blue dot provides our estimate of the amount of crime committed by the average realigned inmate over the course of a year, or alternatively stated, the amount of crime prevented by incarcerating the person for a full year. The black bars extending upwards and downwards span the margin of error of our estimate. When the bars cross the zero line along the vertical axis, this indicates that the estimate is not statistically significant (that is to say, a value of zero is within our margin of error). On the other hand, when the range of the bars lies above the zero value measured on the vertical axis, the estimate is statistically significant.

These estimates reveal no evidence of an impact of realignment on violent crime. All of the estimates are near zero, quite precisely estimated and statistically insignificant. The estimates for property crime suggest a crime effect of 1.1 incidents per year of incarceration. When property crime is broken down into larceny theft, burglary and auto theft, the results show no statistically significant effect on the two former categories of property crime. However, the estimate for motor vehicle theft is statistically significant. One year of prison incarceration prevents approximately 1.2 motor vehicle thefts. In other words, in the context of California's reform, incarceration has a limited crime preventive effect and only an increase in auto thefts can be attributed to the large scale reform. These findings are corroborated in an

Figure 1

Estimated impact of one fewer offender incarcerated in prison for one year in California



Note: The length of the vertical bars represents the corresponding 95 percent confidence interval.
*** Coefficient statistically significant at the one percent level of confidence.

Source: Authors' estimations based on CJSC database; CDCR and BSCC Jail Profile Survey.

analysis of statewide crime trends to determine whether California's post-reform changes in crime rates stand out compared to states with similar pre-reform crime trends (Lofstrom and Raphael 2013b).

Putting the findings in relevant contexts

As discussed above, we find little evidence that the reductions in the state's prison population caused by realignment increased violent crime. However, we find robust evidence of a modest effect on property crime, especially motor vehicle thefts. Specifically, we estimate an average increase of about 1.2 auto thefts for each realigned inmate per year of time not incarcerated in a state prison.

Is this effect on property crime large? There are a number of ways to answer this question. Firstly, we can compare our results to those from previous research. Secondly, we can ask whether the value of the crimes prevented justifies the expenses associated with incarcerating someone for a full year. Thirdly, we can explore whether there are other crime-control strategies that would yield crime reductions at lower costs.

The California estimates are consistent with existing research

Regarding results from previous research, the speed and size of the reduction in California's incarceration rate is unprecedented in the United States, and thus it is impossible to find a comparable evaluation conducted within the United States. There is, however, a relevant example from another country. On July 31, 2006, the Italian Parliament passed legislation that reduced the sentences of most Italian prison inmates by three years effective as of August 1, 2006. The clemency applied only to inmates convicted of a subset of felonies committed prior to May of that year. The passage of the Collective Clemency bill followed a six-year debate surrounding Italian prison conditions, spurred in large part by the activism of the Catholic Church and the personal involvement of Pope John Paul II. With Italian prisons filled to 130 percent of capacity, the one-time pardon was principally motivated by the need to address prison overcrowding.

The legislation caused an immediate and large reduction in the Italian prison population. Within one month of implementation, the Italian prison population declined by roughly 22,000 inmates, equivalent to a 36 percent decrease, with a corresponding decrease in the national incarceration rate from 103 to 66 inmates per 100,000. Buonanno and Raphael (2013) evaluated the effects of the massive prisoner release on crime using empirical methods quite similar to those employed here for California. The magnitude of the increase in crime coinciding with the mass prisoner release suggests that on average each released inmate generates 14 felony crime reports to the police per year. While most of the increase in Italian crime associated with the collective clemency is attributable to theft, there was also a notable and statistically significant increase in robbery, a crime classified in most nations as a violent felony.

Why was the effect on crime so much larger in Italy than in California? For one, these are two very different places with different demographics and systems of policing and criminal sentencing. Hence, the disparity may be due in part to differences in institutional and cultural factors. However, there are other key differences between the two case studies that are probably essential to understanding the difference in outcomes. Firstly, the pre-pardon incarceration rate in Italy stood at roughly 103 per 100,000 residents, quite close to the US incarceration rates that existed prior to 1980. In California, the pre-reform incarceration rate was between 425 and

430 per 100,000, more than four times that of Italy. If we add California's roughly 75,000 jail inmates (a more appropriate comparison to Italy since Italy has a unified prison and jail system) this rate increases to 625 per 100,000. Hence, one possible explanation is that California casts a much wider net in terms of who is sent to prison and for how long. Consequently, the average pre-reform inmate in California is perhaps less criminally prone than the average inmate in Italy, where prison is used more sparingly. Moreover, the Italian Collective Clemency impacted a broader base of prison inmates, while California's realignment reform was much more selectively focused on non-violent offenders and parole violators.

While there are no comparable single-state studies for the US, there are several empirical studies of the relationship between crime and incarceration that employ large data sets for all 50 states that track incarceration and crime over multiple years. These studies generate estimates of the number of crimes prevented per year of incarceration comparable to our estimate for California. This research generally finds significant effects of incarceration on crime through effects that appear to decline with the scale of incarceration. In other words, when the US incarceration rate was very low, small increases in incarceration tended to generate large reductions in crime. Conversely, when the US incarceration rate is high, small increases in incarceration generate very small reductions in crime. This is a textbook example of what economists refer to as diminishing returns to scale.

Levitt (1996) provides one of the most widely cited studies in this vein. Levitt (1996) analyzes data for US states covering the period 1971 through 1993, a period over which the average state in his sample had an incarceration rate of 166 per 100,000. The estimates in the study imply that each prison year served prevented approximately one violent offense and roughly seven property offenses. Raphael and Stoll (2013) provide a similar analysis, but for separate time-periods in the United States across which incarceration rates differ greatly. Specifically, Raphael and Stoll (2013) estimate the average number of crimes prevented for each prison year served for three time-periods: 1977 to 1988, 1989 to 1999, and 2000 to 2010. Average state incarceration rates during these three time-periods were 171, 349, and 449 respectively. The authors estimate that during the earliest period when incarceration rates were the lowest, each prison year served prevented around 1.2 violent felony offenses and 8.6 property offenses (roughly in line with Levitt's estimates). For the latter two periods with higher incarceration rates, the average effect on violent crime falls to zero. The authors find effects on property crime of roughly 1.3 crimes per prison year served during the 1990s; and roughly two crimes per prison year served for the period from 2000 to 2010. Liedke, Piehl and Useem (2006) provide an additional analysis of state level crime and incarceration data, with an explicit focus on how the effect of incarceration on crime varies with the overall incarceration rate. The authors present strong evidence that the effectiveness of incarceration as a crime control device declines as the incarceration rate grows.

Our estimates for California line up quite closely with those from Raphael and Stoll (2013) for the US for more recent years, and are certainly in line with the results presented in Liedke, Piehl and Useem (2006). Moreover, when contrasted with the very large effects on crime related to the Italian mass prisoner release, the estimates presented in this report strongly reinforce the finding from prior research that the effectiveness of prison as a crime control device is subject to diminishing returns to scale.

Cost effectiveness and alternative crime-reducing strategies

There is a growing body of research that places a dollar value on the social costs of specific criminal offenses. Naturally, serious violent crimes carry larger social costs than less serious property offenses. With such costs estimates, one can estimate the benefits associated with incarcerating someone for a year and compare those benefits to the costs of incarceration. Levitt (1996) conducts such a cost-benefit analysis in his analysis of US states during the 1970s and 1980s, as do Buonanno and Raphael (2013) in their analysis of the 2006 Italian Collective Clemency bill. Levitt finds that the dollar value of the benefits in terms of crime reduction of higher incarceration during these early years outweigh the additional incarceration costs. Buonanno and Raphael (2013) find that the costs associated with higher crime caused by the 2006 prisoner release far outweighed the benefits in terms of prison spending.

With our estimates of the effect of realignment on crime, estimates of the costs of crime summarized in a 2010 RAND study by Heaton (2010), and estimates from the Legislative Analyst's Office (LAO) on the costs of incarceration in California, we can perform a similar analysis here. Our preferred empirical results suggest that each prison year served prevents 1.2 auto

thefts. Heaton's (2010) summary of the costs of crime literature implies that each auto theft costs on average USD 9,430. This suggests that each prison year served for those who, as a result of realignment, are no longer incarcerated prevents USD 11,316 in crime related costs. The LAO estimates that the annual cost of incarcerating a prison inmate in California is USD 51,889. Hence, unlike the analysis in Levitt (1996) and the analysis for the Italian prisoner release, here the benefits in terms of prison expenditure savings outweigh the costs in terms of slightly higher property crimes.

The simple cost-benefit analysis discussed above is useful for thinking about whether the social expenditure is justified on the margin. However, such analysis considers the effectiveness of a particular policy intervention in isolation, without considering what could be achieved by reallocating the saved resources towards other uses. For example, it may be the case that a reduction in incarceration, in the absence of some other policy intervention, may generate small increases in property crime. However, if the money saved from reduced prison expenditures was channeled into alternative, and perhaps more cost-effective crime control strategies, increases in crime need not be the end-result. Moreover, to the extent that alternative crime-control tools are at least as effective as incarceration, maintaining low crime rates would not require additional public expenditure.

Perhaps the most obvious policy tool with the strongest research base regarding its impact on crime concerns the expansion of local police forces. There is considerable empirical evidence of the general effectiveness of higher police staffing levels on crime. The research includes broad city-level analyses (Levitt 1996, 2002, Chalfin and McCrary forthcoming), studies that exploit temporary increases in policing (DiTella and Schargrodsky 2004), studies analyzing surges in hiring associated with federal policy (Evans and Owens 2007), as well as high frequency time series analysis (Corman and Mocan 2000). These studies consistently find relatively large effects of expanding city police forces on local crime rates. Heaton (2010) estimates that the benefits in terms of reduced crime of hiring an additional police officer exceed USD 300,000 per years in several cities; a figure substantially exceeding the annual cost of an additional officer. While part of the benefits from expanding police forces most certainly derive from apprehending and incapacitating highly criminally active individuals, a more consistent police presence is also likely to deter criminal activity, especially among those who may be transitionally passing through a high-offending age range, when a future life in crime is certainly not a pre-ordained outcome.

Perhaps the most rigorous analysis of the effects of additional police on crime is provided in a recent study by Aaron Chalfin at the University of Cincinnati and Justin McCrary at the UC Berkeley Law School (2013). In an analysis of the period 1960 through 2010 of medium to large US cities, the authors find substantial and sizable effects of hiring additional police officers on crime rates, with notably statistically significant effects on very serious violent crimes. The empirical results in their analysis imply that each additional police officer reduces annual crime by 1.3 violent crimes and 4.2 property crimes. In an analysis of the costs and benefits of police expansion, the authors conclude that each dollar invested in additional policing generates USD 1.6 in crime savings. Based on these findings the authors conclude that the level of police staffing levels in the United States is too low. It is important to note that our cost-benefits analysis for prison suggests a dollar of additional incarceration generates only 23 cents in crime savings. In other words, the average benefit-cost ratio for incarcerating those who are now on the street as a result of realignment falls far short of one.

Conclusions

Taken together, the findings presented here paint a rather clear and consistent picture. Incarceration does prevent crime, but at high incarceration rates, such as those observed in the US today, the effects are limited and modest. The comparison of just one alternative strategy to incarceration, namely that of more police officers, suggests that there are probably other cost-effective policy interventions that can be deployed to combat crime in, from a world perspective, high incarceration places like California.

Of course, we have discussed only one possible alternative intervention (higher police staffing), but many alternative policy tools could and should be explored by researchers and policymakers. Such alternatives that may pay immediate returns include alternative systems of managing probationers and parolees, including swift-and-certain yet moderate alternative sanctions systems such as Hawaii's Opportunity Probation with Enforcement (HOPE), intervention, or high quality cognitive-behavioral therapy interventions for adult offenders. Interventions that may take a few years bear fruit, yet ultimately result in less crime and fewer offenders,

include early childhood human capital interventions and targeted interventions for high-risk youth. In sum, there are probably other policy interventions, including more police officers, that can be deployed to combat crime in many states in the US and that would not require high incarceration rates to maintain low crime rates.

References

Buonanno, P. and S. Raphael (2013), "Incarceration and Incapacitation: Evidence from the 2006 Italian Collective Pardon", *American Economic Review* 103(6), 2437–65.

Chalfin, A. and J. McCrary (forthcoming), "Are U.S. Cities Under-Policed? Theory and Evidence", *Review of Economics and Statistics*.

Corman, H. and H. NaciMocan (2000), "A Time-Series Analysis of Crime, Deterrence, and Drug Abuse in New York City", *American Economic Review* 90(3), 584–604.

Di Tella, R. and E. Schargrodsky (2004), "Do Police Reduce Crime? Estimates Using the Allocation of Police Forces after a Terrorist Attack," *American Economic Review* 94(1), 115–33.

Evans, W. N. and E. G. Owens (2007), "COPS and Crime", *Journal of Public Economics* 91(2), 181–201.

Heaton, P. (2010), *Hidden in Plain Sight: What Cost-of-Crime Research Can Tell Us About Investing in Police*, RAND.

Levitt, S. D. (1996), "The Effect of Prison Population Size on Crime Rates: Evidence from Prison Overcrowding Legislation", *Quarterly Journal of Economics* 111(2), 319–51.

Levitt, S. D. (2002), "Using Electoral Cycles in Police Hiring to Estimate the Effects of Police on Crime: Reply," *American Economic Review* 92(4), 1244–50.

Liedke, R., Piehl, A. M. and B. Useem (2006), "The Crime Control Effect of Incarceration: Does Scale Matter?", *Criminology and Public Policy* 5, 245–75.

Lofstrom, M. and S. Raphael (2013a), *Impact of Realignment on County Jail Populations*, Public Policy Institute of California, San Francisco, CA.

Lofstrom, M. and S. Raphael (2013b), *Public Safety Realignment and Crime Rates in California*, Public Policy Institute of California, San Francisco, CA.

Raphael, S. and M. A. Stoll (2013), *Why Are So Many Americans in Prison?,* Russell Sage Foundation, New York, NY.

Divided Government and the Adoption of Economic Reforms

Andreas Bernecker[1]

Introduction

Many democratic political systems entail the possibility of non-unified governments, i.e. situations where different political branches are dominated by different party majorities. The most famous example is divided government in the United States in which case the President has to face a majority of the opposing party in either the Senate, or the House of Representatives, or possibly even both. However, also in several other countries do elections often result in similar divisions of political power: In France, for example, the President may have to nominate a Prime Minister from another party than his/her own (so-called "cohabitation"). And even in parliamentary systems such as Germany or Italy, the two legislative chambers may have differing party majorities, resulting in a divided legislature.

A common claim with respect to such non-unified governments is that they are slow in making decisions; or do not make any decisions at all since the parties just block each other. This point has, for example, been made by former White House Counsel Lloyd N. Cutler for divided governments in the United States (Cutler 1988, 489–90): "So you have a government that most of the time, on essential issues, really remains either in a deadlock or in a state where no real decision can be made." A potential consequence is that no relevant reforms can be passed under divided government, as opposed to unified government where one party dominates all branches and can drive through its reforms. This observation by Cutler (1988) seems to have become accepted conventional wisdom by now. For example, The Economist argued along similar lines when analyzing the situation after the November 2012 elections that again confronted Democratic President Obama with a Republican majority in the House of Representatives (The Economist 2012). The claim can also be backed up theoretically. George Tsebelis' veto player theory (Tsebelis 1995, 2002) illustrates nicely how the likelihood of implementing a reform changing the status quo falls the more political actors have a relevant say in policy-making. Thus, divided governments are expected to implement fewer economic reforms compared to unified governments.

However, politics can be more than just fixed opposing partisan views blocking each other. Parties tend to reformulate their policy positions depending on external factors such as political competition. Especially under divided government political competition may, in fact, be particularly intense. Having both parties dominating at least one political branch gives them both considerable agenda-setting powers. These can potentially be used to bring up policy issues. Fruitful policy competition may emerge. It is conceivable that such policy competition induced by divided government leads to more policy reforms being passed compared to a situation of unified government where one party alone dominates policy-making completely. Thus, it is ultimately an empirical question whether it is really true that divided governments implement fewer economic reforms than unified governments.

For this reason I investigate the relationship between divided government and the adoption of reforms empirically in recent work (Bernecker 2014). The focus is on welfare reforms at the US state level. This paper aims to give a short overview of this research. The next section introduces the existing empirical literature on the effects of divided governments. The following section summarizes my findings for welfare reforms in the United States, and the final section is a brief conclusion.

Literature

The effects of divided governments on political outcomes have been empirically analyzed in both political science and economics. In political science, there is a body of literature on policy innovation started by Walker (1969) and reviewed in Berry and Berry (2007) that analyzes the political determinants of reformist

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laws. Some of these studies such as Berry and Berry (1990, 1992) also briefly cover divided government as a potential explanatory factor. More important, however, is the work by David Mayhew (1991, 2005). He shows that in the second half of the 20th century, the number of important laws passed at the US federal level does not actually differ between unified and divided governments. Which laws are important is judged by contemporary or retrospective expert observers. His work cast first doubts on the claim that divided governments pass fewer or less significant laws.

Mayhew's (1991, 2005) work has been criticized by Sarah Binder (1999, 2003). She argues that the number of significant laws passed is an incomplete measure since it does not reflect which important laws discussed during sessions have not actually been implemented. She therefore uses the share of bills passed out of all bills mentioned in relevant newspaper editorials as a key measure of legislative productivity instead. Using this measure for statistical analysis, she finds that divided governments do implement a significantly smaller share of discussed bills only compared to unified governments. This would be in line with standard theory. It has, however, been shown that the whole legislative agenda (i.e. the number of laws discussed) is usually larger under divided governments; and that Binder's (1999, 2003) measure is thus endogenous (Shipan 2006). The results of this strand of literature therefore largely depend on the way legislative productivity is defined. For an overview, see Binder (2011). A further limitation of this literature is that almost all of it focuses on the US federal government. Although this is certainly one of the most interesting levels to study, it does not yield many observations and thus severely limits the power of any statistical analysis.

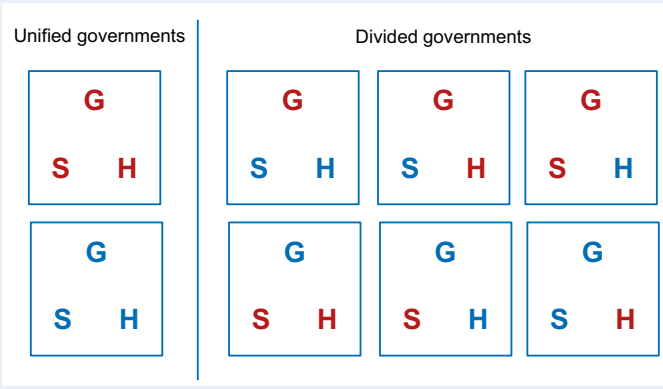
The economics literature has focused on fiscal policy and budgets as outcome variables of interest. One of the first contributions is the one by Roubini and Sachs (1989) which shows that coalition and minority governments are worse at managing budgets during crises in OECD countries. This study thus provides initial insights into how non-unified governments may have negative effects in the realms of budget politics. One issue, however, may be that countries with politically very different institutions are put into a single regression analysis. This is why Poterba (1994) and Alt and Lowry (1994) both investigate the US state level offering the possibility of deep statistical analysis, while keeping the level of institutional heterogeneity at a minimum. Both studies confirm that unified governments are indeed better able to respond to fiscal crises. Recently, the timing of passing budgets has also been compared for divided versus unified US state governments (Andersen et al. 2012, Klarner et al. 2012). These papers find that budgets are more likely to be passed late under divided governments.

Divided government and welfare reforms in the US states

There are different types of divided governments at the US state level depending on which party dominates which of the three institutions Governor (G), State Senate (S), and State House (H), as illustrated in Figure 1. In unified governments, either all three are dominated by Democrats (blue) or all three are dominated by Republicans (red). This means that the respective party controls the gubernatorial office and also has majorities of seats in both legislative chambers. In divided governments, one of the three institutions is dominated by another party than the other two. This definition entails six different possible forms of divided governments. It is conceivable that these different forms have a differential impact on the adoption of reforms. However, this report focuses on solely distinguishing the two categories of divided and unified governments as the most basic differentiation of forms of government. For a more detailed

Figure 1

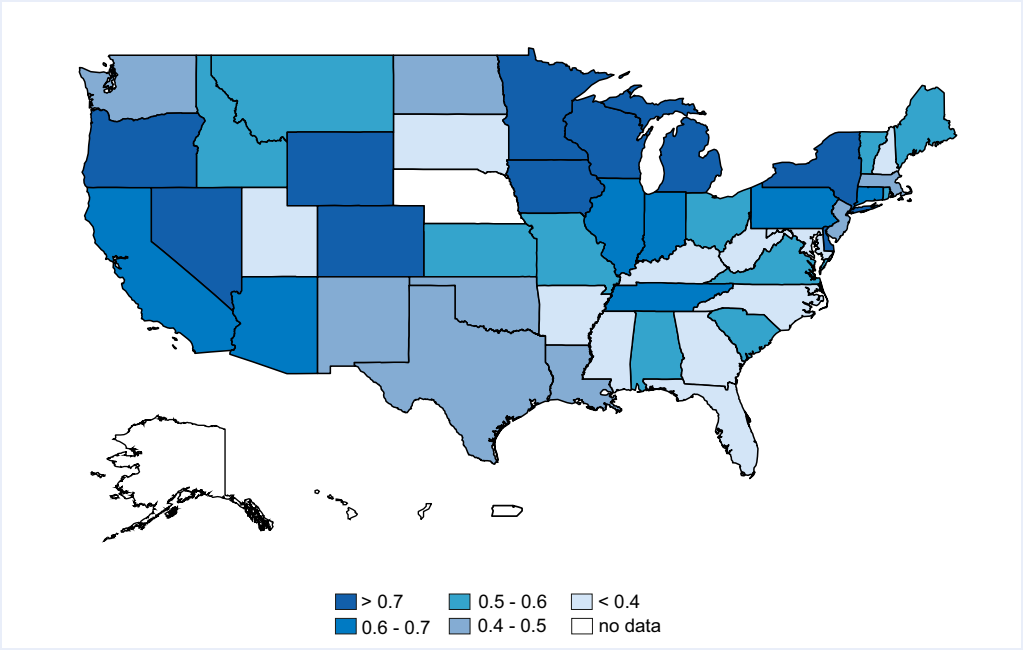
Types of governments in US states



Source: Own illustration, adapted from Bernecker (2014).

Figure 2

Share of years with divided government across US states (1978-2010)



Source: Appendix A, Bernecker (2014).

differentiation, see Bernecker (2014). On average, over half of all US state governments have been divided in past decades.

Divided governments are not evenly distributed across the US states. Figure 2 shows the incidence of divided governments from 1978 to 2010. On the one hand, there are states that have rarely had a divided government in past decades like Georgia or South Dakota. On the other hand, there are states that ended up with government being divided almost all of the time such as Delaware or New York. This is to be expected given that some states are swing states with many competitive elections whereas others are safely dominated by only one party for most of the time. When analyzing the effect of divided government on reform adoption, there is therefore only limited value in comparing, for example, reform adoption by a divided government in New York to reform adoption by a unified government in Georgia. Not only are these states very different when it comes to the frequency of divided government, but politics could work differently in these two states for several other reasons as well. Therefore, the econometric approach employed in Bernecker (2014) is to run fixed effects panel data regressions instead that allow for within-state identification. This means that reform adoption by a divided government in New York is only compared to reform adoption by a unified government in New York. This allows clean identification of the effect of divided government on the adoption of economic reforms.

To analyze the adoption of economic reforms, I focus on welfare policy reforms at the US state level between 1978 and 2010. These reforms include, for example, the introduction or abolishment of, or changes to work requirements, time limits, or sanctions for welfare recipients. Another example of a welfare reform is the introduction of a family cap policy. Such a policy rules that a welfare benefit recipient that conceives a child while already on welfare does not get any benefits for this child when it is born. Since the number of welfare recipients was on the rise in the 1980s and early 1990s, most of these reforms sought to restrict access to welfare. For more background on welfare reforms at the US state level and a political economy analysis, see Bernecker and Gathmann (2013). Welfare reforms are typically a very partisan issue, i.e. parties tend to have opposing views on such reforms. This makes welfare reforms in particular a very sensible instrument for analyzing the reform adoption effects of divided governments: if it is really true that under divided governments parties just

block each other and no reforms can be passed, this should definitely be reflected in the data for a partisan topic such as welfare. In this sense analyzing welfare reform is a conservative test of standard theory.

Table 1 presents a very first look at the data. It shows that unified governments on average reform their welfare system in 20% of all years from 1978 to 2010, whereas divided governments do so in 25%. This difference is not only statistically significant, but also contradicts conventional wisdom. Divided governments pass more welfare reforms than unified governments. But does this counter-intuitive result also hold when running controlled regression analyses?

Table 1

Welfare reforms in US states under unified and divided governments

	Unified governments	Devided governments	Test of difference
Mean reform years	0.20	0.25	0.025**
Observations	695	779	

Notes: Between 1978 and 2010, unified governments reform the welfare system in 20% of all years, divided governments in 25% of all years. A mean comparison t-test shows that this difference is significant at the 5% level (**) with a p-value of 2.5%.

Source: Table 15, Bernecker (2014).

Table 2 presents the results from estimating linear probability models. The dependent variable is a dummy whether there was a welfare reform adopted in a given year or not. The explanatory variable of interest is a dummy that is equal to one if government was divided in a given year. Specification (1) only adds year fixed effects to this regression, i.e. in case there are particularly "reformist years" they can no longer bias the estimation. The significant coefficient of the divided government dummy means that, according to this regression, divided governments are 4.13% more likely to reform welfare. This result confirms the result of the mean comparison in Table 1 and is actually also very similar in size.

Naturally, there are many more variables that could still bias the estimation. This is why specifications (2) to (5) add more and more control variables to the regression. Specification (2) adds state fixed effects, i.e. uses within-state variation in the form of government to identify the effect on reform adoption. Specification (3) adds a state-specific linear time trend. Specification (4) adds a range of demographic controls such as the unemployment rate in a state, its per capita income, the share of welfare recipients, or the share of immigrants in the population. Specification (5) adds several political control variables. Among those are pre- and post-election year controls, measures for the political polarization of legislative chambers, the share of women in the legislature, and a dummy whether the governor can still be reelected for another term or has already reached the time limit.

All specifications find a significantly positive effect of having a divided government on the likelihood of adopting a welfare reform. Across all specifications, the size of the effect is around 5%. Given that the likelihood of a unified government to adopt a welfare reform is about 20% (Table 1), the likelihood of adopting a welfare reform is 5/20 = 25% higher under divided government. Thus, the effect is not only statistically significant, but also sizeable. The statistical tests shown in Tables 1 and 2 do not necessarily establish causality. However, further econometric analysis in Bernecker (2014) does indeed reveal that the result is causal. In US states from 1978 to 2010, divided governments adopted welfare reforms more often than unified governments.

One explanation for the finding that divided governments reform more can be based on political competition. It is known that the different political branches in US states often engage in stiff political competition with each other (Rosenthal 2009). When it comes to innovative policymaking, this competition may be even more pronounced when different branches are dominated by different political parties. Divided government gives both parties relevant agenda-setting powers in policymaking. If political parties use this power to confront their counter-part with political reform ideas, more reforms may eventually be passed compared to a situation with unified government where one party alone may dominate policymaking. This and other potential explanations are also explored econometrically in Bernecker (2014).

A nice example of reform adoption under divided government caused by political competition across branches is provided by the passage of the landmark US Welfare Reform at the federal level in 1996. Haskins (2006) discusses the history of this reform in great detail. Bernecker (2014, 22) provides a brief overview of the reform: in 1992, presidential candidate Clinton cam-

Table 2

Divided government and adoption of welfare reforms in US states

OLS regressions with reform year dummy as dependent variable					
	(1)	(2)	(3)	(4)	(5)
Divided government	0.0413** (0.0195)	0.0552*** (0.0183)	0.0600*** (0.0204)	0.0649*** (0.0229)	0.0637*** (0.0234)
Year FE	√	√	√	√	√
State FE		√	√	√	√
Linear trend			√	√	√
Dem. controls				√	√
Pol. controls					√
Observations	1,474	1,474	1,474	1,343	1,343
R squared	0.253	0.283	0.315	0.326	0.335

Notes: The dependent variable in all specifications is a dummy that is equal to one when a state reformed its welfare system in a given year. Divided government is a dummy that is equal to one when the majority of the state's lower or upper legislative chamber is from another party than the governor. All specifications include year fixed effects, all from (2) onwards state fixed effects, all from (3) onwards state-specific linear time trends, all from (4) onwards lagged demographic controls such as unemployment rate, per capita income, or immigrant population share. Specification (5) additionally includes political controls such as election year, political polarization of chambers, or lame duck governor control. For details, see the source. Robust standard errors clustered at the state level are shown in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Tables 2 and 3, Bernecker (2014).

paigned on welfare reform. The Democrats not only won the presidency, but also majorities in both Senate and House. However, during 1993 and 1994 no welfare reform was passed. Although government was unified, almost nothing happened since Democrats were themselves divided on the issue. When the Republicans won majorities in both Senate and House in the 1994 midterm elections, they almost immediately adopted a conservative welfare reform law. Clinton vetoed the law. However, he was obviously challenged in the realms of welfare policy. After negotiations with the Republicans, a joint welfare reform was finally passed under divided government in 1996. This case study evidence from the federal level supports the econometric findings for the state level: Competition under divided government may lead to more reforms being passed than under unified government.

Conclusion

Bernecker (2014) shows that, contrary to conventional wisdom, US state governments pass more welfare reforms when they are divided among parties. Standard theory suggests that having more veto players in government should result in fewer reforms being passed. However, in this case, having different parties dominating different political bodies seems to enhance political competition between them, and thus also reform-making. Since non-unified governments are a common phenomenon in many democracies and since these governments are often blamed for legislative gridlock, the results presented in this paper therefore call for further research analyzing the relationship between the form of government and reform-making in other countries too.

References

Alt, J. E. and R. C. Lowry (1994), "Divided government, fiscal institutions, and budget deficits: Evidence from the states", *American Political Science Review* 88 (4), 811–28.

Andersen, A. L., D. D. Lassen and L. H. W. Nielsen (2012), "Late budgets", *American Economic Journal: Economic Policy* 4 (4), 1–40.

Bernecker, A. (2014), "Divided We Reform? Evidence from US Welfare Policies", *CESifo Working Paper* No. 4564.

Bernecker, A. and C. Gathmann (2013), "Trial and Error? Policy Experimentation during the US Welfare Reform", *University of Mannheim Department of Economics Working Paper* No. 13-05.

Berry, F. S. and W. D. Berry (1990), "State lottery adoptions as policy innovations: An event history analysis", *American Political Science Review* 84 (2), 395–415.

Berry, F. S. and W. D. Berry (1992), "Tax innovation in the states: Capitalizing on political opportunity", *American Journal of Political Science* 36 (3), 715–42.

Berry, F. S. and W. D. Berry (2007), "Innovation and diffusion models in policy research", in P. A. Sabatier eds., *Theories of the Policy Process*, second edition, 223–60, Boulder, CO: Westview.

Binder, S. A. (1999), "The dynamics of legislative gridlock, 1947-96", *American Political Science Review* 93(3), 519–33.

Binder, S. A. (2003), *Stalemate: Causes and Consequences of Legislative Gridlock*, Washington DC: Brookings Institution Press.

Binder, S. A. (2011). "Legislative productivity and gridlock", in E. Schickler, eds., *The Oxford Handbook of the American Congress*, Chapter 28, Oxford University Press.

Cutler, L. N. (1988), "Some reflections about divided government", *Presidential Studies Quarterly* 18 (3), 485– 92.

Haskins, R. (2006), *Work Over Welfare: The Inside Story of the 1996 Welfare Reform Law*, Washington DC, The Brookings Institution.

Klarner, C. E., J. H. Phillips and M. Muckler (2012), "Overcoming fiscal gridlock: Institutions and budget bargaining", *Journal of Politics* 74 (4), 992–1009.

Mayhew, D. R. (1991), *Divided We Govern. Party Control, Lawmaking, and Investigations, 1946-1990*, New Haven: Yale University Press.

Mayhew, D. R. (2005), *Divided We Govern. Party Control, Lawmaking, and Investigations, 1946-2002*, second edition, New Haven: Yale University Press.

Poterba, J. M. (1994), "State responses to fiscal crises: The effects of budgetary institutions and politics", *Journal of Political Economy* 102 (4), 799–821.

Rosenthal, A. (2009), *Engines of Democracy: Politics and Policymaking in State Legislatures*, Washington DC: CQ Press.

Roubini, N. and J. D. Sachs (1989), "Political and economic determinants of budget deficits in the industrial democracies", *European Economic Review* 33 (5), 903–33.

Shipan, C. R. (2006), "Does divided government increase the size of the legislative agenda?", in E. S. Adler and J. S. Lapinski, eds., *The Macropolitics of Congress*, Chapter 6, Princeton University Press.

The Economist (2012), November 10th Issue, title page.

Tsebelis, G. (1995), "Decision making in political systems: Veto players in presidentialism, parliamentarism, multicameralism and multipartyism", *British Journal of Political Science* 25 (03), 289–325.

Tsebelis, G. (2002), *Veto Players: How Political Institutions Work*, Princeton University Press.

Walker, J. L. (1969), "The diffusion of innovations among the American States", *American Political Science Review* 63 (3), 880–99.

Economic Prosperity and Well-being in Developed Countries

To what extent is economic prosperity linked to a country's well-being? In recent years several new indicators have been proposed as an alternative to the standard economic measure of income. Among the most well-known are the Human Development Index (HDI) and the World Happiness Report. At the same time, the competitiveness of countries as a crucial determinant of prosperity is measured by well-established rankings, e.g., the Doing Business Ranking of the World Bank. Often such indicators are employed to illustrate differences between underdeveloped, poor countries and the highly industrialized, rich Western world. In the following, however, the focus is on whether the above mentioned rankings assess countries within the developed world differently.

The Human Development Index (HDI) emphasizes that people and their capabilities should be the ultimate criteria for assessing the development of a country. It is the geometric mean of normalized indices of three key dimensions: life expectancy and health status, education as measured by expected years of schooling and the standard of living as measured by gross national income per capita. In doing so, the index uses the logarithm of income to reflect the diminishing importance of income with increasing level, but further important dimensions of capabilities such as inequalities and empowerment are neglected.

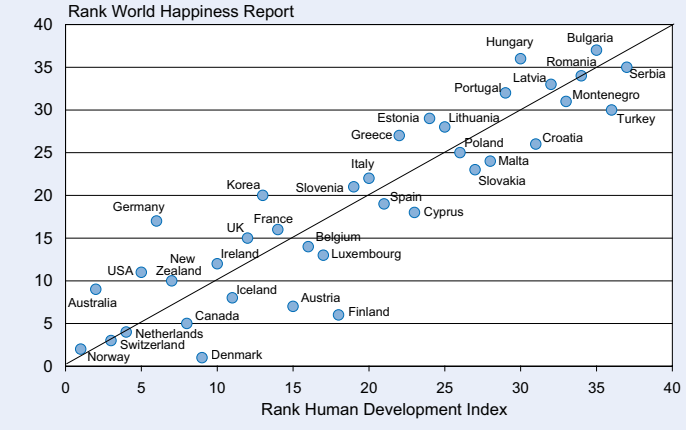
The World Happiness Report focuses on the measurement of happiness as a critical component of how the world should measure its economic and social development. It is published by the United Nations Sustainable Development Solutions Network, covers over 150 countries and its scale runs from 0 to 10. The primary measure of the indicator is life satisfaction or happiness with "life as a whole" in contrast to further components of subjective well-being such as emotions. Accordingly, the survey is explicitly framed to take the respondents' aspirations into account. Six key variables (real GDP per capita, healthy life expectancy, having someone to count on, perceived freedom to make life choices, freedom from corruption, and generosity) explain three-quarters of the variation in annual national average happiness scores.

The Doing Business Ranking of the World Bank assesses the competiveness of countries by focusing on the quality of laws and regulations affecting local business, in particular small and medium size companies. It is based on the responses of local practitioners who evaluate standardized case scenarios. These comprise several areas of business regulation related to the life cycle of a hypothetical company ranging from start-up and expansion, to operation and finally insolvency. In doing so, the assessment covers in particular property rights, access to credit investor protection, administrative burden and flexibility in hiring.

Table 1 compares the most recent rankings of the three indicators for the countries covered by the DICE database (mainly EU-27 and the other major OECD countries). According to the HDI Norway, Australia, Switzerland, the Netherlands and the United States are the most developed countries. Similarly, Denmark, Norway, Switzerland, the Netherlands and Canada fare best in the World Happiness Report. The World Bank's Doing Business Ranking portrays Australia, New Zealand, Switzerland, Canada and Ireland as the most competitive countries. To obtain a better overview, the results of the different rankings are plotted against each other.

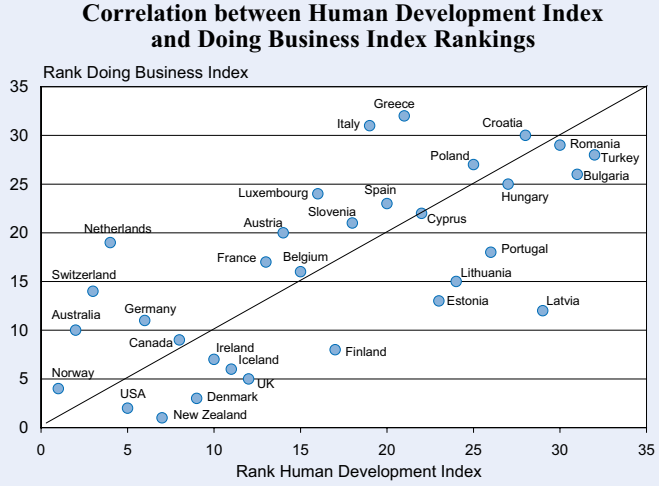
Figure 1

Correlation between Human Development Index and World Happiness Report Rankings



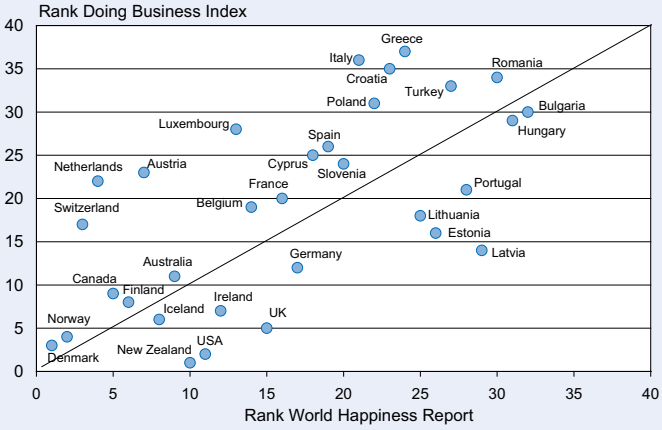
Source: United Nations Development Programme (2014), United Nations Sustainable Development Solutions Network (2013).

Figure 2



Source: United Nations Development Programme (2014), The World Bank Group (2014).

Figure 3



Source: United Nations Sustainable Development Solutions Network (2013), The World Bank Group (2014).

The HDI and the Happiness rankings are compared against each other in Figure 1. Based on this descriptive evidence, both indicators strongly agree on which countries offer a higher level of well-being, as almost all countries lie very close to the 45° line. There are only few, quantitatively small exceptions like Finland where people seem to be comparatively happy given their level of capabilities, and Germany where the situation is assessed more pessimistically.

When comparing the two rankings of well-being against the competiveness indicator a different picture emerges in Figures 2 and 3. The congruence between each of the two measures is clearly less pronounced in both cases. Interestingly, both indicators show that certain countries like Switzerland, the Netherlands, Luxembourg and Italy enjoy a comparatively high level of well-being given their level of competitiveness. At the same time, the Baltic countries, for example, which are highly competitive, clearly obtain a relatively low level of well-being. Taken together these findings suggest that there is no clear trade-off between economic prosperity and well-being when looking at developed countries. Instead, the relationship between well-being and the conditions for economic prosperity seems to be determined by further country-specific social and institutional factors that lie beyond the scope of a stylized analysis based on descriptive rankings of indicators.

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References

The World Bank Group (2014), Doing Business, http://www.doingbusiness.org/CustomQuery/ (accessed 15 November 2014).

United Nations Sustainable Development Solutions Network (2013), World Happiness Report 2013, http://unsdsn.org/wp-content/uploads/2014/02/WorldHappinessReport2013_online.pdf (accessed 15 November 2014).

United Nations Development Programme (2014), Human Development Index, http://hdr.undp.org/en/content/human-development-index-hdi (accessed 15 November 2014).

Table 1

Country Rankings

Rank	Human Development Index[a]	World Happiness Report[b]	Doing Business Index[c]
1	Norway	Denmark	New Zealand
2	Australia	Norway	United States
3	Switzerland	Switzerland	Denmark
4	Netherlands	Netherlands	Norway
5	United States	Canada	United Kingdom
6	Germany	Finland	Iceland
7	New Zealand	Austria	Ireland
8	Canada	Iceland	Finland
9	Denmark	Australia	Canada
10	Ireland	New Zealand	Sweden
11	Iceland	United States	Australia
12	United Kingdom	Ireland	Germany
13	Korea	Luxembourg	Japan
14	France	Belgium	Latvia
15	Austria	United Kingdom	Macedonia
16	Belgium	France	Estonia
17	Luxembourg	Germany	Switzerland
18	Finland	Cyprus	Lithuania
19	Slovenia	Spain	Belgium
20	Italy	Korea	France
21	Spain	Slovenia	Portugal
22	Greece	Italy	Netherlands
23	Cyprus	Slovakia	Austria
24	Estonia	Malta	Slovenia
25	Lithuania	Poland	Cyprus
26	Poland	Croatia	Spain
27	Slovakia	Greece	Slovak Republic
28	Malta	Lithuania	Luxembourg
29	Portugal	Estonia	Hungary
30	Hungary	Turkey	Bulgaria
31	Croatia	Montenegro	Poland
32	Latvia	Portugal	Czech Republic
33	Montenegro	Latvia	Turkey
34	Romania	Romania	Romania
35	Bulgaria	Serbia	Croatia
36	Turkey	Hungary	Italy
37	Serbia	Bulgaria	Greece

Source: a: United Nations Development Programme (2014), b: United Nations Sustainable Development Solutions Network (2013), c: The World Bank Group (2014).

Fiscal Rules

Large structural deficits and growing debt ratios caused by the economic and financial crisis endangered fiscal sustainability in the whole euro area. Apart from the pre-crisis Stability and Growth Pact, as well as the Maastricht Treaty, post-crisis rules like the European Stability Mechanism were created to ensure financial stability for member states. At the national level, domestic fiscal frameworks were introduced as a part of the institutional policy setting that shape fiscal policy making. According to Kopits and Symanski (1998), a fiscal rule is "a permanent constraint on fiscal policy, expressed in terms of a summary indicator of fiscal performance". These rules comprise the arrangements, procedures and institutions governing the planning and implementation of budgetary policies. The main components of domestic fiscal frameworks are numerical fiscal rules, independent fiscal institutions, and budgetary procedures governing the preparation, approval, and implementation of budget plans and medium-term budgetary frameworks for multi-annual budgetary planning.

In 2005 the European Commission launched two surveys on national fiscal rules and independent public institutions in EU member states from 1990–2005. Another survey on the existing domestic medium-term budgetary frameworks was published in 2006. The fiscal rule strength index (FRSI) and the fiscal rule index (FRI) were both calculated based on these surveys. According to the European Commission, a fiscal rule is considered strong if it is likely to be respected and may significantly influence the conduct of fiscal policy.

The measurement of the FRSI is based on five criteria: (i) the statutory/legal base of the rule, (ii) room for setting or revising objectives, (iii) the mechanisms of monitoring compliance and enforcement of the rule, (iv) the enforcement mechanisms of the rule, (v) the media visibility of the rule. Scores are attributed for each criterion from 1 to 3 for the criteria (ii), (iii) and (v) and scores from 1 to 4 for the criteria (i) and (iv). For example, the answer options for (i) the statutory/legal base of the rule range from four points "constitutional base" to one point "political commitment by a given authority".

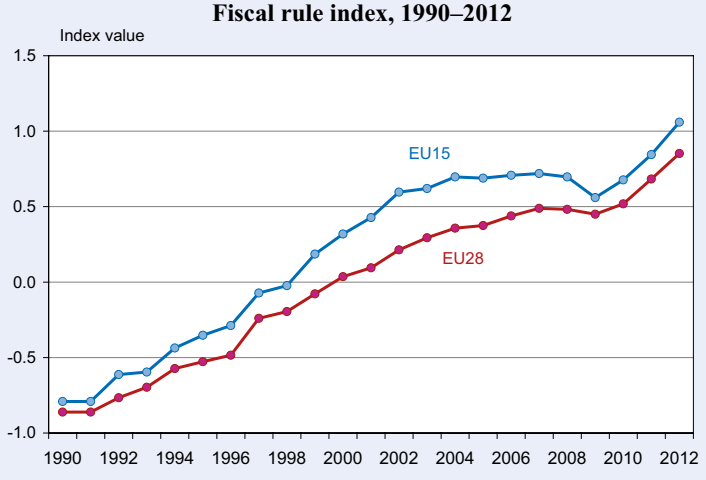
The fiscal rule strength indices are aggregated to one index per country and year, creating the fiscal rule index. Effectively, the index is calculated using equal weights for all its components. This index is standardized with an average of zero and a standard deviation of one, meaning that negative values occur. The surveys are based on self-reporting by the countries and may not therefore reflect actual experience with recently implemented fiscal rules. As a result, care needs to be taken when comparing the indices from different countries with each other.

Looking at the development over the past two decades, there is a clear upward trend for the 28 member states of the European Union, as well as for the 15 states before the Eastern enlargement, as demonstrated in Figure 1. It is worth noting that the short decline during the crisis in 2009 seems to be greater for the EU15 than for the EU28, as can be seen in Figure 1. Overall, however, the fiscal rule index for the EU15 countries is constantly above the index of the EU28.

A positive relationship can be seen between the fiscal rule index and budgetary outcomes. EU member states with the highest index values show better budgetary outcomes on average. Table 1, which contains an extract of the FRI, shows some more interesting details. Since documentation of the FRI started in 1990 Germany initially had a constant index of 0.5, which subsequently started to rise, reaching 1.4 in 2012. Italy did not seem to

Figure 1

Fiscal rule index, 1990–2012



Source: European Commission (2012).

Table 1

Fiscal Rule Index, 1990-2012

	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012
Austria	-1.0	-1.0	0.2	0.2	0.2	0.2	0.2	0.5	0.5	0.6	0.8
Bulgaria	-1.0	-1.0	-1.0	0.9	1.5	1.5	1.5	1.5	1.5	1.9	2.2
Denmark	-0.5	0.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Finland	-1.0	0.4	0.9	0.9	0.9	1.0	0.6	0.3	0.3	0.6	0.4
France	-0.6	-0.6	0.1	0.1	0.5	0.5	0.7	1.0	0.8	1.6	1.6
Germany	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.1	0.8	1.4	1.4
Greece	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.0
Hungary	-1.0	-1.0	-0.8	-0.8	-0.8	0.5	0.5	0.2	0.2	0.2	1.1
Italy	-1.0	-1.0	-0.5	0.1	0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2
Spain	-0.3	-0.3	-0.3	1.7	1.6	1.6	1.6	1.6	1.6	2.6	3.3
Sweden	-1.0	-1.0	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.5	2.5
United Kingdom	-1.0	-1.0	2.0	2.0	2.0	2.0	2.0	-1.0	1.7	1.6	1.6

Source: European Commission (2012).

invest much in fiscal rules either before the crisis or after it. Spain's investment, by contrast, has soared in recent years, from 1.6 in 2010 to 3.3 in 2012, which could be interpreted as a reaction to the crisis and a bid to improve its fiscal sustainability. The same can be observed for Greece (from –1.0 in 2011 to 1.0 in 2012). All in all, the economic crisis has obviously had a positive impact on the presence of fiscal rules throughout Europe.

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References

European Commission (2012), Numerical fiscal rules in the EU Member States, http://ec.europa.eu/economy_finance/db_indicators/fiscal_governance/index_en.htm (accessed 15 June 2014).

Kopits, G. and S. Symanski (1998), "Fiscal Rules", *IMF Occasional Paper* no. 162.

Sectoral Allocation of Aid: What Has Changed?

Official development assistance consists of grants and concessional loans, which are used for socio-economic development in developing countries. Official development assistance (ODA) can be direct transactions between donor and recipient country (bilateral aid) or it can be distributed via multilateral development organisations (OECD 2009). This report gives an overview of different aid sectors and provides information on how the allocation of ODA has changed over time. The dataset referred to in this report shows the allocation of bilateral ODA for different sectors by individual Development Assistant Committee (DAC)[1] donors and covers the sectoral allocation of aid from the year 1987 to 2012 (the dataset is available in the DICE Database: www.ifo.de/w/7dkQfcWa). Numbers are percentage shares of all bilateral commitments.

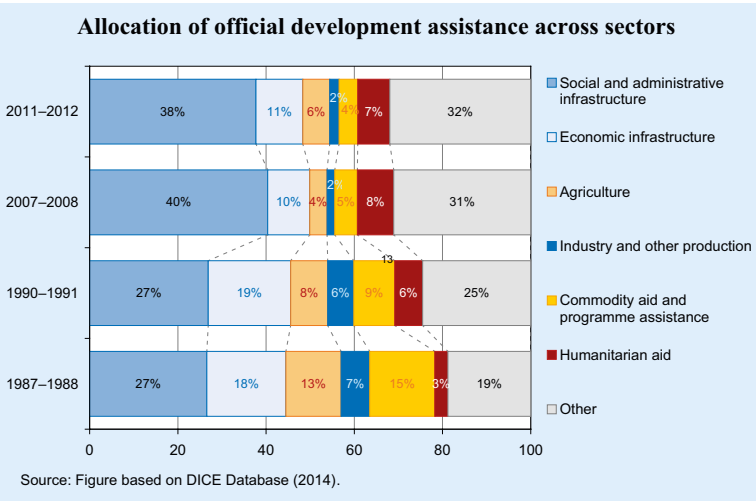
One of the most interesting changes in aid allocation during the time period presented (1987–2012) is the trend in aid allocation from other sectors to the social and administrative sector (Figure 1). An important reason for this trend is Millennium Development Goals (MDGs). The MDGs set the targets for development cooperation and they have a strong focus on poverty, health and educational development. Compared to the other aid sectors, the social sector has a clearer direct impact on those issues (OECD 2008). The humanitarian aid and the "other" sector have also gained importance over the time period presented, which can be seen in Figure 1. However, the share of the allocation to the other sectors has decreased. Commodity aid and programme assistance in particular have lost their share of the total bilateral commitments. There has also been a shift of aid from the agricultural sector to the social sector due to relatively lower transaction costs.

The **industrial sector** includes trade-related issues, construction, mining and other industry-related operations. The importance of funding infrastructural projects and industrial development with foreign aid has decreased over time, which is reflected in the overall aid allocation (Figure 1): The total share of the industrial sector dropped from seven percent to around two percent during the time period 1987–2012. For example, the share of Germany's aid to the industrial sector dropped from 10.8 percent to 1.8 percent during the time period of 1987–2012; and similar shifts can also be seen in other countries' aid allocation. In the 1960s in particular, it was thought necessary to fund big investment projects (highways, power stations, etc.) in developing countries in order to support development. This way of thinking was mainly due to the two-gap model, which was the widely used growth theory for many decades before the neoclassical growth theory became popular in the 1990s. The so-called savings-investment-gap meant that economic growth cannot be generated in developing countries because the level of national savings was not high enough. Spending huge amounts of foreign aid on expensive investments (which would not have been possible without external funding) was seen as the most effective way of boosting economic growth levels in developing countries (Easterly 1999). Due to the obvious failure of such policies and following new findings in academic literature on the topic, big investment projects went out of fashion, and nowadays funding the industrial sector is seen as relatively unimportant (Frot and Santiso 2010).

The **agricultural sector** has also lost significance as a target sector of foreign aid. This has provoked some criticism recently in developing countries, where the agricultural sector is often closely connected with the lives of the majority of people. A lesson can be learned from China's economic development: the fact that

[1] DAC = OECD's Development Assistance Committee.

Figure 1



Source: Figure based on DICE Database (2014).

the state strongly promoted growth in the agricultural sector and improvements in its productivity was one of the reasons behind declining poverty in China (OECD 2013). However, only a few DAC-countries support their agricultural sector with a higher share than ten percent of their bilateral commitments. Finland and Norway are examples of countries with a relatively high share of spending on this sector in 2011–2012 (around 13 and around 14 percent respectively). Bucking the common downwards trend, Finland's commitments to the agricultural sector also experienced a slight increase over the time period of 1987–2012. The overall aid allocation of DAC donors to the agricultural sector dropped from around 13 percent to six percent during the time period in question (Figure 1).

Commodity aid and programme assistance usually consists of general budget support, food aid or other distribution of commodities into developing countries. Commodity aid is now widely seen as an ineffective way to support development. Commodities produced by donor countries are usually more expensive than the same commodities in the respective developing country, so the aid money would be better spent on supporting local production, instead of importing expensive commodities from donor countries. Similarly, technical assistance is often tied to hiring consultants from a donor country, although it would actually be more effective to use experts from the recipient country with the same knowledge, but a better understanding and greater experience of the local situation (Easterly 2007). The importance of commodity aid and programme assistance as a target sector has decreased significantly over the last few decades, falling from a total share of 15 percent to four percent of all official development assistance. For most DAC donors, the allocation of aid to this sector was between one and two percent in 2011–2012. Portugal's commitments to the sector (59.3 percent of all its bilateral aid) constitute an exception to this rule.

The sector of **economic infrastructure** includes, for example, transportation, communication services, energy generation and supply, as well as banking and financial services. Aid for this sector is supposed to promote the development of networks, utilities and services that facilitate economic activity. Its share of the total allocation of aid has remained largely stable in recent decades, but some changes in allocations can be seen at a country level. One interesting example is Austria: the country allocated a remarkable share of 53.4 percent of all its bilateral commitments to economic infrastructure in 1987–1988, but only 8.3 percent in 2011–2012. This was due to a stronger focus on gender equality and environmental issues in Austria's development cooperation policy; nowadays Austria identifies those as its key cross cutting themes (OECD 2013).

The aid distributed as **humanitarian aid** can be an emergency response, as well as reconstruction relief and disaster prevention funding. By its official definition, humanitarian aid is: "assistance designed to save lives, alleviate suffering and maintain and protect human dignity during and in the aftermath of emergencies. To be classified as humanitarian, aid should be consistent with the humanitarian principles of humanity, impartiality, neutrality and independence." (OECD 2013b). Humanitarian aid has experienced a slight increase in last decades, rising from a total share of three percent of all bilateral ODA in 1987–1988 to seven percent in 2011–2012. However, there is a high degree of variation between countries in their shares of humanitarian aid: from almost zero (Portugal, 2011–2012) to 17.7 percent (Luxembourg, 2011–2012).

The "other" sector includes general environmental protection, debt forgiveness and other actions related to debt. The total share of ODA allocated to this sector has increased in the last few decades from 19 percent (1987–1988) to 32 percent (2011–2012). One major reason for the size of the sector is the amount of debt relief grants issued in recent years. For example, Iraq and Nigeria received a combined total of USD 104.4 billion in grants for debt relief in 2006 (OECD 2009).

Nowadays the **social and administrative sector** receives the largest share of foreign aid (total 38 percent, 2011–2012). The sector covers efforts to develop the human resource potential of developing countries and includes education and health services supported by aid, as well as population policies, water and sanitation, and actions related to government and civil society. In recent decades the sector has gained more importance at the expense of other sectors, which can be seen in Figure 1. However, for most of the DAC donors, the social sector has always been a relatively important target sector: as early as 1987–1988, 14 out of those 23 countries allocated more than 20 percent of their bilateral aid to the social sector. In 2011-2012 Italy was the only country whose allocation did not exceed 20 percent, but many of the DAC donors allocated around 50 percent of their bilateral commitments to the social sector during this period.

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References

DICE Database (2014), Major aid uses by individual DAC donors, 1987-2012, Ifo Institute, Munich, www.ifo.de/w/7dkQfcWa

Easterly, W. (1999), "The Ghost of Financing Gap: Testing the Growth Model Used in the International Financial Institutions", *Journal of Development Economics* 60 (2), 423–38.

Easterly, W. (2007), "Are Aid Agencies Improving?" *Economic Policy* 22 (52), 633–78.

Frot, E. and J. Santiso (2010), "Crushed Aid: Fragmentation in Sectoral Aid", *OECD Development Centre Working Paper* No. 284.

OECD (2008), *Business for Development 2008: Promoting commercial agriculture in Africa*, OECD Publishing, Paris.

OECD (2009), *Managing Aid: Practices of DAC Member Countries,* OECD Publishing, Paris.

OECD (2010), *Development Co-operation Report 2010*, OECD Publishing, Paris.

OECD (2013a), *Development Co-operation Report 2013: Ending Poverty*, OECD Publishing, Paris.

OECD (2013b), The list of CRS purpose codes; taking effect in 2013 reporting on 2012 flows, http://www.oecd.org/dac/stats/purposecodes-sectorclassification.htm

Tax Evasion and the Shadow Economy

As long as taxes exist, some people will choose to hide their actions and refuse to pay their taxes. Addressing this issue demands a profound knowledge of the size of the shadow economy, the extent of tax evasion and the reasons why some people choose illegal unofficial work over a standard job. Allignham and Sandmo (1972) have shown that tax non-compliance is basically a cost benefit decision, where the benefits are defined by the taxes that can be avoided and the costs are represented by governmental deterrence measures and the probability of being detected.

Schneider and Buehn (2012a) argue that even although the size of the shadow economy and tax evasion are not congruent, activities in the shadow economy often imply the evasion of direct or indirect taxes, so that the factors affecting tax evasion will most certainly also affect the shadow economy. Based on this reasoning, they elaborate a model with the following seven causal variables to explain the shadow economy: tax and social security contribution burdens, quality of institutions, regulations, public sector services, tax morale and deterrence.[1] The authors perform an empirical analysis of the shadow economies of 38 developed OECD countries over the period from 1999 to 2010 using a Multiple Indicators Multiple Causes (MIMIC) approach. This approach allows them to employ a number of potential measures of shadow economic activities simultaneously. Suitable indicators of shadow economic activities are official working time or labour force participation, official GDP and currency demand.[2] The approach assumes that cash is used for transactions in the shadow economy in order to estimate a currency demand function. The corresponding hypothetical money demand necessary to generate official GDP is compared to actual money demand, and the difference - multiplied by the velocity of money in the official economy – allows the calculation of an estimate of the size of the shadow economy.

Based on this methodology, Table 1 shows the estimated average impact of different variables from 1999 to 2010 in selected countries. It indicates that, on average, the level of indirect taxes is the major reason for entering the shadow economy. The authors estimate that 29.4 percent of the shadow economy's size can be explained by indirect taxes, such as a sales tax or value added tax (VAT), and 13 percent by personal income tax alone.

Based on the above findings, Schneider and Buehn (2012b) generate tax evasion estimates for 38 countries from 1999 to 2010. These estimates are based on a survey by Feld and Schneider (2010) of the German shadow economy, and on the assumption that the share of the

[1] For a more detailed explanation of the variables, see Schneider and Buehn (2012a), Table 1.

[2] The 38 OECD countries are: Australia, Austria, Belgium, Bulgaria, Canada, Chile, Cyprus, Czech Rep., Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Korea, Rep., Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovak Rep., Slovenia, Spain, Sweden, Switzerland, Turkey, UK and the United States.

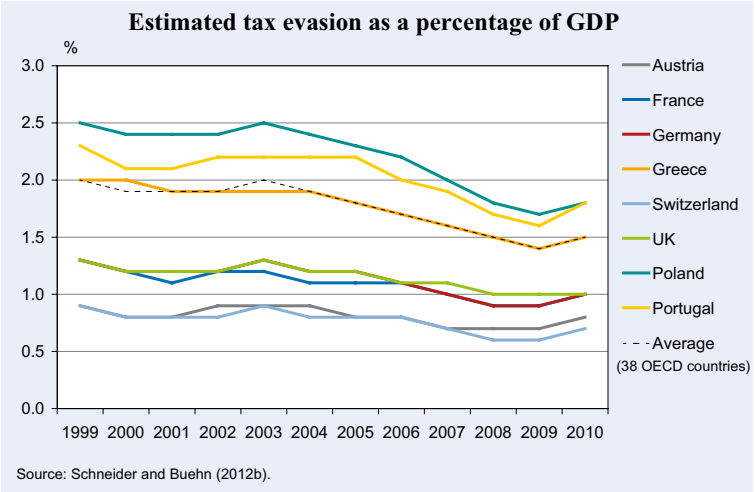
Table 1

Average impact on the shadow economy (1999–2010)

Country	Personal income tax	Indirect taxes	Tax morale	Un-employment	Self-employment	GDP growth	Business freedom	Average size of the shadow economy
Austria	18.5	27.4	11.6	12.1	20.5	0.8	9.1	9.8
France	12.8	24.3	15.5	23.2	15.1	0.4	8.6	14.8
Germany	16.6	24.2	8.3	24.3	16.9	0.6	9.1	15.7
Greece	5.8	21.8	10.4	18.0	37.6	0.7	5.7	27.0
Switzerland	17.7	30.7	9.0	9.6	23.8	0.5	8.7	8.3
United Kingdom	18.2	30.8	8.1	14.3	18.0	0.6	9.9	12.5
Poland	6.1	27.8	7.8	26.1	25.7	1.3	5.3	26.4
Portugal	8.1	29.9	8.7	14.6	31.1	0.4	7.2	22.7
Average	13.1	29.4	9.5	16.9	22.2	0.9	8.1	20.3
Note: For data on more countries see Table 10 in the data source.								

Source: Schneider and Buehn (2012a).

Figure 1



Source: Schneider and Buehn (2012b).

shadow economy due to tax evasion (and not illegal activities) can be explained by the relationship of the indirect tax burden and self-employment.

Figure 1 shows the results of Schneider and Buehn (2012b) indicating tax evasion as percentages of official GDP. The estimated average tax evasion for the observed 38 OECD countries decreases from 1999 to 2010 by 0.5 percentage points from two percent to 1.5 percent. There is a downward trend across countries from 1999–2008. This trend, however, turns into an upward trend for the years after the financial crisis. This might be due to the impact of increased unemployment, which was one of the variables used to estimate the shadow economy, but it is also plausible that the financial crisis itself changed the incentives for tax non-compliance.

With an average tax burden of 39.1 percent of GDP in the EU28 and an estimated tax evasion of 1.5 percent of GDP, the amount of tax money withheld in relation to total tax revenues accounts amounts to four percent. This corresponds to roughly 211 billion euros of tax that is not being paid. Moreover, the estimates of tax evasion deliver only bottom line estimates, as not all channels of the shadow economy are covered.

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References

Allingham, M.G. and Sandmo, A. (1972), "Income Tax Evasion: A Theoretical Analysis", *Journal of Public Economics 1/3, 323-338.*

Feld, L. P. and F. Schneider (2010), "Survey on the Shadow Economy and Undeclared Earnings in OECD Countries", *German Economic Review* 11, 109–149.

Schneider, F. and A. Buehn (2012a), "Shadow Economies in Highly Developed OECD Countries: What Are the Driving Forces?", I*ZA Discussion Paper* no. 6891.

Schneider, F. and A. Buehn (2012b), "Size and Development of Tax Evasion in 38 OECD Countries: What do we (not) know?", *CESifo Working Paper* no. 4004.

New at DICE Database

Recent entries to the DICE Database

In the fourth quarter of 2014, the DICE Database received a number of new entries, consisting partly of updates and partly of new topics. Some topics are mentioned below.

- Pensionable age in selected OECD countries: history and projection
- Pension-reform measures by primary objectives, selected OECD countries
- Early retirement conditions in the EU
- Labour market participation rates by age groups
- Long-term care: different benefit schemes
- Regulation of prices or reimbursement prices of medicines
- Motor vehicle tax revenue in selected EU countries
- Legal framework for road user charging in the EU
- Overview of tax incentives for electric vehicles in the EU
- Global oil reserves and resources
- Confidence in institutions
- Business reforms for starting a business

The interactive graphics application **Visual Storytelling** has been further expanded.

Forthcoming Conferences

CESifo Area Conference on Macro, Money & International Finance
20–21 February 2015, Munich

The purpose of this conference is to bring together CESifo members who are working in the areas of macroeconomics and money to present and discuss their ongoing research, and to stimulate interaction and co-operation between them. All CESifo research network members are invited to submit their papers, which may deal with any topic in Macro, Money and International Finance. The keynote lecture will be delivered by Marcel Fratzscher, President, DIW Berlin.
Scientific organiser: Prof. Paul De Grauwe, Ph.D.

CESifo Area Conference on Applied Microeconomics
6–7 March 2015, Munich

The purpose of the conference is to bring together CESifo members to present and discuss their ongoing research, and to stimulate interaction and co-operation between them. All CESifo research network members are invited to submit their papers, which may deal with any topic within the broad domain of Applied Microeconomics (industrial organisation, experimental and behavioural economics, market regulation, banking and finance, auctions).
The keynote lecture will be delivered by Thomas Mariotti from the Toulouse School of Economics.
Scientific organiser: Prof. Christian Gollier, Ph.D.

5th Workshop "Labour Markets and Social Policy"
19–20 March 2015, Dresden

The 2-day workshop is jointly organised by the Ifo Institute Dresden Branch and TU Dresden. Its aim is to provide a forum for current research results from the field of labour markets and social policy and to contribute to a better networking of young researchers at the same time. Presentations from all sub-fields of both theoretical and empirical research in labour markets and social policy are welcome.
Scientific organisers: Prof. Dr. Alexander Kemnitz, Michael Weber, Lars Vandrei

CESifo Area Conference on Public Sector Economics
16–18 April 2015, Munich

The conference is intended to give an overview of the current research undertaken by members of the Public Sector Economics area of the network and to stimulate interaction and co-operation between area members. All CESifo research network members are invited to submit their papers which may deal with any topic in Public Economics. Please note that Area Conferences are open to CESifo Network Members only.
Scientific organiser: Prof. Rick van der Ploeg, Ph.D.

New Books on Institutions

Macroeconomics: Institutions, Instability, and the Financial System
Wendy Carlin and David Soskice
Oxford University Press, 2014

Democratic Politics in a European Union Under Stress
Edited by Olaf Cramme and Sara B. Hobolt
Oxford University Press, 2014

Government versus Markets
The Changing Economic Role of the State
Vito Tanzi
Cambridge University Press, 2014

CESifo DICE

THE DATABASE FOR INSTITUTIONAL COMPARISONS IN EUROPE

The Database for Institutional Comparisons in Europe – DICE – was created to stimulate the political and academic discussion of institutional and economic policy reforms. DICE is a unique database offering comparative information on national institutions, regulations and economic policy. Although DICE is not a statistical database, it also contains data on the outputs (economic effects) of institutions and regulations where relevant.

DICE covers a broad range of institutional themes: Business and Financial Markets, Education and Innovation, Energy and Natural Environment, Infrastructure, Labour Market and Migration, Public Sector, Social Policy, Values and Other Topics.

The information is presented in tables (text or data), graphics (interactive application Visual Storytelling), and reports. In most cases, all EU countries are covered as well as some other major OECD countries. Users can choose between current comparisons and time series that show developments over time.

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