International Tax Policy Forum and Georgetown Law's Institute of International Economic Law

Tax Competition

February 3, 2017

Georgetown University Law Center
120 F Street NW
Washington, D.C. 20001

ITPF & IIEL Conference
Tax Competition
February 3, 2017

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Featuring Keynote Remarks by Kevin Brady,
Chairman of the House Ways and Means Committee

Friday, February 3rd, 2017
8:30 a.m. – 1:30 p.m.
Georgetown Law
Gewirz Student Center, 600 New Jersey Avenue, NW, Washington, DC 20001

Join Georgetown Law's Institute of International Economic Law (IIEL) and the International Tax Policy Forum (ITPF) on February 3rd for a high-profile conference examining international tax competition as the United States stands on the brink of business tax reform.

Unlike the United States—which currently has the highest statutory corporate tax rate in the developed world—other countries have been lowering corporate tax rates and increasing reliance on consumption taxes. Recently, various multilateral and unilateral efforts to limit income tax competition have reshaped the international tax landscape. In response to these developments, the United States is now considering major tax reforms to restore American competitiveness, such as the destination-based cash flow tax proposed in the House Republican Blueprint.

This conference brings together experts from a variety of backgrounds to share their views on international tax competition and U.S. tax policy. A series of panels will consider the global trend towards consumption taxation, how recent efforts to curtail income tax avoidance interact with tax competition, and the economic effects of international tax competition. The closing panel will consider how the United States should respond.

Kevin Brady, the Chairman of the House Ways and Means Committee, will deliver the keynote address.

Program

8:30 a.m. Registration

8:50 a.m.   Introductory Remarks

John Samuels	William Treanor
Chair	Executive Vice President and Dean of the Law Center
International Tax Policy Forum	Georgetown University

9:00 a.m.   BEPS and Tax Competition

Moderator: James R. Hines
L. Hart Wright Collegiate Professor of Law and
Co-Director, Law and Economics Program
University of Michigan

Presenters: Lilian V. Faulhaber
Associate Professor of Law
Georgetown University

Michael Smart
Professor of Economics
University of Toronto

9:45 a.m.   Economic Effects of International Tax Competition

Moderator: Mihir A. Desai
Mizuho Financial Group Professor of Finance
Harvard Business School

Presenter: Ronald Davies
Professor of Economics
University College Dublin

Discussant: Rosanne Altshuler
Professor of Economics
Rutgers University

10:30 a.m.   Tax Competition and Consumption Taxation

> Moderator: Michelle Hanlon
> Howard W. Johnson Professor and Professor of Accounting
> MIT Sloan School of Management

> Presenters: Alan J. Auerbach
> Robert D. Burch Professor of Economics and Law and
> Director, Burch Center for Tax Policy and Public Finance
> University of California, Berkeley

> Itai Grinberg
> Professor of Law
> Georgetown University

11:15 a.m.   Break

11:30 a.m.   How Should the United States and Others Respond to International Tax Competition?

> Moderator: David Wessel
> Director, Hutchins Center at Brookings and
> Contributing Correspondent, The Wall Street Journal

> Presenters: Kimberly Clausing
> Thormund A. Miller and Walter Mintz Professor of Economics
> Reed College

> Michael J. Graetz
> Columbia Alumni Professor of Tax Law, Columbia University and
> Justus S. Hotchkiss Professor of Law Emeritus, Yale Law School

> Kevin A. Hassett
> State Farm James Q. Wilson Chair in American Politics and Culture and
> Director of Research for Domestic Policy
> American Enterprise Institute

Michael Keen
Deputy Director, Fiscal Affairs Department and Prior Head, Tax Policy
and Tax Coordination Divisions
International Monetary Fund

12:45 p.m. **Break**

1:00 p.m. **Keynote Address**
Kevin Brady, Chairman of the House Ways and Means Committee

1:30 p.m. **Luncheon**

All interested members of the public are welcome; there is no cost to attend.
Please register here and contact Christine Washington,
IIEL's Director of Programs & External Affairs,
at 202.662.4193, or cqw@georgetown.edu, with any questions.

International Tax Policy Forum

Web site: www.itpf.org

About the International Tax Policy Forum

Founded in 1992, the International Tax Policy Forum is an independent group of more than 45 major U.S. multinationals with a diverse industry representation. The Forum's mission is to promote research and education on the taxation of multinational companies. Although the Forum is not a lobbying organization, it has testified before the Congressional tax-writing committees on the effects of various tax proposals on U.S. competitiveness. The ITPF also sponsors annual public conferences on major international tax policy issues. The January 2015 conference on *Corporate Inversions and Tax Policy* was co-sponsored with the Brookings Institution.

On the research front, the Forum has commissioned over 20 papers on international tax policy topics such as the effects of the interest allocation rules on the competitiveness of U.S. firms, the compliance costs of taxing foreign source income, and the linkages between foreign direct investment and domestic economic activity (*see* www.ITPF.org).

Members of the Forum meet three times a year in Washington, DC to discuss key international tax policy issues with leading experts in government, academia, and private practice.

PwC serves as staff to the Forum. **John Samuels**, former Vice President and Senior Counsel for Tax Policy and Planning with General Electric Company, chairs the Forum. The ITPF's *Board of Academic Advisors* includes ITPF Research Director Prof. **James Hines** (University of Michigan), Prof. **Alan Auerbach** (University of California, Berkeley), Prof. **Mihir Desai** (Harvard), Prof. **Michael Devereux** (Oxford), Prof. **Michael Graetz** (Yale), Prof. **Michelle Hanlon** (MIT), and Prof. **Matthew Slaughter** (Dartmouth).

ITPF Mission Statement

The primary purpose of the Forum is to promote research and education on U.S. taxation of income from cross-border investment. To this end, the Forum sponsors research and conferences on international tax issues and meets periodically with academic and government experts. The Forum does not take positions on specific legislative proposals.

SIGNATURE EVENTS

IIEL hosts fora for policy debate and research with a wide range of global organizations, law and consulting firms, NGOs and government agencies. We also offer a robust Executive Education platform, and welcome new partnerships.

Sean Hagan - General Counsel, IMF

Recent programs have included:

- **Global Trade Academy**
- **Ambassadors on Europe After Brexit**
- **Doing Business in the Middle East**
- **Renegotiating NAFTA – Mexico's View**
- **Making IEL Work: Integrating Disciplines & Broadening Policy Choices**
- **Sovereign Debt Research & Management Conference**
- **Systemic Risk in the Global Economy**
- **Taxation and EU State Aid**
- **Taxation of IP in a Global Economy**
- **Annual Conference on WTO Law**

IIEL Executive Education – Global Trade Academy

Jason Furman - Chairman of the Council of Economic Advisers

INSTITUTE OF INTERNATIONAL ECONOMIC LAW
GEORGETOWN UNIVERSITY LAW CENTER

ABOUT IIEL

The Institute of International Economic Law (IIEL) is the focal point for the study of international economic law at **Georgetown Law**. IIEL's faculty include scholars and practitioners at the forefront of all areas of international economic law. Originally focused on trade, the Institute now boasts leading capabilities in a range of areas including investment and financial regulation, tax, business and monetary law. The Institute actively approaches these fields as interrelated and at times overlapping policy spheres that impact how law is devised, practiced and enforced.

IIEL's programs are geared toward both students and professionals alike. Students from around the world pursuing a degree at Georgetown Law are invited to enroll in IIEL's **International Economic Law & Policy Colloquium**; to pursue a **Certificate in WTO Studies**; or to answer legal questions related to international economic law in service of a real client, as part of the **International Economic Law Practicum**. Students and Visiting Researchers may apply to be an **IIEL Fellow** and participate in regular policy discussions and research workshops. Practitioners are invited to expand their knowledge and network by attending one of IIEL's many conferences, special events or Executive Education programs.

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SPEAKERS

Scores of visitors participate in IIEL
events each year. Recent speakers have included:

- **Usman Ahmed**, Head of Global Public Policy, Paypal
- **Jason Furman**, Chairman of the Council of Economic Advisers
- **Sean Hagan**, General Counsel, International Monetary Fund (IMF)
- **Peter Harrell**, former Deputy Assistant Secretary, U.S. Department of State
- **Jennifer Hillman**, former WTO Appellate Body Member
- **Gary Horlick**, former Head, U.S. Department of Commerce's Import Administration
- **Richard Kerschner**, Chief Development Officer, ICAP North America, former Interim CEO, BrokerTec
- **Peter Kerstens**, Lead Counsel, EU Sanctions, European Commission
- **Julie Nutter**, Head, Sanctions Desk, U.S. Department of State
- **Matthew P. Reed**, Chief Counsel, Office of Financial Research, U.S. Department of the Treasury
- **Gregory Scopino**, Office of Chief Counsel, Swap Dealer & Intermediary Oversight, U.S. Commodity Futures Trading Commission
- **Brad Setser**, Greenberg Center for Geoeconomics, Council on Foreign Relations
- **Governor Brian Wynter**, Central Bank of Jamaica

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"In an era of global legal practice, Georgetown Law is recognized as a leader in transnational law. As the international commercial architecture evolves, IIEL is at the forefront of our work on the most cutting-edge, complex and multidisciplinary issues. Engagement with the Institute offers students, alumni and practitioners unparalleled opportunities to enhance their legal education and practice."
- William M. Treanor, Executive Vice President and Dean of the Law Center, Professor of Law

"IIEL has had a banner year—with greater academic programming, faculty and student participation, input by policymakers, and global reach than at any point in the program's history."
- Christopher J. Brummer, IIEL Faculty Director & Professor of Law

http://iielaw.org/; http://law.georgetown.edu

The Impact of Taxes on the
Extensive and Intensive Margins of FDI[*]

Ronald B. Davies[a], Iulia Siedschlag[b], and Zuzanna Studnicka[c]

July 2016

Work in Progress. Comments appreciated.

Abstract: The design of optimal tax policy, especially with respect to attracting FDI, hinges on whether taxes affect multinational firms at the extensive or the intensive margins. Nevertheless, the literature has not yet explored the simultaneous impact of taxation on FDI on these two margins. Using firm-level cross-border investments into Europe during 2004-2013, we do so with a Heckman two-step estimator, an approach which also allows us to endogenize the number of investments and include home country and parent firm characteristics. We find that taxes affect both margins, particularly for firms that invest only once, with 92 percent of tax-induced changes in aggregate inbound FDI driven by movements at the extensive margin. In addition, we find significant effects of both home country and parent firm characteristics, pointing towards the granularity of investment decisions.

JEL Codes: F23; F14; H25.

Keywords: Foreign direct investment; taxation; extensive margin; intensive margin.

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1. Introduction

Given the large role foreign direct investment (FDI) plays in many economies, there has developed a sizeable literature describing the effects FDI has on economies (both the home and host) as well as the factors influencing the amount of FDI that takes place between countries. In particular, the role of taxes in affecting FDI activity has received a great deal of attention, in no small part because taxes are one of the key policy instruments that governments use to influence investment, both unilaterally and in a strategic setting. These studies include those that consider the role of taxes at the aggregate level, where FDI is commonly measured as stocks of investment, sales of affiliates, or the number of firms, and at the firm level, where the question is whether or not taxes affect whether or not a given firm invests in a given host.

To date, however, these approaches have yet to be combined in a single estimation, that is, to ask how taxes affect a given firm's decision of whether or not to invest and, conditional on investment, how they affect the size of the investment.[1] Further, existing studies have ignored the impact of the owner's (the foreign investing firm's) characteristics on these decisions. This paper fills this void by using a Heckman two-step estimator to simultaneously examine investment at the extensive (whether to invest) and intensive (how much to invest) margins using a sample of 10,845 greenfield cross-border investments involving 30 European countries from 2004-2013. Beyond estimating both the extensive and intensive margins, this empirical approach has advantages relative to those used elsewhere that include endogenizing the number of investments by a given owner and including owner and home country characteristics that do not vary across potential hosts.

Understanding the extent to which taxes alter FDI at the extensive and intensive margins is important for developing effective policy. This is because in the presence of fixed investment costs, an investment will typically have a minimum operating scale where the variable profits are just sufficient to cover these fixed costs (see, for example, Helpman, Melitz, and Yeaple (2004)). If not all of the fixed costs are tax deductible, such as when they include entrepreneurial effort, as taxes rise the affiliate eventually becomes unprofitable. As such, a rise in the tax has a marginal effect on the intensive margin (if it is distortionary) and then a discrete effect at the extensive margin. This then introduces a discontinuity in the size of FDI as a function of taxes. This discontinuity impacts the choice of the revenue-maximizing tax rate. Indeed, the welfare impacts of taxation in open economies often hinges on whether investment decisions are intensive, as in the classical models of Wilson (1986) and Zodrow and Mieszkowski (1986), or extensive, as in Haufler and Wooton (1999), with this latter approach finding that taxation generally leads to efficient investment with larger rents captured by firms. Recent models of taxation combine these, finding that even with a continuum of firms, the discrete investment decision by individual firms significantly impacts optimal equilibrium taxes, efficiency, and the distribution of surplus.[2] Beyond taxation, the extensive and intensive effects have implications for other benefits from inbound FDI since, for example, changes in the intensive margin may

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[1] As discussed below, existing work either considers the size of (aggregate) investment or the probability of investment. Yeaple (2009) is an exception who considers the probability of investment and the size of FDI using a linear probability model and a separate OLS regression.

[2] Examples here include Davies and Eckel (2010), Haufler and Wooton (2010), and Krautheim and Schmidt-Eisenlohr (2011).

affect the speed of technology transfer to the local economy whereas changes at the extensive margin stop them altogether.

We find that taxes affect both margins of investment, although their impact on the extensive margin is more robust. This holds for both country-level and firm-specific tax measures. Further, our estimates suggest that approximately 92% of tax-driven changes in aggregate inbound investment levels are explained by changes at the extensive margin. This suggests that many affiliates may be established roughly at their minimum operating scale, below which investment ceases to be profitable and it is therefore better not to invest at all. An implication of this is that it suggests that taxes are more likely to affect the host economy by changes in the number of inbound investments rather than through the scale of those affiliates which can affect both the nature and desirability of using tax policy to attract investment. In addition, we find that the impact of taxes varies with owner characteristics. Specifically, we find that host taxes matter more for multinationals that invest only once during sample, a group which accounts for 80% of our investors but only 59% of investments (i.e. 41% of investments come from the 20% of firms that invest multiple times; these multi-investors also account for 59.6% of the value of FDI in our data). This may be driven by the ability of larger firms to engage in more aggressive transfer pricing, mitigating the impact of host taxes.[3] Understanding this is important in light of the OECD's current initiative to curb base erosion and profit shifting.[4] In addition, it highlights the granular effects of tax policy which, if the different types of owners create spillovers to the host economy, has implications for the use of tax policy to promote local development.[5]

Beyond the role of taxes, we find that traditional gravity variables affect the different margins of investment. Note that by virtue of using the Heckman estimator, we can include those home country factors which do not vary across potential hosts, some conditional logit cannot do. Of particular interest is that some, such as distance, affect the extensive and intensive margins in different directions. For example, the distance between the home and host countries reduces the likelihood of investment but, conditional on investing, increases the size of that investment. Such patterns would arise if larger distances increase both the fixed cost of investment and trade costs, the first increasing the desire to concentrate investment and the latter increasing the preference for proximity in a horizontal style model.[6] Beyond these traditional gravity variables, we find that barriers to inbound investment are a significant deterrent, suggesting that by combining tax hikes with reductions in red tape, it may be possible to increase revenues from FDI without lowering investment.

Finally we find that owner characteristics play a significant role which, as with home variables, cannot be done under conditional logit. Larger owners are both more likely to invest and when they do so the investment is larger. The same holds for younger owners and those that invest multiple times during the sample. Beyond this, we find that the industry of the owner matters. In particular, the financial sector seems to be especially sensitive to taxes on both margins.

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[3] Using price level data, Davies, et al. (2015) find that transfer pricing is observed only for large French multinationals.

[4] See http://www.oecd.org/ctp/beps.htm for details on these efforts.

[5] The granular effects of FDI on host economies has been explored by Davies and Desbordes (2015) and Harms and Meon (2014) among others.

[6] See Markusen (1984) for a theoretical treatment of the horizontal model and Brainard (1997) for a seminal discussion of the proximity-concentration tradeoff.

Conversely, services appear to be the least sensitive to taxes with manufacturing in the middle. If services are on average more able to engage in tax-reducing transfer pricing as compared to manufacturing, this would be consistent with our results.

In the next section, we review the literature on the impact of taxes on FDI. Section 3 lays out our empirical methodology, including a comparison of its relative benefits and shortcomings relative to those used elsewhere. Section 4 describes the data, including the measures of taxation we use. Section 5 contains our results, ending with a decomposition of changes in aggregate FDI into those caused by changes in the number of investments and those driven by changes in the average size of investments. Section 6 concludes.

2. Literature Review

The literature on foreign direct investment is as large and varied as the phenomenon itself with works like Navaretti and Venables (2006) providing useful entry points. Within this literature, the work closest to our study focuses on the choice of where to locate investment (as opposed to, for example, the choice between exporting and FDI).[7] Even within this subset, different contributions focus on different issues, including how the location choice depends on factors such as access to other markets (Head and Mayer, 2004), agglomeration (Head, Ries, and Swenson, 1995; Crozet, Mayer, and Mucchielli, 2004; Brülhart, Jametti, and Schmidheiny, 2012), EU Cohesion Fund spending (Basile, Castellani, and Zanfei, 2008), firm productivity (Chen and Moore, 2010), or local R&D and innovation (Siedschlag et al. 2013a, Siedschlag, Zhang, and Smith, 2013b). That said, the predominant factor examined in the location choice literature is that of taxes (and indeed, the above studies also typically include taxes among their control variables).

The rationale for this is simple. First, as is well documented, FDI in the aggregate responds to taxation issues.[8] Overall, the results indicate that FDI flees taxes, with the meta-analysis of Heckemeyer and Overesch (2013) estimating the semi-elasticity of MNE profits with respect to the tax rate of 0.8.[9] Second, unlike many of the factors that influence investment decisions such as market size or the skill of the workforce, tax policy is something that governments are capable of swiftly altering in order to influence investment.[10]

An early contribution in this vein is that of Devereux and Griffith (1998) who use a nested multinomial logit model to examine the location decision of US owned affiliates in Europe. They find that, although taxes are unimportant for whether or not a firm locates within Europe or somewhere else in the world, they do play a role in where in Europe it locates. More recent examples in this vein include Hebous, Ruf, and Weichenrieder (2011) and Davies and Killeen (2015), both of which estimate conditional logit models. The first of these uses information on

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[7] See Helpman, Melitz, Yeaple (2004) for a recent and influential contribution to the export/invest strand of the literature.

[8] See Gresik (2001), Fuest, Huber, and Mintz (2005), or de Mooij and Edverdeen (2008) for surveys of this work.

[9] Note that, as we focus on the effect of tax rates, we similarly limit our discussion here. Lawless (2013) examines the role of tax complexity on aggreagate FDI, finding that it has a significantly detrimental effect on inflows. Davies, Norbäck, and Tekin-Koru (2010) examine the impact of tax treaties on location, finding no significant effect on where Swedish firms locate but an impact on their trade patterns.

[10] See Blonigen and Piger (2014) for an overview of the typical variables used in FDI empirical analysis.

German outbound FDI which is further broken down into greenfield FDI and those affiliates created via a merger or an acquisition. They find that although host taxes reduce the likelihood of investment via either mode, the impact is significantly smaller for mergers and acquisitions. This is consistent with the model of Becker and Fuest (2010) where the intuition is that the tax advantages of an acquisition will be factored into the equilibrium target price. Davies and Killeen (2015), meanwhile utilize data on non-bank financial FDI into Europe. Comparable to the others, they find that higher host taxes lower the probability of investment. In addition, they find that smaller firms in this industry (i.e. ones that are established primarily for tax minimization purposes) are more sensitive to taxes than their larger counterparts.

One limitation of these papers is that they do not consider the role of home taxes which, especially for a foreign tax crediting country like the US, can significantly alter the effective taxes of a host country.[11] In response, Barrios, et al. (2012) include both home and host taxes in their conditional estimation of intra-European MNE location choices.[12] They find that higher taxes in either the home or a potential host reduce the likelihood of that location being chosen. In their study using FDI into Europe, Lawless, et al. (2015) find that using the cross-border effective average tax rate (EATR), which includes host taxes as well as the taxes that would be levied on affiliate income by the home country, has comparable effects to other measures of the tax rate (including the policy rate, the host EATR, and the host effective marginal tax rate (EMTR)). It is worth noting that this latter study also breaks the data down into FDI in manufacturing and services, finding that while both sectors are deterred by host taxes, services are less so.

Outside of tax rates, the above work finds that the impact of other control variables on the affiliate location choice are comparable in direction to what is found in the literature examining aggregate FDI, i.e. investment is more likely in large, proximate countries with low trade and investment barriers. Additionally, access to other markets and skill tend to increase the location probability whereas higher labour costs tend to reduce it.

This prior research then informs several of our choices. First, as in Barrios, et al. (2012), Siedschlag et al. (2013a, 2013b) and Lawless, et al. (2015) we will use investment choices across Europe from multiple source countries. Second, we include both home and host tax rates with the expectation that as taxes increase this decreases the likelihood of investment.[13] Third, our selection of control variables draws from those identified in the literature. Fourth, we disaggregate our sample along various lines in order to examine the potential for differential effects across sectors and firm groups.

That said, our analysis has two additional contributions. First, in contrast to the logit-based estimator used in papers such as Devereux and Griffith (1998) and Barrios et al. (2012), we employ a Heckman sample selection estimator. As described in more detail in the next section,

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[11] See Kemsley (1998) who demonstrates that this does indeed affect exporting relative to affiliate sales for US MNEs. Concerns over this also lead Davies and Killeen (2015) to estimate their regressions using subsamples of the home countries, something which does not overly impact their results.

[12] In unreported robustness checks, comparable results were found using a nested logit estimator.

[13] Note that Barrios et al. (2012) control for the additional tax on affiliate profits by the home country and thus do not estimate the impact of the host tax relative to the tax that would be incurred if the firm invested at home rather than overseas.

this approach has several advantages, including endogenizing the number of investments and permitting the inclusion of owner variables (which is not possible under conditional logit). Second, we estimate both the extensive (location choice) and intensive (investment size) decisions. In particular, if higher host taxes reduce the size of investment (as our results indicate), then focusing on only the extensive margin likely underestimates the impact of host taxes on the amount of FDI it receives.

To our knowledge, the two papers that come closest to ours are Yeaple (2009) and Davies and Kristjánsdóttir (2010). Yeaple (2009) examines the extensive and intensive margins of US firm-level FDI decisions. His analysis, however, differs from ours in several respects. First, rather than using a two-step approach and dealing with sample selection in the second stage, he uses a linear probability model for the extensive margin and a separate OLS estimator for the intensive margin. Second, in these estimates, he only controls for industry dummies, owner size, and owner productivity; later regressing aggregate activity variables on host country characteristics. In contrast, we include firm and country variables at the same time. Third, he does not consider home country variables as all of his observations are for US outbound investment. Finally, he does not consider the role of taxes. That said, he finds that both the size and probability of investment are increasing in owner size, something we also find in our analysis. As with our approach, Davies and Kristjánsdóttir (2010) use a Heckman two-step estimator on FDI into Iceland in the power-intensive industry. Their analysis, however, only considers a single host and a single industry, operates at the aggregate bilateral level (i.e. the model the initial entry from a given home country, not from a given owner), and, like Yeaple (2009), do not consider taxes.

3. Empirical Approach

In this section, we lay out a simple discussion of a representative firm's FDI location decision in order to explain our empirical approach and how it differs in interpretation from that used elsewhere.

Consider a firm from home country h that can raise capital from the global capital market at rate r. This firm has the ability to invest in a subset of L locations. The profit from a given location l is:

$$\pi_{i,l} = R\left(K_{i,l}; X_{h,l}, Z_i\right) - V\left(K_{i,l}; X_{h,l}, Z_i\right) - F\left(X_{h,l}, Z_i\right) + \varepsilon_{i,l} \tag{1.1}$$

where $X_{h,l}$ is a matrix of characteristics of the firm's home country h (such as GDP and the cost of capital), the potential host l, and pair specific variables (such as distance), Z_i is a vector of firm characteristics, and $\varepsilon_{i,l}$ is the firm-potential host error term which is normally distributed. The first term represents revenues from choosing a capital-level $K_{i,l}$. The middle two terms represent variable costs V (which again depend on the capital choice) and fixed costs F.

Given that it invests, the firm will choose the capital level such that marginal revenues equal marginal cost:

$$R_K\left(K_{i,l}^{*}; X_{h,l}, Z_i\right) = V_K\left(K_{i,l}^{*}; X_{h,l}, Z_i\right) \tag{1.2}$$

which would yield a maximum profit of (conditional on investment):

$$\pi_{i,l}{}^* = R\left(K_{i,l}{}^*; X_{h,l}, Z_i\right) - V\left(K_{i,l}{}^*; X_{h,l}, Z_i\right) - F\left(X_{h,l}, Z_i\right) + \varepsilon_{i,l}. \tag{1.3}$$

With this in mind, the firm invests only when

$$\pi_{i,l}{}^* \geq 0. \tag{1.4}$$

This latent variable, however, is unobserved. Instead, what is observed is the firm's decision of whether to invest and, given the decision to do so, the size of its investment. As is well established, if one estimates the impact of the exogenous variables on the size of the investment (i.e. the observed capital stock or some other measure of affiliate size), there is a possibility of sample selection bias. If the error term is normally distributed, we can deal with this by using a Heckman two-step estimator.[14]

In doing so, it is necessary to identify variables that affect the decision of whether or not to invest but not the size of investment. (i.e. would be found only in the fixed costs $F\left(X_{h,l}, Z_i\right)$). These selection variables would be those that affect fixed costs and/or total profits but not the marginal rate of return on capital. In the first group, as detailed in the data section, we include variables on host investment barriers. The key element in the second group is the effective *average* tax rates which influence the location choice. Note that these differ from effective *marginal* rates which affect the size of the investment (placing them in $V\left(K_{i,l}; X_{h,l}, Z_i\right)$).

Note that a key aspect of this approach to the investment decision is that the firm can invest in multiple locations with the number of such locations being endogenous. This is distinct from alternative approaches to location choice which assume that the firm has an exogenous number of investment choices where each one carries an opportunity cost of forgone investment elsewhere. Put differently, under this approach, each firm *can* invest in all or none of the potential hosts; whether or not it does so depends on the profitability of each host.[15] This is thus very different from the underlying model of the logit estimators used to date and discussed in Section 2. As detailed in the next section, 40% of the investments in our data come from a small number of firms that invest multiple times. Thus, not only is it intuitive to seek to endogenize the number of investments, the data suggests that multiple investments are a key aspect of the data.

This approach has other benefits beyond endogenizing the number of investments by a given firm. First, it allows us to control for variables that do not vary across hosts, something not possible to do with logit estimators. This allows us to control for home country features (such as taxes and other gravity variables) as well as for characteristics of the owner. This gives us new insights into features affecting the location choice of firms. Second, the two-step methodology allows us to simultaneously estimate the size of the investment (the intensive margin), not just the decision of whether or not to invest (the extensive margin). This does not happen in a logit estimator. Third, the probit approach does not suffer from the independence of irrelevant alternatives problem because it does not force the firm to compare one location against a well-specified set of alternative locations. Instead, it presents the firm with two options for each potential location – invest or not – for which there is no third alternative.

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[14] See Greene (2011) for an introduction to this method.

[15] It must be noted, however, that as with all other studies we only include firms that actually invest. Thus, the results must nevertheless be interpreted in light of this selection.

That said, there are two limitations to our approach. First, although it would be advantageous to use a multi-variate Heckman probit in the first stage so that a given owner's choice across potential hosts is treated as a joint decision, there is a difficulty in doing so. This arises because many of our home countries are also potential hosts. Because we consider only cross-border investments, the set of potential hosts varies by home. For example, a UK-based owner considers all European countries except the UK as a potential host (including Germany) whereas a German-based owner considers the UK a potential host but not Germany. Since the set of potential hosts vary, so too does the multivariate probit we would seek to estimate, implying that we would have to do this country-by-country.[16] Nevertheless, we cluster our errors by firm i (i.e. by the owner, not the affiliate) in an attempt to partially deal with this. Further, we control for past investment activity, both in a potential host and elsewhere. Second, including fixed effects (or even a large number of categorical variables) in a probit regression biases both coefficients and standard errors (see Greene (2004) for discussion). This does not occur in logit estimators and is something explored in our analysis.

4. Data

Our firm level data comes from Bureau van Djik's Amadeus dataset which covers activity in Europe.[17] From this, we extract information on new cross-border greenfield investments.[18] This information provides several key pieces of information. First, it indicates the owner of the affiliate, the owner's country of residence (the home country) and location of the investment (the host country). Table 1 provides the list of home and host countries along with the share of outbound and inbound investments for the set of firms we use.[19] As can be seen, although all of the countries in our data are homes, four are not hosts during the sample. This is because, although they did receive investment, those investments were missing firm-level information we need for our regressions. Second, Amadeus provides the year of the investment. We restrict our sample to 2004 to 2013 for consistency purposes. Table 2 breaks down the number of investments by year. Third, from Amadeus we obtain information on the size of the affiliate (measured as total assets in constant 2005 US dollars), the size of the owner (measured as total assets in constant 2005 US dollars from unconsolidated statements so as to exclude the affiliate for the year prior to the investment or, if missing, for the closest year for which it was available), the age of the owner (i.e. the years since its incorporation), and the 4-digit NACE code of the owner and the affiliate. If these data are missing, we are forced to exclude the investment from our analysis. When a given owner invests multiple times in a given host in a given sector during

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[16] It should be noted that a comparable problem arises in the logit estimations of Lawless, et al. (2015), Barrios, et al. (2012), and other multiple-home studies. In Davies and Killeen (2015), this issue does not occur when using only the non-European home subsample, as then all homes have the same set of potential European hosts. As they discuss, at least in their data, the results are comparable to where they simply treat investment in the home country as another non-chosen option. Thus, it may be that this issue does not overly impact the literature's results.

[17] This can be found at https://amadeus.bvdinfo.com/.

[18] As shown by Davies, Desbordes, and Ray (2015) greenfield investments make up about half of FDI investments in Europe during this sample. In addition, they demonstrate that consistent with Hebous, Ruf, and Weichenrieder (2011), only greenfield FDI is sensitive to taxes, hence our focus on greenfield investments.

[19] The home country is defined as the country of residence of the affiliate's global ultimate owner.

the same year, these were added together.[20] In addition, we drop investments where the 2005 US dollar value was under $1,000 or above $1 billion. This leaves us with 10,845 investments for which we have our control variables. Note that because of the use of owner data, our home countries all belong to Europe. In addition, for a subset of 5,972 firms, we are able to construct a rough proxy for owner productivity, measured as the owner's operating revenues (in constant US dollars) relative to its size. With these data, for a year in which an owner invests in a given sector somewhere, we estimate the probability of it investing in a given host and, conditional on that occurring, how large that investment is.

From the empirical heterogeneous firms literature (e.g. Yeaple (2009) and Davies and Jeppesen (2015)), we expect that larger and older firms are more likely productive ones. As such, we expect that they are both more likely to invest in a given host and, conditional on investment, that the size of the affiliate is larger. Likewise, we expect a positive effect from productivity. Therefore, a priori, we anticipate positive coefficients for these variables at the extensive and intensive margins.

One important aspect of the data is that some owners have multiple investments. As shown in Table 3, our 10,845 investments are spread across 7,980 owners. Of these owners, almost 80% only have one investment, meaning that 41% of our investments come from only 20% of owners. Put differently, most owners invest only once in the sample, but a large share of investments are done by firms that invest multiple times. Indeed, just 1% of owners invest six or more times in the data, yet they account for 6.6% of total investments. Using this information, we classify our owners into those that are single investors or multi-investors. Nearly by construction, we anticipate that the probability of investment in a given location is higher for multi-investors. However, as such firms are again potentially more productive, we also expect them to invest more conditional on investment. Thus, as with the other owner variables, we anticipate that multi-investor will have a positive coefficient at the extensive and intensive margins. In addition to this, we construct a variable counting the number of investments a given owner has done prior to the year of the investment in question.

In addition to the owner variables, we utilize a set of common home, host, and home-host control variables. To control for the market size of the countries, we utilize GDP and market potential (constructed as the sum of other countries' GDPs weighted by their distance to the country in question). We generally expect a positive effect from home and host GDP at both the extensive and intensive margins (i.e. investment is more likely and bigger in large economies). GDP per capita can capture both desirable market income effects (encouraging FDI to locate there), higher skill levels (the attractiveness of which may depend on the skill-intensity of the industry), and higher worker wages (driving investment away). Thus, it is unclear what to anticipate a priori. Market potential is typically presumed to have positive effects on FDI and indeed, this is commonly found (see for example a review by Fontagné and Mayer, 2005). That said, several studies such as Blonigen, et al. (2007) instead find the opposite, implying that investment prefers the periphery. As shown by Blonigen, et al. (2007), the extent of this can vary across industry. Thus, we are initially agnostic about the expected effect of market potential.

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[20] We do this because with the estimation approach, we operate at the owner-host-sector-year level. This merged 87 investments.

Beyond market size, we control for the level of tertiary education of the home and host (measured as the share of population with tertiary education).[21] Much like GDP per capita, this can have a positive effect (reflecting skill) or a negative effect (reflecting costs). Also, as is common, we control for "openness", i.e. exports and imports relative to GDP. This is one measure of an economy's trade barriers which is generally seen as a hindrance to both outbound and inbound vertical FDI but something that increases horizontal FDI. In addition to this, we include dummies for whether the host, home, or both countries are EU15 members or Eurozone members. We also use three pair-wise proxies for the cost of doing business across borders: contiguity, common language, and distance (measured as the distance between themost important cities/agglomerations in terms of population). These were obtained from the CEPII.[22] In unreported results, contiguity and language were insignificant in the intensive estimation stage, therefore we only include them in the extensive selection stage. Beyond these, we include the average FDI investment barrier index developed by the OECD.[23] This index combines data on four subcategories restricting foreign-owned firms (equity restrictions on foreign ownership, screen and approval requirements, the use of key foreign personnel, and other restrictions). As this is about the establishment of the firm rather than affecting its marginal costs, we use this only in our extensive margin selection stage, where we anticipate a negative coefficient.

In addition to these common gravity measures, we include the cost of capital (K) from Spengel, et al. (2014) which measures the after-tax cost of creating €1 of investment. At first blush, one might expect that a higher cost of capital in the host reduces FDI at the extensive and intensive margins. Alternatively, a high cost of capital can reflect a high rate of return and high productivity, increasing FDI. Similarly, when the home country has a high cost of capital, FDI can go down (if investment is at least partially financed in the home country) or up (if this again reflects productivity).

Finally, and for us our variable of focus, we use four measures of tax rates, two which are country-specific and two which are firm-specific. From Spengel, et al. (2014), we obtained the effective average tax rate (EATR) and the effective marginal tax rate (EMTR) for each of the countries in our sample. [24, 25] Given our two-stage question, having access to both of these rates is extremely important. When choosing whether or not to locate in a given host country, the firm would consider the total-after tax profit. In this case, the relevant tax is the average tax (t^a)

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[21] This comes from the World Development Indicators database (http://data.worldbank.org/data-catalog/world-development-indicators). In unreported results, we used the share of workers in R&D or the share of GDP spent on R&D, measures which reduced the number of countries in the sample. Comparable results were found and are available on request.

[22] See Mayer and Zignago (2011) for more details. The CEPII can be accessed at http:// www.cepii.fr/.

[23] This can be found at http://www.oecd.org/investment/fdiindex.htm. Note that this measure is how difficult it is for a foreign firm to establish itself in a given host, including those barriers existing for domestic investors. Thus, although national treatment under the EU would imply lower barriers to investment from another EU country than a non-EU home, barriers still exist.

[24] This can be found at https://assets.kpmg.com/content/dam/kpmg/pdf/2015/11/global-tax-rate-survey-2015-v2-web.pdf.

[25] The EATR is calculated as the difference of the net present value of a profitable investment project in the absence of tax and the net present value of the same investment in the presence of tax. The EMTR is calculated as the difference between the cost of capital and the required post-tax real rate of return, i.e. the additional return required due to taxation. Both of these are calculated using the methodology of Devereux and Griffith (2003).

since after tax income would be $(1-t^a)\pi$ where π is pre-tax income. Alternatively, if the question is how taxes affect marginal, intensive decisions, the appropriate tax rate to use is the effective marginal tax rate. The reason for this is that, by increasing investment and generating an additional euro of income, the firm does not pay the average tax rate on that additional income, but the marginal rate. Unless the tax system is flat, these two will typically differ. On personal income, under a progressive tax system, the marginal rate will exceed the average rate. In our data, as shown in Figure 1, the reverse is generally true. This is because of the large tax benefits from debt financing at the margin (see Graham, 2000, for a thorough discussion). Because the tax measure we use is constructed by averaging the effective rates across three financing modes – retained earnings, equity, and debt – this results in a marginal rate below the average rate.[26]

Further, it must be remembered that the effective rates are calculated as averages across three financing modes and five income-generating assets (which are industrial buildings, intangibles, machinery, financial assets, and inventories). As such, the true tax will vary across firms depending on their ability to access differing finance sources and the industry in which they operate (which will affect the relative importance of different assets). With this in mind, we construct firm-specific tax rates using the product of the owner's share of a specific asset in its total assets and the country's tax rate for this type of asset, i.e. for firm i in country $c \in \{l,h\}$ in year t with assets $a_{i,x,t}$ of type x out of its total assets $A_{i,t}$:

$$EATR_{i,c,t} = \sum_x \frac{a_{i,x,t}}{A_{i,t}} EATR_{c,x,t}$$

where we use four asset categories (intangible fixed assets, total fixed assets, inventories, and financial assets). We similarly construct firm specific EMTRs and costs of capital.[27]

Figure 1 illustrates the average of these four tax variables across countries. [28] As can be seen, there is a good deal of variation across countries, both in the levels of taxes and the differences between the EATR and the EMTR. Table 4 presents correlations between the four taxes for the host and home, as well as the cost of capital. This suggests that, although our firm-specific EATRs are highly correlated with the country one, this is less true for the EMTR.

Table 5 presents our summary statistics. Note that all non-binary variables are logged, including the size of the affiliate and that they are lagged by one year relative to the date of investment.[29] Finally, in the intensive stage, we include dummies for the home country, host country, 2-digit owner and affiliate industries, and year.[30] As is well established, however, this cannot be done in the extensive (probit) stage of the estimation as doing so biases both the standard errors and the

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[26] In our data, for approximately 250 investments, this actually results in a negative marginal rate for a potential host (mostly Belgium in 2008). Note that as we use the log of taxes, we lose these observations from our sample.
[27] Note that Amadeus does not distinguish between investments in buildings and machinery. For these types of assets we use the sum of total fixed assets and other fixed assets and the average of two tax rates for industrial buildings and machinery.
[28] Although omitted here, examination of the time trend in the average across countries yields no clear-cut pattern.
[29] This is because the decision to invest is likely made before the actual investment occurs and is therefore based on information prior to the date of investment.
[30] Note that this does not permit estimation of the host/home country's EU15 or Euro dummies.

coefficients (see Greene, 2004, for a complete discussion; below we illustrate this result in our data). With this in mind, in the extensive stage, we only include year dummies and use the owner-sector average of size, age, and multiple investor status to help to control for sector-specific factors.

5. Results

In this section, we develop our baseline specification. Following that, we explore various features of the data, including differences across sectors and between single and multi-investors.

5.1 Baseline

In Table 6, we develop our baseline specification. In each of the three specifications, the intensive column contains the estimates for the size of the affiliate conditional on investment taking place. The extensive column, meanwhile, shows the results from the selection estimation, i.e. whether or not investment occurs. In the first specification, we use the country-level taxes and cost of capital. Specification 2 replaces these with the firm-specific measures. As this lowers the sample size somewhat due to missing subcategories of owner assets, Specification 3 uses the same sample as 2, but the tax and cost measures of 1.

We begin our discussion with the tax rates. As can be seen, regardless of the specification we find that higher home or host EATRs significantly reduce the probability of an investment. This is consistent with the conditional logit findings of papers such as Barrios, et al. (2012) and Lawless, et al. (2015). Although the point coefficients on the EMTRs are also negative, they are not significant. This may be due to the inclusion of the country dummies which force the estimates to rely on the admittedly small variation across time (specification 1 and 3) or firms (2). We explore this in more detail below.

In terms of the firm-specific variables, we find that, as expected, larger owners invest more often and have larger affiliates. This then mirrors Yeaple (2009). Contrary to our expectations, younger owners invest more often and with larger size. This may be because older owners have already done the bulk of their FDI prior to the start of the sample. Finally, multi-investors invest more often (which is not surprising) and larger than do their single investor counterparts.[31] When the owner is in a sector that is larger and younger, the probability of investment is again higher. The opposite is true for multi-investor status, i.e. the higher probability of investment by a multi-investor in a sector with many multi-investors is smaller than when it stands out compared to its peers. The cost of capital in the host is significantly positive at the extensive margin, suggestive of more likely investment where rates of return are high. The home cost of capital, however, is only significant when using the country-specific taxes.

Moving to the country variables, as expected, when the host has large barriers to FDI, this reduces the probability of investment. Again, as this variable measures the costs of setting up a firm, we only use it in the extensive stage. The other country variables are typically significant only in the extensive estimation. This is potentially due to the inclusion of country dummies, something explored below. Beginning with the market size variables, we find that the probability

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[31] Omitting this variable does not impact the estimates, something explored in detail below.

of investment is higher when the host is large with low income (i.e. low wages). Conversely, the probability is higher when the home is small yet wealthy. In addition, we find that host per capita GDP is positive in the intensive stage in two of our specifications. This suggests that investment is less likely in high income hosts but that if it does happen, the investment tends to be larger. Market potential is generally negative with significance for both host and home in the extensive stage and for the host in the intensive stage. This suggests that, for European investors, they are attracted to the periphery countries.

Although unimportant for the size of investment, the probability is rising in the home's education level but falling in the host's (again suggestive of a deterrent effect of high wages on the extensive margin). Investments in less-open hosts is more likely and larger, investments from less-open homes are also more likely. This is suggestive of market-seeking horizontal FDI (Markusen, 1984).

EU15 membership increases the probability of investment when one or both countries are members.[32] Euro membership, however, is only significant for the host and there it reduces the probability of investment (reflective of the preference for the periphery found by market potential). For distance, we find differing effects at the extensive and intensive margins, with investment less likely in a distant host but, if it occurs, investment tends to be larger. This would be consistent with distance increasing both the fixed cost of investment and the marginal cost of exporting, i.e. leading towards greater concentration but, if investment happens, encouraging more production in the host in a horizontal manner (Markusen, 1984). Common language and contiguity increase the probability of investments.[33]

Finally, in each specification, we find a significant coefficient on rho, indicative of sample selection bias. This suggests that it is indeed important to control for the probability of investment occurring when estimating the size of the affiliate. As the results are similar across specifications, we adopt 2 as our baseline as this uses the firm-specific taxes, providing more variation in this key variable. In unreported results using the country-specific measures, the following estimates were very similar and are available on request.

Thus, from our baseline, three features are clear. First, the decision of whether to invest is influenced by owner characteristics, a feature of the data that cannot be analyzed when using a conditional logit estimator. Second, our estimates suggest that these variables also affect the size of investment, something missing when using aggregated data. Third, the omission of the selection stage has the potential to bias the coefficients from a gravity regression performed at the firm level.

Given the non-linear nature of the extensive estimation, Table 7 reports the estimated elasticities for our baseline specification evaluated and the sample mean. In particular, this suggests that a 1% increase in the host EATR (i.e. a rise from 10 to 10.1%) would reduce the probability of

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[32] Note that as nearly all of our countries are EU members, we use this EU15 designation rather than EU membership to achieve suitable variation in the variable.

[33] As noted above, when these two were included in the intensive stage, they were insignificant. Given their discrete nature, we therefore use them only in the extensive stage where the dependent variable is also discrete to aid in selection identification. These alternative results are available on request.

investment by 1.29%. One policy implication from our estimates is that this reduction can be offset by a 2.7% reduction in the FDI barriers. Thus, when coupled with a reduction in investment barriers, a country may be able to increase its tax revenues via higher taxes without a loss of inbound FDI.

5.2 Dummy Variables

One possible reason for the lack of significance of the EMTR and country controls in the intensive stage is that we include home and host country dummies. Particularly for slow-changing variables such as the EMTR, this can eliminate their significance. To explore this, in Table 8, we repeat Table 6's specifications 1 and 2 but exclude the home and host dummies. As expected, doing so increases the significance of the country variables in both specifications. In addition, for specification 1 where taxes are country-specific, we now find significantly negative impacts of the EMTR which are roughly the same magnitude as the insignificant coefficients in Table 6. This suggests that the EMTR does indeed matter for the size of investment, but that this effect was obscured by the country dummies. When using the firm-specific taxes, however, although we again find negative point estimates that are very close to those in the baseline, they fall just outside the normal significance levels.

As established by Greene (2004) among others, probit estimation does not perform well with large numbers of categorical variables, often yielding poor standard errors and biased coefficients. This is why we have not included sector, home, or host country dummies in our first stage analysis. Nevertheless, it is important to at least attempt to understand what may be uncovered by doing so while being cognizant of the potential issues. In Table 8's specification 3, we do this by adding owner 2-digit sector dummies, host dummies, and home dummies to the year dummies already used in the extensive stage.

Doing so results in similar impacts for the owner characteristics, but has two important effects. First, comparable to what happens to the EMTR, including country dummies wipes out significance of the EATR. Second, we now find counter-intuitive results for FDI barriers, which now suggest that investment is more likely where it is more difficult. This is then indicative of the biases Greene (2004) warns of and we therefore do not use these additional dummies in our estimation.

5.3 Productivity

Before delving deeper into the issue of tax measurement, Table 9 expands on the baseline by including our measure of owner productivity. We do so because Yeaple (2009) finds that more productive firms are both more likely to invest and invest larger amounts. We do not do so in the baseline because it was available for only half of our investments. For those where productivity was available, the results of specification 1 indicate that more productive firms are no more likely to invest in a given host; however conditional on investment, the size of the affiliate is smaller. This stands in contrast to Yeaple, suggesting that by not controlling for sample selection, his results may be biased (or that our measure of productivity is weak). In addition, we see a general fall in the significance of our other controls. When significant, excepting the home cost of capital, the coefficients match the sign of that in the baseline. To determine whether this

is due to the inclusion of productivity, specification 2 uses the same sample but omits productivity. As can be seen, this does indeed point to the reduction in the sample for these changes. Thus, since the inclusion of productivity seems to generate sample selection without eliminating any obvious omitted variable bias, we proceed without it.[34]

5.4 Sector Differences

To this point, although we have controlled for sector-specific effects, we have not examined whether there is a difference in the tax responsiveness of investment across different industries. In Tables 10 and 11, we do so in two ways. First, in Table 10, we split the sample into affiliates in manufacturing (specification 1), services other than financial services (specification 2), financial sector (specification 3), and utilities and construction (specification 4).[35] Based on the findings of Lawless, et al. (2015), we anticipate that finance FDI is more sensitive to the host EATR than is manufacturing, which is more sensitive than services. Looking at the point estimates, this does indeed seem to be the case, with utilities and raw materials as sensitive as finance. While we can reject the equality of the finance/utilities and manufacturing/services host EATR coefficients at the 95% level, we cannot do so between finance and utilities or between manufacturing and services. In addition, we find that FDI in services and finance is sensitive to the home EATR with no significant difference between these coefficients. Also consistent with the relative sensitivity of financial FDI, we find an impact from the host EMTR in the intensive estimation for this sector. Although this split and its reduction in the number of observations lowers the significance of our various control variables, on the whole we find similar patterns across the four sectors. That said, we only find evidence of sample selection for the financial investment regression.

In Table 11, we split the non-financial firms into high-technology (specification 1) and low-technology (specification 2) categories using the classification of Eurostat.[36] As can be seen, the two groups are broadly the same, with coefficients comparable across the two groups in terms of magnitude and significance. One notable difference, however, is owner age which is only significant for the low technology group. Thus, for this group, it may particularly be the case that older owners had undertaken the bulk of their investments prior to the start of the sample.

5.5 Single versus Multi-Investors

As discussed above, a small minority of firms carry out a large share of the investments. In this subsection, we explore the differences between owners that invest a single time and those that do so multiple times. We begin by splitting the sample in Table 12.[37] Specification 1 reports the estimates using only the single investors; specification 2 does so for the multi-investors.[38] On the whole, the two look fairly similar, although the negative effect from owner age is significant

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[34] Results including productivity in all specifications are available on request.

[35] Specifically, the financial sector includes services engaged in financial intermediation, which is sectors 6420, 6430, 6491, 6499, 6600, 6610, 6611, 6612, 6619, 6621, 6622, 6629, and 6630.

[36] See http://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an2.pdf.

[37] It is important to remember that this distinction is based on the number of new investments during our ten year time frame and thus potentially classifies firms with additional investments prior to 2004 or after 2013 as single investors.

[38] Note that we are therefore unable to include the "multi-investor" dummy.

only for the single investor group. Looking at the EATR estimates, we find that the point estimates are roughly 50% larger for the single investors (although we fail to reject equality of the coefficients). These coefficients then suggest that single investors are more deterred by taxes than are multi-investors. This might be the case if multi-investors, by virtue of a larger, more complex pattern of intra-firm trade, are more able to engage in transfer pricing and other tax minimization strategies. This would then mean that host taxes would have a smaller – or even no – impact as they can be avoided. This is consistent with the results of Davies, et al. (2015) who find that transfer pricing is an activity only identifiable by the largest multinationals.

In Table 13, we further examine the behavior of multi-investors by using the full sample but introducing the number of investments in prior years (which is zero for all single investors and multi-investors in the year of their first investment).[39] We do so to examine whether prior investment experience affects the current investment behavior. As can be seen, the more prior investments an owner has undertaken, the greater its probability of investing in the current year in a given host. This would be suggestive of a "learning by investing" effect making investments easier. That said, the more prior investments an owner has done, the smaller the current investment is. This may be reminiscent of the literature on how firms expand their trade destinations, with marginally profitable choices being undertaken last (see Albornoz, et al. (2012) for a review).

In specification 2, we extend this by decomposing the prior investment variable into those in the same host and those in other hosts. When doing so, we find that comparable to specification 1, the more investments in other hosts, the more likely investment in the country in question and the smaller any investment that occurs. For prior investments in the same host, however, we find that the more prior investments the less likely a new investment is with no effect on its size. This then argues against agglomeration driving location choice.

Adding these additional variables, however, does not affect our other coefficients including those for taxes.

5.6 The Impact of Host Taxes on Aggregate FDI

Given the above, we see that host taxes affect inbound FDI at the extensive margin and, when omitting country effects, some indication that they also do so at the intensive margin. In this subsection, we calculate a "back of the envelope" change in aggregate FDI (the number of firms times the size of the average firm) due to a 1% increase in the host EATR and EMTR (i.e. going from 10% to 10.1%) and decompose this into those caused by changes at the extensive and intensive margin.

Using the baseline estimates, the average probability of obtaining an investment from a given investor is 2.41%, implying that if there are 100 potential investors, on average a given host should get investment from 2.41 of them. In the sample, the average size of an affiliate is $3.069 million. Thus, baseline aggregate investment would be $12.97 million. Increasing the host EATR, using the average elasticity of -1.29 from Table 7 would reduce the expected number of

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[39] Note that this is only for investments done during the sample and misses those carried out before 2004. Specifically, for year *t*, this is the sum of investments across all sectors prior to *t*.

firms from 2.41 to 2.38. Of the firms the host still receives, using the intensive elasticity of -.115, the average size of an affiliate would shrink to $3.066 million. Together, these two changes result in aggregate FDI falling from $7.39 million to $7.29 million, a decline of 1.4% (compare this to the 0.8% found in Heckemeyer and Overesch's (2013) meta-study). Of this 1.4% decline, 92% of it is due to changes in the extensive margin with the remaining 8% coming from a reduction in the size of firms that do invest.

Thus, our estimates suggest that the bulk of changes in inbound aggregate FDI activity due to host tax changes occur at the decision of whether or not to invest, not in how much to invest. In particular, it suggests that for many firms, the affiliate investment may operate near a minimum operating scale, making the extensive margin more sensitive to policy. Note that although a tax increase would deter investors, our estimates indicate that this can be undone by altering FDI barriers with our estimates suggesting that a 1% tax increase can be offset by a 3% barrier decrease. Thus, when considering tax policy changes, our estimates suggest that there may be particular gains in doing so in the context of an overall investment liberalization strategy.

7. Conclusion

Although it has long been recognized that taxes affect both the size of aggregate investment and the probability of a given host being chosen by a multinational, to date these have not been studied as a single, integrated decision. In this paper, we have done so using over 10,000 investments across 30 European countries during 2004-2013. While we find evidence that taxes affect both margins of an individual firm's investment, the evidence is stronger for changes at the extensive margin. This effect appears particularly large for firms that invest only once during the sample, i.e the majority of our owners. In addition, we find differences across sectors, with the financial sector the most sensitive and services other than financial services the least. Using our estimates, we find that host taxes contribute to aggregate FDI more through changes at the extensive margin than at the intensive margin as may be expected if affiliates are established near their minimum operating scale. Understanding these differing effects has important implications for the use of tax policy vis-à-vis FDI, in particular if different types of investors and different industries have varying impacts on host economies. In addition, this suggests a discontinuity in the investment decision, which has critical implications for the optimal tax rate. Finally, our estimates reiterate the literature's findings that taxes, while important, are only a part of the overall investment decision. In particular, by combining tax changes with investment liberalization, it may be possible to raise taxes without lowering FDI, resulting in even greater revenue gains.

Figure 1: Comparison of Tax Rates
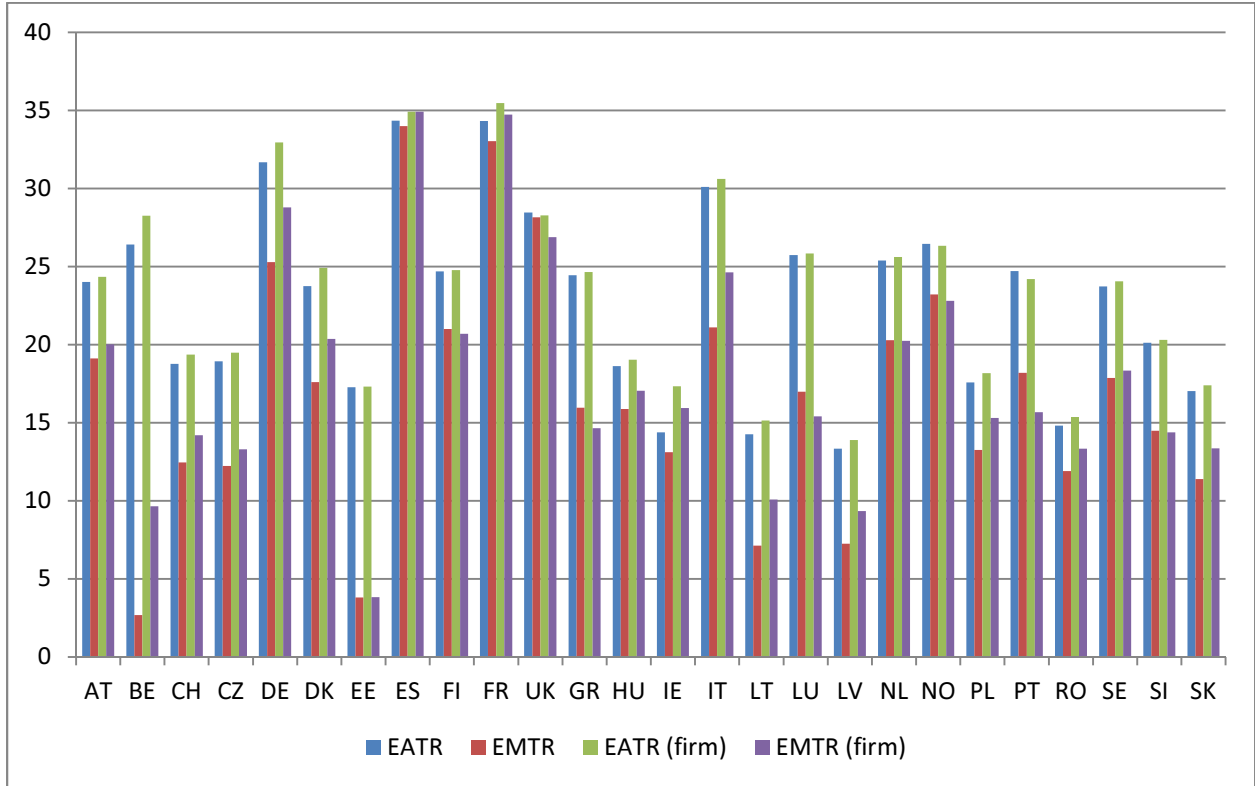
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Table 1: Home and Host Countries

Country	Number of Outbound	Percent of Outbound	Number of Inbound	Percent of Inbound
AT	347	3.2%	603	5.6%
BE	910	8.4%	256	2.4%
CH	64	0.6%		0.0%
CZ	144	1.3%	318	2.9%
DE	1,245	11.5%	1,580	14.6%
DK	790	7.3%	163	1.5%
EE	81	0.7%	120	1.1%
ES	938	8.6%	629	5.8%
FI	268	2.5%	163	1.5%
FR	544	5.0%	592	5.5%
GR	46	0.4%	8	0.1%
HU	192	1.8%	137	1.3%
IE	162	1.5%	119	1.1%
IT	802	7.4%	937	8.6%
LT	12	0.1%	43	0.4%
LU	553	5.1%	50	0.5%
LV	20	0.2%	142	1.3%
NL	1,537	14.2%	846	7.8%
NO	271	2.5%	559	5.2%
PL	90	0.8%	302	2.8%
PT	236	2.2%	521	4.8%
RO	8	0.1%	1,782	16.4%
SE	914	8.4%		0.0%
SI	28	0.3%		0.0%
SK	107	1.0%	244	2.2%
UK	536	4.94%	731	6.7%
	10,845	100.0%	10,845	100%

Source: Authors' calculations based on the *Amadeus* data set.

Table 2: Investments by Year

Year	Number of Investments	Percent
2004	615	5.67
2005	900	8.3
2006	1,263	11.65
2007	1,453	13.4
2008	1,403	12.94
2009	1,200	11.07
2010	1,096	10.11
2011	1,182	10.9
2012	1,020	9.41
2013	713	6.57

Source: Authors' calculations based on the *Amadeus* data set.

Table 3: Number of Investments by Owner

Number of Investments	Number of Owners	Share of Investors	Share of Investments
1	6,409	80.31	59.1
2	981	12.29	18.09
3	324	4.06	8.96
4	119	1.49	4.39
5	62	0.78	2.86
6	32	0.4	1.77
7	15	0.19	0.97
8	11	0.14	0.81
9	6	0.08	0.5
10	5	0.06	0.46
11	5	0.06	0.51
12	2	0.03	0.22
13	1	0.01	0.12
14	2	0.03	0.26
15	2	0.03	0.28
16	1	0.01	0.15
17	1	0.01	0.16
19	1	0.01	0.18
25	1	0.01	0.23
Total	7,980	100	100

Source: Authors' calculations based on the *Amadeus* data set.

Table 4: Country versus firm-specific taxes

	EMTR host	EATR host	EMTR host (firm-specific)	EATR host (firm-specific)
EMTR host	1			
EATR host	0.5714	1		
EMTR host (firm-specific)	0.7972	0.6264	1	
EATR host (firm-specific)	0.546	0.9681	0.6967	1

	EMTR home	EATR home	EMTR home (firm-specific)	EATR home (firm-specific)
EMTR home	1			
EATR home	0.4262	1		
EMTR home (firm-specific)	0.7998	0.5988	1	
EATR home (firm-specific)	0.3536	0.956	0.6327	1

	Cost of K host	Cost of K home	Cost of K host (firm-specific)	Cost of K home (firm-specific)
Cost of K host	1			
Cost of K home	-0.0027	1		
Cost of K host (firm-specific)	0.8671	0.0108	1	
Cost of K home (firm-specific)	0.0039	0.8537	0.1232	1

Source: Spengel, et al. (2014) and authors' calculations based on Spengel, et al. (2014) and the *Amadeus* data set.

Table 5: Summary Statistics

Variable	Obs.	Mean	Std.Dev.	Min	Max
Firm-level					
Affiliate size	10,845	12.463	2.337	6.797	19.61
Assets owner	255,718	16.035	2.683	6.924	20.723
Age owner	255,718	1.909	1.275	0	5.549
Multi investor	255,718	0.4	0.49	0	1
Productivity	140550	-1.585	2.557	-18.55	5.903
EMTR host (firm)	228,699	2.78	0.563	-3.986	6.561
EMTR home (firm)	228,890	3.034	0.502	-0.735	5.963
EATR host (firm)	229,437	3.111	0.281	1.022	5.837
EATR home (firm)	229,442	3.313	0.204	1.781	4.744
Cost of K host (firm)	229,440	1.823	0.115	0.178	4.109
Cost of K home (firm)	229,442	1.881	0.117	0.544	3.401
Prior investments	255,718	0.485	1.402	0	23
Prior host investments	255,718	0.196	0.719	0	10
Prior other investments	255,718	0.29	1.09	0	20
Country Level					
EMTR host	255,718	2.682	0.645	0	3.567
EMTR home	255,718	2.875	0.744	0	3.567
EATR host	255,718	3.087	0.281	2.468	3.611
EATR home	255,718	3.277	0.2	2.468	3.611
Cost of K host	255,718	1.799	0.098	1.569	2.041
Cost of K home	255,718	1.846	0.104	1.569	2.041
GDP host	255,718	26.148	1.465	23.209	28.781
GDP home	255,718	27.119	1.2	23.209	28.781
GDP per capita host	255,718	10.099	0.735	8.304	11.364
GDP per capita home	255,718	10.515	0.403	8.61	11.364
Market potential host	255,718	10.032	0.324	9.453	10.817
Market potential home	255,718	10.169	0.39	9.453	10.817
Education host	255,718	3.259	0.318	2.425	3.761
Education home	255,718	3.345	0.263	2.573	3.761
Openness host	255,718	4.576	0.448	3.82	5.853
Openness home	255,718	4.523	0.469	3.82	5.853
FDI barrier host	255,718	-3.377	0.859	-5.521	-1.726
EU15 home	255,718	0.906	0.292	0	1
EU15 host	255,718	0.664	0.472	0	1
EU15 both	255,718	0.622	0.485	0	1
Euro home	255,718	0.708	0.455	0	1
Euro host	255,718	0.595	0.491	0	1
Euro both	255,718	0.454	0.498	0	1
Pair-level					

Contiguity	255,718	0.143	0.35	0	1
Common language	255,718	0.079	0.27	0	1
Distance	255,718	6.921	0.658	4.088	8.121

Source: Authors' calculations.

Table 6: Baseline Results

	(1) Country Taxes		(2) Firm Taxes		(3) Country Taxes	
	Int.	Ext.	Int.	Ext.	Int.	Ext.
EMTR host	-0.186		-0.115		-0.153	
	(0.168)		(0.157)		(0.179)	
EMTR home	-0.176		0.0668		-0.168	
	(0.120)		(0.119)		(0.125)	
EATR host		-0.543***		-0.550***		-0.580***
		(0.0553)		(0.0586)		(0.0593)
EATR home		-0.215***		-0.197***		-0.209***
		(0.0198)		(0.0245)		(0.0209)
Assets owner	0.195***	0.00346***	0.209***	0.00453***	0.210***	0.00329***
	(0.0105)	(0.000740)	(0.0118)	(0.000844)	(0.0116)	(0.000822)
Age owner	-0.0485**	-0.00296*	-0.0546**	-0.00440***	-0.0571***	-0.00282*
	(0.0206)	(0.00158)	(0.0216)	(0.00170)	(0.0215)	(0.00170)
Multi investor	0.224***	0.0212***	0.212***	0.0228***	0.214***	0.0241***
	(0.0513)	(0.00396)	(0.0544)	(0.00414)	(0.0544)	(0.00416)
Cost of K host	0.168	1.283***	0.808	0.992***	-0.382	1.478***
	(1.436)	(0.137)	(0.665)	(0.0941)	(1.496)	(0.148)
Cost of K home	1.651	0.204***	-0.836	0.00673	1.412	0.244***
	(1.482)	(0.0352)	(0.611)	(0.0395)	(1.544)	(0.0392)
Mean Size		0.0232***		0.0274***		0.0264***
		(0.00464)		(0.00517)		(0.00511)
Mean Age		-0.0385***		-0.0501***		-0.0454***
		(0.00682)		(0.00769)		(0.00754)
Mean Multi		-0.109***		-0.124***		-0.123***
		(0.0226)		(0.0247)		(0.0245)
Country-level Variables						
FDI barrier host		-0.192***		-0.201***		-0.190***
		(0.00915)		(0.00955)		(0.00959)
GDP host	-2.465	0.247***	-3.556	0.260***	-2.425	0.250***
	(2.159)	(0.0109)	(2.188)	(0.0114)	(2.256)	(0.0114)
GDP home	-2.267	-0.0335***	-1.406	-0.0150***	-2.116	-0.0242***
	(2.131)	(0.00536)	(2.141)	(0.00581)	(2.234)	(0.00598)
GDP per capita host	3.156*	-0.160***	3.587**	-0.154***	2.546	-0.164***
	(1.771)	(0.0172)	(1.788)	(0.0180)	(1.856)	(0.0181)
GDP per capita home	2.449	0.0403***	1.183	0.0352***	1.919	0.0312***
	(1.947)	(0.00841)	(1.925)	(0.00843)	(2.022)	(0.00886)
Market potential host	-10.67**	-0.359***	-11.74**	-0.372***	-8.661	-0.347***
	(5.172)	(0.0411)	(5.207)	(0.0438)	(5.327)	(0.0435)
Market potential home	0.0189	-0.280***	2.330	-0.336***	0.876	-0.314***
	(4.788)	(0.0151)	(4.543)	(0.0160)	(4.962)	(0.0164)
Education host	0.391	-0.606***	0.410	-0.606***	0.708	-0.647***
	(0.652)	(0.0294)	(0.654)	(0.0300)	(0.674)	(0.0314)
Education home	0.208	0.166***	-0.000813	0.179***	-0.229	0.153***

	(1)		(2)		(3)	
	(0.544)	(0.0126)	(0.589)	(0.0129)	(0.604)	(0.0133)
Openness host	-1.323***	-0.212***	-1.463***	-0.204***	-1.367**	-0.184***
	(0.511)	(0.0367)	(0.536)	(0.0380)	(0.536)	(0.0383)
Openness home	0.677	-0.201***	0.854	-0.159***	0.850	-0.158***
	(0.671)	(0.0158)	(0.718)	(0.0173)	(0.722)	(0.0175)
EU15 host		0.0412***		0.0258**		0.0323***
		(0.0108)		(0.0114)		(0.0118)
EU15 home		0.0873***		0.0588***		0.0721***
		(0.0143)		(0.0150)		(0.0158)
EU 15 both	0.445**	-0.0454***	0.466**	-0.0235**	0.474**	-0.0319***
	(0.176)	(0.0109)	(0.193)	(0.0116)	(0.192)	(0.0121)
Euro host		-0.0206***		-0.0123**		-0.0146**
		(0.00528)		(0.00591)		(0.00597)
Euro home		0.00347		0.0151**		-0.000299
		(0.00569)		(0.00614)		(0.00616)
Euro both	-0.0970	0.000405	0.0314	-0.0115*	0.0315	-0.00872
	(0.116)	(0.00595)	(0.132)	(0.00691)	(0.131)	(0.00695)
Distance	0.282**	-0.465***	0.186	-0.465***	0.180	-0.468***
	(0.116)	(0.0144)	(0.126)	(0.0148)	(0.127)	(0.0149)
Contiguity		0.284***		0.246***		0.235***
		(0.0214)		(0.0222)		(0.0223)
Common Language		0.205***		0.210***		0.239***
		(0.0268)		(0.0269)		(0.0281)
Rho	-0.274***		-0.220**		-0.210*	
	(0.0984)		(0.112)		(0.112)	
Sigma	0.772***		0.756***		0.754***	
	(0.0227)		(0.0213)		(0.0206)	
Constant	181.4*	5.138***	186.7*	5.536***	160.9	4.723***
	(103.1)	(0.409)	(96.52)	(0.412)	(106.0)	(0.421)
Observations	255,718		229,385		229,385	

Notes: All intensive margin regressions include home country, host country, year, and owner and affiliate sector dummies. All extensive margin regressions include year dummies. Specification 1 uses country-level taxes and cost of capital; 2 and 3 use firm-level. Errors clustered at the owner level. *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 7: Estimated Elasticities

EATR host	-1.29***	Market potential host	-0.881***
EATR home	-0.434***	Market potential home	-0.816***
Assets owner	0.0105**	Education host	-1.42***
Age owner	-0.0102***	Education home	0.44**
Multi investor	0.0536**	Openness host	-0.478***
Cost of K host	2.34**	Openness home	-0.364***
Cost of K home	-0.0467	EU15 host	-0.0061
Mean Size	0.0652**	EU15 home	0.03
Mean Age	-0.122***	EU 15 both	-0.0176
Mean Multi	-0.285***	Euro host	-0.00268
FDI barrier host	-0.473***	Euro home	0.0556**
GDP host	0.612**	Euro both	-0.0254
GDP home	-0.0229***	Distance	-1.1***
GDP per capita host	-0.362***	Contiguity	0.572**
GDP per capita home	0.113**	Common Language	0.497**

Notes: Elasticities based on estimates of Table 6, specification 2 and calculated at the sample mean.

Table 8: Additional Dummies in the Extensive Margin

	(1) Country Taxes		(2) Firm Taxes		(3) Firm Taxes	
	Int.	Ext.	Int.	Ext.	Int.	Ext.
EMTR host	-0.246**		-0.117		-0.130	
	(0.117)		(0.133)		(0.158)	
EMTR home	-0.259***		-0.0959		0.0699	
	(0.0831)		(0.107)		(0.119)	
EATR host		-0.551***		-0.556***		0.0330
		(0.0557)		(0.0592)		(0.103)
EATR home		-0.207***		-0.184***		-0.0378
		(0.0207)		(0.0257)		(0.0311)
Assets owner	0.205***	0.00339***	0.219***	0.00447***	0.209***	0.00565***
	(0.0104)	(0.000741)	(0.0117)	(0.000846)	(0.0118)	(0.000653)
Age owner	-0.0738***	-0.00255	-0.0777***	-0.00407**	-0.0561***	0.000157
	(0.0201)	(0.00159)	(0.0211)	(0.00172)	(0.0216)	(0.00125)
Multi investor	0.242***	0.0205***	0.236***	0.0221***	0.213***	0.0318***
	(0.0516)	(0.00397)	(0.0549)	(0.00416)	(0.0544)	(0.00305)
Cost of K host	-0.553	1.297***	0.123	1.001***	0.900	0.412***
	(0.878)	(0.137)	(0.538)	(0.0949)	(0.663)	(0.146)
Cost of K home	1.413*	0.197***	-0.00588	-0.00488	-0.867	-0.0723
	(0.749)	(0.0355)	(0.506)	(0.0401)	(0.610)	(0.0595)
Mean Size		0.0247***		0.0289***		
		(0.00493)		(0.00547)		
Mean Age		-0.0432***		-0.0543***		
		(0.00737)		(0.00829)		
Mean Multi		-0.109***		-0.124***		
		(0.0248)		(0.0268)		
Country-level Variables						
FDI barrier host		-0.192***		-0.200***		0.0739**
		(0.00910)		(0.00952)		(0.0330)
GDP host	-0.147***	0.248***	-0.207***	0.260***	-3.520	0.603
	(0.0505)	(0.0109)	(0.0534)	(0.0114)	(2.197)	(0.483)
GDP home	-0.0204	-0.0330***	-0.0277	-0.0147**	-1.498	0.144
	(0.0519)	(0.00536)	(0.0565)	(0.00581)	(2.143)	(0.135)
GDP per capita host	0.427***	-0.159***	0.368***	-0.154***	3.860**	-1.932***
	(0.0830)	(0.0172)	(0.0906)	(0.0181)	(1.807)	(0.407)
GDP per capita home	0.318***	0.0394***	0.241**	0.0340***	1.317	-0.191
	(0.0924)	(0.00841)	(0.0964)	(0.00843)	(1.926)	(0.116)
Market potential host	0.436**	-0.360***	0.420**	-0.373***	-13.53**	11.42***
	(0.174)	(0.0411)	(0.175)	(0.0438)	(5.402)	(1.311)
Market potential home	0.202	-0.283***	0.232	-0.339***	2.053	0.397
	(0.156)	(0.0152)	(0.166)	(0.0161)	(4.547)	(0.366)
Education host	0.525***	-0.607***	0.500***	-0.607***	0.299	-0.516***
	(0.165)	(0.0294)	(0.154)	(0.0300)	(0.646)	(0.145)
Education home	-0.349**	0.165***	-0.134	0.178***	0.0616	-0.0435
	(0.143)	(0.0126)	(0.130)	(0.0128)	(0.587)	(0.0343)
Openness host	-0.399**	-0.212***	-0.354*	-0.204***	-1.611***	0.412***
	(0.199)	(0.0366)	(0.194)	(0.0379)	(0.539)	(0.137)

Openness home	0.0421	-0.199***	-0.109	-0.157***	0.750	0.142***
	(0.178)	(0.0159)	(0.185)	(0.0173)	(0.720)	(0.0434)
EU15 host	-0.125	0.0406***	-0.0956	0.0253**		
	(0.196)	(0.0108)	(0.211)	(0.0114)		
EU15 home	-0.233	0.0854***	-0.307*	0.0570***		
	(0.157)	(0.0144)	(0.170)	(0.0151)		
EU 15 both	0.408**	-0.0450***	0.451**	-0.0232**	0.461**	-0.00122
	(0.171)	(0.0109)	(0.186)	(0.0117)	(0.193)	(0.00502)
Euro host	-0.0473	-0.0200***	-0.177	-0.0117**		
	(0.112)	(0.00519)	(0.121)	(0.00583)		
Euro home	0.157	0.00316	0.213**	0.0142**		
	(0.0983)	(0.00571)	(0.108)	(0.00617)		
Euro both	-0.0545	-2.09e-06	0.0852	-0.0121*	0.0346	-0.0210***
	(0.107)	(0.00591)	(0.120)	(0.00688)	(0.132)	(0.00492)
Distance	0.363***	-0.466***	0.310***	-0.466***	0.0939	-0.441***
	(0.0851)	(0.0144)	(0.0913)	(0.0148)	(0.0994)	(0.0160)
Contiguity		0.282***		0.244***		0.383***
		(0.0215)		(0.0223)		(0.0250)
Common Language		0.208***		0.213***		0.334***
		(0.0267)		(0.0271)		(0.0359)
Rho	-0.237***		-0.209***		-0.123	
	(0.0684)		(0.0770)		(0.0792)	
Sigma	0.776***		0.768***		0.742***	
	(0.0149)		(0.0152)		(0.0109)	
Constant	0.529	5.127***	3.956*	5.534***	206.0**	-115.8***
	(2.477)	(0.410)	(2.262)	(0.412)	(97.44)	(17.48)
Observations	255,718		229,385		229,385	

Notes: All intensive margin regressions include year and owner and affiliate sector dummies. All extensive margin regressions include year dummies. Specification 3 also includes home, host, and owner dummies in both intensive and extensive regressions. Errors clustered at the owner level. *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 9: Including Owner Productivity

	(1) With Productivity		(2) Without Productivity	
	Int.	Ext.	Int.	Ext.
EMTR host	0.0802		0.0124	
	(0.207)		(0.210)	
EMTR home	0.139		0.0992	
	(0.178)		(0.180)	
EATR host		-0.567***		-0.566***
		(0.0818)		(0.0817)
EATR home		-0.0146		-0.0126
		(0.0395)		(0.0380)
Productivity owner	-0.0708***	-0.000107		
	(0.0160)	(0.000973)		
Assets owner	0.226***	0.00813***	0.248***	0.00816***
	(0.0182)	(0.00127)	(0.0175)	(0.00125)
Age owner	0.0148	-0.00871***	-0.00783	-0.00875***
	(0.0299)	(0.00248)	(0.0294)	(0.00243)
Multi investor	0.0963	0.0234***	0.113	0.0233***
	(0.0696)	(0.00480)	(0.0696)	(0.00479)
Cost of K host	-0.130	1.112***	-0.0450	1.110***
	(0.964)	(0.140)	(0.973)	(0.140)
Cost of K home	-0.346	-0.168***	-0.514	-0.170***
	(0.816)	(0.0576)	(0.833)	(0.0557)
Mean Size		0.0150**		0.0150**
		(0.00587)		(0.00587)
Mean Age		-0.0199**		-0.0201**
		(0.00808)		(0.00811)
Mean Multi		-0.0592**		-0.0591**
		(0.0250)		(0.0249)
Country-level Variables				
FDI barrier host		-0.186***		-0.186***
		(0.0122)		(0.0122)
GDP host	-6.648**	0.234***	-6.470**	0.234***
	(2.617)	(0.0139)	(2.631)	(0.0139)
GDP home	-0.0748	-0.0373***	-0.123	-0.0374***
	(2.758)	(0.00718)	(2.745)	(0.00716)
GDP per capita host	5.985***	-0.152***	5.805***	-0.152***
	(2.178)	(0.0243)	(2.191)	(0.0243)
GDP per capita home	0.145	0.0237**	0.147	0.0236**
	(2.569)	(0.00950)	(2.560)	(0.00949)
Market potential host	-13.60**	-0.342***	-13.61**	-0.342***
	(6.447)	(0.0552)	(6.451)	(0.0552)
Market potential home	-1.275	-0.365***	-0.671	-0.365***
	(5.613)	(0.0199)	(5.584)	(0.0199)
Education host	-0.957	-0.552***	-0.918	-0.551***
	(0.859)	(0.0375)	(0.851)	(0.0375)
Education home	-0.0400	0.142***	0.0727	0.142***
	(0.773)	(0.0154)	(0.768)	(0.0154)

Openness host	-1.878***	-0.281***	-1.899***	-0.281***
	(0.659)	(0.0473)	(0.659)	(0.0473)
Openness home	1.838**	-0.192***	1.788*	-0.192***
	(0.937)	(0.0198)	(0.936)	(0.0198)
EU15 host		0.0290**		0.0291**
		(0.0123)		(0.0123)
EU15 home		0.0768***		0.0768***
		(0.0164)		(0.0164)
EU 15 both	0.358	-0.0164	0.347	-0.0165
	(0.220)	(0.0127)	(0.223)	(0.0127)
Euro host		-0.000767		-0.000659
		(0.00669)		(0.00666)
Euro home		0.00934		0.00912
		(0.00835)		(0.00832)
Euro both	0.284*	-0.0192**	0.285*	-0.0193**
	(0.159)	(0.00859)	(0.159)	(0.00857)
Distance	0.216	-0.519***	0.185	-0.519***
	(0.283)	(0.0178)	(0.248)	(0.0177)
Contiguity		0.238***		0.238***
		(0.0272)		(0.0271)
Common Language		0.120***		0.120***
		(0.0397)		(0.0397)
Rho	-0.195		-0.160	
	(0.252)		(0.219)	
Sigma	0.724***		0.721***	
	(0.0411)		(0.0303)	
Constant	274.2**	7.335***	266.8**	7.338***
	(118.9)	(0.475)	(118.9)	(0.475)
Observations	134,524		134,524	

Notes: All intensive margin regressions include home country, host country, year, and owner and affiliate sector dummies. All extensive margin regressions include year dummies. Errors clustered at the owner level. *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 10: Sector Differences

	(1) Manufacturing		(2) Services		(3) Financial		(4) Utilities	
	Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.
EMTR host	-0.458		0.0943		-1.603***		0.781	
	(0.421)		(0.167)		(0.612)		(0.701)	
EMTR home	0.291		-0.0284		0.0428		0.976*	
	(0.377)		(0.130)		(0.435)		(0.541)	
EATR host		-0.499***		-0.439***		-1.343***		-1.306***
		(0.155)		(0.0702)		(0.232)		(0.207)
EATR home		-0.0561		-0.204***		-0.383***		-0.0650
		(0.0693)		(0.0281)		(0.0955)		(0.0804)
Assets owner	0.284***	0.00412**	0.205***	0.00398***	0.209***	0.00366	0.190***	0.00990***
	(0.0298)	(0.00193)	(0.0136)	(0.000945)	(0.0511)	(0.00291)	(0.0367)	(0.00273)
Age owner	-0.108**	0.000377	-0.0287	-0.00490**	-0.125	-0.0128**	-0.144**	-0.00797
	(0.0505)	(0.00337)	(0.0254)	(0.00193)	(0.110)	(0.00536)	(0.0718)	(0.00510)
Multi investor	0.139	0.0314***	0.261***	0.0255***	-0.158	-0.0126	0.0617	0.000433
	(0.134)	(0.00958)	(0.0633)	(0.00469)	(0.257)	(0.0127)	(0.181)	(0.0128)
Cost of K host	-0.240	1.165***	0.408	0.988***	5.581	0.903***	-2.324	2.023***
	(1.775)	(0.264)	(0.703)	(0.110)	(3.423)	(0.341)	(3.245)	(0.366)
Cost of K home	-1.195	-0.190**	-0.492	-0.0287	-1.686	0.446***	-4.854*	-0.181
	(1.815)	(0.0941)	(0.663)	(0.0479)	(3.182)	(0.145)	(2.675)	(0.133)
Mean Size		0.0204*		0.0316***		0.000802		0.0228
		(0.0106)		(0.00649)		(0.0148)		(0.0174)
Mean Age		-0.0412**		-0.0485***		-0.0421**		-0.0661***
		(0.0162)		(0.00859)		(0.0211)		(0.0251)
Mean Multi		-0.103**		-0.132***		-0.131**		-0.139
		(0.0518)		(0.0292)		(0.0668)		(0.0887)
Country-level Variables								
FDI barrier host		-0.247***		-0.159***		-0.279***		-0.234***
		(0.0242)		(0.0111)		(0.0434)		(0.0291)
GDP host	0.148	0.333***	-0.526	0.239***	6.971	0.235***	-14.62*	0.326***
	(0.156)	(0.0274)	(2.507)	(0.0133)	(16.14)	(0.0500)	(7.822)	(0.0367)
GDP home	3.615	0.0176	-1.818	-0.0136**	-8.722	-0.0847***	4.636	-0.0127
	(5.345)	(0.0123)	(2.565)	(0.00587)	(10.49)	(0.0199)	(6.695)	(0.0165)

GDP per capita host	0.220	-0.518***	2.342	-0.0936***	-13.29	0.225**	10.61	-0.211***
	(0.291)	(0.0455)	(2.036)	(0.0208)	(13.57)	(0.0917)	(6.466)	(0.0625)
GDP per capita home	-5.454	-0.00383	-0.0166	0.0474***	16.80*	0.0843***	5.600	-0.00633
	(5.111)	(0.0191)	(2.291)	(0.00949)	(8.760)	(0.0209)	(6.212)	(0.0300)
Market potential host	0.139	-0.595***	-17.41***	-0.456***	-13.60	1.724***	-24.66	-0.978***
	(0.510)	(0.113)	(5.842)	(0.0494)	(37.22)	(0.229)	(23.51)	(0.154)
Market potential home	8.900	-0.348***	-1.136	-0.339***	54.79**	-0.255***	8.638	-0.238***
	(11.38)	(0.0328)	(5.324)	(0.0183)	(23.23)	(0.0941)	(17.35)	(0.0432)
Education host	-0.156	-0.565***	0.745	-0.611***	4.756	-0.596***	-1.221	-0.878***
	(0.390)	(0.0764)	(0.739)	(0.0339)	(4.870)	(0.183)	(3.264)	(0.0909)
Education home	-0.542	0.253***	-0.501	0.199***	-2.337	0.0393	1.905	0.151***
	(1.499)	(0.0257)	(0.673)	(0.0135)	(3.340)	(0.0309)	(1.903)	(0.0383)
Openness host	-0.704	-0.0586	-1.508**	-0.172***	5.358	-0.832***	-3.604*	-0.360***
	(0.503)	(0.0947)	(0.635)	(0.0440)	(4.080)	(0.200)	(2.070)	(0.132)
Openness home	0.424	-0.103***	0.972	-0.168***	7.835**	-0.276***	3.818	-0.169***
	(2.010)	(0.0377)	(0.831)	(0.0183)	(3.454)	(0.0600)	(2.515)	(0.0569)
EU15 host		0.0690**		0.00739		-0.137***		0.100**
		(0.0330)		(0.0131)		(0.0442)		(0.0490)
EU15 home		0.00949		0.0469***		0.125***		0.0782
		(0.0309)		(0.0161)		(0.0456)		(0.0509)
EU 15 both	-0.504	0.00130	0.330	-0.0201	-0.126	-0.0222	0.711	0.00787
	(0.314)	(0.0333)	(0.214)	(0.0136)	(1.376)	(0.0459)	(0.793)	(0.0472)
Euro host		-0.0456**		-0.000525		-0.00466		-0.142***
		(0.0200)		(0.00666)		(0.0281)		(0.0310)
Euro home		-0.00589		0.0369***		0.00300		-0.0562***
		(0.0152)		(0.00753)		(0.0286)		(0.0216)
Euro both	0.0893	0.0110	-0.0235	-0.0364***	-0.512	-0.0545	-0.0593	0.114***
	(0.259)	(0.0202)	(0.151)	(0.00812)	(0.811)	(0.0352)	(0.579)	(0.0281)
Distance	-0.152	-0.528***	0.0975	-0.473***	0.690	-0.292***	-0.214	-0.470***
	(0.196)	(0.0357)	(0.121)	(0.0168)	(0.421)	(0.0794)	(0.370)	(0.0433)
Contiguity		0.0910*		0.309***		0.409***		0.134*
		(0.0514)		(0.0252)		(0.0938)		(0.0748)
Common Language		0.258***		0.175***		-0.00312		0.406***
		(0.0720)		(0.0307)		(0.0946)		(0.0912)
Rho	0.163		-0.127		-0.780***		0.152	
	(0.168)		(0.105)		(0.293)		(0.291)	

Sigma	0.719***		0.685***		1.058***		0.799***	
	(0.0268)		(0.0145)		(0.137)		(0.0416)	
Constant	-117.3	7.596***	233.8**	5.883***	-457.3	-12.82***	269.9	11.76***
	(180.9)	(0.987)	(111.5)	(0.467)	(663.0)	(2.787)	(364.4)	(1.239)
Observations	32,585		159,188		13,661		23,831	

Notes: All intensive margin regressions include home country, host country, year, and owner and affiliate sector dummies. All extensive margin regressions include year dummies. Errors clustered at the owner level. *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 11: Sector Skill Differences

	(1) High Tech		(2) Low Tech	
	Int.	Ext.	Int.	Ext.
EMTR host	-0.206		0.103	
	(0.302)		(0.184)	
EMTR home	0.0481		0.0611	
	(0.228)		(0.149)	
EATR host		-0.505***		-0.551***
		(0.101)		(0.0750)
EATR home		-0.230***		-0.134***
		(0.0387)		(0.0316)
Assets owner	0.204***	0.00355***	0.214***	0.00488***
	(0.0198)	(0.00125)	(0.0146)	(0.00110)
Age owner	-0.0398	-0.00160	-0.0669***	-0.00528***
	(0.0405)	(0.00270)	(0.0259)	(0.00204)
Multi investor	0.362***	0.0227***	0.144**	0.0248***
	(0.0949)	(0.00574)	(0.0666)	(0.00534)
Cost of K host	2.179*	0.885***	-0.169	1.202***
	(1.285)	(0.162)	(0.798)	(0.123)
Cost of K home	-1.365	0.155**	-0.441	-0.169***
	(1.175)	(0.0772)	(0.749)	(0.0482)
Mean Size		0.0173***		0.0328***
		(0.00637)		(0.00734)
Mean Age		-0.0396***		-0.0561***
		(0.0102)		(0.00974)
Mean Multi		-0.0726**		-0.152***
		(0.0326)		(0.0325)
Country-level Variables				
FDI barrier host		-0.179***		-0.186***
		(0.0163)		(0.0116)
GDP host	-1.164	0.296***	-4.848*	0.243***
	(3.956)	(0.0204)	(2.729)	(0.0136)
GDP home	5.017	-0.00864	-2.684	-0.00900
	(3.832)	(0.00808)	(2.493)	(0.00684)
GDP per capita host	1.382	-0.148***	4.726**	-0.180***
	(3.137)	(0.0307)	(2.239)	(0.0223)
GDP per capita home	-4.494	0.0374***	1.681	0.0345***
	(3.444)	(0.0116)	(2.245)	(0.0108)
Market potential host	-18.52**	-0.460***	-7.049	-0.554***
	(8.719)	(0.0742)	(6.651)	(0.0538)
Market potential home	6.629	-0.346***	-2.242	-0.320***
	(8.437)	(0.0255)	(5.577)	(0.0184)
Education host	1.561	-0.501***	-0.167	-0.691***
	(1.194)	(0.0499)	(0.810)	(0.0360)
Education home	-0.800	0.189***	0.256	0.204***
	(1.098)	(0.0200)	(0.700)	(0.0147)
Openness host	-1.776*	-0.0967	-1.521**	-0.211***
	(0.976)	(0.0664)	(0.647)	(0.0465)

Openness home	0.576	-0.113***	0.788	-0.180***
	(1.237)	(0.0255)	(0.901)	(0.0209)
EU15 host		-0.00784		0.0416***
		(0.0193)		(0.0141)
EU15 home		0.0444**		0.0458**
		(0.0212)		(0.0184)
EU 15 both	-0.00345	-0.0149	0.472**	-0.0174
	(0.376)	(0.0202)	(0.219)	(0.0142)
Euro host		-0.00646		-0.0206***
		(0.00992)		(0.00780)
Euro home		0.0231**		0.0118
		(0.0116)		(0.00746)
Euro both	-0.0467	-0.0315***	0.115	-0.00445
	(0.225)	(0.0122)	(0.162)	(0.00855)
Distance	0.158	-0.444***	0.116	-0.495***
	(0.151)	(0.0253)	(0.185)	(0.0173)
Contiguity		0.272***		0.241***
		(0.0404)		(0.0262)
Common Language		0.190***		0.237***
		(0.0457)		(0.0329)
Rho	-0.231*		-0.121	
	(0.133)		(0.165)	
Sigma	0.696***		0.723***	
	(0.0281)		(0.0189)	
Constant	64.86	4.237***	237.7*	7.936***
	(166.0)	(0.725)	(122.8)	(0.476)
Observations	66,701		148,903	

Notes: All intensive margin regressions include home country, host country, year, and owner and affiliate sector dummies. All extensive margin regressions include year dummies. Errors clustered at the owner level. *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 12: Single versus Multi-Investors

	(1) Single Investors		(2) Multi-investors	
	Int.	Ext.	Int.	Ext.
EMTR host	-0.000463		-0.319	
	(0.188)		(0.279)	
EMTR home	-0.0741		0.254	
	(0.145)		(0.194)	
EATR host		-0.631***		-0.437***
		(0.0690)		(0.0991)
EATR home		-0.241***		-0.142***
		(0.0279)		(0.0401)
Assets owner	0.270***	0.00445***	0.133***	0.00523***
	(0.0140)	(0.000842)	(0.0192)	(0.00143)
Age owner	-0.109***	-0.00438***	0.0340	-0.00435
	(0.0257)	(0.00164)	(0.0364)	(0.00284)
Cost of K host	0.992	1.005***	0.442	1.011***
	(0.780)	(0.111)	(1.308)	(0.161)
Cost of K home	-0.473	0.0441	-1.880	9.72e-05
	(0.702)	(0.0468)	(1.176)	(0.0654)
Mean Size		0.0214***		0.0382***
		(0.00436)		(0.0127)
Mean Age		-0.0459***		-0.0515***
		(0.00715)		(0.0141)
Country-level Variables				
FDI barrier host		-0.221***		-0.171***
		(0.0113)		(0.0164)
GDP host	-5.452**	0.278***	-1.917	0.236***
	(2.648)	(0.0130)	(3.657)	(0.0203)
GDP home	-0.841	-0.0117**	-1.965	-0.0144
	(2.671)	(0.00539)	(3.432)	(0.00923)
GDP per capita host	5.870***	-0.203***	1.255	-0.0914***
	(2.204)	(0.0201)	(2.969)	(0.0317)
GDP per capita home	-0.826	0.0509***	3.930	0.0111
	(2.343)	(0.00775)	(3.193)	(0.0153)
Market potential host	-20.72***	-0.483***	-3.141	-0.221***
	(6.857)	(0.0506)	(7.951)	(0.0752)
Market potential home	1.048	-0.352***	2.097	-0.303***
	(5.516)	(0.0158)	(7.739)	(0.0282)
Education host	0.448	-0.596***	0.393	-0.623***
	(0.795)	(0.0346)	(1.137)	(0.0522)
Education home	-0.0165	0.189***	0.345	0.153***
	(0.740)	(0.0118)	(0.946)	(0.0225)
Openness host	-1.385**	-0.218***	-1.514*	-0.189***
	(0.652)	(0.0433)	(0.890)	(0.0672)
Openness home	1.496*	-0.195***	-0.760	-0.101***
	(0.876)	(0.0166)	(1.227)	(0.0289)
EU15 host		0.0487***		0.00131
		(0.0122)		(0.0231)

EU15 home		0.0600***		0.0533*
		(0.0138)		(0.0280)
EU 15 both	0.339	-0.0294**	0.446	-0.0202
	(0.215)	(0.0124)	(0.378)	(0.0232)
Euro host		-0.0334***		0.00833
		(0.00676)		(0.0103)
Euro home		0.000130		0.0233**
		(0.00655)		(0.0113)
Euro both	0.00225	0.00390	0.101	-0.0278**
	(0.152)	(0.00780)	(0.229)	(0.0116)
Distance	0.184	-0.538***	0.130	-0.362***
	(0.134)	(0.0162)	(0.303)	(0.0272)
Contiguity		0.260***		0.227***
		(0.0244)		(0.0408)
Common Language		0.278***		0.138***
		(0.0292)		(0.0490)
Rho	-0.162		-0.319	
	(0.115)		(0.306)	
Sigma	0.659***		0.847***	
	(0.0183)		(0.0784)	
Constant	316.2***	7.520***	81.57	2.454***
	(122.1)	(0.447)	(155.2)	(0.770)
Observations	135,630		93,755	

Notes: All intensive margin regressions include home country, host country, year, and owner and affiliate sector dummies. All extensive margin regressions include year and sector dummies. Errors clustered at the owner level. *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 13: Prior Investments

	(1) Single Investors		(2) Multi-investors	
	Int.	Ext.	Int.	Ext.
EMTR host	-0.114		-0.132	
	(0.157)		(0.158)	
EMTR home	0.0721		0.0800	
	(0.119)		(0.119)	
EATR host		-0.550***		-0.551***
		(0.0586)		(0.0587)
EATR home		-0.200***		-0.201***
		(0.0242)		(0.0242)
Prior Investments	-0.0456**	0.00739***		
	(0.0182)	(0.00213)		
Prior Same Host			0.0504	-0.00635**
			(0.0377)	(0.00280)
Prior Other Hosts			-0.0858***	0.0132***
			(0.0219)	(0.00227)
Assets owner	0.212***	0.00395***	0.213***	0.00383***
	(0.0118)	(0.000806)	(0.0117)	(0.000800)
Age owner	-0.0521**	-0.00467***	-0.0523**	-0.00470***
	(0.0216)	(0.00168)	(0.0216)	(0.00167)
Multi investor	0.260***	0.0147***	0.246***	0.0168***
	(0.0565)	(0.00409)	(0.0566)	(0.00407)
Cost of K host	0.813	0.992***	0.913	0.991***
	(0.665)	(0.0940)	(0.665)	(0.0943)
Cost of K home	-0.837	0.00512	-0.873	0.00705
	(0.611)	(0.0391)	(0.606)	(0.0393)
Mean Size		0.0271***		0.0270***
		(0.00509)		(0.00504)
Mean Age		-0.0492***		-0.0489***
		(0.00740)		(0.00722)
Mean Multi		-0.128***		-0.125***
		(0.0243)		(0.0240)
Country-level Variables				
FDI barrier host		-0.201***		-0.201***
		(0.00955)		(0.00956)
GDP host	-3.517	0.260***	-3.235	0.260***
	(2.183)	(0.0114)	(2.180)	(0.0114)
GDP home	-1.492	-0.0139***	-1.687	-0.0141***
	(2.159)	(0.00531)	(2.163)	(0.00519)
GDP per capita host	3.547**	-0.154***	3.365*	-0.154***
	(1.785)	(0.0180)	(1.785)	(0.0180)
GDP per capita home	1.230	0.0365***	1.436	0.0370***
	(1.945)	(0.00796)	(1.950)	(0.00769)
Market potential host	-11.67**	-0.373***	-11.82**	-0.373***
	(5.203)	(0.0438)	(5.205)	(0.0438)
Market potential home	1.950	-0.337***	1.981	-0.334***
	(4.558)	(0.0155)	(4.559)	(0.0154)

Education host	0.408	-0.606***	0.440	-0.606***
	(0.653)	(0.0300)	(0.652)	(0.0300)
Education home	0.0704	0.181***	0.0802	0.181***
	(0.597)	(0.0120)	(0.598)	(0.0117)
Openness host	-1.429***	-0.204***	-1.380***	-0.205***
	(0.534)	(0.0379)	(0.534)	(0.0380)
Openness home	0.793	-0.158***	0.748	-0.158***
	(0.718)	(0.0163)	(0.717)	(0.0160)
EU15 host		0.0250**		0.0245**
		(0.0111)		(0.0109)
EU15 home		0.0565***		0.0584***
		(0.0139)		(0.0134)
EU 15 both	0.465**	-0.0220*	0.477**	-0.0234**
	(0.193)	(0.0114)	(0.192)	(0.0112)
Euro host		-0.0119**		-0.0133**
		(0.00591)		(0.00583)
Euro home		0.0154**		0.0129**
		(0.00611)		(0.00600)
Euro both	0.0334	-0.0125*	0.0136	-0.00910
	(0.132)	(0.00693)	(0.131)	(0.00677)
Distance	0.179	-0.465***	0.172	-0.466***
	(0.126)	(0.0147)	(0.125)	(0.0147)
Contiguity		0.246***		0.246***
		(0.0223)		(0.0223)
Common Language		0.210***		0.210***
		(0.0269)		(0.0270)
Rho	-0.211*		-0.196*	
	(0.112)		(0.111)	
Sigma	0.754***		0.751***	
	(0.0207)		(0.0195)	
Constant	190.8**	5.531***	189.2*	5.517***
	(96.98)	(0.410)	(97.41)	(0.410)
Observations	229,385		229,385	

Notes: All intensive margin regressions include home country, host country, year, and owner and affiliate sector dummies. All extensive margin regressions include year dummies. Errors clustered at the owner level. *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Greenfield versus Merger & Acquisition FDI:

Same Wine, Different Bottles?[*]

Ronald B. Davies[†]   Rodolphe Desbordes[‡]   Anna Ray[§]

Abstract

Relying on a large foreign direct investment (FDI) transaction level dataset, unique both in terms of disaggregation and time and country coverage, this paper examines patterns in greenfield (GF) versus merger & acquisition (MA) investment. Although both are found to seek out large markets with low international barriers, important differences emerge. MA is more affected by geographic and cultural barriers and exhibits opportunistic behaviours as it is more sensitive to temporary shocks such as a currency crisis. Further, MA is more affected by destination factors such as financial development and institutional quality. GF, on the other hand, is relatively more driven by factors such as origin comparative advantage and destination taxes. These empirical facts are consistent with the conceptual distinction made between these two modes, i.e. MA involves transfer of ownership for integration or arbitrage reasons while GF relies on firms' own capacities, which are linked to origin country attributes. They also suggest that GF and MA are likely to respond differently to policies intended to attract FDI.

Keywords: Foreign Direct Investment; Mergers and Acquisitions; Greenfield Investment; Multinational Firms.

JEL Classification: F21; F23

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1 Introduction

Foreign direct investment (FDI) occurs via two modes, greenfield (GF) investment and cross-border mergers and acquisitions (MA). The implicit distinction between the two modes is that GF investment relies on the internal capabilities of the multinational enterprise (MNE), as is most clearly embodied in the notion of building a new subsidiary from the ground up; MA meanwhile involves transfer of ownership of an existing asset. Although there is widespread recognition of the distinct nature of these modes, due to data constraints there is little research actually simultaneously comparing GF and MA FDI, especially at the disaggregated level. Further, what does exist almost exclusively relies on data for a single developed country. In addition, while it is generally presumed that most worldwide FDI flows are MA (e.g. Globerman and Shapiro, 2004 or Head and Ries, 2008), these statements rely on data during the 1990s and miss the remarkable growth of services and primarily GF FDI in developing countries during the 2000s (UNCTAD, 2014). Thus, there is a need for a study comparing GF and MA FDI using more recent data which follows the overall shift towards using disaggregated international data. This paper fulfills that need by using a unique combined transaction-level dataset covering worldwide GF and MA FDI for the period 2003-2010 across 24 manufacturing and services sectors. This level of disaggregation has been heretofore unavailable and allows us to compare how the two modes of FDI react to economic and institutional/policy factors, and in particular to use sector-level information to identify how country-level features affect the two modes differently.[1]

We find that the two modes share several similarities. For example, both tend to come from the developed countries and are affected by traditional "gravity" variables such as GDP and distance. Similarly, FDI in either mode is higher when comparative advantage of a country is stronger. Nevertheless, there are key differences across modes. While the developed countries receive the majority of MAs, developing countries host the bulk of GF FDI. In addition, our count data regression analysis shows that GF is relatively more reliant on origin country comparative advantage, a result in line with the idea that such investments are particularly reliant on knowledge produced in the origin. In contrast, MA investment is more responsive to barriers between the origin and destination countries, including geographical and cultural barriers. This is particularly true for contract intensive or intangible asset

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[1]Specifically, as described below, we employ a triple-difference effect across countries, modes, and sectors to identify these differences.

intensive sectors, i.e. where integration of the parent and affiliate is more critical to the functioning of the firm. In a similar way, MA is more sensitive to the destination country's institutional quality, with this gap largest for these same sectors. GF investment, meanwhile is especially reliant on the origin country's level of financial development with MA more reactive to the destination's financial development. This differential response is particularly large in sectors that are dependent on external capital. Thus, by exploiting identification made possible by the use of sector-level data, we find results consistent with the conceptual distinction made between the two modes; namely, that MA involves transfer of ownership (arising from a desire to integrate or exploit arbitrage opportunities) whereas GF relies more on a firm's own capacities (which are intrinsically linked to the origin country's attributes). Beyond this, we find that, consistent with the theory of Becker and Fuest (2010), GF is falling in the destination tax whereas MA is not. Conversely, MA is more responsive to temporary shocks such as currency crises than is GF.

Recognizing these differences is important to understanding the patterns of FDI and therefore the policies that can be used to attract one type of investment relative to another. This matters since the potential impacts of FDI can vary by mode. For example, as discussed by Davies and Desbordes (2015), outbound GF may have much stronger negative effects on an origin country's labour market than does MA. Similarly, Harms and Meon (2014) find larger growth effects from inbound GF than MA. Thus, if a country experiences FDI decreases due to an increase in its tax, our estimates suggest this would primarily be in GF and therefore have larger than average labour market and growth effects.

Our work is part of a growing drive to employ disaggregated FDI data. For example, Alfaro and Charlton (2009) use firm-level data from Dun & Bradstreet's WorldBase database to classify investment into horizontal and vertical investments and examine how, depending on sectoral skill intensity, the country's skill endowment affects this mix.[2] Alviarez (2015), meanwhile, uses Eurostat data across 35 countries to examine the impact of local sectoral productivity on FDI sector-level inbound investment. Fukui and Lakatos (2012) supplement the Eurostat data with other sources to construct a much more comprehensive dataset that they then use to investigate the role of gravity variables. In a comparison of multinationals and non-multinationals during the recent economic crisis, Alfaro and Chen (2014) employ WorldBase data and find that multinationals (particularly those with

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[2]Other papers, including Wheeler and Mody (1992), instead opt to estimate sector-specific coefficients.

strong links to the parent) proved more resilient to the downturn. Alfaro and Chen (2012) use the same data to compare agglomeration patterns between the two fiirm groups. None of these, however, compare GF and MA. While there are studies that do compare the two modes, as detailed below they do not exploit sector-level variation in identifying their effects.

The paper proceeds as follows. First, we review the existing literature on FDI with a focus on that which compares the two modes of investment. In particular, as we do so we develop our hypotheses for the data. Section 3 describes our data, including sources and measurement issues. Section 4 contains an overview of the data, including a discussion of the primary origins, destinations, and sectors for MA and GF FDI. Section 5 tests our hypotheses by utilizing regression analysis to estimate where the two modes move in similar - and in different - ways in response to country features, with a particular eye towards how this depends on sector characteristics. Section 6 concludes.

2 Greenfield versus M&A FDI

The literature on FDI is vast, covering models suggesting why FDI occurs, empirical studies testing those models, analyses of the impacts of FDI, and suggestions on the management of MNEs via government policy.[3] Despite this plethora of papers, there is remarkably little discussing both GF and MA FDI, either theoretically or empirically.[4] In this section, we describe this small body of research with the goal of identifying hypotheses for our analysis.

At its heart, the primary comparison between GF and MA FDI builds from the notion that whereas GF injects the parent firm into the destination (where the affiliate is located), MA brings the destination into the parent. In this, the basic concept is that with GF, the MNE develops proprietary assets in the origin country (where the parent firm is located) that are then taken to the destination.[5] In contrast, MA FDI identifies an asset in the destination and then integrates that with the parent firm's

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[3]For brevity, we do not attempt to provide a comprehensive overview of the FDI literature and focus only on what is most relevant to the comparison between GF and MA. See Navaretti and Venables (2006), Blonigen (2005), and Blonigen and Piger (2011) for recent overviews of the broader literature on FDI.

[4]There are, however, many papers discussing one mode or the other. Examples of GF models include Helpman (1984), Markusen (1984), and Helpman et al. (2004). Neary (2007) and Head and Ries (2008) provide models where FDI is exclusively MA.

[5]Here, we use the term proprietary asset to represent the features unique to a MNE that allows it to compete globally. These can represent intellectual property, advanced technologies, unique product varieties, and/or reputation advantages. For further discussion, see Caves (1996).

global activities. A prime example of this comparison is Nocke and Yeaple (2008) who provide a model in which a MNE establishes a subsidiary for two reasons: lowering production costs and hiring new entrepreneurs who provide headquarter services. While both modes seek lower production costs, only MA acquire new entrepreneurs by purchasing an acquisition target whereas GF makes do with those it has in the origin country.[6] An implication of this is that, since a new entrepreneur is only beneficial to the firm if her productivity exceeds that of the origin-country entrepreneur, firms with high origin productivity are unlikely to gain from MA and therefore focus on GF.[7] In addition, due to complementarities between production and headquarter services, productive firms (and thus GF firms) will dominate when there are large production cost differences (such as between the developed North and less-developed South). On the other hand, North-North FDI will be predominantly MA. This is then our first expectation for the data, one for which Nocke and Yeaple (2008) provide some evidence using US outbound FDI data.

Hypothesis 1 *MA will be more dominant in FDI between developed countries whereas GF will be more predominant in FDI involving developing countries.*

This notion that GF is about bringing the origin to the destination whereas MA integrates the destination with the parent has two additional implications. The first of these has to do with the reliance on the origin country. For GF, the proprietary assets necessary for the MNE are created in the origin country. For MA, however, this is relatively less important as the MNE obtains some proprietary assets in the destination. As a consequence, GF is going to be more reliant on the origin's technological development and other advantages.

Hypothesis 2 *GF is more dependent on origin country technology and comparative advantage than is MA.*

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[6]For evidence on the choice of target, see Blonigen et al. (2012), and Guadalupe et al. (2012) who focus on the characteristics of the target (so called "cherry picking"). Herger and McCorriston (2014) analyze the linkages between the acquiring and target firm via input-output tables, finding a large role for vertical acquisitions and a surprisingly large share of acquisitions for which there are no obvious industrial linkages. Ray (2014) compares the acquirer and target in product space. She shows that even in the absence of direct linkages, multinationals acquire activities in industries relatively closely related to their own spectrum of products.

[7]In a related paper Nocke and Yeaple (2007) show that this productivity ranking, and hence the impact of country characteristics, can depend on whether the firm productivity differences relates to the international mobility of its production characteristics.

The second implication has to do with barriers between countries. By its nature, MA requires the integration of foreign-grown assets with the parent firm. GF, on the other hand, begins from a position of integration since the assets used in the affiliate come from the origin. Because of this, barriers to integration, which can be proxied by distance between countries, a prior colonial relationship, or the presence of a common language, will be a greater hindrance for MA than for FDI. We further expect that these barriers will matter more in sectors where integration is key, i.e. those with relationship specific intermediates (so called contractually intensive industries) or those with a high reliance on intangibles (where communication is especially important).

Hypothesis 3 *GF is less deterred by international barriers - geographic, cultural, and policy-driven - than is MA. These differences will be especially pronounced in contract intensive and intangible intensive industries.*

This hypothesis is supported by Drogendijk and Slangen (2006) who use survey data from Dutch MNEs to focus on the role of cultural distance in the mode choice, finding that greater cultural barriers tend to encourage GF over MA. Similar support can be found in the survey of the business literature provided by Slangen and Hennart (2007). A difficulty with these studies, however, is that they typically only use data on the outbound FDI of a single country (with the exceptions being data on inbound FDI to a single destination or for a very small number of countries). In contrast, Neto et al. (2009) use a panel of countries from UNCTAD (2014), finding that cultural barriers appear to be more important for GF than MA.[8] An important qualification of these data is that they are unilateral, i.e. it reports aggregate inbound and outbound investment, not at a bilateral country-pair level. As suggested by Slangen and Hennart (2007), this, along with the lack of a consistent set of regressors across studies, may drive the general lack of consistent findings. In addition, as these studies cannot differentiate by sector as we are able to, if the mix of industries varies across origins and destinations, this can lead to differences across analyses.

Concurrent with the literature focusing on integration, a somewhat smaller literature examines a second difference between the modes - that for an MA a target must be acquired from a seller whereas

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[8]DiGuardo et al. (2013) also find that physical, cultural and political distances reduce MA flows but do not consider GF flows. Azemar et al. (2012) point to market familiarity (a combination bilateral ties, experience with weak institutions, and lack of international experience) as an important factor in FDI between developing countries.

a GF is built "from scratch". An example of this is Raff et al. (2009), who provide a model where the acquisition price is forward looking, i.e. where the potential target recognizes that, should they charge a high acquisition price, this can lead to GF investment which increases the number of firms and has consequences for their profits.[9] Muller (2007) provides a model in which changes in competition feed into the acquisition price and shows that it depends on the extent of existing competition in the country. In particular, GF FDI will be preferred when there are either few or many firms; MA FDI will dominate under moderate competition. Note that in contrast to Nocke and Yeaple (2008), the tradeoff in this line of research is less about the transfer or acquisition of technology but more about changes in competition.

Thus, factors which affect the price of an MA will affect the choice of mode. Here, five hypotheses emerge. First, dovetailing with Muller (2007), there is a link between trade protection and FDI intended to affect competition in the domestic market. As discussed by Georgopolous (2008), when destination tariffs are high making exporting unattractive, competition-driven MA will be especially attractive, something confirmed in his estimates of US-Canadian MAs. Combining this with Muller's predictions, we would expect this tariff-wall jumping effect to be stronger for MA than GF.

Hypothesis 4 *Destination tariffs will encourage MA relative to GF.*

Second, when undertaking an MA, the acquirer must be able to agree with the current target owner on exactly what is being purchased. This is particularly true when the acquisition of intangibles is a prime motivation since the acquirer must be assured that the current owner does not simply keep and utilize those intangibles. As such, particularly in contract intensive and intangible intensive sectors, the quality of destination institutions will play a major role, with inbound MA relatively higher where institutions are strong.

Hypothesis 5 *MA is more dependent on destination institutions, particularly in sectors where incentive problems are large, than are GF.*

Third, the fact that the target in an MA already exists where a GF affiliate does not creates a difference in the timing of investment. With a MA, once the target is identified, the deal can be

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[9]Other papers focusing on the acquisition price include Görg (2000) and Buckley and Casson (1998).

(fairly) quickly completed. In contrast, GF costs are spread over a relatively longer horizon. This is because to engage in GF FDI, a site must be chosen and purchased, then the affiliate facility is designed, built, and integrated into the local infrastructure network. Thus, one would expect that the shorter planning period for implementing a MA would make it more sensitive to short-run fluctuations in the origin currency price of the target (which is typically denominated in the destination currency). This idea is behind so-called "fire sale" FDI, that is, investments which are spurred by a decline in the cost of establishing/acquiring the affiliate due to exchange rate movements or a financial crisis (Froot and Stein, 1991).[10]

Hypothesis 6 *MA is more sensitive to temporary destination shocks affecting asset prices than is GF.*

Fourth, this difference in planning creates a difference in where costs are incurred. For GF, many of the costs are incurred in the origin during the planning phase. For MA, the cost of acquisition is often incurred in the destination.[11] An implication of this is that MA will be more sensitive to factors related to the ability to raise funds in the destination with GF relying more on origin capital markets. Furthermore, even once investment occurs, there is likely to be time before the project becomes profitable. One way to measure this for a sector is the degree to which it is dependent on external finance, with more dependent sectors more reliant on capital markets.[12] With this in mind, we would expect these differences to be greater in industries for which access to capital, and thus country financial development, play a larger role.

Hypothesis 7 *MA is more sensitive to host financial development than is GF, with the reverse true for origin financial development. These differences are heightened in sectors reliant on external finance.*

Hypotheses 5 through 7 have primarily been examined using aggregated FDI (typically at the country level). Perhaps the most utilized data for this is that provided by UNCTAD (2014), which produces annual reports documenting the world-wide and regional patterns of GF and MA FDI. Using these data in a cross-section, Globerman and Shapiro (2004) compare how FDI inflows and outflows

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[10]In this type of investment, coined by Krugman (2000), the firm's intent is more driven by the ability to acquire a investment asset while its price is low rather than the traditional motives ascribed to MA FDI. Evidence of such behavior is found by Blonigen (1997). See also Aguiar and Gopinath (2005).

[11]See Davies and Gresik (2003), who provide evidence showing that the majority of capital investment in an overseas affiliate comes from destination sources.

[12]See Desbordes and Wei (2014) for a discussion of the links between financial development and FDI.

vary with gravity variables (measures of market size and trade and investment costs) for both the full and MA only samples.[13] In addition, drawing from the literature looking exclusively at MA FDI, they control for a variety of institutional and financial depth measures, again finding that MA is typically more sensitive to these factors than is overall FDI.[14] Also using of the UNCTAD data, Neto et al. (2009) and Park et al. (2012) (restrict themselves to the developing countries and employing alternative estimating techniques) find comparable results. These studies are limited, however, by their lack of bilateral FDI information, making them unable to estimate the role of key gravity variables such as the distance between origin and destination or shared languages.[15] In addition, depending on the year, UNCTAD provides multilateral data on aggregate FDI and MA (number of projects and total value), but the GF data only becomes available in 2002. Hence in Park et al. (2012), the GF data are created by subtracting MA flows from aggregate FDI.[16] As this ignores other possible forms of FDI changes, such as equity increases by existing projects via retained earnings, non-standardized reporting definitions and reporting across countries, and round-tripping FDI, this is not a clear-cut comparison between MA and GF FDI.

Fifth, it must be remembered that the price of the target in an MA is negotiated between the acquirer and its current owner who will use this price to extract as much of the gains from creating the MA via a higher price. Becker and Fuest (2010) use this idea in their theoretic examination of how taxes affect the price of a MA. Their results suggest that, because the tax advantages to the MNE from an acquisition will be capitalized in the price, this negates the effect of destination taxes on the desire to complete the MA. This would not be true for GF, however, meaning that GF should be more dependent on host taxes than MA are.

Hypothesis 8 *MA is less sensitive to destination factors such as taxes that affect the marginal benefit of investment than is GF.*

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[13]See Blonigen and Piger (2011) for an overview of the standard gravity controls in FDI regressions.

[14]Examples of studies looking at the effect of institutions and/or financial depth on MA FDI include Rossi and Volpin (2004), di Giovanni (2005), Hyun and Kim (2007), Hur et al. (2011), and Coeurdacier et al. (2009). Desbordes and Wei (2014), using data on GF flows, find that both origin and destination financial development are driving factors.

[15]An exception to this rule is Klein and Rosengren (1994), who compare bilateral MA flows and total bilateral FDI flows for the US and find that inbound US MA investments are marginally more sensitive to exchange rate variation than are aggregate flows

[16]Neto et al. (2009) on the other hand combine MA data in values for 1996-2002 with GF data with number of projects for 2002-2006.

This is supported by Hebous et al. (2011) who have bilateral data decomposing FDI into GF and MA for outbound German investments. This allows them to include both distance, which impedes GF less than MA (as per Hypothesis 3), and the tax rate of the destination, finding that MA is less sensitive to destination taxes than is GF. In her comparison of GF and MA FDI across US states, Swenson (2001) finds a similar difference in tax sensitivities.

With these hypotheses in hand, we now turn to our data to explore to what extent they are reflected in our data which, in contrast to the above studies, covers a far wider range of countries and, by virtue of our sector-level information, improved identification.

3 Data Description

In this section, we discuss our variables of interest, which measure GF and MA FDI, as well as the control variables we use in our regression analysis. Our key variables are $FDI_{m,o,d,s,t}$ which is the number projects via FDI mode m from origin country o to destination d in sector s in year t. In order to simplify our discussion, we use the term project to mean an investment project, that is a GF investment or an MA. The mode of the project refers to whether it is GF, i.e. a new project that did not exist before, or MA, that is a merger with or acquisition of a pre-existing entity. The list of the 24 sectors in our study is in Table 1. While our sample covers the globe, in our discussion and tables we refer to specific countries. The list of country abbreviations used is found in Table 2.

3.1 Construction of GF

Our GF data come from *fDi* Markets, which is a commercial database tracking the universe of cross-border greenfield investments that claims to cover all sectors and countries worldwide since 2003.[17] The data are available at the project level, that is, an individual GF investment. These data report the source and destination countries as well as the sector of the GF project (note that this is the sector

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[17]This is the source of greenfield FDI data for the UNCTAD (2014) data. It can be found at http://www.fdimarkets.com/.

of the project, not the parent firm undertaking the project).[18] This classification is in Table 1.[19] In addition, these data report the function of the affiliate (e.g. whether it is in manufacturing or customer support, which is distinct from the sector of the affiiate). We can thus classify our GF investments into those where an affiliate in a manufacturing sector fulfills a manufacturing function and those in a services sector playing a service-provision role, something we discuss further below. Unfortunately, the data do not report a measure of the size of the investment which is comparable to that in the MA data. Further, it does not provide us detailed information on the parent firm. Thus, we cannot utilize the data for a meaningful study at the observation level à la Drogendijk and Slangen (2006) and instead aggregate these up to the origin, destination, sector, year (o, d, s, t) level, making our data more similar to that of Hebous et al. (2011). Finally, note that these projects can represent either a new GF project in a destination country where the source firm was already active or a first time entry into that destination.[20]

3.2   Construction of MA

These data come from the Zephyr database, produced by Bureau van Dijk from press releases.[21] Zephyr claims to cover the universe of domestic and international MA projects. Although the data extend back to before 2003 for some countries, we only utilize only the data since 2003 to match the GF data and to cover the globe. As with the GF data, these are at the project level. Although there is more detailed information on both the acquiring firm (located in the origin) and the target (located in the destination), without comparable information in the GF data, these are of little use in our comparisons. In order to match the GF information, we therefore aggregated up to the o, d, s, t level. In doing so, there were two challenges.

First, the MA data report both a country name and a country code for the origin and destination.

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[18]As we do not have data on the sector of the parent, we cannot identify vertical versus horizontal investments as Herger and McCorriston (2014) do for MA data.

[19]Although the original data provide additional sectors, we were unable to obtain the sector-level controls for all of these individually and were forced to combine some sectors. To minimize confusion we therefore focus on the aggregated groupings in Table 1. When we do not do so, the largest difference is that in Table 4, Software & IT, Financial Services, and Business services claim the top three spots for both modes.

[20]These data also provide some information on the expansion of a pre-existing GF investment, however, in order to match the MA data, we exclude these.

[21]These can be found at `http://www.bvdinfo.com`. In comparison to the UNCTAD data, which can include investments by foreign affiliates in the destination, our data have roughly half as many projects. That said, when regressing our MA count on UNCTAD's, the R-squared is .94 for origins and .86 for destinations.

While in most cases the name and code match, there are exceptions.[22] In these cases, we used the country code to allocate a project to a particular origin/destination country. In other cases, only the name or the code was reported. In this situation, we used the available information to allocate the project. Finally, there were cases where neither the name nor the code was reported.[23] In these cases, we allocated the project to a catch-all category ("Earth") and these projects were then used in the below discussion when bilateral information is not needed.

Second, unlike the GF data, the MA sectors are classified in 4-digit SIC codes, distinguishing between codes of the parent and target firms. To correspond to the GF data, we used the target industry code as the code of the project and a correspondence from *fDi Markets* that maps SIC codes into the GF sector classification. However, this correspondence did not cover all SIC codes. For some, we allocated the project by matching the SIC industry's description and the GF sector description.[24] Nevertheless, for some projects, there was no clear-cut classification or the industry code was missing. When including these, the data patterns and estimation results were very similar in quantitative and qualitative ways to what we report here. Nevertheless, we do not use them in order to reduce confusion over the classification scheme.[25]

Finally, following the international standard, we included MA where a foreign firm acquired a minimum of a 10% stake in the affiliate. This 10% cutoff is common across countries in determining whether or not a foreign person has control, i.e. whether it counts as FDI.

3.3 Interpretation of the measures

Before continuing to a detailed analysis of the data, it is important to recognize what these GF and MA measures do and do not capture. These variables measure the number of new projects occurring between two countries in a given sector in a given year. As such, they are flow variable, not a measure of the stock of projects. Because of this, countries that feature heavily in flows during the sample period (such as China) may still lag behind in their share of accumulated investment flows.

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[22]In the origin data, mismatches were approximately 6% of projects. For destinations, the mismatch was about 1% of projects.

[23]These missing information cases amounted to 15.6% for the origin data and 3.5% for the destination data.

[24]Details on the correspondence construction are available upon request.

[25]The primary difference is that whereas the data we use here has 54,807 MA, including these raises the number of MA projects to 67,702, altering the relative shares of MA and GF in the number of projects. Beyond that, however, the results are essentially the same. These results are available on request.

In addition, these count investments, not dis-investments, meaning that they do not measure the *net* flows of projects. Furthermore, we focus here exclusively on FDI which is by definition cross-border investment and do not include what happens within a country. Thus, one must keep these issues in mind when interpreting the patterns and findings below. Finally, these data are count data and do not reflect for the size of the project (be that measured as employment, the value of investment, sales, or some other measure). We are forced to do this as there does not exist a comparable measure of size in the GF and MA datasets. Nevertheless, we endeavor to link these count measures back to the value of capital flows below.

In addition to these issues, it must be remembered that the data must be interpreted in light of how they are constructed. Both the GF and MA data are compiled from news sources. As such, projects unreported may be omitted, something that may be a particular problem for smaller projects or those in developing countries. Furthermore, both only capture cross-border investments and miss, for example, a foreign-owned affiliate that invests in its host (i.e. a project that is classified as a domestically-owned one even though the ultimate control may lie elsewhere). As it is unclear how these different omissions affect the GF versus MA numbers, we can only caution that the results must be interpreted in light of these caveats.

3.4 Control variables

In our regressions, we utilize a set of canonical control variables which are standard in FDI analysis, including origin, destination, and pair-wise factors. Details on data sources, measurements, and summary statistics are in the Appendix. Broadly speaking, these "gravity" variables fall into two categories: market size and international barriers. For both the origin and destinations, we use GDP and population as measures of market size. Note that as both are in logs, including both implicitly controls for per-capita income. In addition, we include the destination's market potential which is intended to control for the destinations proximity to other markets.[26] For international barriers, we include a number of different measures. The first is the World Bank's (2014) bilateral trade cost measure which controls for the ease of trade between the origin and destination. In addition, we use several geographic measures: the distance between countries, a dummy equalling one when they are contiguous

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[26]Blonigen et al. (2007) provide discussion on this issue.

(i.e. share a common border), and dummy variables indicating whether the origin or destination is an island or landlocked country. To control for cultural differences, we include a dummy equal to one when the two countries share a common language and dummy indicating whether or not they share a colonial history. As another measure of barriers, we include a proxy for destination investment costs.

Beyond these gravity variables, we utilize several measures of the political and economic environments. For both the origin and destination, we include proxies for institutional development, technological development, the quality of corporate governance, and to proxy for financial depth, the extent of stock market capitalization. In addition, to examine how FDI may be affected by exchange rate shocks, we include controls for whether or not the origin or destination country is experiencing a banking or currency crisis. Given the importance attributed to taxes when making location decisions, we include the the countries' statutory corporate tax rate.[27]

In addition to these country-level variables, we utilize several sector-level variables. As a measure of the development of the proprietary assets in a sector, we use the Balassa (1964) measure of revealed comparative advantage (RCA). This measure identifies a comparative advantage in a sector s for country i if s's average share in i's export basket exceeds s's share in worldwide exports. Note that unlike our other measures, RCA is available at the sector level, however due to trade data limitations, we were only able to obtain measures for nineteen of our sectors, most of which were in manufacturing. This list of sectors for which RCA is available is in Table 1. In addition, we use sector-country average destination tariffs from 2001. Beyond these, we use three additional measures that vary by sector, but not country. We use the contractual intensity of a sector, which measures the degree of relationship-specificity in inputs. We also use sectoral intangibility intensity. We expect that for industries where these measures are larger, that integration between the parent and affiliate is especially important. Finally, we use the sector's dependence on external finance. One factor in this ranking is the time that it takes for an industry to bring a project to profitability. As such, industries with a high score here need better access to credit. Note that these three measures are available only for manufacturing.

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[27]Although the effective average tax rate would be more appropriate when estimating the decision of whether or not to invest, available measures are very limited in their country coverage.

4   An Overview of Broad Patterns

Before delving into the econometric analysis, it is beneficial to explore the data using simple descriptive statistics and construct a set of stylized facts regarding the overarching patterns in GF and MA flows. As stressed above, on the whole the two modes are often found to behave similarly, however, even a basic analysis reveals important differences. Figure 1 shows the evolution of GF and MA FDI over our sample period (for the moment, simply focus on the cumulated levels). From this, three key observations can be drawn. First, in terms of the number of projects, GF outstrips MA by nearly two to one (more on this below), with a total of 54,807 MA projects and 95,112 GF projects worldwide during our sample. Second, both have been generally growing during the sample period. Third, in response to the financial crisis of 2008-2009, both modes of FDI fell. In percentage terms, this decline was more severe for MA. On the other hand, MA flows recovered to their pre-crisis levels by 2010 whereas GF flows remained stagnant.

4.1   Top Origins and Destinations

Table 3 presents the top ten origins, destinations, and origin-destination pairs in terms of number of GF and MA projects. The most obvious feature of the origin and destination columns is in their overlap. The same eight countries are top origins for both GF and MA. Further, all the top origins are developed Northern economies (with the exception of Singapore, the 10th ranked origin for MA). As a group, these ten nations generate a very large share of FDI, accounting for 51.1% and 68.8% of the total MA and GF projects in the sample. Overall, of the 246 countries in the worldwide sample, 70 are never origins for either mode with an additional 26 only being origins for MA and 29 being origins only for GF. Turning to the destinations, we see a similar degree of overlap between the MA and GF countries. MA destinations are again predominantly developed (and indeed are also typically major sources of MA flows), with China being the exception. GF recipients, on the other hand, are more varied, with China, Russia, India and the United Arab Emirates ranking in the top ten. As with outflows, the top ten again account for approximately half of FDI inflows, although the GF inflows are noticeably less concentrated.

With respect to the country-pair ranking, the English speaking countries of the US, Canada, and

the UK dominate the MA results. In addition, China is a major destination, particularly from other Asian locations and the US. Indeed, Japanese FDI in China has received a good deal of attention (e.g. Armstrong, 2009) and Singapore is well known financial hub that acts as an intermediary between China and the West. GF, however, is again more varied. Although the Anglo-Saxon countries still feature heavily as origins, Japan is a primary source twice, whereas the destination countries cover both the major developed economies as well as large developing nations. Finally, it is worth recognizing the concentration in FDI flows, with these ten country pairs alone making up 14.7% of MA and 15.2% of GF FDI. Of the 60,270 possible country pairs, 54,656 never experience FDI of either mode, 351 only see MA, and 1302 only see GF.

Thus, as suggested by Hypothesis 1, Table 3 suggests that the mode of FDI will be dependent on the level of development of the origin and destination, as well as the interaction of the two. With this in mind, we compare flows between developed countries, termed North-North (NN) flows, flows from developed to developing countries (North-South, NS), flows from developing to developed countries (SN), and flows between developing countries (SS).[28] Figure 1 shows the evolution of these four groups over our sample period. Unsurprisingly, the Northern countries are the dominant origin for both modes, however, GF destinations are typically Southern whereas MA destinations are typically Northern. By way of contrast, FDI from the South is more concentrated in Southern destinations for both modes. As noted above, there was a difference in the modes' responses to the financial crisis of 2008-2009. Breaking this down into the four directions, we see that the shifts in MA flows were predominantly driven by flows from the North to either destination. GF, however, saw most of their declines due to falls in NS flows.

4.2   Sector Patterns

Table 1 indicates that our data include both manufacturing and services sectors. Figures 2 and 3 show the evolution of manufacturing and services for both modes across the four directions. Mirroring global trends in trade and value-added, it is little surprise that services FDI via either mode have been growing more rapidly than manufacturing FDI. Despite this, the number of manufacturing FDI projects exceeds that in services, a difference that is much more pronounced in GF than in MA. Other

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[28]The designations for the different countries, which follows the IMF's classification, is found in Table 2.

than this, however, the broad patterns in terms of changes over time and directions of investment are on the whole similar between them.

Table 4 lists the top ten sectors for GF and MA respectively. As can be seen, even though manufacturing dominates overall FDI projects, two of the top three sectors in both GF and MA are service sectors, specifically Software & IT and Financial Services.[29] Indeed, there is a good deal of overlap across the two modes' top sectors: the top three sectors are shared across modes with and additional five ranking in the top ten for both. That said, there are also noticeable differences. For example, whereas Aerospace ranks fourth for GF, they do not rank at all in MA. Likewise, Real Estate and Transport rank in the top ten for MA not for GF.

4.3 Projects vs. Value of FDI

As noted above, our data indicate that most projects over the sample period took place via GF, not MA. This appears in contrast to the accepted wisdom that most FDI is MA, not GF.[30] It must be remembered, however, that our measure is a count of the number of projects, not their value. Although our GF and MA data contain some information on the size of investment, they are not comparable across the two (and are missing for many MA projects). Thus, we cannot carry out a meaningful comparison of the total magnitudes of the two types of FDI using our data.

Nevertheless, as a step towards calculating such a value comparison, we utilized data on net FDI inflows (in millions of US dollars) from the World Development Indicators (World Bank, 2013) and regressed it on the number of inbound MA and GF projects in a given destination d in year t along with a set of year dummy variables. Thus, the coefficients on the two variables should roughly reflect the average relative value of the inflow of a particular type of project. The results are found in Table 5. These estimates suggest that the average MA project is valued at approximately 6.8 times that of a GF project. Taking into account that the number of GF projects is 50% higher than the number of MA projects, this suggests that for every dollar of FDI, about 79.5% is due to MA while the remainder is composed of GF. While this figure must be taken with a grain of salt, it suggests that although most

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[29]Recall that this is a count, not a measure of the size of projects, thus this may be due to numerous small projects in these sectors.

[30]See, for example, Globerman and Shapiro (2004).

FDI is GF in terms of projects, the majority of FDI values are likely due to MA.[31]

5   Regression Findings

Although the above stylized facts suggest that different factors may matter for the two modes, it is necessary to supplement that analysis with a more rigorous econometric investigation. Specifically, we are interested in whether we observe differences in the patterns of MA and GF consistent with our above hypotheses.[32] With this in mind, we estimate the following exponential model for FDI in mode m from origin o to destination d in sector s in year t:

$$FDI_{modst} = exp(\alpha_{modst} + (x_{odst})\,\beta_1 + GF_m \cdot (x_{odst})\,\beta_2)\epsilon_{modst} \tag{1}$$

where $\alpha modst$ is a matrix of constants, x_{odst} is a vector of controls drawn from those discussed above, and GF_m is a dummy variable equal to one when the mode is GF. Given the count data nature of our dependent variable and our heavy use of fixed effects in various dimensions of the data, we adopt a (conditional fixed effects) Poisson estimator. Standard errors are clustered at the country-pair level. Note that although the above descriptives use data for all countries, due to data availability this is not true in our regression analysis, with the sample of countries and sectors varies across specifications depending on which controls are included. Table 2 lists which nations are in at least one regression. We modify this approach (particularly with regards to the constants (α_{modst}s) in different specifications in order to focus on long-run versus short-run, sector, or sector-country variation as described below. In particular, this latter exploits how different modes in different industries respond to variation in country characteristics, i.e. a triple-difference estimation.

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[31] In particular, recall that here we can only use our data when the destination is identified and that our project count data include only new investments whereas the net value data include expansion of existing investments via retained earnings and disinvestments as FDI is shut down or sold to domestic investors. Further, as small projects may be missing from either the original GF or MA data, this skew the count in one direction or the other. That said, it is unclear whether this censoring would be greater for GF due to the collection strategy, MA due to its explicit cut-off, or roughly balanced between the two.

[32] Note that we are not asking whether a MA and GF are substitutes or complements for one another, which would require analysis at the firm level, but whether they respond differently to different factors. Therefore our results should not be interpreted as indicating whether an increase in MA projects is because of a reduction in GF ones (i.e. the modes are substitutes), but as whether the number of MA projects changes, which can occur to both substitution and the creation of projects that would not otherwise have happened.

5.1 Long-run Characteristics

For our first approach, we focus on long-run characteristics of origins, destinations, and pairs (od) and therefore collapse the data to an ods triad of means and include sector-mode effects α_{ms}. As such, we rely on cross-sectional variation only. Table 6 presents our results. In the table, the first column presents the coefficients for our non-interacted controls (that is the total effects for MA). The second column presents the coefficients for the controls interacted with GF_m, i.e. the estimated difference between the effect on MA and GF with the sum of the two the estimated total effect for GF. The significance of this total effect is indicated by the †s on the standard error of the interacted variable (something particularly of interest when the interacted and non-interacted coefficients differ in sign).

In the first specification, we use the full time period to construct our means; in the second, we use only the pre-2008 non-crisis years in creating our averages. We do so because of the possibility that the crisis years represent a fundamentally deviation from the "typical" investment climate of a country, potentially creating misleading averages.[33] Note that due to data availability, this excludes a handful of countries from our analysis.

Looking across the results, we see a pattern typical of gravity models of FDI – that FDI is larger between larger countries with small barriers between them. Rather than belabour these well-known points, we focus our discussion on our above hypotheses. Hypothesis 1 predicts that MA should be more common between developed countries whereas GF involves the South. The estimates suggest that MA comes from and goes to large GDPs, but is unaffected by GDP per capita (as the population variables are insignificant). GF, on the other hand is larger when either country has a higher population, meaning that GF is greater when per-capita incomes are lower. This is reinforced by the significantly lower impact of destination GDP. Thus, the data is consistent with Hypothesis 1, suggesting a development bias differing across modes.

Hypothesis 3 predicts that MA will be more deterred by barriers between countries than GF is due to the increased need for intra-firm integration. When comparing the interacted and non-interacted coefficients, we find largly opposite signs that are consistent with this. Further, this difference is significant for distance, island status, and origin landlocked status. In the non-crisis specification,

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[33]In unreported results, we restrict our data to the sectors used in Table 8. This did not affect the nature of the estimated results, regardless of whether or not we include the crisis years. These are available on request.

this also holds for the trade cost measure. Thus the data provides some support for this hypothesis. Somewhat surprisingly, we do not find an impact of cultural barriers (proxied by common language or colonial status). Below, we show that by exploiting differences across sectors as well as countries aids in identifying the role of cultural barriers.

Hypothesis 2 posits that GF will be more dependent on the origin level of technology, suggesting that origin technology should have a positive coefficient for the GF interaction which it does (albeit this is significant only when using the non-crisis averages). Somewhat surprisingly, we find a negative effect from destination technology which is significantly smaller for GF in the full-sample specification (again suggesting a relative dependence on origin technology for GF). One possible rationale for this negative impact is that this country-wide effect is not reflective of what motivates investment in a specific sector, something we consider when using sector-level RCA below.

Turning to the tax coefficients, we find that destination taxes deter only GF, consistent with Hypothesis 8 and Becker and Fuest (2010). In addition, the non-crisis specification suggests that higher origin taxes deter GF as well, something also found by Barrios et al. (2012), although the effect is only marginally significant. Finally, although Table 6 uses country averages and is therefore unable to indicate what happens *during* a crisis, the non-crisis specification's results indicate that destinations prone to banking crises get more MA than GF. This is thus suggestive of the fire-sale FDI prediction of Hypothesis 6.

Thus, this cross-section analysis supports most of our hypotheses. Two, however, do not fit our expectations. First, because MA is dependent on enforcing the merger terms, Hypothesis 5 suggests that it should be more dependent on the institutional quality of the destination than is GF. Nevertheless we find no evidence of this using the institutional measure (although the estimates for corporate governance do lend some support). Second, Hypothesis 7 predicts that, although both modes likely thrive when financial development is strong, MA is more dependent on that in the destination whereas GF is more dependent on the origin. The results reject this pattern, instead suggesting that GF is actually less dependent on the origin's financial development with no difference in sensitivity to the destination's level. These non-conformities, however, may be due to the implicit assumption that all sectors respond equally to institutional quality or financial development. Thus, as with the role of cultural barriers, we explore this more fully below by combining it with sectoral data.

Combining the above, we find that both FDI modes follow typical gravity patterns. That said, there are significant differences that lend support to the majority of our hypotheses.

5.2   Short Run Country Changes

Here, in contrast to focusing only on cross-sectional variation, we focus exclusively on time variation by including year-mode, sector-mode, and country pair-mode effects. Thus, whereas Table 6 indicated the impact of long-run country differences, our estimates in Table 7 reflect the effects of short-run variations within country pairs. As before, we do this with and without the crisis years.[34] The most obvious difference between these results and the previous ones is the sharp drop in significance of many of our variables. This indicates that FDI is more heavily influenced by long-run features than by short-run movements.

Nevertheless, the goal of this table is to highlight short-run variations to test in particular Hypothesis 6, which predicts that MA is more apt to occur during a downturn in the destination (as acquisition targets may become temporarily cheaper) than is GF. In doing this, we find evidence consistent with this in two places. First, a short run rise in origin GDP increases outbound FDI of MA only, suggesting a rise in outbound investment during a boom. In contrast, during a temporary reduction in destination GDP per capita (either from a fall in GDP or a rise in population), inbound FDI increases with this effect somewhat smaller for GF when using only the non-crisis years. Second, when the destination experiences a currency crisis, this significantly increases MA but not GF. Not surprisingly, this is especially true when using the crisis years. Inn addition, we find the opposite, albeit insignificant, pattern for an origin currency crisis. We find less significance for banking crises, although, in line with consistent with Hypothesis 7, GF falls during an origin banking crisis, reflecting that modes particular dependence on origin financing.

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[34]Note that the larger decline in the number of observations is that here, unlike in Table 6 we are using the time dimension of the data. Note that with these country-pair mode effects, country pairs that never experience FDI do not contribute to the identification of the parameters and are therefore dropped from the sample.

5.3 Exploiting Sectoral Variation

One feature of our data not yet exploited is the sector-level variation. This is particularly important because some features such as intra-firm communication or dependence on external funding vary a great deal across sectors. As such, assuming equal impacts of variables such as colonial history or financial development across sectors may hide important variation. In this subsection, we therefore use sector-level variables in two ways.

The first is in Table 8 in which we introduce two country-sector varying variables, RCA and tariffs. In doing so, we use country pair-mode-year and sector-mode effects to control for other determining factors. As before, we include results using the crisis years and results without them. In contrast to the previous tables, however, we only include manufacturing (due to the tariff data which do not exist for services) and those projects where the affiliates sector matches its function (e.g. where the affiliate is in manufacturing and has a manufacturing function). We do this since an affiliate in a manufacturing sector such as Metals that performs a service function such as customer support may behave very differently from one that actually produces the good. Although this reduces the size of the sample, it leaves us with a cleaner dataset that improves interpretation of the estimates.

As can be seen, both modes originate from and go to countries with a comparative advantage in the relevant sector, with GF particularly so. When also controlling for the tariff, we find that although both depend on the RCA of both nations, consistent with Hypothesis 2 the extra sensitivity of GF is only for the RCA of the origin. In addition, we find that although MA is attracted to countries with high tariffs on the parent's sector, GF is not impacted by tariffs. This is consistent with Hypothesis 4. In addition, it would align with a situation in which MA is relatively composed of horizontal, market-seeking FDI (Markusen, 1984) while GF is more vertical (Helpman, 1984). Since, as discussed by Davies (2008), horizontal FDI is typically bound for developed countries with vertical going to developing ones, this also lends support to Hypothesis 1.

The second manner in which we exploit the sector-level aspect of the data is by using interactions between the mode dummy, sector-level variables and country-level variables, i.e. a triple interaction. We do this because some sectors may be particularly sensitive to factors such as barriers between countries; for example, sectors where intangibles play a large role may be more deterred by commu-

nication barriers than are others.[35] This triple difference approach allows us to perform a degree of identification not possible in the existing literature. Further, by focusing on sector-country variation, we are able to use country pair-year-mode and sector-mode effects to control for other features that may influence FDI. Note that because our sector-level variables are available only for manufacturing sectors, we further narrow our data where a manufacturing parent invests in an affiliate with a manufacturing function.[36]

We begin by re-examining the impact of three barriers between countries: distance, common language, and a shared colonial relationship. Hypothesis 3 predicts that barriers between countries will be a bigger deterrent for MA than GF as MA needs to integrate the foreign target with the parent. In particular, one might expect that such issues are particularly important in sectors where integration is critical. We proxy for such issues by using either the sectoral contract intensity or the sectoral intangibility intensity. This is then interacted with the country-pair barrier measure as well as the mode. To the extent that these three country pair characteristics proxy for the difficulty in integration, we anticipate a negative sign on this distance interaction and a positive sign on common language and colony, with opposite signs for the GF interactions. As shown in Table 9, when the coefficients are significant they match our predictions. Thus, even within a given country pair, by exploiting the extent to which a sector relies on smooth communication between the parent and the affiliate, we are able to able to find support for the hypothesis that, relative to GF, MA is particularly impacted by distance and colonial history. Note that this latter effect was obscured in Table 6 where we restricted the impact of colonial history to be the same across sectors. This highlights the value of using this triple difference approach. As well as comparing a given sector across country pairs, these results indicate that, in a given pair, the MA to GF ratio in industries such as Aerospace or Printing (which rank highest in contractual and intangibility intensity) will be higher than in Metals or Ceramics (where these are low).

Hypothesis 5 predicts that, due to the greater potential for conflict during the integration process, MA will be especially reliant on destination institutions, something we found little support for when

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[35]In their analysis of the effect of country skill on FDI, Alfaro and Charlton (2009) use a diff-in-diff approach, interacting country skill with industry skill intensity.

[36]Although we omit them here to conserve space, when using only non-crisis years, results are very similar. These are available on request.

using country-level variation only. To examine this, in Table 10 we again use the contract and intangible intensity variables but now interact them with the quality of countries' institutions as well as the institutional distance ($InstDist$, which is the absolute value of the difference between the origin and destination institutions). As can be seen, with the exception of column 2 where we use intangible intensity and separate the origin and destination institution values, this is precisely the pattern we find in the data. Thus, again, by exploiting cross-sector as well as cross-country variation, we find support for our hypotheses.

Finally, according to Hypothesis 7, MA should be more dependent on destination financial development whereas GF is more dependent on the supply of capital in the origin. In Table 11's column 1, we interact the sectoral external finance dependency with the stock market capitalization. We expect industries such as Plastics and Communication, which are particularly dependent on external capital, to respond more to financial development, with a greater GF response to the origin's development and a smaller GF response to the destination's. As can be seen, we find this pattern, although there is no significant differential across modes for the interaction between for the origin. As a robustness check, the second specification uses domestic credit as a share of GDP in place of stock market capitalization as the measure of financial development. Here, we again find results consistent with Hypothesis 7, although the GF interaction for the destination is now insignificant. Thus, we find results in line with our expectations, although the difference across modes is somewhat sensitive to the measure of financial development.

6   Conclusion

FDI is a dominant feature in the global economy, with intra-firm trade accounting for a third of global trade flows (Lanz and Miroudot, 2009). One long-recognized aspect of FDI is that it takes place for a variety of different reasons and through different modes, namely mergers and acquisitions and greenfield investment. In particular, it has been assumed that these modes likely respond differently to factors including barriers to integration, institutional quality, and financial development due to the idea that whereas GF takes the origin country to the destination, MA integrates the destination with the origin. Nevertheless, data constraints have hindered a rigorous analysis of these ideas. This paper

has sought to fill that gap by using updated, disaggregated data and an estimation methodology that exploits this disaggregation.

Using worldwide data on MA and GF for 2003-2010 across 24 sectors we find that although both modes respond in similar ways to traditional gravity variables, there are differences in relative responsiveness. In particular, we find that MA is more deterred by barriers between countries, weak destination institutions, and low destination financial development. GF, on the other hand is especially reliant on origin comparative advantage, destination taxes, and origin financial development. In particular, these differences are heightened in sectors where integration plays a crucial role or firm are reliant on external funding due to long development periods, patterns that are not always clear when not exploiting the sectoral information of the data. Thus, these results are consistent with the conceptual distinction between the two modes.

Taken as a whole, these results are reassuring in that they suggest that the current state of understanding of FDI patterns is not overly sensitive to the distinction between FDI modes. Nevertheless, recognizing the differences between MA and GF is potentially important to reconciling the varying results found across different data sets. Furthermore, our results suggest that policies intending to influence FDI may have a differential impact across modes. For example, cutting one's tax rates may lead to more inbound GF investment but not additional MA. To the extent that these have different impacts on an economy (see Davies and Desbordes (2015) for an example), this may be important when developing policy. Thus, although this exercise has been largely descriptive, it makes a significant contribution in terms of our understanding of FDI and of the sometimes contradictory literature that has been written about it.

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A   Data description and sources

Our GDP measure is the log of GDP in constant 2005 US dollars. Population is the log of population in 1000s. Both come from version 8 of the Penn-World Tables (Feenstra et al., 2013). Distance is the log distance in kilometers between capital cities. This, along with the common language, contiguity, and colonial history data came from the CEPII database (Mayer and Zignago, 2006). Market potential for a destination d in t is $\sum_{i \neq d} \frac{GDP_{it}}{dist_{id}}$. Landlock and island nation status come from Wikipedia (2014b, 2014a). For trade costs, we use one year lags of the World Bank's Trade Costs Dataset (2014).[37] This measure is constructed from multiplying the ratio of exports from i to j relative to trade within i by the comparable ratio for j. See Novy (2013) for details. Investment costs are constructed as $ln(100 - INV_{it})$ where INV_{it} is the investor perception index from the Heritage Foundation (2013).[38]

The measure of country-level governance indicates how well property rights are protected and enforced. It corresponds to the first principal component of three Worldwide Governance Indicators, available over the 2003-2010 period: Political Stability; Rule of Law; and Control of Corruption.[39] These indicators have been constructed by Kaufmann et al. (2011) on the basis of a weighted aggregation of governance indicators from different sources, e.g. surveys of firms and households, subjective assessments of various organisations.[40] A higher value means better country-level governance. The measure of corporate governance indicates how much firms' management is accountable and transparent. It corresponds the first principal component of the following indicators: Efficacy of corporate boards; Protection of minority shareholder's interests; Strength of auditing and accounting standards. These indicators come from the 2005-2010 issues of the World Economic Forum Global Competitiveness Report (GCR) and are based on surveys from business leaders.[41] A higher value means better corporate governance. The technology measure also comes from the GCRs and reflects the availability of latest technologies in a given country. A higher value means that more frontier technologies are available. Note that GCR variables do not vary over time.

Statutory tax data come from Loretz (2008) which was supplemented with data from KPMG (2012) when needed. We use the logged vvalue. The currency crisis dummy variable comes from Reinhart and Rogoff (2010). A currency crisis is defined as an annual depreciation versus the U.S. dollar (or the relevant anchor currency) of 15 percent or more. Stock market capitalization is normalised by GDP and comes from Beck et al. (2009). Higher values reflect a deeper financial system. Domestic credit is measured as a percentage of GDP and comes from the World Bank's World Development Indicators.[42] Revealed comparative advantage is calculated using the method of Balassa (1965), so that the RCA in sector s for country i in t is $\frac{\frac{E_{ist}}{E_{it}}}{\frac{E_{st}}{E_t}}$, i.e. the share of i's exports that are in sector s relative to that share for the world as a whole. Data come from CEPII (Gaulier and Zignago, 2010)). As these may be influenced by FDI, we use one year lagged values.

Contractual intensity comes from Nunn (2007) and measures the degree to which an industry's intermediates tend to be relationship-specific. Intangibility intensity is the median level of the ratio of

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[37]These are at `http://data.worldbank.org/data-catalog/trade-costs-dataset`.

[38]These are at `http://www.heritage.org/index/explore?view=by-region-country-year`.

[39]We use a principal component analysis for the governance measures because the variables constituting these measures are highly correlated. Indeed the first principal component accounts for nearly 90% of total variance. Details on this and all other principal component procedures are available on request.

[40]See `http://info.worldbank.org/governance/wgi/index.aspx`.

[41]See `http://www.weforum.org/issues/global-competitiveness`.

[42]These are at `http://data.worldbank.org/topic/financial-sector`.

intangible assets to fixed assets for ISIC industries for the period 1980-1999 and comes from Kroszner et al. (2007). External capital dependence is obtained from Rajan and Zingales (1998), who use the ratio of capital expenditures minus cash flow from operations to capital expenditures of firms in each industry to measure the structural need for external finance.

Summary statistics for all variables are in Table 12.[43]

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[43]Country-variable summary statistics are based off of the sample in Table 7. RCA is based on that in Table 8, the intensity measures on that in Table 9, and external capital dependence on that in Table 11.

Figure 1: Evolution of FDI over time
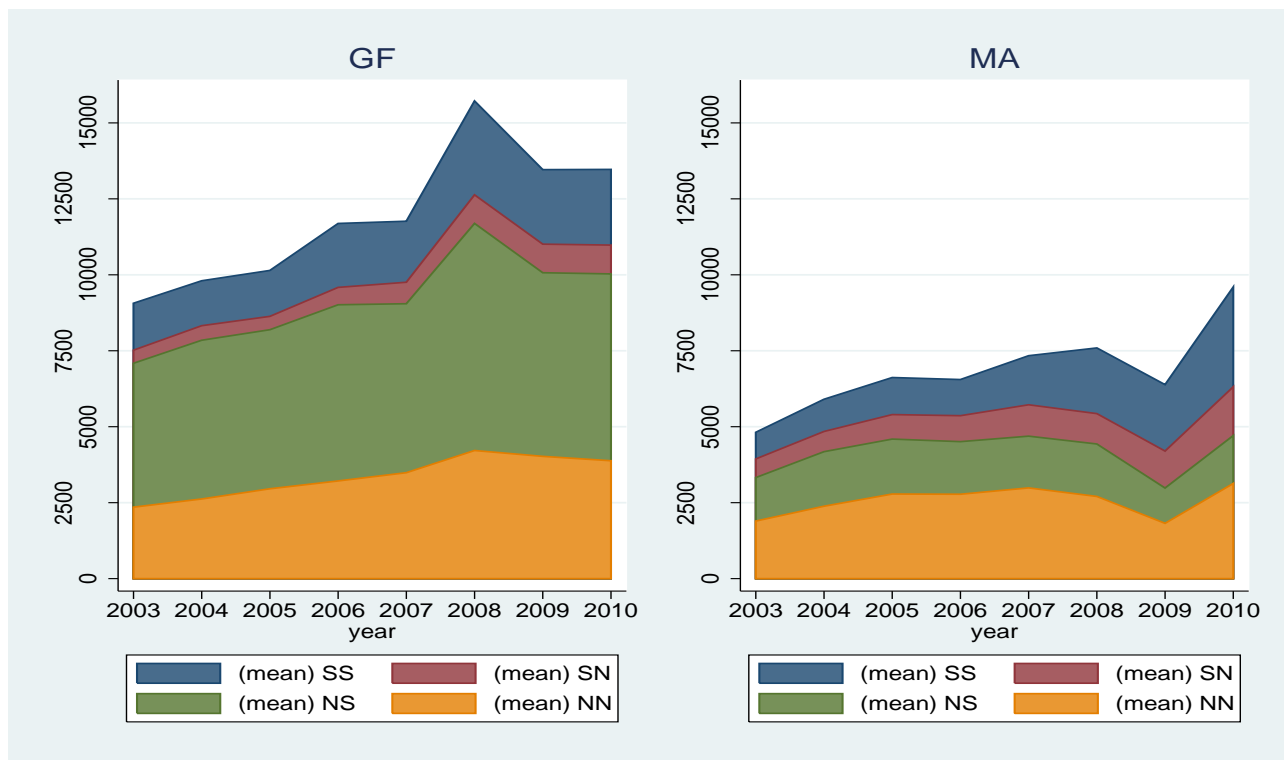
Figure 2: Manufacturing FDI over time
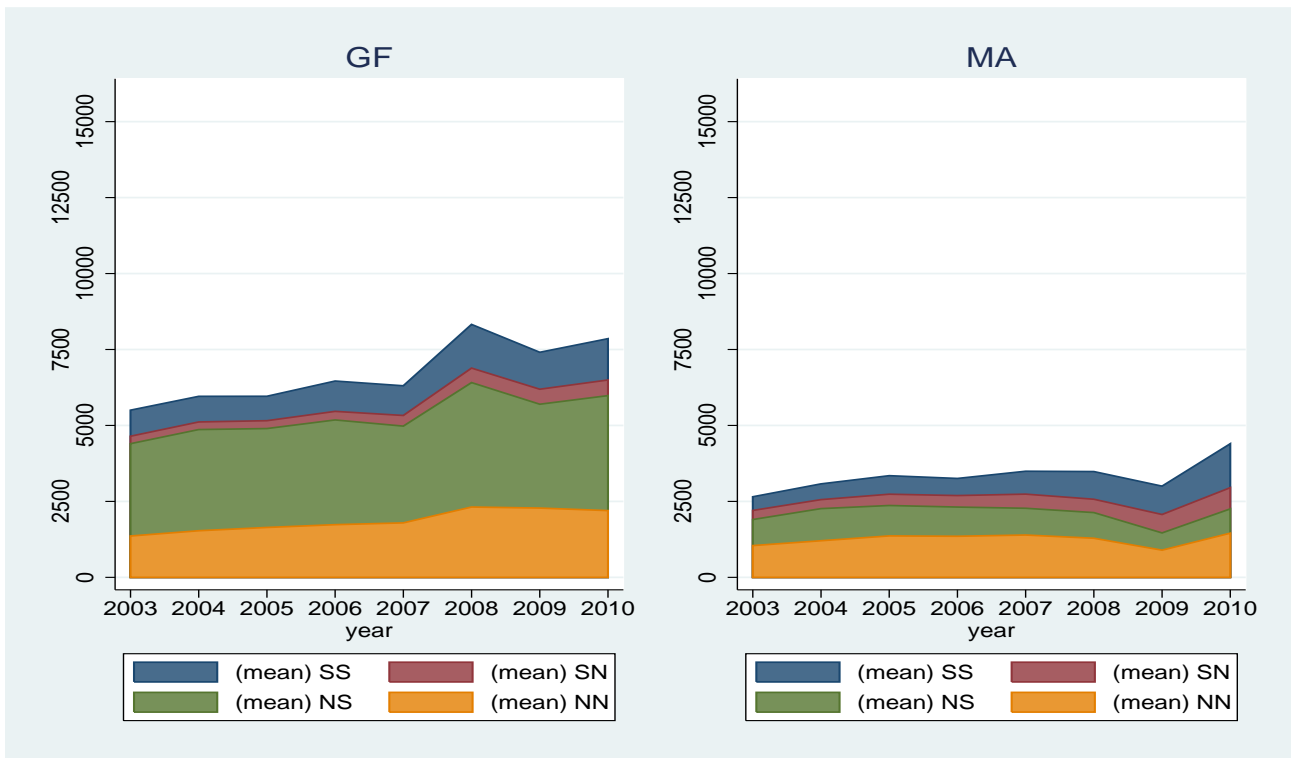
Figure 3: Services FDI over time
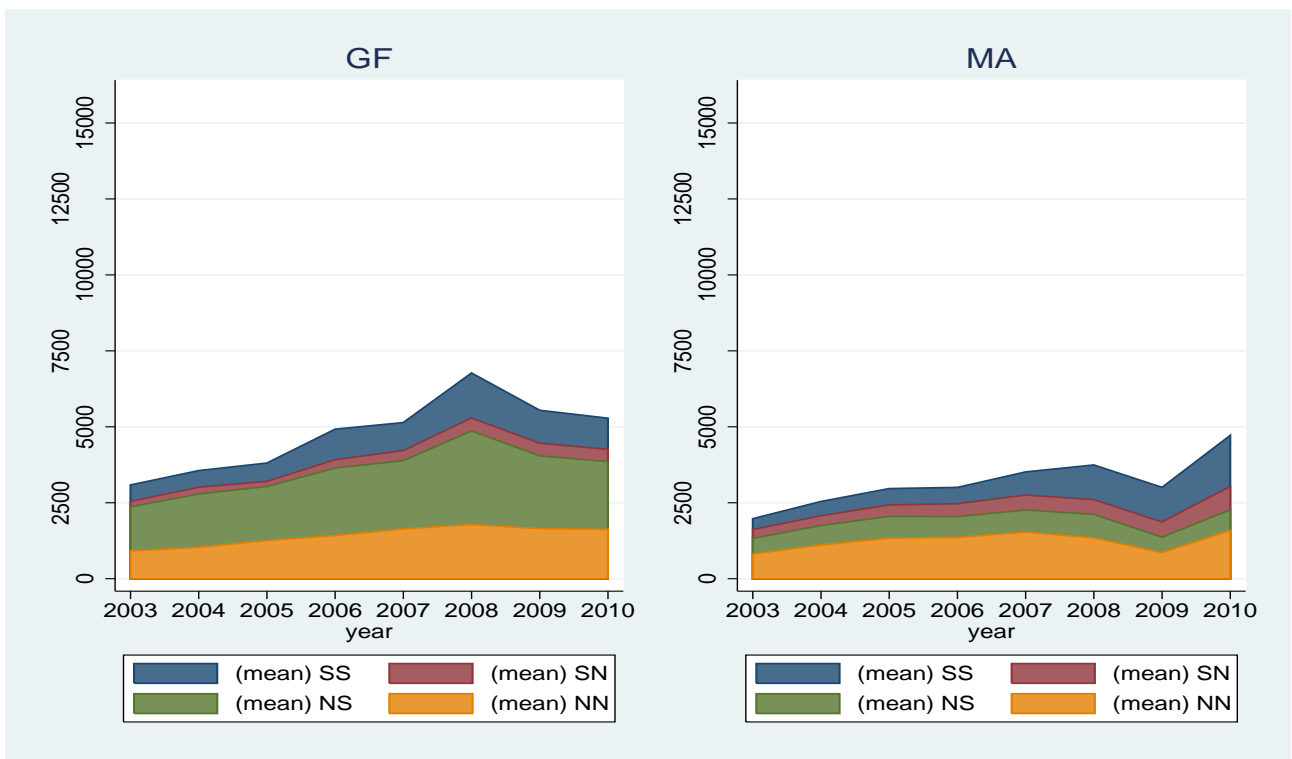
Table 1: List of sectors

Aerospace, Automotive, & Transport	Leisure & Entertainment*†
Beverages	Metals
Bio-tech, Chemicals, & Pharmaceuticals	Minerals†
Business Services*	Paper, Printing, & Packaging
Ceramics, Glass, & Building Materials	Plastics
Coal, Oil and Natural Gas†	Real Estate*†
Communications, Electronics, & Elec. Components	Rubber
Equipment & Machinery	Software & IT services*
Financial Services*	Textiles
Food & Tobacco	Transportation*
Healthcare*	Warehousing & Storage*†
Hotels & Tourism*	Wood Products

Notes: * indicates services sector. † indicates RCA data unavailable

Table 2: List of countries and their abbreviations

Argentina	(ARG)	Finland^N	(FIN)	Mauritius	(MUS)	South Africa	(ZAF)
Australia^N	(AUS)	France^N	(FRA)	Mexico	(MEX)	Spain	(ESP)
Austria^N	(AUT)	Germany^N	(DEU)	Morocco	(MAR)	Sri Lanka	(LKA)
Belgium^N	(BEL)	Ghana	(GHA)	Netherlands^N	(NLD)	Sweden^N	(SWE)
Bolivia	(BOL)	Greece^N	(GRC)	New Zealand^N	(NZL)	Switzerland^N	(CHE)
Brazil	(BRA)	Hong Kong*	(HKG)	Nigeria	(NGA)	Thailand	(THA)
Canada^N	(CAN)	Hungary	(HUN)	Norway^N	(NOR)	Tunisia	(TUN)
Chile	(CHL)	Iceland	(ISL)	Panama	(PAN)	Turkey	(TUR)
China	(CHN)	India	(IND)	Paraguay	(PRY)	United Arab Emirates*	(ARE)
Columbia	(COL)	Indonesia	(IDN)	Peru	(PER)	UK^N	(GBR)
Costa Rica	(CRI)	Ireland^N	(IRL)	Philippines	(PHL)	USA^N	(USA)
Cote d'Ivoire	(CIV)	Italy^N	(ITA)	Poland	(POL)	Venezuela	(VEN)
Denmark^N	(DNK)	Japan^N	(JPN)	Portugal^N	(PRT)	Zambia	(ZMB)
Ecuador	(ECU)	Kenya	(KEN)	Romania	(ROM)	Zimbabwe	(ZWE)
Egypt	(EGY)	Korea	(KOR)	Russia	(RUS)		
El Salvador	(SLV)	Malaysia	(MYS)	Singapore	(SGP)		

Notes: N denotes a Northern country. * denotes a country not in regressions.

Table 3: Top origin, destination and origin-destination country pairs

	Top origin countries				Top destination countries				Top origin-destination pairs					
	M&A		GF		M&A		GF		M&A				GF		
	country	#	country	#	country	#	country	#	origin	dest.	#	origin	dest.	#
1	USA	9020	USA	22498	USA	5731	CHN	10351	USA	GBR	1573	USA	CHN	2830
2	GBR	4643	DEU	9017	GBR	4732	USA	6793	USA	CAN	1325	USA	GBR	2232
3	CAN	2624	GBR	8064	CHN	3767	IND	5718	CAN	USA	1284	USA	IND	2146
4	DEU	2416	JPN	6922	CAN	2829	GBR	5570	GBR	USA	1040	JPN	CHN	1690
5	FRA	2300	FRA	5657	RUS	2598	DEU	3398	USA	CHN	650	GBR	USA	1087
6	NLD	2112	ESP	3002	DEU	2539	FRA	3356	USA	DEU	560	USA	DEU	976
7	SWE	1407	ITA	2696	FRA	2063	RUS	3330	USA	FRA	484	USA	CAN	927
8	JPN	1275	NLD	2621	AUS	1354	ESP	2541	JPN	CHN	428	DEU	USA	887
9	CHE	1163	CHE	2515	NLD	1346	ARE	2196	HKG	CHN	405	USA	FRA	875
10	SGP	1070	CAN	2467	ESP	1149	POL	2150	SGP	CHN	321	JPN	USA	835
% of Total	51.1%		68.8%		51.3%		47.7%		14.7%			15.2%		
Total	World	54807	World	95112	World	54807	World	95112	World		54807	World		95112

Table 4: Top 10 Sectors 2003-2010

	M&A			GF	
rank	Sector	# deals		sector	# deals
1	Software & IT services	6571		Communications, Electronics, & Elec. Components	11065
2	Financial Services	5710		Software & IT services	10379
3	Communications, Electronics, & Elec. Components	5228		Financial Services	8601
4	Business Services	5175		Aerospace, Automotive, & Transport	7230
5	Bio-tech, Chemicals, & Pharmaceuticals	3833		Bio-tech, Chemicals, & Pharmaceuticals	7161
6	Metals	3634		Business Services	7002
7	Equipment & Machinery	3630		Equipment & Machinery	6887
8	Real Estate	2467		Textiles	5688
9	Food & Tobacco	2445		Food & Tobacco	5239
10	Transportation	2442		Metals	3627

Table 5: Value of M&A and GF

Number of M&A projects	192.1***
	(33.42)
Number of GF projects	28.45**
	(14.29)
Constant	-690.1
	(463.3)
Observations	1550
R-squared	0.657

Notes: The dependent variable is net FDI inflows in millions of US$. Regression controls for year fixed effects. Standard errors in parentheses. ***, **, and * on coefficients denote significance at the 1%, 5%, and 10% levels respectively.

Table 6: Cross Sectional Estimates

	All Years		Pre-Crisis Only	
		GF*		GF*
GDP_o	0.806***	-0.180	0.674***	0.116
	[0.177]	[0.157]†††	[0.190]	[0.168]†††
GDP_d	0.724***	-0.234***	0.553***	-0.157*
	[0.103]	[0.091]†††	[0.090]	[0.080]†††
Pop_o	-0.224	0.337**	-0.097	0.132
	[0.180]	[0.159]	[0.195]	[0.170]
Pop_d	-0.006	0.304***	0.195**	0.297***
	[0.097]	[0.092]†††	[0.092]	[0.080]†††
$MktPotential_d$	-0.009**	0.004	-0.010**	0.008**
	[0.004]	[0.003]†	[0.004]	[0.003]
$TradeCost_{od}$	-0.011***	0.002	-0.012***	0.003**
	[0.001]	[0.001]†††	[0.001]	[0.001]†††
$Distance_{od}$	-0.427***	0.112**	-0.423***	0.103**
	[0.058]	[0.046]†††	[0.059]	[0.047]†††
$Contiguity_{od}$	-0.058	-0.113	-0.060	-0.143
	[0.120]	[0.108]	[0.125]	[0.109]†
$Language_{od}$	0.862***	-0.158	0.841***	-0.137
	[0.107]	[0.107]†††	[0.104]	[0.100]†††
$Colony_{od}$	0.423***	-0.012	0.387***	0.046
	[0.111]	[0.106]†††	[0.113]	[0.103]†††
$Island_o$	-0.093	0.167**	-0.077	0.127
	[0.081]	[0.083]	[0.103]	[0.082]
$Island_d$	-0.191**	0.127*	-0.289***	0.185**
	[0.085]	[0.070]	[0.090]	[0.078]
$Landlock_o$	-0.453***	0.589***	-0.531***	0.745***
	[0.169]	[0.172]	[0.165]	[0.181]
$Landlock_d$	-0.103	0.183	-0.127	0.322**
	[0.126]	[0.118]	[0.129]	[0.126]
$InvFreedom_d$	0.003	-0.002	0.003	0.001
	[0.003]	[0.003]	[0.003]	[0.003]
$FinDev_o$	0.502***	-0.299***	0.547***	-0.336***
	[0.073]	[0.071]†††	[0.084]	[0.078]†††
$FinDev_d$	0.262***	-0.059	0.183**	-0.039
	[0.073]	[0.066]†††	[0.077]	[0.076]††
$Tech_o$	0.237*	0.135	0.090	0.345***
	[0.128]	[0.116]†††	[0.136]	[0.120]†††
$Tech_d$	-0.624***	0.230**	-0.649***	0.154
	[0.111]	[0.107]†††	[0.118]	[0.107]†††
$Institution_o$	0.194	0.212**	0.412***	-0.150
	[0.123]	[0.106]†††	[0.136]	[0.117]†††
$Institution_d$	0.142	-0.108	0.280***	-0.058
	[0.089]	[0.080]	[0.087]	[0.072]†††
$CorpGov_o$	0.104	-0.228***	0.021	-0.047
	[0.068]	[0.062]††	[0.075]	[0.066]
$CorpGov_d$	0.223***	-0.122***	0.172***	-0.132***
	[0.056]	[0.044]†	[0.051]	[0.046]
$BankCrisis_o$	0.033	0.599***	0.436	-0.626
	[0.209]	[0.183]	[0.482]	[0.447]
$BankCrisis_d$	-0.030	0.141	0.829**	-0.909**
	[0.231]	[0.207]†††	[0.410]	[0.396]
$CurrencyCrisis_o$	0.136	0.506	0.226	0.532*
	[0.370]	[0.347]††	[0.344]	[0.286]†††
$CurrencyCrisis_d$	-0.200	-0.459	-0.307	-0.428
	[0.320]	[0.321]††	[0.333]	[0.290]†††
Tax_o	-0.069	0.196	0.258	-0.403*
	[0.238]	[0.221]	[0.247]	[0.229]
Tax_d	-0.193	-0.921***	-0.118	-1.075***
	[0.188]	[0.181]†††	[0.204]	[0.186]†††
Observations	163,536		162,384	

Notes: ***, **, and * on coefficients denote significance at the 1%, 5%, and 10% levels respectively. Analogously †††, ††, and † on GF standard errors denote whether sum of the two coefficients differs from zero at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the parentheses are clustered at country pair level. Regression controls for sector-mode fixed effects.

Table 7: Time-Variation Estimates

	All Years		Pre-Crisis Only	
		GF*		GF*
GDP_{ot}	2.432***	-2.179***	0.863	-1.026
	[0.452]	[0.508]	[0.773]	[0.854]
GDP_{dt}	-0.917***	-0.081	-2.004***	0.993*
	[0.338]	[0.362]†††	[0.562]	[0.588]†
POP_{ot}	-2.338*	4.328**	0.761	-0.767
	[1.420]	[1.952]	[2.018]	[2.793]
Pop_{dt}	4.084***	0.394	2.847	0.335
	[1.250]	[1.472]†††	[1.961]	[2.474]††
$MktPotential_{dt}$	0.184	-0.039	-0.199	0.909***
	[0.189]	[0.264]	[0.260]	[0.344]†††
$TradeCost_{odt}$	0.002	-0.002	-0.008**	0.003
	[0.002]	[0.002]	[0.003]	[0.004]†
$InvFreedom_{dt}$	-0.003	-0.002	-0.004	0.004
	[0.002]	[0.003]†	[0.003]	[0.004]
$FinDev_{ot}$	0.158**	0.056	0.281**	-0.119
	[0.078]	[0.103]†††	[0.138]	[0.161]
$FinDev_{dt}$	-0.179**	0.116	-0.175	0.102
	[0.086]	[0.077]	[0.120]	[0.119]
$Intitution_{ot}$	0.067	-0.116	-0.070	-0.240
	[0.137]	[0.173]	[0.183]	[0.190]
$Institution_{dt}$	0.064	0.110	0.001	0.276*
	[0.101]	[0.136]†	[0.128]	[0.154]†††
$BankCrisis_{ot}$	0.045	-0.082	0.086	-0.206**
	[0.037]	[0.062]	[0.065]	[0.095]††
$BankCrisis_{dt}$	-0.089*	-0.019	-0.093	0.107
	[0.054]	[0.087]†	[0.084]	[0.114]
$CurrencyCrisis_{ot}$	-0.015	0.002	-0.023	0.077
	[0.038]	[0.049]	[0.053]	[0.070]
$CurrencyCrisis_{dt}$	0.076*	-0.125**	0.117**	-0.124
	[0.039]	[0.054]	[0.053]	[0.077]
Tax_{ot}	-0.032	-0.644*	0.125	0.144
	[0.259]	[0.359]	[0.334]	[0.456]
Tax_{dt}	-0.060	-0.280	0.254	-0.728*
	[0.258]	[0.296]†††	[0.293]	[0.383]†
Observations	387,192		218,112	

Notes: ***, **, and * on coefficients denote significance at the 1%, 5%, and 10% levels respectively. Analogously †††, ††, and † on GF standard errors denote whether sum of the two coefficients differs from zero at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the parentheses are clustered at country pair level. Regression controls for country pair-mode, year-mode, and sector-mode fixed effects.

Table 8: Sector Level RCA and Tariffs

	All Years	Pre-Crisis	All Years	Pre-Crisis
RCA_{ost}	0.113***	0.112***	0.134***	0.138***
	[0.015]	[0.015]	[0.031]	[0.031]
RCA_{dst}	0.104***	0.102***	0.140***	0.135***
	[0.015]	[0.020]	[0.021]	[0.028]
$Tariff_{ds}$			0.005***	0.007***
			[0.001]	[0.002]
$GF*RCA_{ost}$	0.159***	0.193***	0.141***	0.171***
	[0.019]†††	[0.020]†††	[0.034]†††	[0.034]†††
$GF*RCA_{dst}$	0.049***	0.056**	0.013	0.021
	[0.019]†††	[0.023]†††	[0.023]†††	[0.030]†††
$GF*Tariff_{ds}$			-0.005***	-0.006***
			[0.002]	[0.002]
Observations	129,492	82,248	111,963	70,981

Notes: ***, **, and * on coefficients denote significance at the 1%, 5%, and 10% levels respectively. Analogously †††, ††, and † on GF standard errors denote whether sum of the two coefficients differs from zero at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the parentheses are clustered at country pair level. Regression controls for country pair-year-mode and sector-mode fixed effects.

Table 9: Sectors and Barriers

	X_s =Contract Int.		X_s =Intangible Int.	
		GF*		GF*
$X_s*Distance_{od}$	0.078	0.341***	-0.662***	0.934***
	[0.081]	[0.103]†††	[0.169]	[0.266]
$X_s*Language_{od}$	-0.132	-0.258	-0.311	1.071
	[0.206]	[0.285]	[0.465]	[1.159]
$X_s*Colony_{od}$	0.624**	-0.940***	0.945	-0.134
	[0.301]	[0.347]	[0.638]	[0.966]
Observations	135,707		135,707	

Notes: ***, **, and * on coefficients denote significance at the 1%, 5%, and 10% levels respectively. Analogously †††, ††, and † on GF standard errors denote whether sum of the two coefficients differs from zero at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the parentheses are clustered at country pair level. Regression controls for country pair-mode-year and sector-mode fixed effects.

Table 10: Sectors and Institutional Quality

	$X_s =$Contract Int.				$X_s =$Intangible Int.			
	GF*			GF*		GF*		GF*
$X_s * Inst_{ot}$	-0.078	0.246**				0.270	0.831***	
	[0.083]	[0.097]†††				[0.198]	[0.263]†††	
$X_s * Inst_{dt}$	0.171**	-0.178**				0.371***	0.125	
	[0.083]	[0.084]				[0.136]	[0.188]†††	
$X_s * InstDist_{odt}$			-0.325***	0.316***			-0.641***	0.748***
			[0.102]	[0.102]			[0.176]	[0.221]
Observations	105,651		105,651			105,651		105,651

Notes: ***, **, and * on coefficients denote significance at the 1%, 5%, and 10% levels respectively. Analogously †††, ††, and † on GF standard errors denote whether sum of the two coefficients differs from zero at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the parentheses are clustered at country pair level. Regression controls for country pair-mode-year and sector-mode fixed effects.

Table 11: Sectors and Financial Development

	Stock Mkt. Cap		Domestic Credit/GDP	
		GF*		GF*
$ExternalCap_s * FinDev_{ot}$	0.218**	-0.059	0.304***	0.319**
	[0.087]	[0.106]†	[0.116]	[0.137]†††
$ExternalCap_s * FinDev_{dt}$	0.351***	-0.228***	0.480***	-0.116
	[0.067]	[0.078]†††	[0.083]	[0.102]†††
Observations	121,147		115,986	

Notes: ***, **, and * on coefficients denote significance at the 1%, 5%, and 10% levels respectively. Analogously †††, ††, and † on GF standard errors denote whether sum of the two coefficients differs from zero at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the parentheses are clustered at country pair level. Regression controls for country pair-mode-year and sector-mode fixed effects.

Table 12: Summary Statistics

	Obs	Mean	Std. Dev.	Min	Max
MA_{ods}	387192	0.108	0.75	0	58
GF_{ods}	387192	0.158	1.203	0	127
GDP_o	387192	20.34	1.409	15.031	23.298
GDP_d	387192	20.005	1.514	15.031	23.298
Pop_o	387192	10.417	1.642	5.674	14.101
Pop_d	387192	10.482	1.529	5.674	14.101
$MktPotential_d$	387192	367.278	14.951	334.053	392.026
$TradeCost_{od}$	387192	123.937	57.955	0.228	536.361
$Distance_{od}$	387192	8.435	0.983	5.081	9.879
$Contiguity_{od}$	387192	0.066	0.249	0	1
$Language_{od}$	387192	0.179	0.383	0	1
$Colony_{od}$	387192	0.06	0.238	0	1
$Island_o$	387192	0.218	0.413	0	1
$Island_d$	387192	0.184	0.387	0	1
$Landlocked_o$	387192	0.073	0.26	0	1
$Landlock_d$	387192	0.077	0.267	0	1
$InvFreedom_d$	387192	60.477	19.349	0	95
$FinDev_o$	387192	4.244	0.724	0.013	6.190
$FinDev_d$	387192	3.996	0.848	-1.474	6.190
$Tech_o$	387192	5.465	0.825	2.94	6.53
$Tech_d$	387192	5.075	0.921	2.94	6.53
$Institution_o$	387192	1.618	1.361	-2.123	3.336
$Institution_d$	387192	0.944	1.694	-2.767	3.684
$CorpGov_o$	387192	1.606	1.479	-2.732	3.565
$CorpGov_d$	387192	1.067	1.58	-2.732	3.565
$BankCrisis_o$	387192	0.164	0.371	0	1
$BankCrisis_d$	387192	0.121	0.326	0	1
$CurrencyCrisis_o$	387192	0.101	0.301	0	1
$CurrencyCrisis_d$	387192	0.092	0.29	0	1
Tax_o	387192	-1.251	0.254	-2.079	-0.865
Tax_d	387192	-1.256	0.243	-2.303	-0.865
$ExternalCap_s$	121147	0.278	0.332	-0.155	1.14
$ContractInt_s$	135707	0.539	0.181	0.242	0.859
$IntangibleInt_s$	135707	0.116	0.075	0.03	0.27
RCA_o	129492	1.003	1.412	0	60.854
RCA_d	129492	1.039	1.19	0	37.824
$Tariff_d$	111963	12.389	19.672	0	698.262
$Cred_o$	115986	4.633	0.607	1.191	5.609
$Cred_d$	115986	4.077	0.867	0.068	5.609

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January 2017

WP 17/01

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Working paper series | 2017

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January 27, 2017

Preface

This paper sets out a possible approach to the international taxation of corporate profit: a destination-based cash flow tax (DBCFT). This option is one of a number that have been considered over the last three years by a group of economists and lawyers, chaired by Michael Devereux. The other current members of the group are Alan Auerbach, Michael Keen, Paul Oosterhuis, Wolfgang Schön and John Vella.

The group's intention is to produce a book which provides an extensive discussion of alternative ways in which jurisdictions might tax a share of the profit of multinational companies, including the existing system and well-known alternatives such as formulary apportionment. The book will analyse in detail two reform proposals, a DBCFT and a "residual profit allocation", which is based more closely on the existing framework for taxing multinational profit. Members of the group presented both of these ideas in public conferences at Oxford University in June 2016, and at the Tax Policy Center in Washington DC in July 2016, as well as at other events in Europe and the USA.

In June 2016, the Ways and Means Committee of the US House of Representatives published a Blueprint document "A Better Way for Tax Reform",[1] which proposes a version of a DBCFT. In the light of the public interest in this idea, the group has decided to publish this paper in advance of completing the book; in effect it is a draft of one chapter of the book. The intention of publishing this now is to help inform the public debate about the properties of a DBCFT, and to highlight and discuss issues that would arise in its implementation.

The paper shows that the DBCFT is equivalent in economic terms to a reform that introduces a broad-based, uniform rate VAT (or achieves the same effect through an existing VAT), and reduces taxes on payroll by the same proportion. Each of these two options has advantages and disadvantages in terms of implementation, which are set out and discussed in the paper.

The authors of this paper would like to thank several people who have contributed to their thinking about the DBCFT and other options, especially group members Paul

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[1] https://waysandmeans.house.gov/taxreform/

Executive Summary

This paper presents, analyses, and further develops the idea of a destination-based cash-flow tax (DBCFT). Its purpose is expositional: to describe the DBCFT, how it might work, what its effects would be and some of the challenges that its implementation would face.

The DBCFT has two basic components.

- The "cash flow" element gives immediate relief to all expenditure, including capital expenditure, and taxes revenues as they accrue.
- The "destination-based" element introduces border adjustments of the same form as under the value added tax (VAT): exports are untaxed, while imports are taxed.

This is equivalent in its economic impact to introducing a broad-based, uniform rate Value Added Tax (VAT) - or achieving the same effect through an existing VAT - and making a corresponding reduction in taxes on wages and salaries.

The paper evaluates the DBCFT against five criteria: economic efficiency, robustness to avoidance and evasion, ease of administration, fairness and stability. And it does so both for the case of universal adoption by all countries and the more plausible case of unilateral adoption.

In contrast with existing systems of taxing corporate profit, especially in an international environment, the DBCFT and VAT-based equivalent have significant attractions:

- A central motivation for the DBCFT is to improve economic efficiency by taxing business income in a relatively immobile location – that is, the location of final purchasers of goods and services (the "destination"). The DBCFT should not distort either the scale or the location of business investment and eliminates the tax bias towards debt finance by assuring neutral treatment of debt and equity as sources of finance.

- Taxing business income in the place of destination also has the considerable advantage that the DBCFT is also robust against avoidance through inter-company

transactions. Common means of tax avoidance – including the use of inter-company debt, locating intangible property in low-tax jurisdictions and mispricing inter-company transactions - would not be successful in reducing tax liabilities under a DBCFT.

Here however the distinction between universal and unilateral adoption is important. With adoption by only a subset of countries, those not adopting are likely to find their profit shifting problems to be intensified: companies operating in high tax countries, for instance, which may seek to artificially over-price their imports, will face no countervailing tax when sourcing them by exporting from related companies in DBCFT countries.

- By the same token, the DBCFT provides long term stability since countries would broadly have an incentive to adopt it – either to gain a competitive advantage over countries with a conventional origin-based tax, or to avoid a competitive disadvantage relative to countries that had already implemented a DBCFT. It would also be resistant to tax competition in tax rates.

In terms of its distributional impact, given the equivalence between a DBCFT and a VAT combined with a labour tax cut, the incidence of the tax would be on domestic residents financing consumption other than from wages, including from profit subject to the DBCFT. In that respect, the DBCFT would be more progressive than a single rate VAT, and possibly more so than existing corporate taxes (the burden of which may fall largely on labour). If desired, it would be possible to maintain a tax on the return to capital at the personal level, though the paper does not elaborate on this.

Fairness between countries is harder to assess, but – combined with taxes on natural resources – some very preliminary evidence suggests that few countries would be likely to see a reduction in their tax base as a result of border adjustment in itself.

The paper looks closely at the application of DBCFT treatment to the financial sector, which is a familiar problem under the VAT but has been little considered under the DBCFT. It compares two alternative approaches, based on the Meade Committee's 'R-base' (taxing only "real" flows) and its 'R+F' base (taxing "real and financial") flows. There are shown to be equivalent for transactions between taxed entities.

Administrative considerations suggest applying the R base to most companies, but also taxing financial flows between financial companies and tax exempt entities and individuals

The DBCFT raises a number of significant implementation issues - both administrative and legal - and requires substantial changes, both conceptually and in application, from current practice in corporate taxation. Neither of its two principal design features, a cash flow tax base and taxation on a destination basis, are commonplace amongst existing corporation taxes. Issues related to losses, familiar under the VAT, would be amplified. The paper sets out this and other core implementation issues, and how they might be addressed. It also compares the implementation of a DBCFT with the economically equivalent VAT-based approach, setting out the advantages and disadvantages of each.

One critical legal issue is that many have argued that the basic DBCFT, with an integrated relief for labour costs, is inconsistent with WTO rules. However, this is not true of the economically equivalent VAT-based approach, either on the usual invoice-credit basis, or on a subtraction method. It is also possible that the DBCFT would be considered to be within the ambit of bilateral income tax treaties, in which case it would clearly be inconsistent with several of the typical provisions of such treaties.

For any country, replacing a conventional corporate income tax by a DBCFT, or VAT-based equivalent, would be a major undertaking. This paper considers core issues of design and implementation, but the assessment of any proposal must evaluate its details, including in relation to possible accompanying measures. Deviations from the design principles set out in the paper could alter significantly the analysis it provides and the conclusions that it reaches. For any proposal, careful, country-specific assessment of design, implementation and probable effects, including those for other countries, will be essential.

Destination-Based Cash-Flow Taxation

This paper presents, analyses, and further develops the idea of a destination-based cash-flow tax (DBCFT).[2]

The DBCFT has several highly attractive properties: it does not distort the scale and location of investment, assures neutral treatment of debt and equity as sources of finance, is robust against avoidance through inter-company transactions, and provides long term stability due to its incentive compatibility and its resistance to tax competition amongst states. The DBCFT thus addresses many of the ailments afflicting current tax systems in both purely domestic and international settings.

On the other hand, the DBCFT raises a number of significant implementation issues - both administrative and legal - and requires substantial changes, both conceptually and in application, from current practice in corporate taxation. Neither of its two principal design features, a cash flow tax base and taxation on a destination basis, are commonplace amongst existing corporation taxes.[3]

The purpose of this paper is expositional: to describe the DBCFT, how it might work, what its effects would be and some of the challenges its implementation would face. To this end, the paper starts by outlining how a DBCFT would work, and elaborating on its key elements, including the nature and role of border tax adjustments. We show too that a tax reform with equivalent economic effects would be to introduce a broad-based, uniform rate Value Added Tax (VAT) - or achieve the same effect by raising the rate of an existing VAT - and making a corresponding reduction in taxes on wages and salaries. Section 2 then evaluates the DBCFT on the basis of five criteria: economic efficiency, robustness to avoidance and evasion, ease of administration, fairness and stability. In doing so we deal in turn with two cases: that in which all countries adopt a DBCFT (or VAT-based equivalent) and that in which adoption is unilateral. Section 3 then considers the treatment of financial flows, from both conceptual and practical perspectives. This is as an important issue that has not

[2] For earlier discussions of the DBCFT, see Bond and Devereux (2002), President's Advisory Panel on Federal Tax Reform (2005), Devereux and Birch Sorensen (2006), European Economic Advisory Group (2007), Auerbach, Devereux and Simpson (2010), Auerbach (2010), Devereux (2012) and Auerbach and Devereux (2015). See also Avi-Yonah and Clausing (2016) and Cui (2016).
[3] The only national-level cash flow tax of which we are aware is the Mexican IETU, which operated (as a minimum tax) between 2007 and 2014, apparently without major technical difficulty.

previously been considered in detail. Finally, Section 4 takes up a range of implementation issues, though the paper does not attempt a full treatment of all the issues that are likely to arise in practice (many of which are likely to be country-specific).

I. THE DBCFT IN OUTLINE

The DBCFT has two distinct attributes: a cash-flow tax base and a destination basis. A destination basis could be applied to a variety of tax bases, and arguments for cash-flow taxation originally arose in a purely domestic setting. But there are advantages to combining the destination basis and the cash-flow tax base. This section recalls the features of a cash flow tax operating in a single economy, explains what destination-basing would mean and what a DBCFT would look like, and shows its economic equivalence to the combination of a VAT and a reduction of taxes on labour by the same amount.

1.   Cash flow taxation

Cash flow taxation in a single economy has been studied at length.[4] As its name implies, a cash flow tax applies to net receipts arising in the business. Receipts are included in the tax base when payment is received and expenses are recognized when payment is paid.[5] The tax base in any given period is the former less the latter. The most significant difference in the timing of the inclusion of receipts and expenses in the base, compared to most existing corporate tax systems, is that under cash flow taxation even capital assets that are typically depreciated over time are immediately expensed (i.e. deducted in full upon purchase). There is therefore no need for complex depreciation rules that are typically found under current systems, and no need to differentiate between different types of assets. This also introduces a significant difference between the cash-flow tax base and measures of profit in financial statements.

In the terminology of the Meade Committee (1978), a cash-flow tax could be levied on a company on an R (real) base or an R+F (real plus financial) base. Under the R base, transactions involving financial assets and liabilities are ignored – so, for example, interest receipts would not be taxed and interest expenses would not be deductible.

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[4] The idea of the cash flow tax dates back to Brown (1948), and has since been the subject of an extensive literature that began with Kaldor (1955), Andrews (1974), US Treasury (1977), Meade (1978) and Graetz (1979). Readers familiar with properties of cash flow taxation in a closed economy can easily skip this subsection.

[5] More precisely, the tax would naturally be based on an accruals basis so that, for example, receipts are recorded when the obligation to pay is incurred, rather than when cash is actually received. The accruals basis would also apply to purchases, including of capital assets. Similar arrangements are common, of course, under the VAT.

The R base is thus limited to the difference between real inflows (from the sale of products, services and real assets) and real outflows (from the purchase of materials, products, services – including labour – and real assets). By contrast, under the R+F base, all cash inflows, including borrowing and the receipt of interest, would be taxable; all cash outflows, including lending, repaying borrowing and interest payments would be subtracted in calculating the tax base. That is, the tax would apply to all net financial inflows related to borrowing, including principal amounts, as well as to net real inflows.[6] The choice between an R and an R+F base is discussed in detail below.

The properties of the cash flow tax, conceived of as operating in a single economy, are well-known and so treated only briefly here. The starting point for understanding them is the usual assumption that an investor seeks to maximize the net present value (NPV) profit of an investment, measured as the sum of all discounted cash flows associated with it. The discounting effectively adjusts for interest that might otherwise have been earned during the intervening period. For instance, in the example below, assuming a discount rate of 10%, a cash flow of 110 in one year's time has a present value of 100. Since the discounting approach adjusts for a required rate of return on an investment, the NPV is a measure of the economic rent of an investment. In principle, it is worth undertaking any project with a NPV greater than zero; and it is not worth undertaking any project with a NPV less than zero. Any tax that falls only on economic rent (and has a rate between zero and 100%) has the property that the post-tax NPV of an investment has the same sign as the pre-tax NPV. In this case, any investment worth undertaking in the absence of tax remains worth undertaking in the presence of tax, and vice versa. Hence the investment decision is independent of a tax on economic rent.

The example in Box 1 shows that a cash flow tax can indeed be thought of as a tax on the NPV, or economic rent, of an investment. Intuitively, cash flow taxation is neutral because, in effect, the government contributes a proportion of all costs of the business (through giving tax relief for all costs when they are incurred), and takes the same proportion of all receipts. In effect, the government becomes a shareholder in the business. Like other cases in which the ownership of shares in a business changes, this in itself has no effect on the profitability of the business, or on marginal

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[6] The Meade committee discussed a third form: the 'S' base cash flow tax, levied on net distributions to shareholders. As a consequence of the identity between a firm's sources and uses of funds, an S-base tax is precisely equivalent to an R+F-based one, at least in a domestic context.

investment and financial decisions. By taxing all cash flows at the same rate, the government captures that same proportion of economic rent.[7]

Box 1. Neutrality of cash flow taxation in a single economy setting

Consider a two-period investment, with a cost of 100 in period 1, an interest rate of 10%, and a tax rate of 20%. Under a cash flow tax, there is a negative tax liability in period 1 of -20. In period 2 the investment makes a return. For an investment that just breaks even, the total value of the investment in period 2 must be 110: this represents a rate of return of 10%, equal to the discount rate. The total return of 110 generates a tax liability in period 2 of 22. In NPV terms, the NPV pre-tax and post-tax are both zero. That is, the economic rent before and after tax are both zero. The tax also has a NPV of zero; that is consistent with the tax only falling on economic rent.

Illustration of properties of a cash flow tax on investment incentives

	Pre-tax cash flows	Cash flow tax	Net cash flows
Period 1 outflows	100	-20	80
Marginal investment			
Period 2 inflows	110	22	88
NPV, at 10% discount rate	0	0	0
Rate of return earned	10%	-	10%
With economic rent			
Period 2 inflows	132	26.4	105.6
NPV, at 10% discount rate	20	4	16
Rate of return earned	32%	-	32%

In the lower part of the table, we assume instead that the investment generates a return of 32%, that is, it is worth 132 in period 2. Combined with the initial outlay of 100, that represents a net present value of 20.[8] Tax due in period 2 is 26.4, implying that the NPV of the tax is 4. That leaves a post-NPV of 16. Since both the pre-tax and post-tax NPVs are positive, the investment is attractive to the investor irrespective of the tax. Note also, that the NPV of the tax is equal to 20% of the pre-tax NPV of the investment; so the tax is effectively a tax on the economic rent of the investment. That is why it does not affect the investment decision. This also implies that the post-tax rate of return (a return of 105.6 on a net investment of 80) is also 32% - the same as the pre-tax rate of return.

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[7] Complications may arise in practice. For example, this simple characterisation assumes a symmetric tax system, in which the government collects tax when cash flows are positive, but effectively makes a tax rebate when cash flows are negative. The appropriate treatment of losses is discussed below in a number of different settings.

[8] The net present value of a cash flow arising in the next period is calculated by dividing the value of the cash flow by 1 plus the interest rate, expressed as a decimal. Thus, in this case, the NPV of 132 is 132/1.1=120.

The neutrality of cash flow taxation applies also to financial decision-making. Existing taxes on corporate profit generally treat debt and equity asymmetrically: the return on debt is generally deductible from the corporate tax base, whilst the return to equity is not. This favourable treatment of debt distorts the choice of financing between debt and equity financing, leading to leverage ratios that are higher than they would otherwise be.[9] This is a significant concern: socially excessive levels of debt, especially in the financial sector, are widely seen as having played a central role in triggering and deepening the financial crisis of 2008.

By contrast, cash flow taxes, either with an R or an R+F base, do not distort the choice between debt and equity. This is easily seen in the case of an R base, since all financial flows are simply ignored, be they associated with debt or equity. But the same applies to the R+F base. We return to this issue in more detail below.

However, there are caveats to this analysis. One is that cash flow taxes lose their neutrality if the tax rate is expected to change over time: a falling rate will encourage investment, for instance, since the cost is deducted at a higher rate than it is later taxed. Second, even cash flow taxes may distort the choice between mutually exclusive projects which face different tax rates; the classic case in which this is a factor is in location choices between countries, as we discuss below, but this could also occur in a purely domestic context. Third, the analysis is based on the assumption that a business will aim to maximize its value, summarized by the NPV. This may not necessarily be the case. One possibility, for example, is that managers with a short term horizon will seek to maximize current profit as recorded in financial statements; this is more likely, of course, if managers' own remuneration depends on current financial earnings. In some cases, this may not be consistent with maximizing the NPV of the business. At various points in the discussion below of the precise design of the DBCFT, we consider this possibility.

It should be noted too that cash flow taxation is not the only way to achieve neutrality in business taxation. The same economic effects can in principle be achieved by giving relief for the cost of depreciation of assets, instead of an immediate write-off, and in addition giving relief for the cost of finance. In the case of debt finance, this cost is

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[9]For a survey on the impact of the tax incentive to use debt, see Graham (2003). More recent evidence is provided by, amongst others, Devereux, Maffini and Xing (2016), Doidge and Dyck (2015), Heider and Ljungqvist (2015) and Keen and de Mooij (2015).

normally the interest payments that the business must make on its borrowing. For equity finance, it is an opportunity cost, reflecting the return that the shareholder has foregone on some alternative asset of equivalent risk. These financial costs can be seen as reflecting a minimum rate of return that the providers of finance require on their investments in the business. Naturally, then, giving relief for these costs implies that only economic rent – that is, profit over and above the minimum required rate of return – is subject to tax.

Comparing this approach to cash flow treatment, relief for the opportunity cost of finance can also be seen as compensating for the lack of immediate expensing in the system. Giving relief only for the depreciation of capital assets in effect defers tax relief on capital expenditure relative to a cash flow tax. Relief for the opportunity cost of capital compensates for this deferral. In fact, as the IFS Capital Taxes Group (1991) showed, it is possible for a tax to fall on economic rent with any schedule of depreciation allowances, as long as relief for the opportunity cost of capital is based on the difference between the initial cost of the asset and its tax-depreciated value. The IFS Capital Taxes Group proposed an "Allowance for Corporate Equity" (ACE) based on this principle, which would be a relief in addition to relief for the cost of interest payments.[10]

The approach using an ACE has the advantage of being more similar to existing corporation taxes, in that it simply adds one additional relief and leaves features like interest deductibility and capital allowances unaffected. It has the disadvantage of adding some complexity relative to the cash flow tax, since it requires the specification of a rate at which the allowance is applied, although this has been applied in practice in the context of ACE reliefs introduced in several countries,[11] and also in resource taxes.

2.   Destination basis

The international setting introduces the second dimension of the DBCFT, relating to how a country determines the component of a corporation's tax base falling within its

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[10] The equivalence of expensing and a rate of return allowance was first shown by Boadway and Bruce (1984). Kleinbard (2007) proposes a related form of cost of capital allowance. Bond and Devereux (1995, 2003) analyse the properties of various such rate of return allowances in the presence of risk.

[11] For example, in Austria, Belgium, Brazil, Croatia, and Italy. Experience with the ACE is reviewed in de Mooij (2011); see also Zangari (2014) and IMF (2016a).

particular jurisdiction. A DBCFT would be based on sales of goods and services in the country less expenses incurred in the country: so receipts from exports are not included in taxable revenues and imports are taxed.[12] This 'border adjustment' is essentially the same treatment as is common under VAT; we explore differences from and similarities with VAT below. In a sense, the DBCFT would tax inflows and outflows asymmetrically – since income from sales are subject to tax in the place of the sale (the "destination" country), while expenses, including for labour, receive tax relief where they are incurred (the "origin" country). It thus combines both destination and origin elements. We stick, however, with the established terminology, with the term "destination" – taken from the literature on VAT—highlighting the role of border adjustment on payments and receipts.

A simple example makes the workings of the DBCFT clear (Table 1). Suppose a company produces goods in country A, employing labour at a cost of 60 and with costs of 40 on other domestic purchases. It sells goods to domestic consumers in A for 150, and also has exports goods to country B of 150. It therefore has a total profit, in cash flow terms, of 200.

Table 1. Illustration of application of the DBCFT

	Country A	Country B	Total
Tax rate	*20%*	*30%*	
Labour costs	60	0	60
Other costs	40	0	40
Sales	150	150	300
DBCFT tax base	50	150	200
DBCFT charge	10	45	55
VAT tax base	110	150	260
VAT charge	22	45	67
Relief for labour costs	-12	0	-12
VAT + relief for labour costs	10	45	55

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[12] More precisely (and as discussed later): imports by businesses liable to a DBCFT could either be taxed, with a deduction then available, or untaxed but not deductible; imports by final consumers would simply be taxed.

The DBCFT tax base in country A is calculated as domestic sales of 150 less domestic cost of 100: a total of 50. The DBCFT tax base in B is simply the value of the imports into B: 150. If the tax rate in A is 20% and that in B is 30%, then the firm's tax liabilities are 10 in A and 45 in B.

The relevant "destination" for the calculation of tax, it should be emphasized, is the location of the immediate purchaser, not (necessarily) that of the final consumer. For example, if a US manufacturer sells steel to a French automobile producer which uses the steel to produce automobiles sold back to the United States, US application of the destination-based tax would not tax the sale of steel but would tax the automobile imports.

It is, however, the location of the final consumer upon which the impact of the DBCFT ultimately turns. Sales to other businesses effectively attract no tax under the DBCFT, either (if the sale is domestic) because they generate a deduction for the purchaser or (if exported) because they are untaxed. Thus the DBCFT, as will be seen more clearly below, is built on the intuition that taxing companies on the basis of something that is relatively immobile - which, by and large, we take consumers to be - limits the scope for the gaming that has caused such difficulties within the current international tax framework.

It should be noted too that other forms of rent tax, other than cash flow taxes, could also be destination-based. One could also implement border adjustments under an ACE, for example, though this would raise additional considerations. For instance, it will be seen below that one advantage of the cash flow approach to destination-basing is that tax frequently nets out to zero. An example is the taxation of an import of capital assets used by business, where under a cash flow tax, the tax on the import nets out with the tax relief for the cost of the input. In effect this means that the import can be ignored except to the extent that enforcement requires that they are not passed off as domestic purchases, which would receive relief on the grounds that tax had already been paid on the purchase from the domestic supplier. This is not true under the ACE, where the capital asset would initially receive only a depreciation allowance.

3. Equivalence between the DBCFT and a VAT with matching reduction in wage taxes

Before turning to an evaluation of the DBCFT, it is useful to compare the DBCFT with a VAT. In the example in Table 1 above, under the usual invoice–credit method, at a tax rate of 20%, the company would remit VAT on the value of the domestic sale (30) net of the VAT already paid on the non-labour input (8).[13] The total VAT payment by the company in A would thus be 22. The VAT due in B, where there are only sales,[14] would be the same as the DBCFT charge, 45.

The only difference in principle between the DBCFT and a VAT is in the treatment of labour costs. In B, where no wage costs are incurred, the liability is the same under the DBCFT as under the VAT. In A, the difference in the DBCFT base and the VAT base is the 60 of labour costs incurred in A. The DBCFT is intended to tax profit, and so gives relief for labour costs. The VAT is intended to tax value added; this is equivalent to the sum of profit and the amount paid to labour, and so VAT does not give relief for labour costs. It follows that introducing a VAT (or increasing its rate) – having in mind here an idealized VAT, levied at a single rate on a broad base[15] - and reducing labour income taxes at the same rate would have equivalent economic effects to those of the DBCFT. This is shown in the last two lines of the table: giving relief for labour costs in A reduces the tax in A by 12, and the combination of the VAT and relief for labour costs yields the same tax base as the DBCFT.

Below we discuss in some detail the two options of (a) implementing a DBCFT as a reform to corporation tax, and (b) an economically equivalent reform of introducing a VAT (or applying an increased rate to the generality of transactions under an existing VAT) combined with a matching reduction in taxes on wages and salaries.

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[13] The standard invoice-credit method of collecting VAT keeps track of VAT on every transaction. A VAT registered business remits tax on its sales less the VAT it has paid on its inputs. A subtraction-method VAT is more akin to a corporation tax - and the DBCFT - with annual accounting of the sales less non-labour costs made by the company. In the simple case in which there is a single VAT rate, these approaches result in the same tax base.

[14] Importation of the 150 from the entity in country A would be subject to VAT, but a credit of exactly the same amount would be available against the VAT due on sales.

[15] A qualification that, for brevity, we shall often omit below.

4. Border Adjustments[16]

A key element for understanding both the incentive effects of a DBCFT and the incidence of a DBCFT is the role played by border tax adjustment (BTA). By this is meant that exports would not be subject to the tax, but imports would be. The impact of BTA has been extensively studied in the literature on VAT, in analysing the effects of shifting from an origin-based system (export taxed, imports untaxed) to a destination-based system (exports untaxed, imports taxed); we draw on that literature here.

The adoption of border adjustments would appear initially to make a country more competitive in international trade. But any such effect is at most a temporary one.

To see this, consider first the case in which there is a single common currency, or a fixed exchange rate. Then consider a border adjustment by one country only; for the moment we consider only the impact of this border adjustment, abstracting from the other elements of the DBCFT. [17,18] Moving from an origin-based tax that included exports in the tax base, the border adjustment would make exports cheaper on the world market; this would create a stimulus to exports. By contrast, the domestic cost of imports would increase with the tax on imports; this would discourage imports. With a fixed exchange rate, and sticky wages, both effects would induce a stimulus to domestic activity. This corresponds to the well-known effect of such border adjustments having the same impact as a currency devaluation – that is, in making exports cheaper to non-domestic consumers, and imports more expensive for domestic consumers.[19] In the short run, this would generate a stimulus to domestic production relative to foreign production.

Over the longer run, however, we would expect prices to adjust. Expansion of domestic production would lead to an increase in the demand for labour. This would

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[16] See Auerbach and Holtz-Eakin (2016) for an elaboration of, and examples illustrating, the arguments in this subsection.

[17] As discussed below, alternatively consider the case of a switch from an origin-based cash flow tax to a destination-based cash flow tax; this would give the same effect, reducing the tax on exports, and increasing the tax on imports.

[18] The analysis here is in the context of the border adjustment taking place in a single country. If it happened in several countries at once, then the effects identified would be replicated in each country. The extent of price and/or exchange rate adjustments would depend on relative tax rates in the countries undertaking the reform.

[19] First pointed out by Keynes (1931).

in turn push up the wage rate, and in consequence, push up the price of domestically produced goods and services. The effect of this rise in prices and wages would be to begin to raise again the price of exports on the world market, and to raise the price of domestically-produced goods relative to imports. When domestic prices and wages had risen far enough, the initial real equilibrium will be re-established.[20] In this long run, there would be no overall impact on trade, due to the price adjustments.

If instead the country had a flexible exchange rate, the same real long-run effect would occur naturally – and much more quickly, quite possibly indeed immediately (with some effect in advance if the change is pre-announced) - through an appreciation of the exchange rate, which would raise the (domestic currency) price of exports in the world market and reduce the price of imports. This would not require adjustment to the nominal price level in the domestic country.[21] In effect, the initial fiscal devaluation would immediately be offset by an appreciation of the currency – i.e. a revaluation; these two effects would cancel out, leaving trade unaffected.

The nature of the adjustment — as between changes in domestic prices and wages, in the nominal exchange rate, and in the level of activity — will thus depend in practice on which of these can adjust more rapidly. There is, it may be helpful to note, an important difference here between the adoption of a DBCFT and the adoption of a VAT. Under the latter, consumer prices rise relative to wages, an effect that cannot be accomplished simply by a change in the nominal exchange rate; with wages sticky, the expectation is that the effect will come largely through an increase in consumer prices. The DBCFT, however, leaves that relative price unchanged, and so can be transmitted through the exchange rate.

The precise conditions under which - as a consequence of adjustment in the exchange rate and/or domestic prices - the shift from an origin to a destination basis will have no impact on the real equilibrium have been extensively studied in the VAT

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[20] See Auerbach and Devereux (2015).

[21] It is important to distinguish these effects of the DBCFT from its effects on the *levels* of wages, prices and exchange rates, even though the concepts are related. The impact on the general price level is a macroeconomic phenomenon related to monetary policy, exchange rate policy, the nature of bargaining in the labour market, and domestic price-setting behaviour, and in itself tells us relatively little about the effects of the tax.

literature.[22] And, since wages are deductible in both cases, these results apply directly to the comparison between a destination - and origin - based cash flow tax.

The conditions required for such an equivalence between a destination- and origin-based cash flow tax, it should be stressed, are demanding. One necessary condition is that a uniform tax rate applies to all sectors: without this, adjusting only the exchange rate or simply rescaling process by some common factor cannot re-establish the pre-reform pattern of relative prices. Equivalence is unlikely to hold, for instance, if there is a large untaxed sector, or significant variation in business tax rates across sectors, or in respect of real-world VATs for which rate differentiation is commonly extensive.[23] The wider political economy of taxation clearly plays a role here. Nor does the result hold with imperfect competition.[24] There is, however, little work on the quantitative extent to which plausible violations of uniformity are likely to cause departures from equivalence.

It should be noted too that whilst in the simplest models it is immaterial whether it is domestic prices or the nominal exchange rate that adjusts, this does matter for precisely who is affected by BTA. Nominal exchange rate changes will have balance sheet effects for non-residents with assets or liabilities (or contracts) denominated in the currency of the DBCFT-adopter for example, which is some cases would be significant; domestic prices changes do not. The incidence of the DBCFT is discussed more fully below.

Account also needs to be taken on the impact of Border Tax Adjustment (BTA) on revenue.[25] For countries running a trade deficit – imports exceeding exports – the shift to a destination basis will increase tax revenue. If trade is balanced in the long run, however, and the tax rate is expected to remain unchanged, the revenue impact in present value is zero, except to the extent of net imbalances prior to enactment. If consumers are sufficiently forward-looking to recognize this, there will then be no real impact from this revenue effect. More generally (and plausibly), however, there may

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[22] A comprehensive analysis is provided by Lockwood (2001), synthesizing a number of earlier contributions, including de Meza et al (1994) and Lockwood (1993).

[23] Feldstein and Krugman (1990) stress and explore the trade implications of departures from uniformity of the VAT.

[24] The implications of imperfect competition for the comparison between origin and destination principles for indirect taxation are considered in Keen and Lahiri (1998).

[25] Assuming other conditions for equivalence to be met, this revenue impact is essentially an income effect across national borders, and does not affect the economic efficiency of the outcome reached.

be an impact. Governments that are credit-constrained, for example, will not be indifferent to the timing of their tax revenues; and consumers may not be – though its nature is imponderable, depending, for instance, on the use made of the revenue and on consumers' preferences.

All these (and other) qualifications mean that the adjustment to the introduction of a DBCFT in practice may well not be as simple – even in the long run, and leaving aside potentially significant short-run effects – as some combination of a rescaling of domestic prices and appreciation of the nominal exchange rate. To the extent that this raises revenue, for instance, the impact will depend on what use is made of that additional revenue, on how interest rates react and on how consumers respond. It is important too to bear in mind that the discussion above has considered the introduction of a DBCFT in isolation, not in replacement of an existing corporate (or other) tax. That would of course bring additional considerations. For instance, moving to cash flow tax from a traditional corporate tax would be expected to ease disincentives to investment, creating a source of efficiency gain itself. Macro simulation methods can potentially provide more nuanced assessments of practical reform proposals, though of course subject to their own limitations. The key point, however, is that the considerations raised by the basics of BTA are likely to be of first order importance in assessing the impact of practical reforms.

One might hope to be able to draw on past experiences to gauge the likely impact of destination-basis taxation. But there is, unfortunately, very little empirical evidence on the effects of BTA (or of significant tax changes more generally) on exchange rates – largely because these are rarely fundamental enough, relative to all the other factors that buffet exchange rates, to create reasonable prospect of being found in the data. There are, however, signs of effects along the lines just described in the work of de Mooij and Keen (2013) on 'fiscal devaluations.' These are tax changes that combine an increase in VAT and a reduction in the employers' social contributions[26] on labour – which, recalling the discussion in Section I.3, is much the same thing as an increase in the rate of a DBCFT. This was advocated by some as a way to stimulate activity in the Eurozone, mimicking the effects of the devaluation that was unavailable to them, until offset by upward movements of prices and wages as described above. Looking at 30 OECD countries between 1965 and 2009, what emerges is that there is indeed a

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[26] The reason for focusing on the employers' contribution is that wage stickiness is most likely to apply to the wage net of those contributions, so that a cut translates immediately into reduced employment costs.

marked short-term boost to net exports within the Eurozone countries and period. Outside the Eurozone, however, there is no effect – suggesting that adjustment to what resembles close to a DBCFT comes very quickly when the exchange rate is allowed to react. Where the exchange rate is fixed, recent evidence that increases in the standard rate of VAT are fully passed on to consumers fairly quickly – in about 6 months[27]— suggest that it is rigidity in nominal wages that is most likely to account for extended adjustment periods.

There are two other respects, not addressed in these analyses, in which origin and destination taxation fundamentally differ. First, as set out below, a DBCFT should not affect the location of investment projects, whereas an origin-based cash flow tax generally would. Second, origin taxation, but not destination taxation, is vulnerable to transfer pricing abuse, since the prices charged on cross-border intermediate transactions affect overall tax liability.[28] Under origin taxation, the seller charges tax at the rate of the exporting country but the buyer then takes a deduction at the tax rate of the importing country; if the rate charged on sales exceeds that on purchase, there is an incentive in transactions between related parties to set an artificially low price, and conversely if it is less. Under destination taxation, in contrast, neither country charges tax on such sales. And so, as will be amplified later, BTA removes a wide range of avoidance possibilities.[29]

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[27] Benedek and others (2016).

[28] The point is stressed by Auerbach and Devereux (2015) in the context of cash flow taxation; see also Genser and Schulze (1997) in the VAT context.

[29] This is a major reason to prefer a DBCT over an origin-based cash flow tax even when the conditions of the standard equivalence results are met.

II. EVALUATING THE DBCFT

We evaluate the properties of the DBCFT in two settings. The first is that in which the DBCFT is adopted by all countries, although – importantly – not necessarily at the same rate. The second is that in which it is adopted by just one. Our main discussion relates to the former case. Considering the properties of the DBCFT if introduced in a single country, or small group of countries, is critical, however, for the issue of whether individual countries might find it in their own interest to adopt the DBCFT, or whether it could only be introduced by significant agreement between countries. This issue is also important for its stability; for example, is there an incentive for an individual country to introduce the DBCFT if other countries have already adopted it; or are countries that have already adopted it likely to undermine it through competition?

The evaluation is by five criteria: economic efficiency, robustness to avoidance and evasion, ease of administration, fairness and stability. The first four of these are common criteria for evaluating taxes. By stability we mean that there is an incentive for a country to adopt a system, whether or not other countries adopt it, and that there would also be no incentive for a country to compete with others by changing the basic system or by cutting the tax rate, each of which could impose costs on other countries and thereby undermine the overall international system. In a subsequent section we address issues of implementation in more detail, here we focus on economic principles.

1. Universal adoption

a. Economic efficiency

In principle, the DBCFT has remarkable properties in terms of economic efficiency. In particular, it should not distort the scale or location of investment, nor forms of financing choices. We discuss each in turn.

Location of investment

Whilst taxes on economic rent should not distort marginal investment decisions in a domestic setting, once we move to an international setting such taxes can distort

decisions on the location of investment if imposed on an origin basis – that is, broadly where the economic activity, or production defined very widely, takes place. This decision would be distorted, for example, if the states operating a tax on economic rents on an origin basis offer different tax rates. Faced with the decision where to locate their investment, the difference in tax rates may be so large as to induce companies to locate in the location which is less advantageous from a non-tax perspective. More generally, a difference in average tax rates on different mutually exclusive options may induce distortions, even if the tax base is economic rent.[30]

That distortion does not arise, however, if taxes on economic rent are levied on a destination basis. To see this, we have to consider the tax levied on the income generated from sales and the tax relief available for expenses. A key reason for choosing a destination basis is that consumers are relatively immobile; they are unlikely, except in some specific circumstances, to move in response to a higher rate of DBCFT. But it might be thought that there would be an advantage to locating expenses in a country with a high tax rate. By doing so firms would deduct expenses from profits which would otherwise be taxed at a high rate of tax (or, if in loss positions, they would receive relief at this high rate of tax). This is true – but the effect is negated by the impact of the border adjustments described above.

To see this, consider the example in Table 2. In Panel A, sales and costs in the two countries are as in Table 1, with the exchange rate between the two countries taken to be one-for-one. Initially, the two countries levy their DBCFTs at the same rate, 10 percent, which leaves the firm with after-tax profits of 180. From the point of view of the firm, the situation is just as if it operated in a single economy with a single DBCFT of 10 percent. This means, in particular, and just as discussed there, that the firm's investment (and financing) decisions are wholly unaffected by the presence of the two taxes.

Suppose now that country B raises the rate of its DBCFT to 25 percent. If nothing else changes, this, as seen in Panel B, increases the firms' total tax charge by 22.5 (15 percent of the base of 150 in country B), leaving it after-tax profits of 157.5.

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[30] This assumes that the rent at issue is not specific to a particular location. See Devereux and Griffith (1998) for empirical evidence on the role of effective average tax rates on location decisions, and Auerbach and Devereux (2015) for a theoretical analysis.

Table 2. Investment Neutrality of the DBCFT with universal adoption

Panel A

	Country A	Country B	Total
Tax rate	*10%*	*10%*	
Labour costs	60	0	60
Other costs	40	0	40
Sales	150	150	300
DBCFT tax base	50	150	200
DBCFT charge	5	15	20
Net profit	45	135	180

Panel B

	Country A	Country B	Total
Tax rate	*10%*	*25%*	
Labour costs	60	0	60
Other costs	40	0	40
Sales	150	150	300
DBCFT tax base	50	150	200
DBCFT charge	5	37.5	42.5
Net profit	45	112.5	157.5

Panel C

	Country A	Country B	Total
Tax rate	*10%*	*25%*	
Labour costs	0	60	60
Other costs	0	40	40
Sales	150	150	300
DBCFT tax base	150	50	200
DBCFT charge	15	12.5	27.5
Net profit	135	37.5	172.5

Panel D

	Country A	Country B	Total
Tax rate	*10%*	*25%*	
Labour costs	0	72	72
Other costs	0	48	48
Sales	150	180	330
DBCFT tax base	150	60	210
DBCFT charge	15	15	30
Net profit	135	45	180

Panel E

	Country A	Country B	Total
Tax rate	*10%*	*25%*	
Labour costs	60	0	60
Other costs	40	0	40
Sales	150	180	330
DBCFT tax base	50	180	230
DBCFT charge	5	45	50
Net profit	45	135	180

But, still assuming no other changes, the increased tax rate in B gives the firm an incentive to shift its production there from A to B, since that higher tax rate means a larger deduction for costs. As shown in Panel C, shifting production in this way reduces the firm's total tax liability, and so increases its after-tax profit, by 15 (the difference in tax rates, 15 percent, multiplied by production costs of 100).

If the tax rate change applied only to this firm, which was just one among many, that would be the end of the story. But if it applies to the generality of businesses, things will change, along the lines discussed in Section I.4 above. As the demand of residents of B for imports from A falls (and the demand of residents of A for exports from B rises) upward pressure emerges—as described above—on the value of B's currency[31] (or on wages and prices in B, if A and B have a fixed exchange rate). This has the effect, shown in Panel D, of increasing the value of profits earned in B expressed in A's currency, and rising by a factor (of 1.2 in this example)[32] that reflects the difference in tax rates. Profits in B, expressed in A's currency, rise to 60, which, after tax at 25 percent, exactly restores after-tax profits to the level they had before the tax change and when all production was in A. Moreover, as shown in Panel E, the rise in B's prices also eliminates the firm's incentive to shift production to B, as maintaining production in A also results in after tax profits of 180, rather than the 157.5 shown in Panel C.

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[31] One can also think of the incipient capital inflow into B described in the previous paragraph and the incipient net export surplus of B described here as implying an excess demand for B's currency in the foreign exchange market that is eliminated by a nominal appreciation of B's currency.

[32] Denoting the tax rate in country *i* by T_i, the adjustment required is $(1 - T_A)/(1 - T_B)$, which is n this example is $(1 - 0.1)/(1 - 0.25) = 1.2$. Note that this adjustment does not depend on the firm's costs, sales or any other characteristics—and hence offsets the tax change for all firms. What is required for neutrality, however, is that the same rate apply to all firms in either country.

The idea that prices and/or the exchange rate will adjust so as to exactly neutralize differences in rates of DBCFT across countries, it should be stressed, is not fanciful or arbitrary. The point, as is clear from the earlier discussion of BTA, is that if the initial situation is an equilibrium – firms and consumers all content with whatever it is they are doing – then so is that in which prices and/or the exchange rate have adjusted as described. Indeed unless there are some other equilibria, the adjustment must be of exactly this form.

If the exchange rate is fixed or managed, however, or if wages or prices are sticky, this adjustment may not come about instantaneously. Without the equilibrating appreciation of B's current or increase in prices and wages, B's exports will be cheap abroad and its imports expensive at home. Its net exports, and the level of activity, will therefore tend to rise. As the pressures on wages and prices this creates build up, however, the effect would be expected to be temporary.

Scale of investment

That the level of investment is also undistorted when all countries apply a DBCFT, at whatever rate, follows from the arguments just given. We have just seen that the presence of a DBCFT in country B, at whatever rate, left the firm's after-tax profit exactly as it was when it faced a 10 percent DBCFT everywhere. But when it faces such a tax, then, by the general property of cash flow taxation shown in Box 1, its investment decision is entirely undistorted.

Form of financing

Under an R-based cash flow tax, whether origin- or destination-based, financial flows simply do not enter the tax calculation and so are evidently left undistorted. The same is true under an R+F base, given price and/or exchange rates of the kind analysed above.

b. Robustness to avoidance and evasion

No tax system is perfectly robust to avoidance and evasion. However, when adopted universally the DBCFT closes the most significant avoidance channels found under existing tax systems: it simply does away, in particular, with many of the problems

currently besetting the taxation of multinationals, cutting through the swathe of issues taken on in the G20-OECD project on Base Erosion and Profit Shifting (BEPS).

When adopted in all countries, the DBCFT eliminates the shifting of profits to low-tax countries through the three most important current channels: lending from a low-tax country to a high-tax country, locating intangible assets that earn a royalty or license payment in a low tax country, and manipulating transfer prices.

The most straightforward of these to explain is debt shifting. Under an R-based cash flow tax, there is no tax relief for interest payments and there is no tax on interest received. So the debt-shifting channel simply would not exist. Lending among affiliates of a multinational located in different countries would simply have no tax consequences. As we set out below, this channel would not exist under the R+F base either.

Profit shifting through the manipulation of intra-group prices is also precluded by the DBCFT. To see this, consider the effect of a sale of a good by company A to another member of the same multinational group, company B, with the two companies located in different countries. Under current arrangements, A pays tax on the sale of the good to B, but B receives tax relief on the purchase of the good as an input into its own activity. If A's country has a higher tax rate, then there is an incentive to understate the true price of the good; B's tax relief on the purchase of the good will then exceed the tax levied on A's sale. If A's country has a lower tax rate, then the incentive is reversed; overall tax is lowered if the price is overstated.

But under a DBCFT, A faces no domestic tax on its export. B does face a tax on its import,[33] but as an input into whatever activity B is undertaking the cost of the good will also be deducted from B's tax base. These two effects exactly cancel out, making the value of the import irrelevant for tax purposes.

An alternative approach to implementing this treatment of imports, as discussed in Auerbach (2010) and further below, would be simply to exclude imports by taxable businesses from the tax base altogether – so that for them there is neither a tax on

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[33] There is a need to define what is an import. The key issue here is that all goods sold domestically should be subject to the tax. Broadly, in this case, an "import" would be a good or service sold by an entity not subject to the domestic DBCFT (and also not a domestic entity excluded from it by virtue of size, as we discuss below in the context of the scope of the tax).

imports,[34] nor a deduction for the cost of the imported good. In this case, the transaction between A and B is entirely free of tax. Under this alternative approach, it is particularly easy to see how the destination basis eliminates certain tax avoidance opportunities based on mispricing of within-group cross-border transactions. Because cross-border transactions would simply no longer affect the tax base for either of the parties to the transaction, a company cannot influence its domestic tax liability by misstating revenues or expenses associated with cross-border transactions.

Table 3 illustrates this key point that – given universal adoption of a DBCFT, albeit at different rates in different countries - understating or overstating intra-group prices makes no difference to the overall tax liability under the DBCFT. The company imports the good from an affiliate in the same multinational group, and then sells it to a domestic third party – for example, a final consumer or an unrelated party - for a price of 120. Both countries operate a DBCFT, and so there is no tax on the export in the exporting country. The tax in the importing country - assumed to be at 25% - can be thought of in two ways, as described above. In column (a) the import is taxed, and the cost of the import set against the tax charge on the sale to the final consumer. In column (b), the import is ignored for both purposes.

Suppose that the price at which the good is imported is 100. Then under method (a), there is a tax charge on the import of 25. In addition, there is a tax charge on the profit of the importing company at 25% of sales less imports - a tax liability of 5. Total tax is therefore 30. Under method (b), the import is simply ignored, and there is a tax charge on the total value of the sale to the domestic consumer, which also generates a total tax liability of 30. This shows the irrelevance of the import price of the import for the total tax charge. Even if the price were set to zero, or 120, the total tax charge would remain 30.

The netting out of business-to-business transactions also makes the DBCFT robust to avoidance strategies used in the context of formulary apportionment systems which are based on the destination of sales.[35] Under a formulary apportionment system, a highly profitable company could sell its products in a fully arms-length transaction to a much less profitable retail company in a low-tax jurisdiction. As a result, only the low rate of tax would be applied to the company's high profits. The retail company could

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[34] Imports by final consumers would remain taxable.
[35] By this is meant a system under which the consolidated profits of a multinational are allocated for taxation across jurisdictions according to the share of each in its total sales.

sell on the goods into a high tax jurisdiction and face tax at a higher rate, but this would only apply to its relatively low profit. The overall tax liability may then be considerably lower than if the original company had sold directly into the high tax jurisdiction. This would not happen under a DBCFT. In that case, the full value of imports into the final country of destination would be subject to tax in that country.

Table 3. DBCFT liabilities in importing country, with different prices for imports

	Price	Tax liability: Method (a)	Tax liability: method (b)
Import	100	25	0
Sale to domestic consumer	120	5	30
Total tax liability	-	*30*	*30*
Import	0	0	0
Sale to domestic consumer	120	30	30
Total tax liability	-	*30*	*30*
Import	120	30	0
Sale to domestic consumer	120	0	30
Total tax liability	-	*30*	*30*

A third common strategy for profit shifting under the existing system is to place highly valuable intangibles in low tax jurisdictions. Other companies within the multinational group that are located in high tax countries may then pay royalties or license fees to the company that owned the intangible asset in return for their use. These payments receive tax relief at the high rate of tax and are liable to tax on the receipt at the low rate of tax. Again, this would not happen under a DBCFT.

The reason is the same as that given above. The purchase or sale of the right to make use of the intangible asset would naturally be treated in the same way as the purchase or sale of a good. This is, then, an import into a destination country, and as such, would be liable to tax in that country. If A (located in a high tax jurisdiction)

acquires a license from B (located in a tax haven) to use its IP, this would give rise to a tax liability in the high tax jurisdiction. But the tax paid on that import would be deductible as a cost for A. Just as above, these two elements would exactly balance out. An alternative arrangement, as with other imports by taxed businesses, would be simply to disregard the import and the payment for it. In any case, since there are no real tax consequences of the transaction, the incentive to locate intangible assets in a low tax country would disappear under the DBCFT.

Finally, note that the DBCFT puts considerably less pressure on the notion of corporate residence than does the existing system, though at the cost of introducing a different notion of nexus than exists in current tax treaties. The tax base is essentially domestic sales less domestic expenses. There is no requirement for corporate residence to identify either sales or expenses. Sales are taxed in the country of the consumer, irrespective of corporate residence. And expenses are allowed in the country in which they are incurred, also irrespective of corporate residence.

The DBCFT is not perfectly robust to avoidance and evasion. Indeed, certain forms of evasion commonly found in the VAT sphere, such as fraudulently disguising domestic sales as exports, can be expected. However, if adopted in all countries the DBCFT is robust to the most significant and widespread avoidance mechanisms including locating intangible assets in tax havens, transfer pricing abuse and shifting profit through the use of debt. Their elimination is a major strength of the DBCFT.

c. Ease of Administration

We examine issues of implementation in detail in Section IV below. Here we simply outline the main specific features that differentiate the DBCFT – since the DBCFT eliminates the need for swathes of complex legislation which burdens the current tax system and increases compliance costs on taxpayers and revenue authorities alike.

Under the R-based cash flow tax, since debt and equity are treated in a neutral fashion, there is also no need for complex rules that police the border between the two. Further, due to the immediate expensing of all asset purchases under a cash-flow tax no rules are required to distinguish between assets that are expensed and those that are capitalized. It follows that there is also no need for complex depreciation schedules or to keep track of individual assets and their bases.

The destination basis also brings extensive simplifying benefits. It eliminates the need for some of the most significant, yet complex and lengthy, extant anti-avoidance rules. These include including exit taxes, transfer pricing, Controlled Foreign Company, thin capitalisation and anti-inversion rules. These rules require constant updating to meet new planning strategies and their application is notoriously costly and burdensome. Their elimination thus provides significant benefits of simplification to both governments and businesses.

On the other hand, the DBCFT does raise some significant administrative challenges which are new to corporation taxes, but well known in VAT. One is the need to distinguish between real and financial flows; this is addressed in Section III. Others include the challenges posed by negative liabilities and the need to levy a tax in the place of sale, a particularly difficult problem for services and digital products; these are addressed in Section IV.

d. Fairness

What ultimately matters for the fairness of any tax system, of course, is how it affects people; and corporations are not, in other than a legal sense, people. But how we tax corporations does have implications for the fairness with which the tax burden is shared, both within and across countries. This section looks at the DBCFT in this light, and at the particular question of the suitability, or not, of the DBCFT for developing countries.

Incidence of the DBCFT

The effective incidence of the DBCFT – who bears the burden of this tax – can be most easily understood by recalling from Section I.3 that the DBCFT is equivalent to a VAT plus a matching deduction for wages and salaries. The incidence of the DBCFT will thus be the same as that of a tax on domestic consumption net of a subsidy, at the same rate, to domestic wages or, equivalently, a tax on domestic consumption financed by resources *other than* wage and salary income. These resources will have three components.

First, in transition they will include returns to previous investments. Second, on an ongoing basis and in present value terms, rents: the return on investments in excess of that needed to cover the normal return to capital. But the precise identity of who bears this element of the tax depends on the nature of the exchange rate or price adjustment, discussed earlier.

Third, in the context of a country with a fixed exchange rate, introducing a DBCFT would tend to push up prices and wages. So the tax would be borne by any domestic consumption financed from income or resources other than wages and salaries, including domestic residents holding shares in companies subject to the DBCFT. This could also include individuals (typically the more elderly) consuming from their wealth, earning a minimum wage or in receipt of government transfer payments, such as pensions. Neutralizing some of the possible adverse distributional effects may require indexing such payments, and any minimum wage, to consumer prices.

But by contrast, in a country with a flexible exchange rate, nominal domestic prices would be unaffected; their value would change relative to world prices through an appreciation of the exchange rate. In this case, we would expect only domestic residents owning firms subject to the DBCFT and those holding assets denominated in the foreign currency to bear any tax burden;[36] those consuming from wage income would again be unaffected. Note, though, that there are other valuation effects of adopting the DBCFT (rather than simply raising the tax rate under the DBCFT, as in Table 2) that must be taken into account. In particular, a move to immediate expensing of domestic investment lowers the value of existing capital relative to new capital, and a shift away from taxing foreign source income may raise the value of offshore assets.

A tax on consumption not financed by labour earnings would be expected to fall on the affected consumers, except to the extent that these consumers respond to the imposition of the tax. In general, these consumers may seek to avoid a tax on their consumption from non-labour income by changing their behaviour.[37] For the DBCFT, however, some of the channels of response normally associated with corporate taxation would be absent. In particular, because the cash-flow tax base excludes the

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[36] Non-residents holding assets denominated in the currency of the DBCFT country, on the other hand, would receive a benefit. And of course changes in the exchange rates may have other effects through contracts or pricing specified in its currency.

[37] If their demand for consumption goods is inelastic, then standard incidence analysis would conclude that these consumers bear the entire tax burden.

normal return to saving, there would be no incentive to save less;[38] and, because of the destination basis used for the cash-flow tax base, there would be no incentive for capital or business activity to move to other jurisdictions, as already discussed.

One possible shift away from taxation that remains under the DBCFT would be through cross-border shopping, if other nearby or accessible jurisdictions impose tax at a zero or lower rate.[39] With few exceptions, however, significant cross-border shopping has tended to be confined to excisable goods: in response to general differences in rates of VAT, in particular, it has tended to be modest. (The treatment of remote purchases is discussed later). If demand is reduced, we would expect some of the tax to be borne on the supply side, for example by factors entering the production process, regardless of their location, such as the intangible assets a company owns.[40]

This analysis indicates an important point regarding the incidence of the DBCFT: it would likely be considerably more progressive than a broad-based VAT, which falls on the generality of consumers.[41] The comparison with a conventional corporate tax is more complex. On this it is important to remember that the latter is at least to some extent passed on in higher prices to consumers and in lower wages to workers. Replacing a conventional corporate tax by the DBCFT would remove the normal return to capital from tax[42] Though we do not discuss here the issues that this raises, a tax on the normal return to capital could, if so desired, be levied at personal level.[43]

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[38] Unless of course such a tax was levied at personal level.

[39] This depends on how the place of the sale is defined. In principle, we are searching for the least mobile tax base – which is probably the normal place of residence of the consumer, rather than the place of purchase. This would imply that a consumer that shops abroad would still be taxed at her domestic tax rate. But in practice this is unlikely to be feasible, certainly in all circumstances. See the discussion in Devereux and de la Feria (2014).

[40] An alternative approach to understanding the incidence of the DBCFT is to start with an origin-based cash-flow tax, which would impose a tax on the cash flows of firms' domestic operations. In general, such a tax would fall on the owners of the business. The border adjustment included in the DBCFT would in effect convert the tax base from a tax on the cash flows received by owners of domestic firms to a tax on the cash flows received by domestic owners of firms worldwide. See Auerbach and Devereux (2015).

[41] VATs in practice of course often include reduced rates on some items precisely in order to improve their progressivity. As is widely recognized, however, this is an extremely inefficient way in which to pursue distributional objectives, especially in advanced economies that have quite finely targeted income support measures available to them. The implication is that distributional impact can be improved by moving to a single rate VAT while strengthening income support (Crawford and others (2010)).

[42] The same would be true of any form of rent taxation.

[43] This is the approach, for instance, of the Business Enterprise Income Tax proposed by Kleinbard (2007), which combines a rent tax at corporate level with a tax on the normal return at the personal level.

Inter-nation equity

Taxing sales on a destination basis but giving relief for expenses on a source basis can produce an allocation of profits amongst states which might be considered to be inequitable. If a company produces goods in country A and exports to country B, then, under a DBCFT, A would not receive any tax on the company's profits. A system under which a government which potentially contributes significantly to the success of business operations by providing infrastructure, legal protection and other goods and services, but receives no tax revenue – while governments that contributed nothing happily pick up a cheque - might be considered to be unfair, or at least inappropriate, violating a view of taxation as in part payment for the benefits provided by governments.

Note, however, that current taxes on business profit do not satisfy the prescriptions of the benefit principle either, as they can result in high taxation for companies which derive very little value from publicly provided goods and services and no taxation for companies which derive a great value. In other words, there is no necessary connection between benefits derived and taxes paid. Concern for the benefit principle would thus be better addressed through the adoption of fees based on a businesses' footprint in a particular state. Such fees could be introduced alongside a DBCFT by states so wishing to do, although, of course, this could affect the attractiveness of the country as a location for investment.

Furthermore, this issue should be viewed at a state rather than at an individual company level. Under a DBCFT there will certainly be instances in which little or no tax is collected by states from businesses which export a high percentage of their products or services. However, such states will also tax the profits of businesses which incurred their production costs in a different jurisdiction. Viewed at a state level, then zero-rating of exports and taxation of imports would net out in the aggregate tax base to the extent that there was a balance of trade, with exports equal to imports. Of course, net exporting states would find themselves on the wrong side of this balance. However, two factors militate against the conclusion that the DBCFT would not be right for such countries. First, net trade positions change over time, albeit extremely slowly in some cases, and net exporting states might find themselves closer to a balance of trade or even net importers in years to come. Second, states which seek to tax on a source basis because of the benefit principle might in time find themselves

simply unable to do so. Competitive forces will continue driving down corporate tax rates under the current system and businesses will respond by moving their real activity.

More generally, apart from the shift to a destination basis, there would be several effects on the revenue generated from the DBCFT, relative to the revenue generated from the conventional tax. First, as noted above, the DBCFT should make it considerably harder to shift profits to low tax jurisdiction. Second, the pressure to have a low rate of tax in order to compete with neighbouring countries disappears when all adopt a DBCFT, since, as seen above, location decisions by business should be independent of the rates at which each levies its DBCFT. Each country could therefore raise its tax rate without fearing an exodus of either real economic activity or taxable profit. On the other hand, moving to a cash flow tax might reduce the tax base relative to a conventional tax, since the cash flow tax provides immediate expensing rather than traditional depreciation deductions; in the other direction, the conventional tax allows interest payments to be deducted, while the DBCFT would not. The net impact of these two offsetting effects on the tax base is unclear, and would depend on the initial circumstances in a particular country with respect to the generosity of existing depreciation schedules and the extent of leverage in corporate capital structure. While one cannot say for certain that these offsetting changes in the tax base, combined with less profit shifting, would lead to an overall broadening of the tax base, the opportunity to increase the tax rate without concern about cross-border shifting at least offers the possibility of recovering any revenue lost if these effects reduce the tax base.[44]

Distinct considerations may well apply to natural resources. These are often largely exported, a major source of government revenue, and perceived as a national asset. Governments of resource-rich countries are unlikely to be content to receive, as they would under a DBCFT, no revenue from their exploitation – and even finding

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[44] Patel and McClelland (2017) examine some of the revenue consequences of introducing a DBCFT in the US, on the assumption of unchanged behaviour of businesses. They find that, over the period 2004-13, if the US had an origin-based cash low tax in place, the total tax base would have been almost the same as under the actual tax system in place at the time. Also the number of firms with tax losses, both unweighted and weighted by assets, would have been almost identical to the actual tax system. Because the US had a trade deficit during this period, moving from this to a destination-based cash flow tax would have significantly increased the aggregate US tax base. The proportion of firms with tax losses would again have been barely unchanged on an unweighted basis, but would have been higher weighted by assets, reflecting the fact that firms that participate in cross-border transactions tend to be larger.

themselves paying large amounts to foreign extractive firms. Moreover, while the DBCFT looks to the immobility of consumers, this is a case in which there is an immobility of the underlying asset – giving rise to rents that are specific to their location – that can be exploited. There are thus powerful forces pointing to the retention of some element of origin-based taxation of natural resources as both a political reality and a potentially efficient form of taxation.[45]

Developing countries

Business tax reform is a high stakes game for developing countries – perhaps even more so than for advanced countries. They are in many cases heavily reliant on tax revenues from the extractive industries, derive a larger proportion of their total revenue from non-resource corporate taxes than do higher income countries, and have fewer realistic alternative sources of revenue. All this makes it important to consider the case for movement towards a DBCFT especially closely for them. There are four main issues.

The first is the treatment of natural resources. As argued above, there is a strong case to retain origin-based taxes on these. Thus the impact of the DBCFT on developing countries should thus be considered once revenue from natural resources is carved out.

The second is the impact on the tax base. Broadly, moving from a traditional source-based corporate tax to a DBCFT means – assuming no change in behaviour - losing revenue to the extent that exports exceed imports, and to the extent that the source-based tax is levied on the normal return to capital.[46] The likely extent of the latter, however, is hard to assess. While one could argue that this could in any event be recouped, at least in relation to domestic owners, by levying the tax at a personal level, experience on the taxation of capital income in low income countries is not encouraging.

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[45] Efficiency would call for some form of resource rent taxation, though administrative considerations may imply balancing this with royalties (charges on the volume or, more commonly, the value of output) which, though more distortionary, may be less vulnerable to avoidance through the manipulation of costs: see Boadway and Keen (2010). Similar considerations would apply to other cases in which there are location specific rents that derive largely from exportation.

[46] There could also be some loss from the removal of withholding taxes on payments to nonresidents, to the extent that these are not already undermined by treaty shopping.

To consider the likely direction of effect through the trade balance, suppose a country currently has both a tax on natural resources and a conventional corporation tax, which applies both to natural resources and all other activities. Now suppose that the country continues to tax its natural resources at the same level – including *both* existing sources of taxation. But for non-resources, it border adjusts its corporate tax. Then, in aggregate, and abstracting from other factors affecting the tax base, the country would see a rise in its taxable income if all imports exceeded exports from the non-resource sector. We are able to analyse the position of a large number of countries using data on balance of payments statistics from UNCTAD, with information on exports of natural resources from UNComtrade. We can identify 17 countries out of 181 analysed for whom, over the period 1996-2014, exports excluding natural resources exceeded imports. These include Japan, China, Germany, Switzerland and Sweden. Only one low income country (Nepal) and four lower middle income countries (East Timor, Uzbekistan, Bangladesh and Philippines) are included in this list. If these countries continued to have such an imbalance of trade then moving to a destination basis would tend to reduce their corporate tax base. But the overall effect on their revenue would also be affected by the other factors described above. However, for all other countries, if they maintained similar taxes on their natural resources, then these calculations suggest that moving to a DBCFT for non-resource trade would tend to increase their tax base.

A third consideration that is common to all countries but applies with particular force to many developing countries is non-compliance. The existence of an untaxed sector means that the equivalence results set out earlier clearly do not apply – so these may be further off the mark for developing than for advanced countries. More to the immediate point, if (as seems plausible) the untaxed sector viewed on its own tends to have a trade deficit – importing more than it exports - then the view of the likely revenue impact set out in the previous paragraph will be over-optimistic. There is cause for more optimism, perhaps, on the impact of movement towards the DBCFT on compliance: all else equal, remission of the tax on the normal return would make entrance into the corporate tax more attractive, while the wage deduction should also make the DBCFT more attractive to comply with than the VAT.

A fourth consideration is the greater weakness of tax administrations in developing countries. Here the heightened need to refund losses is a major concern. This remains a major issue under the VAT, and - in whichever form adopted - would be amplified

under a DBCFT or the equivalent VAT cum payroll subsidy. Cross-crediting is more difficult in such countries, both because of the administrative challenges this implies and because there are fewer taxes against which credit might be taken: there are commonly no payroll contributions and only modest personal income taxes. Corruption and fraud are obvious concerns in the processing of refund claims (indeed credits more generally). But the greater difficulty with VAT refunds has commonly been not too many, but too few, as administrations either adopt strong safeguards or lack access to the funds to pay them.

Against all this, however, one must weigh the weaknesses of current international tax arrangements. These, in many respects, have not served developing countries well: the evidence is that, relative to their total revenues, they lose more from BEPS-type avoidance than do advanced economies.[47] And they are exposed too to the rigours of aggressive international tax competition. The gains from escaping those (except in relation to natural resources) could, over the long haul, outweigh quite considerable shorter-term difficulties.

e. Stability

The existing tax system for taxing profit and alternatives such as a residence-based tax on the parent company and a multi-factor formulary apportionment system are or would be destabilized by competitive forces which drive countries to cut their tax rates. We have seen, however, that the DBCFT would not be subject to competitive forces of this kind, since reducing the tax rate of a DBCFT would not help attract inward investment, headquartering or business activity, nor would it be necessary to combat tax avoidance. States can thus set their DBCFT rates in accordance with their own preferences, without concern about the rates set by other states. By neutralizing these competitive forces, the DBCFT would provide long term stability in the tax system; this is one of its principle merits.

2. Unilateral adoption

So far we have considered the properties of the DBCFT if it were introduced in all countries, possibly at different rates. But of course, it is very unlikely to be introduced

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[47] See, for example, Crivelli and others (2016).

by general agreement in many countries. An important issue is therefore what the properties of the DBCFT would be if it were introduced in only one country, or a small group of countries. For considerations of stability, we are interested both in the effects on countries which introduce it, and on those that do not. In particular, we are interested in the incentives of the first group as to whether to continue to use a DBCFT, and in the spillover effects on those that do not, including their incentive to respond by adopting a similar system – and including, for both, the implications for likely extent and nature of tax competition. We address the same five criteria as in the previous section.

a. Economic efficiency

A DBCFT adopted unilaterally by one country would have the same efficiency properties in terms of scale of investment in that country, as a DBCFT adopted universally. For the case of purely domestic activity, or equivalently, for an origin – based cash flow tax, this is demonstrated by the example in Table 1. Adding border adjustments where some of the cash flows associated with the investment represent either imports or exports does not affect this neutrality property. Consider for example, the case in which a domestic firm exports, and thus does not pay tax on its sales. In this case, the exchange rate appreciation arising from the introduction of the border adjustment offset the benefit of the zero-rating of exports. This leaves the scale of any investment decision in the country unaffected by the domestic DBCFT (although it might in principle be affected by taxes levied on the export by the importing country). The DBCFT is also neutral with respect to borrowing from domestic sources, as we discuss in detail below. We discuss the incentive to shift borrowing among countries to the section on the taxation of financial flows below.

However, location of investment decisions would be distorted. Suppose country A used a DBCFT but other countries maintained an origin-based corporation tax. Then, in effect, A would not levy tax on the returns to economic activity taking place in A – apart from economic activity in the form of sales. This clearly would create an incentive for companies to locate economic activities such as manufacturing in A, no matter how low the origin-based tax in country B. Note however, that the advantage of locating such activity in a DBCFT jurisdiction would not vary with the rate at which it is charged. This is because, as we argued above, relief for costs incurred on that economic activity would be offset by a rise in relative prices, so the net impact of the

DBCFT would be tantamount to reducing its origin-based tax on corporate income to zero. And this would be true whatever the tax rate in the DBCFT jurisdiction.

In effect, replacing an origin-based tax on profit with a DBCFT could be seen as an aggressive move in the existing tax competition game. Origin-based taxes on corporate income would continue in other countries, giving companies an incentive to locate, or relocate, their activities to country A. This would be true irrespective of the market in which the product was destined to be sold.

b. *Robustness to avoidance and evasion*

The unilateral adoption of a DBCFT would leave existing avoidance opportunities in place; however, they would operate to the detriment of the rest of the world, not that of the adopting country. Consider, for example, incentives for transfer mispricing. In the previous section, we argued that if two countries adopt the DBCFT, a company could not shift profits from one to the other by mispricing intra-group transactions. But what would happen if country A adopted a DBCFT, but country B maintained the existing source-tax based tax?

As we have seen above, cross-border intra-group transactions would not appear in the tax base in country A. Exports would be excluded from the tax base. Imports could be treated in two ways: they could be taxed, but with this tax then exactly netting against the relief for the cost of the input; or they could be just ignored. In either case there would be no tax consequences in country A. But the declared prices used for intra-group cross-border transactions would still affect the tax base in country B. If the company was exporting from B, there would be an incentive to under-price the export. If the company was importing to B, there would be an incentive to overprice the import. This incentive arises independently of the tax rates in A and B.

A similar analysis applies to the strategic location of intangible assets. Under the existing system, there is an incentive for companies to locate intangible assets in low-tax countries and pay royalties and license fees from high–tax countries to where the assets are owned. But, as we argued above, this incentive would not be present in a country with a DBCFT, however high the rate. That is because the use in the DBCFT country of the benefits of the intangible asset would be treated as an import. The tax on the import would again net out with tax relief on the purchase of that import; or

the import could be ignored entirely. In either case, there is no net deduction for the cost of using the imported service from the intangible asset.

If other countries maintained existing source-based systems, however, then there would be an incentive to locate intangible assets in the DBCFT country, since there would be no tax on the receipt of royalty or license fees. To this extent, the DBCFT country would again be operating in a way akin to a tax haven under a source-based tax system. Royalty payments to the DBCFT country would generally be deductible in other countries; this would facilitate a reduction in taxable income in those countries, although it would not be shifting the tax base to the DBCFT country, since the income would not be taxed there.

As will be seen later, the preferred treatment of financial flows under a DBCFT can also worsen base erosion in non-adopters, since interest payments may be deducted in the non-adopting countries but untaxed in the DBCFT country.

The adoption of the DBCFT by a single country is thus very likely to aggravate the problems of base erosion and profit shifting in countries that did not implement a DBCFT, whilst rendering the adopter immune from such activity – indeed turning it into a beneficiary. This is, or should be, a significant concern with unilateral adoption. The quantitative impact of additional profit shifting opportunities on other countries will be hard to gauge: multinationals already have many opportunities to shift profits to low rate jurisdictions. And the impact will depend on the particular circumstances, being greater, for instance, if the adopter is a large and initially high-tax country.

The likelihood is, in any case, of increased pressure on the devices that non-adopters have at their disposal to limit profit-shifting: thin capitalization rules, withholding taxes and the like. While the most direct responses are in the hands of the non-adopters, the adopter may also wish to protect foreign tax bases from undermining through artificial transactions and pricing. Participation in the county by country reporting that is a minimum standard under the G20-OECD BEPS project, for instance, may yield little direct benefit to the adopter, but can be helpful for others in addressing transfer pricing issues. Even if adequate responses can be shaped, however, this – or, as discussed below, following suit by adopting a DBCFT - is likely to take some time, during which the adverse impact on non-adopters might be significant.

c. *Ease of Administration*

For the country adopting it, the main administrative benefits and costs of adopting a DBCFT – prominent among the former being that opportunities for shifting profit to low taxed jurisdictions are at least considerably diminished, if not extinguished - are much the same whether adopted unilaterally or universally.

Two issues would arise if the DBCFT were introduced unilaterally, however. First, as we discuss in detail in Section IV on implementation below, there would be benefits in tax collection if countries cooperated with each other. These benefits would presumably be much less likely to occur if a country introduced the DBCFT unilaterally. Second, from the perspective of taxpaying multinationals, there may be an additional compliance cost in dealing with a DBCFT in one country, and existing corporation taxes in other countries, although of course businesses must already cope with quite significant differences in national tax systems.

d. *Fairness*

Broadly, the considerations of fairness are the same as if the tax were introduced globally. The tax would continue to be equivalent to a tax on domestic consumption financed by resources *other than* wage and salary income. The issues of inter-nation equity are also similar as well, though with the additional twist of the likely impact of increased profit shifting out of non-adopters.

The factors influencing revenue (other than BEPS-type through avoidance) would again be similar. However, in the case of unilateral adoption of the DBCFT, the behavioural response of multinationals would be different, and this could affect revenue, and welfare of the country that introduced the tax. For example, suppose that country A introduced a DBCFT and country B did not. Then a company that produced in A and exported to B would face no tax on its profit. But a company that produced in B and sold in A would be taxed on its profit in B, and on its import to A. This might be considered unfair, but is simply the result of the two countries having a different basis for taxation.

e. Stability

The attractiveness of moving from a traditional source-based corporate tax from the perspective of a single country, acting on its own, involves a trade-off, as discussed in Auerbach and Devereux (2015), between the benefits of attracting capital and profits from other jurisdictions and the potential costs of a reduced ability to "export" taxes to the residents of other countries. A country unilaterally introducing a DBCFT would in effect be reducing its source based tax on corporate income to zero. As discussed, this would attract real activity and profit from other countries where that source-based income would be liable to tax. But on the other hand, a source-based cash flow tax would fall in part on the owners of the business being taxed, including non-resident owners. By contrast, as discussed above, a destination-based tax would ultimately fall only on domestic residents. A move to a DBCFT from a source-based cash flow tax would therefore have a cost in reducing the ability of the country to levy a tax the incidence of which is partly on non-residents. This second factor may be more important for a large country, or one with unique location-specific production assets (as in the case of natural resources, discussed earlier), and so countries in such circumstances may find adoption of a DBCFT less attractive.

However, existing corporate taxes are less likely to be "exported" to non-residents than source-based cash flow taxes. That is because existing taxes do not generally fall solely on economic rent; consequently, they create incentives for companies to distort their behaviour and prices in ways that pass on the burden of the tax to others, particularly residents. This, while there is a clear trade-off between source and destination-based cash flow taxes, the benefit of a conventional source-based tax in exporting tax to non-residents is weaker than with a source-based cash flow tax.

In addition to effecting a zero tax rate on domestic source income, the treatment of borrowing and interest under the DBCFT would introduce a powerful incentive for adoption elsewhere, for it would shift borrowing and interest deductions to other jurisdictions where interest is still deductible (at least as long as the other jurisdictions did not combat this incentive by the use of anti-avoidance rules). Similarly, as the adoption of the DBCFT by one state safeguards it against a number of profit shifting techniques, whilst providing opportunities for MNEs to shift profits from states operating a source based corporation tax to it, it gives these states an incentive to adopt the DBCFT too.

For non-adopters, as seen above, despite such possible defences as mentioned there – and to an extent that again depends on circumstances - the replacement of a traditional corporate income tax by a DBCFT in another country may, depending on circumstances, place substantial pressures in the forms of both reduced investment and heightened profit shifting. They are likely to respond. This may take the form of either reduced statutory rates or base narrowing measures, while retaining a traditional CIT, or a mimicking movement to a DBCFT. The former response provides no lasting solution to continued tax competition. Subject to important caveats – notably those in relation to developing countries discussed above - the latter may well have more attractions than the continued undermining of the international tax systems that is all too clear under current arrangements.

How the incentives for adoption would change in response to other countries' adoption is a complex question. Empirical evidence – see, for example, Devereux et al (2008) - suggests that countries respond to a reduction in the tax rate in other countries by reducing their own tax rate. That in turn suggests that the attractiveness of adopting the DBCFT would be enhanced by other countries already having done so. That is because countries that kept a source-based tax would be at a competitive disadvantage since in effect they would be competing for real economic activity and profit with countries that have no source-based taxation. As investment and profits shifted to the countries that had unilaterally introduced the DBCFT, there would be a powerful incentive for other countries to follow suit. The unilateral introduction of a DBCFT could therefore be seen as an aggressive move in the tax competition being played out in source country corporate taxes. This would seem to be further enhanced by the treatment of interest under the DBCFT, as one would expect borrowing to shift from countries as they adopt the reform to countries that have yet to do so.

A unilateral move to the DBCFT can be seen as the ultimate move in a tax competitive game, as it results in a source based corporation tax rate of zero. However, the adopting state would not be susceptible to tax competitive forces on the tax rate it selects. In that sense the acceleration of one tax competitive game also puts a stop to another and would provide long term stability for the adopting state free from destabilizing tax competitive forces.

III. TAXING FINANCIAL FLOWS

The growing importance of financial institutions and activities within the corporate sector (see the statistics for the UK and the US in Auerbach et al, 2010) increases the attractiveness of taxing the economic rent accruing to financial companies. This section considers how this can be achieved, first under a DBCFT and then under a VAT-based equivalent.

1. The choice between an R base and an R+F base

As discussed earlier, there are two basic approaches to the treatment of financial flows under a cash flow tax, including the DBCFT. These were set out by the Meade Committee (1978), and we use their terminology here. The first option is simply to ignore them, and that – in the sense of exempting or 'input-taxing' them[48] - is the route taken by most VATs. This is equivalent to a tax only on "real" inflows, which Meade calls the R-base. The second is to tax also all net financial inflows other than equity transactions with its shareholders, which Meade calls the R+F base. Table 4, which is adapted from Meade (1978), shows which flows that would be subject to tax under an R and an R+F base.

Table 4. Elements of R and R+F base taxation

INFLOWS	OUTFLOWS
Real Items	
R1 Sales of goods	*R*1* Purchases of materials
R2 Sales of services	*R*2* Wages and salaries
R3 Sales of assets	*R*3* Purchase of fixed assets
R	*R**
Financial Items	
F1 Increase in any forms of borrowing	*F*1* Decrease in any form of borrowing
F2 Decrease in any form of lending	*F*2* Increase in any form of lending
F3 Decrease in cash	*F*3* Increase in cash
F4 Interest received	*F*4* Interest paid
F5 Decrease in holding of shares in foreign companies	*F*5* Increase in holding of shares in foreign companies
F	*F**

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[48] This means that no tax is charged on sales, but tax charged on purchases cannot be recovered.

In the table, "real" inflows are denoted as R and "real" outflows are denoted as R^*. The R base is therefore simply net real inflows, $R-R^*$. The key elements of each flow are shown in the table.

The "financial" element is also straightforward, although perhaps less intuitive. The "financial" tax base would be inflows, F – including new borrowing, interest received and reductions in cash holdings – less outflows, F^* – including repayment of borrowing, interest payments and new lending. The "R+F" base would include both real and financial flows, that is, in the notation of the table, would be $R+F-R^*-F^*$.

Note that, at least in a domestic setting as noted by the Meade Committee, an R+F base is equal to net distributions to shareholders – that is, distributions from the company to shareholders net of new equity issues. Thus, a tax on the R+F base could be implemented alternatively as a tax on distributions to shareholders net of new equity issues (the 'S base', in Meade's terminology). This could in principle be imposed at either the company level or the shareholder level, the latter opening up the thought of rooting cash flow taxation in the residence of the shareholder, rather than the location of consumption.[49] We consider the S base no further here.

Now compare tax liabilities under the R and R+F bases. We focus here initially on the interaction between the financial and nonfinancial sectors, starting with the domestic case so as to leave aside for the moment the issue of the location of tax.

2. Transactions between taxable entities

Consider first the application of the R+F base to both sectors. When a bank lends to a nonfinancial company, the outflow of funds receives tax relief in the hands of the bank. But the company is taxed on its financial inflow. As long as the lender and borrower face the same tax rate, the net tax on the transaction is zero. The same applies when the company repays the bank with interest. The repayment of principal and interest by the company reduces the company's taxable income, but the receipts to the bank are taxed. Again, if the tax rates are the same, then the net tax is zero.

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[49] A possibility stressed for instance by Cui (2015).

Table 5 demonstrates this. In this example the bank lends 100 to a nonfinancial company at a 10% interest rate. The corporate tax rate is 30%. Taking only these financial flows into account, the taxes on the borrower and lender net out in each period, with the result that no net tax is paid.

Table 5. Treatment of Financial Flows under the R+F base

	Pre-tax flows		Tax flows		
	Bank	Borrower	Bank	Borrower	Total
Period 1: Lending	-100	+100	-30	+30	0
Period 2: Repayment with interest	+110	-110	+33	-33	0

An equivalent system would be one in which the financial flows between the financial and nonfinancial sectors are ignored for the purposes of tax. But this is exactly what the R-base does. So in effect there is no economic difference between the R base and the R+F base with respect to financial flows between entities that are liable to the same tax system.

However, to compare the R and R+F base in more detail, we will expand the example, as shown in Tables 6 and 7. Now suppose that the bank receives deposits of 100 from an individual or other tax exempt entity, on which it pays interest of 5%. It lends the 100 to the company at a rate of 10%. The bank therefore makes a pre-tax profit of 5. The company invests 100, financed by borrowing, and earns a return of 20%, so that it has a value of 120 in period 2. It repays 110 to the bank and therefore earns a pre-tax profit of 10. Given that there are no other costs, these measures of pre-tax profit are actually economic rent. The total rent is therefore 15, with the company earning 10, and the bank earning 5.

The position under the R+F base is as shown in Table 6. All real and financial flows are taxed. In period 1, all flows net to zero. The bank borrows and lends 100, with no net tax consequence. The company borrows 100 and invests 100 also with no net tax consequence: the tax due on its receipt of the loan is exactly matched by the value of the deduction for its investment.

Table 6. Treatment of Financial Flows under the R+F base

	Pre-tax flows		Tax Flows	
	Bank	Borrower	Bank	Borrower
Period 1				
Bank receives deposit	100		30	
Bank lends	-100	100	-30	30
Investment by borrower		-100		-30
Total period 1 flows	0	0	0	0
Period 2				
Return earned by borrower		120		36
Repayment with interest	110	-110	33	-33
Repayment to depositor	-105		-31.5	
Total period 2 flows	5	10	1.5	3

In period 2, the company pays tax on the value of its investment, but gets tax relief on what it repays to the bank. The bank pays tax on its receipts from its lending, but gets tax relief on its repayment to its depositors. In sum, the bank pays tax of 1.5 and the company pays tax of 3. In both cases, this represents 30% of the pre-tax economic rent earned by each party.

Now consider the R base, as shown in Table 7. In this case, financial flows are simply disregarded. Let us start by assuming that the company still wants to make its investment of 100. It receives tax relief on that investment of 30. Consequently, it need only borrow 70 from the bank. Since no taxes are levied on the financial flows of the bank, the bank only has to raise 70 from its depositors. In period 2, the company earns 120 and pays tax on that of 36. It repays 77 to the bank, including 10% interest, and the bank repays 73.5 to the depositors, including 5% interest. There are no other taxes.

There are clearly differences in cash flows in these two examples. The bank only borrows and lends 70. And the company receives tax relief of 30 in period 1, and pays tax of 36 in period 2. But exactly the same real investment is undertaken, and both the bank and the company are exactly as well off as they were under the R+F base. The bank has a post-tax rent of 3.5, and the company has a post-tax rent of 7 (43 – 36). Further, if we gross up the 30 of tax relief from period 1 at the "normal" (deposit)

interest rate of 5%, this is equivalent to tax relief of 31.5 in period 2. The overall tax liability in period 2 terms is then 4.5, exactly as under the R+F base.[50]

Table 7. Treatment of Financial Flows under the R base

	Pre-tax flows		Tax Flows	
	Bank	Borrower	Bank	Borrower
Period 1				
Bank receives deposit	70			
Bank lends	-70	70		
Investment by borrower		-100		-30
Total period 1 flows	0	-30	0	-30
Period 2				
Return earned by borrower		120		36
Repayment with interest	77	-77		
Repayment to depositor	-73.5			
Total period 2 flows	3.5	43	0	36

If under the R base the bank is not being taxed on its return from lending, then it may appear that it can earn an economic rent without tax. But in this case, any economic rent it earns is effectively being taxed in the hands of the borrower. Under the R+F base, the company and the bank each pay tax on their share of the overall economic rent earned. Under the R base the company would get no tax relief for repaying its debt with interest. In effect it is therefore taxed on the entire economic rent, while the bank is not taxed at all. Thus, the netting procedure under the R base effectively transfers part of the tax base from financial firms to nonfinancial firms.

But, as the example makes clear, this does not mean that the bank gains at the expense of the company. This is because the amount of lending is lower under the R base. At the same interest rate, then, the bank earns a lower pre-tax economic rent.

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[50] Note that this equivalence depends on grossing up the tax relief in period 1 by 5% to transform it into a period 2 value. This is based on the deposit rate paid by the bank in the previous example. Note though, that if the discount rate were 6%, but the bank earned rent on its borrowing by paying only 5% to its depositors, then the overall tax liability in period 2 terms would be lower than under the R+F base. In effect, the rent earned by the bank on its borrowing would be untaxed, illustrating the need in general to include financial transactions with non-taxable entities and individuals in the tax base, as described below.

We noted above that a main weakness of the R base is thought to be its inability to tax economic rents earned by the financial sector. However, these examples show that this is not true in the case of lending and borrowing between two businesses subject to the R based tax.

Four other important issues arise in comparing the R and R+F bases for transactions between entities liable to the tax.

The first concerns any other expenses incurred by the bank. Suppose in our example, the bank has additional costs of 5 in period 2 – say employment costs. Under the R+F base analysis, this would extinguish the bank's economic rent; in effect the bank would not earn a rent. That would be dealt with easily by the R+F base: the additional 5 of costs would be set against net income of 5 in period 2, and the bank's R+F tax liability would fall to zero. The total tax paid would then be only the 3 paid by the bank on its economic rent of 10.

Under the R base, however, the bank has no taxable income, since all of its income is in the form of financial flows. Yet the R base would still give tax relief for this additional real cost. In effect, the bank's R base taxable income should be negative, at -5, and under a symmetric tax system, it should receive a tax credit of 1.5. Give that the value in period 2 terms of the tax paid by the company is 4.5, then that tax credit is required to make the R and R+F bases comparable in this case. The taxable loss arises for the bank under the R base because its taxable income has in effect been transferred to the company, as explained above. It is true that there may be a problem of perception, as people may find it difficult to understand why banks should apparently be subsidized despite the fact that they may be earning economic rent.[51] But this is indeed a problem only of perception, since, as set out here, the underlying economic rent is being taxed in the hands of the borrower.

That raises issues of how a credit would be paid, and in what circumstances. The bank has not made a loss, yet under the R base it may have a negative tax base. Dealing with the tax loss by carrying it forwards, even with interest, would be inadequate as financial firms with underlying profitability could easily be in permanent tax loss positions. One option would be simply to give a tax rebate to the bank. A second

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[51] This problem of perception may arise even if the bank appears to be paying low or no tax under the R base.

would be to allow the bank to offset the negative taxable profit against its liabilities for other taxes.

A second issue which arises under the R+F base is that companies are able to defer their tax payment, possibly indefinitely, through the simple expedient of not paying the profit to their shareholders. For example, consider the borrower in the example above. Under the R+F base it has a pre-tax profit in period 2 of 10, which is implicitly assumed to be paid as a dividend to its shareholders. But suppose instead that it simply saved the money in a financial account: either cash in a bank, or buying government bonds, for example. Either form of such saving would be treated as a financial outflow (of the form F*2 or F*3 in the table above) and would therefore reduce the R+F base of the company to zero.

One possible response to this is that this is not a problem. The R+F base is in effect a tax on net distributions to shareholders. So if no net distribution is made, then there is no tax. If the company buys bonds in one period, for example, and earns interest on those bonds, then the dividend paid in the following period would be higher by the amount of the interest, and hence the tax liability at that point would also be higher. If the interest rate earned is the same as the shareholder's discount rate, then the net present value of the post-tax return to the shareholder would be unaffected.

However, this argument does not take account of the fact that there could be advantages in deferring tax from the perspective of financial reporting. As noted in Section I, company directors may be evaluated on the basis of the profit declared in their financial statement; this is particularly true for listed companies. If the deferred tax is not included in the profit and loss statement (which may happen if the deferral is expected to be for a long enough period) then the reported post-tax profit would be boosted. Such an incentive to keep cash within the business may reinforce agency problems as directors seek to avoid the discipline of raising finance from the debt markets, potentially giving rise to corporate over-investment. The susceptibility of the R+F base to the timing of tax payments provides a strong reason to prefer the R base, at least for transactions between financial and non-financial companies that face the same tax system and tax rate.[52]

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[52] The problem remains to some extent if, as discussed below, financial transactions with tax exempt entities and individuals are taxed. Then in principle, tax could be deferred by lending to these groups. If this problem were serious enough, it might in practice be counteracted by requiring there to be a deemed dividend in place of the additional lending.

A third issue is that banks may charge their borrowers in ways other than through interest – for example, through fees. Under an R base, the fee could be deductible for the borrowing business, and taxable for the bank. As with other flows between the bank and the borrower, these taxes net out. In the case where both parties are liable to tax at the same rate, it should not matter whether the flows are included in the tax base or not. But if one of the parties has a taxable loss which does not receive an effective rebate then this is not true. For example, if the bank has a permanent taxable loss, for which it does not receive full relief, it may have an incentive to charge fees instead of interest, in order to generate higher taxable income against which its expenses could be offset. This raises the question of how other flows between the two parties should be treated. On the one hand, it may be beneficial to allocate the bank a higher taxable income to reduce the problem of taxable losses in the bank. But it may also be more straightforward not to discriminate between flows, and to leave all financial flows between the two parties outside the tax base.

A fourth issue concerns implementation. The R-base taxes only "real" flows, and so requires a distinction in the tax law between "real" and "financial" flows. This is required to counter incentives to disguise R flows as F flows, thus keeping them outside the R base. (Note though, that this only applies in cases where one of the two parties to a transaction is subject to tax at a different rate, or not subject to the tax, for example a tax exempt entity or an individual subject to an income tax; otherwise the taxes levied on both sides of the real transaction would net out.) On the other hand, under the R+F base, but not under the R base, the border between debt and equity requires policing. That is, as equity is not part of the tax base under an R+F base, companies have an incentive to disguise inflows of debt as equity, and outflows of equity as debt. To counter this, rules must be introduced to prevent investors using hybrid financial instruments for tax planning – for example, having the main characteristics of equity, but disguised as debt for tax purposes, or vice versa. Both of these implementation issues are discussed further below.

3. Transactions with individuals and tax-exempt entities

A difference between the R base and the R+F base arises where a financial company engages in financial transactions with an individual, a tax exempt institution or another entity that is not subject to the tax. Applying the R base to a bank would

result in there being no tax at all; the bank engages in only financial transactions which would not be subject to tax, and the borrower would not be subject to this tax at all. To the extent that the bank may earn an economic rent from such transactions, an R base would therefore leave this economic rent untaxed. This would be similar to the case in the previous table, but with the borrower paying no tax.

This suggests that, even if an R base is used for transactions between taxable entities, financial companies should be subject to tax on their financial flows with any entities that are not subject to the same tax, and where the "F" transactions do not therefore net out.[53] An example of this is shown in Table 8. This is the same as in the R+F example above, except that the borrower is here assumed to be exempt from tax. In this case, in period 1 the bank receives deposits of 100 and lends 100, with a net tax liability of zero. The borrower invests 100 in period 1 and earns 120 in period 2, but is not subject to tax. But in period 2 the bank pays tax on its profit, or economic rent in this case, measured as the difference between the 110 it receives and the 105 it pays out. The bank's economic rent of 5 is therefore taxed at 30%, but the tax exempt's economic rent of 10 is untaxed.

Table 8. Treatment of Financial Flows under the R+F base: tax exempt borrower

	Pre-tax flows		R+F base tax
	Bank	Borrower	Bank only
Period 1			
Bank receives deposit	100		30
Bank lends	-100	100	-30
Investment by borrower		-100	
Total period 1 flows	0	0	0
Period 2			
Return earned by borrower		120	
Repayment with interest	110	-110	33
Repayment to depositor	-105		-31.5
Total period 2 flows	5	10	1.5

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[53] The combination of R-base treatment for B2B transactions and a form of R+F treatment for B2C transactions was proposed in the context of VAT by Huizinga (2002).

Applying the R base for transactions between taxed entities, and applying the R+F base to financial companies in their financial transactions with individuals or entities which are not subject to the tax therefore has the advantages of (a) excluding non-financial firms from the complications of implementing an R+F base; while (b) taxing all of the economic rents of financial companies – either directly through the F base applied to transactions with tax exempt entities, or indirectly by shifting the tax base to taxed borrowers.

Such a system would to some extent also lessen the problem of financial companies having a negative tax base, discussed above. Suppose again that the bank in the example above has labour costs of 5. This reduces its economic rent to zero. In this case, the 5 of labour costs can be offset against the rent generated from lending to the tax exempt entity, implying that the bank does not have a negative tax base. Of course, it is still possible that the bank has a negative tax base; if, in the example, it has labour costs in excess of 5.

Note that the financial company should be taxed on its net financial inflows from non-taxable entities, less *all* real costs (for example, for purchases of labour and other inputs) that it incurs. That is, it is not necessary to allocate its real costs to the activities in which it is directly taxed. That is because, as we have seen above, the financial company should get relief for its real costs even when it is transacting with taxable entities. As noted above, the problem of dealing with a negative tax base is partly a matter of perception as in aggregate the tax base in each period is equivalent to that under an R+F for both financial and non-financial firms. If costs are fully allowed, then exactly the same tax would be generated if all taxable companies faced the R+F base, and all entities would earn the same post-tax economic rent.

As noted, one of the main motivations for the netting approach to financial transactions is to simplify the tax system for nonfinancial firms by excluding their financial flows from the tax base. But this requires drawing a line between financial firms and other firms. Many nonfinancial firms engage in transactions with households that incorporate financial components, such as loans implicit in deferred payment arrangements. To the extent that these components increase the firm's tax base (by charging a high implicit interest rate in exchange for deferred payment), the nonfinancial firm might wish to explicitly separate the real and financial components, as the latter would not be taxable, and also to misstate the

magnitudes of real and financial pieces, for example by overstating the interest rate charged on deferred payments and understating the initial purchase price. However, in this sense, non-financial companies would be earning an economic rent on their financial transactions with tax exempt consumers; to match the treatment of financial companies we would therefore want to tax them on such transactions. The easiest way to do so would be to include all expenditures and receipts from transactions of non-financial firms with tax exempt entities (such as individual customers) in the R base - even if they relate to charges for deferred receipt or payment, such as through leasing and hire purchase. In that case, there would be no need to extend formally the R+F approach to such firms.

In cases where real and financial activities are segregated, firms may already have separate operating units, which would allow the financial unit to be included in the financial regime. This separation would be possible for "nonfinancial" firms with significant levels of financial transactions. Such firms could then either treat the financial flows as if they were real (and include them under the R base), or they could treat them as financial, and include them under an R+F base that applied to transactions with non-taxable entities and individuals. These two approaches would have the same tax consequences.

4. International Considerations

We now turn to the taxation of financial flows in an international context.

First, consider the effects of implementing a full R+F base on all taxed entities, and applied on a traditional origin basis. Suppose that a bank in country A lends to a company in country B, and both countries operate a origin-based R+F system. Then the bank would receive tax relief at A's tax rate on its lending, while the company would be taxed at B's tax rate. Similarly, the company would get tax relief on its repayment of debt at B's tax rate, and the bank would be taxed at A's tax rate. Clearly then, extending the tax base to all financial cash flows does not eliminate the incentive to lend from a low tax country to a high tax country, nor, for transactions between related parties, does it eliminate the incentive to overstate the interest in such cases.[54]

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[54] The same would be true under the Tax Calculation Account (TCA) base, discussed below and in the Appendix.

If an R+F tax were implemented in both countries, then instead it would be natural to have border adjustments for financial flows as well as real ones, in order to eliminate these incentives for profit shifting. In the case of financial flows, we treat the country of the borrower as being the place of "destination". An intuition for this approach is that the bank is essentially providing a service to the borrower, of the provision of funds for a period. This service is being "consumed" by the borrower, and so it is natural under the destination-based approach to apply the relevant taxes on financial flows in the location of the borrower.

An example of how the R+F base would work if used in two countries is given in Table 9, which extends the previous example above by assuming that a bank in country A lends to a company in country B. Assume that country A has a 20% tax rate and country B has a 30% tax rate. Under an R+F tax base in both countries, country A would not give relief at its tax rate on lending by the bank, nor would it tax the return that the bank earns, since it is not the destination country. Instead, all the tax effects from the cross-border lending itself would arise in country B. Suppose, as in the example above, that the company in B wants to invest 100, on which it expects to earn a return of 20%. The bank in A is willing to lend 100 at an interest rate of 10. In this case, country B would both give relief on the initial bank lending and tax the funds received by the bank, both at B's tax rate. These taxes net out. But, the net cost to the bank of lending 100 is only 70, since it receives tax relief in B. In order to raise 70, it must issue 87.5 in gross deposits, on which it will pay tax in A at 20% of 17.5. In period 1, then, net cash flows are zero for both the bank and the company. The overall value of the investment to the bank and the company therefore depends only on net cash flows in period 2. But, country A will have raised 17.5 in tax revenue in period 1, while country B would have a net 30 reduction in tax revenue in period 1, due to the immediate expensing of the investment by the company. So the overall value of tax revenue to each government requires an aggregation of period 1 and period 2 flows.

In period 2, the company earns a gross return of 120 – on which it pays tax of 36 - and repays the bank 110. The company receives tax relief of 33 on the repayment, and the bank pays tax of 33 – again these taxes net out. The bank then repays its depositor at 5% on the initial deposit, and receives tax relief on that repayment at 20% in country A. Given that the bank and the company both have zero net cash flows in period 1, the net effect is that the bank again earns a net economic rent of 3.5 (18.1+18.4-33),

and the company again earns a net economic rent of 7 (10-3). This is the same as in the previous example of a single country with a tax rate of 30%. To identify the period 2 values of net tax receipts, we gross up the period 1 taxes at 5% and add them to the period 2 values. The total value in period 2 terms of tax levied is again 4.5. However, in this case, this tax is collected entirely in country B – the destination country. The two tax effects in country A – taxing the deposit in period 1 and giving relief for the repayment of the deposit with interest in period 2 - net to zero.

Table 9. Treatment of International Financial Flows under the R+F base

	Pre-tax flows		Tax in A (20%)		Tax in B (30%)	
	Bank in A	Borrower in B	Bank in A	Borrower in B	Bank in A	Borrower in B
Period 1						
Bank in A receives deposit	87.5		17.5			
Bank lends	-100	100			-30	30
Investment by borrower		-100		-		-30
Total period 1 flows	-12.5	0	17.5	0	-30	0
Period 2						
Return earned by borrower		120				36
Repayment with interest	110	-110			33	-33
Repayment to depositor	-91.9		-18.4			
Total period 2 flows	18.1	10	-18.4	0	33	3
Net value of taxes (in period 2 values)			0	0	1.5	3

Shifting the tax base of the financial firm to the place of destination has two consequences. First, the incentive to lend from a low tax country to a high tax country is eliminated, so that it is not possible to shift profits using flows of debt and interest. For example, even if the bank were located in a tax haven it would make no difference to the tax liability of either party.

Second, since the taxes on financial flows net out in each period, this is equivalent to implementing an R base for these financial transactions. This is exactly the same as in the case of purely domestic transactions; the R-base example above would also apply to a foreign bank lending to a domestic company, with border adjustments and hence a destination base. Intuitively this also mirrors the case of imports of goods and services; for these we noted that since the taxation of imports netted out with the deduction for the cost of the input, it would be possible to ignore imports purchased by taxable entities altogether. The R base can be seen as the equivalent for financial transactions. Since the tax flows in the R+F destination base cancel out when the financial transactions are between taxable entities, then again they can simply be ignored. For financial transactions, this again returns us to the R base.

That is, for all financial transactions between taxable entities, border adjustments could be implemented by simply excluding cross-border financial flows from the tax system. Therefore the conclusion reached for financial flows between financial and non-financial firms in a domestic setting – to simply use the R base - also holds in an international setting. The example can be used to consider the case of an R base, shown in Table 10. In this case, there would be no net tax levied in country A, since in that example there are only financial flows.[55] In country B, there would be tax relief of 30 for the investment undertaken there in period 1, and a tax of 36 on the total return to that investment in period 2. All the financial flows would be untaxed. In order to finance that investment, the company has to borrow 70 from the bank. As under the R+F base in the previous, the period 2 value of the tax liability (evaluated at a mark-up rate of 5%) would be 4.5, the company would earn an economic rent of 7 (43 – 6), and the bank would earn an economic rent of 3.5.

Applying the R base for financial transactions with non-financial companies would require financial companies to determine whether their financial transactions were with taxable entities or not. However, it would alleviate their need to distinguish between domestic and foreign businesses in their transactions, as all such financial transactions would now be excluded from the tax base, not just those with foreign businesses.

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[55] In the example, there would be no net tax revenue even if there were also a tax on financial flows with tax exempt depositors since depositors are assumed to be paid a rate of interest equal to the bank's discount rate.

Table 10. Treatment of International Financial Flows under the R base

	Pre-tax flows		Tax in B (30%)	
	Bank in A	Borrower in B	Bank in A	Borrower in B
Period 1				
Bank in A receives deposit	70			
Bank lends	-70	70		
Investment by borrower		-100		-30
Total period 1 flows	0	-30	0	-30
Period 2				
Return earned by borrower		120		36
Repayment with interest	77	-77		
Repayment to depositor	73.5			
Total period 2 flows	3.5	43		36

Note that the application of a DBCFT in an international setting brings to the fore another reason for adopting an R base for domestic transactions. If financial flows are ignored in an international context but not in a purely domestic context, this would cause difficulties with respect to the treatment of cross-border sales of existing debt securities in secondary markets, where the original issuer need not be aware of the change in ownership. Suppose for example, that domestic company A borrowed from domestic company B, which subsequently sold the loan to foreign company C; in this case C would pay B the value of the loan and B would pass on to C all interest received from A. Since the initial loan was within the same domestic country, under an R+F base the amount lent would be taxable for A and deductible for B, and interest payments would be deductible for A and taxable for B. All of B's dealings with C (the proceeds from selling the loan to C and delivery of the subsequent interest payments to C would be untaxed in the domestic country because of border adjustments. That is, B would continue to pay tax on the loan's interest even after selling the loan to C, just as in the case where B borrowed separately from C and kept the loan to A rather than selling the original loan to C. On the other hand, if A borrowed from foreign lender D, which subsequently sold the loan to domestic company E, border adjustments would exclude all flows from the domestic tax base, including those between A and D and those between D and E. This discussion suggests that there would be considerable benefits in leaving both domestic and cross-border financial flows between tax-paying companies out of the tax base altogether, as would happen if the R base were applied.

A final issue is that also faced in a domestic setting – how to tax cross-border lending by a financial company to individuals or entities which are not subject to the tax. To align their treatment when borrowing from either domestic or foreign banks, then it would be necessary to apply border adjustments in these cases too. That is, we would need to tax flows from and to the foreign bank at the domestic tax rate, with a deduction on lending and a tax on the repayment of principal and interest. As in the purely domestic case, these financial flows between financial institutions and these taxpayers do not net out. In effect, then, in an international setting a destination-based R+F base would need to be applied for financial flows between financial institutions and these taxpayers.

We discuss further implementation issues below. In practice, cross-border loans by individuals should not be a major issue for most households, most of whose financial transactions are with domestic businesses, although it could be more important for wealthy households.

Unilateral Adoption

So far we have considered the treatment of financial flows in a setting where the DBCFT is adopted by all the countries concerned. But suppose that only one country – country A – adopted the DBCFT on an R base for transactions between taxed entities, and on an R+F base for transactions with non-taxed entities.[56] Suppose that all other countries maintained a traditional approach, taxing interest received and giving relief for interest paid, both on an origin basis. What would the incentives for borrowing and lending, and the location of each?

First, suppose that an affiliate of a multinational in country A lent to an affiliate located in country B. Then, irrespective of the identity of the borrower, there would be no tax levied in A, even under the R+F base, since A would not be the destination country in this case. In country B, relief would be given in the usual way on the interest paid to A on the loan. Relative to the existing system, this makes A appear like a tax haven: interest paid from B to A receives tax relief in B, but would not be taxed in A. This would clearly give an incentive for multinationals to locate

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[56] A question arises in this case as to whether and how to differentiate borrowing from foreign "taxable" and "non-taxable" entities, neither of which would be subject to a DBCFT in their home countries. The consequences of each are discussed in the context of R+F treatment.

outbound lending in a country operating a destination base, whether an R base or R+F base applied to such financial flows. (This may give rise to country B using CFC rules to combat profit shifting out of B).

What of the reverse position? Suppose that the multinational instead lent from an affiliate in B to an affiliate in A? Then under the R base treatment, the financial flows would be ignored in country A. The treatment under an R+F base in A would depend on how the foreign entity is treated. If it is treated as "taxable" under the DBCFT, then the borrower would be taxed in the receipt of the loan, while the lender would receive tax relief. Similarly, the repayment of the loan with interest would be taxable in the hands of the recipient, but the borrower would receive tax relief. These tax effects would exactly cancel out, so that in this case, the R-base and R+F base would be equivalent, with no net tax effects in country A. In country B, however, the interest on the loan would be taxable. This situation would be akin to lending to a tax haven under the existing system; there would be no net tax in A, but B would impose a tax on the receipt of the interest. In this case, there would clearly be an incentive for multinational companies to avoid lending from an affiliate in a non-DBCFT country to an affiliate in a DBCFT country.

Overall, then, if a DBCFT were adopted in only one country, that would introduce a strong incentive for companies to shift their borrowing to other countries that continue to impose a traditional source-based income tax. Any borrowing, domestic or international, by a company located in a country operating a DBCFT would be ignored; whilst borrowing by a company in a country operating a traditional origin-based income tax will benefit from interest deductibility. As with the incentives for profit shifting discussed earlier, this incentive is present even with respect to foreign countries with very low source-based tax rates.

Treatment of financial services under the VAT cum payroll subsidy approach

The equivalence between a DBCFT and an appropriate VAT combined with a corresponding payroll subsidy can be readily extended to the treatment of financial services. To see this, since the treatment of labour costs is the same in the two cases, it suffices to focus only on the financial flows themselves

In practice, financial services (other than those explicitly charged for as a fee) are commonly exempt under the VAT: that is, there is no charge on services provided but nor is there any credit of refund of VAT charged on inputs. This has been a long-standing source of dissatisfaction, as it implies some cascading of taxes on financial services used by registered businesses – and hence risk of production inefficiency – and excludes from the tax base the value of services provided to final consumers.

The conceptual difficulty perceived in this area has been that of allocating the margin embedded in the pricing of financial services between the two side of the transaction, and hence to ensure smooth functioning of the credit mechanism – something that, importantly, is needed only in relation to final consumers: for services provided to registered businesses, the spilt is immaterial, since any VAT charged by the seller will be creditable for the buyer.

One solution to this problem, developed by Poddar and English (1997), is R+F-type cash-flow treatment of exactly the kind discussed above. And the reason it allocates the margin appropriately is analogous to that in which the R+F treatment allocates rents across firms: taxing and crediting all flows between registered businesses means that the only revenue that remains reflect the margin enjoyed by consumers.

For financial transaction between businesses, this netting of payments is exactly as under the DBCFT described above – and so, just as an R-base was seen there to be adequate for the treatment of financial flows under a DBCFT, so under a VAT they might equally well be ignored. This would mean 'zero-rating' such transactions: that is, charging no tax on provision (as at present) but providing full refund for input taxes allocable to transactions with registered businesses. Some countries already do something approaching this.

In an international context, the argument above suggested R-base treatment would also be appropriate for transactions with taxable entities abroad. This corresponds in VAT terms to zero-rating. And that, indeed, is already the norm: financial services provided to non-residents are generally zero-rated. The primary difference between current international VAT arrangements and those required to replicate the DBCFT as described above is thus the need for cash flow treatment of transactions with non-registered taxable persons and entities.

Consideration of the cash flow approach in the context of the VAT led to the development of one means of implementation that does not require immediate taxation of principal amounts. Somewhat analogous to the ACE relief described above, this is the "tax calculation account", the basic idea of which is to defer tax liabilities on financial inflows until the deductions for the corresponding outflows arise. To compensate for the difference in timing, it would be necessary to markup the deferred tax period by period. We discuss this in more detail in the Appendix. Briefly, the reasons for keeping the cash flow approach mirror those for not choosing the ACE approach for real flows. First, it may be administratively simpler to net out the tax on lending and on borrowing, which would only occur under the full cash flow treatment. Second, it would be necessary to specify the appropriate rate of markup for the TCA. In principle, setting the wrong markup rate could lead to distortions to financial flows, although the size of such distortions are likely to be small if the error in setting the markup rate were also small. This issue is discussed further in the Appendix.

IV. IMPLEMENTATION

Each country contemplating the policy choices described above will have its own concerns and circumstances. These would include not only the initial state of its revenue administration and wider tax system, but its policy objectives in terms of such issues as the treatment of smaller enterprises,[57] not-for-profits and pass through entities. There are, however, several generic issues to be faced. Some of these have been touched on above; the focus here is on others.

1. Two Economically Equivalent Reforms

Most of the discussion so far in this paper has concerned the possibility of implementing a DBCFT as a form of corporation tax. However, we have also emphasised that an economically equivalent reform would be to raise the rate of VAT, or introduce a VAT - here in either case having in mind an idealized VAT levied at a single rate on a broad base -- and reduce labour taxes by that same rate. We set out these two approaches first, and then discuss some of the details of each.

Starting with the first of these, the key elements needed to transform a typical corporation tax into a DBCFT would be to:

- Abolish relief for interest payments;
- Allow immediate expensing for all business expenses;
- Ignore the proceeds of exports in the country of export;
- Ignore imports purchased by taxable entities (or tax them but include in deductible costs);
- Introduce a tax on imports purchased by non-taxable entities, including individual consumers; and
- For financial companies, tax net financial inflows resulting from transactions with non-taxable entities.

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[57] A number of countries tax smaller enterprises at a reduced corporate tax rate, generally rationalizing this as a response to difficulties they may face in borrowing. Not all find the case for a reduced rate within current corporate tax systems compelling, seeing a stronger case for supporting new rather than small enterprises (IMF, 2016b). Whether to apply such treatment under a DBCFT would, in any case, require close thought. A small exporter purchasing from larger domestic enterprises, for instance, would be disadvantaged by being entitled to rebate at a rate lower than that to which its suppliers' sales are subject.

VATs observed in practice differ in two important ways from the idealized VAT envisaged in the equivalence relationship with a DBCFT proposition: they are typically not levied at a uniform rate on all goods and services, and they do not tax financial flows between financial companies and tax exempt entities or consumers. Bearing that in mind, the reforms needed to transform the corporate tax into the equivalent of a DBCFT through a VAT-based approach are to:

- Abolish corporation tax;
- Raise the rate of VAT – and, for close equivalence to a DBCFT, abolish multiple VAT rates where they exist;
- Reduce the tax rate on labour income by the same rate. We refer to this as a "payroll subsidy" to identify its net effect relative to existing taxes; this would not amount to a tax rebate unless the rate of subsidy exceeded existing tax rates on labour income.
- To tax the returns to financial companies, introduce a cash flow tax on transactions between financial companies and both non-taxable entities and individuals.

Under either approach, many anti-avoidance features of existing corporate tax systems could simply be repealed, since they would no longer be required. These include, for example, CFC rules, transfer pricing rules, loan relationship rules and patent box regimes.

While these two approaches are economically equivalent and yield the same revenue, their implementation would obviously be different. Consequently, there are advantages and disadvantages of each of the two approaches, which we address in the final part of this section. For the vast majority of countries that already have a VAT, its existence can be both an advantage and a disadvantage.

It can be an advantage because raising the rate of an existing tax, even substantially, does not generally amount to a radical rewriting of the tax system. Further, many of the design questions that arise in designing a DBCFT have already been addressed in the implementation of VATs. But it can be a disadvantage, because most existing VAT systems do not cope as well as one would hope with all of the issues that we discuss here in ways which appear preferable – for example, in the treatment of financial flows. Also, most VATs are marked by widespread exemptions and/or the application

of differential rates. Raising only the standard rate of VAT and combining that with a payroll subsidy may then seem a relatively easy option, but it would not be economically equivalent to introducing a DBCFT; and nor would the equivalence results of Section 2 fully apply. The DBCFT route may then (subject to various caveats below) be more appealing.

It is important to recognize, in any case, that many of the design problems and implementation problems to be faced are much the same for the DBCFT and the VAT-based approach. We have already seen this in relation to the treatment of financial services, and will see the point again below when discussing how to define 'destination.' Nor do all the administrative issues associated with a traditional corporate tax disappear. It remains necessary under both the DBCFT and VAT-based approach, for example, to distinguish between business and (non-deductible) personal expenditures.

Either direction of reform could be introduced gradually, potentially reducing the transition costs of moving to a new system. Clearly, in the case of the VAT plus payroll subsidy, it would be possible to gradually adjust the rates of the three taxes concerned. And for the DBCFT itself, it would be possible, for example, to gradually extend the proportion of exports and imports that are not taxed, thereby gradually introducing the destination basis; we describe this further below. Such gradual adjustment may reduce the transition costs of moving to a new system, although the period of time of transition would clearly be longer.

2. Practical Issues

Any new tax raises practical challenges, and creating a DBCFT by reforming the corporation tax is no different. Many issues, however, are familiar. Some are familiar because they relate to the cash-flow element of the tax and have been discussed, together with potential solutions, over many years. Others are familiar because they relate to the destination element of the tax and thus also arise in the context of existing VATs. A third group of issues are common to existing systems of business taxation. And fourth, there are some issues that are specific to this particular reform; these require more extensive consideration here.

The difficulties in implementing the alternative approach, through increasing the rate of VAT and reducing the rate of payroll taxes, depends on whether a country already has experience of a VAT and payroll taxes. For countries which do not have a VAT, such as the US, many issues arise in the choice of determining the way in which the VAT is implemented – with the opportunity to learn from the best practices of others, for instance in maintaining a simple rate structure, minimizing exemptions and in the treatment of the financial sector.[58] For countries that already have a VAT, it is straightforward to raise the standard rate, the difficulty with this being that the existing VAT may well not match the broad-based tax we have in mind here. On the payroll subsidy element, for developed countries it would be relatively straightforward to simply reduce their extensive payroll taxes. (Where payment of such taxes is linked to entitlement to future benefit, arrangements would need to made to secure those rights; but this has proved straightforward to do, for example in the case of payroll tax holidays). Most developing countries, however, do not have extensive payroll taxes, and the reach of taxes on wage income is often limited. Outright wage subsides would then be needed, posing significant administrative issues. For such countries, the most practicable route to a DBCFT-equivalent system is likely to be to adopt the DBCFT itself.

Against this background, we discuss practical issues under five main headings: the scope of the tax; the need to distinguish real from financial flows, and flows of debt from flows of equity; the treatment of taxable losses; identifying the place of destination; and methods of collection. In each case, we begin by analysing the case of a DBCFT and then consider how things would be different if the reform were instead shaped as a VAT with payroll subsidy.

a. Scope

Any tax on business profits has to contend with a number of questions relating to its scope. These include specifying which legal forms of business are to be subject to the tax, whether there is to be a minimum threshold below which businesses would be exempt and how such businesses would then be taxed. In setting the scope of the DBCFT, efficiency suggest that (i) the tax apply equally to all businesses, to avoid distortions to legal form or size, and also to avoid competitive distortions; and (ii)

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[58] Conversely, of course, introducing a DBCFT while raising labour taxes can be a way of introducing a VAT; and perhaps with more chance of achieving these desirable ends than through the reform of an existing VAT.

either to set the rate for closely held businesses at the personal income tax rate or adopt rules that require such businesses to treat an appropriate portion of their income as salary, so to avoid the incentive for individuals to declare labour income in the form of business profit (or vice versa, depending which tax rate is higher). (Of course, this potential problem exists under most current systems whenever there are different rates for personal and business income).[59] It is also important to consider the administrative and compliance burden on small businesses and revenue authorities.

The scope of the tax on business profits varies between countries. In most, corporation tax is applied to all incorporated businesses. But this is not universal. In the US, for example, 'S corporations' are subject to pass-through treatment, under which profit is allocated to individual shareholders and is subject to personal income tax.[60] By contrast, VAT is normally applied to all businesses over a certain size threshold, almost always defined in terms of turnover; the smallest businesses are not required to register for the tax because for them administrative and compliance costs would be disproportionate to the revenue at stake and potential distortions from their exemption.

Ultimately, the key choice here is that of the threshold between those businesses (whether or not they are incorporated) that would be subject to the DBCFT, and those that would not be. The latter could most probably be subject to pass-through treatment.[61] Two questions arise in choosing the threshold. First, what should be the nature of the threshold: Should it be specified in terms, for instance, of having a certain number of investors, earning some level of profit or (like most VAT systems) having turnover above some level?[62] Second, at what level should that threshold be set?

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[59] Crawford and Freedman (2010) and the Mirrlees Review (2011) propose to maintain the corporation tax for incorporated businesses only, but to introduce the combination of a rate of return allowance at the personal level, an allowance for corporate equity at the corporate level, and an alignment of rates to limit shifting between personal and corporate taxes.

[60] There are restrictions on which businesses can elect for S corporation status. For example, S corporations are allowed a maximum of 100 shareholders, who must be US citizens or residents.

[61] Since in most countries shareholders in closely held corporations must pay some tax on distributions of corporate profits, to avoid competitive distortions investors in unincorporated businesses should similarly be taxed on distributions if those businesses bear the same DBCFT tax rate as corporations. This has the advantage of minimising distortions in competition between businesses, and in choices of legal form for businesses above the threshold.

[62] It is worth pointing out that one can cover most business activity, or at least the activity of large businesses that operate in a manner similar to corporations, without covering most businesses, given

The appropriate level of the threshold has been most extensively studied in relation to the VAT. This literature points to three main considerations.[63] First, a lower threshold tends to raise more revenue. Acting in the opposite direction, administration and compliance costs rise the more firms lie above the threshold. Another though somewhat less clear-cut consideration is that the more businesses that do not face the DBCFT, the greater are likely to be competitive distortions between different types of companies.[64] Businesses that are not subject to the DBCFT but are subject to pass-through treatment may be better or worse off than business subject to the DBCFT, depending on the relative rates of tax.

On balance, the best option may well be to follow the same approach as is standard under the VAT, and apply the DBCFT to all businesses over a certain (modest) size, measured by domestic sales. Indeed, an obvious and simple approach would be to set the threshold for the DBCFT at the same level as the VAT threshold.[65] Clearly, this alignment of the scope of corporation tax with VAT also brings the two reform options closer together. For any given turnover threshold, the scope of the DBCFT would then coincide with that from instead using the VAT plus payroll subsidy approach.[66]

The question also arises as to whether businesses outside whatever scope is determined should be allowed to register for the tax voluntarily – which they may wish to do to an even greater extent than under current VATs, in order to claim rebates. Efficiency considerations argue that they should be; but this may need to be tempered

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the size distribution of the business sector. For example, according to Auerbach (2010), in 2007 in the USA, 90 percent of all S corporations, accounting for 58 percent of all net income of S corporations, had at most two shareholders. Only 0.2 percent of the sector's returns, accounting for less than 8 percent of the sector's income, came from S corporations with more than 20 shareholders. So limiting the reform in the USA to those S corporations with more than a few shareholders would have a minor impact on the sector as a whole.

[63] See Ebrill et al. (2001), Keen and Mintz (2004) and, on empirics, Liu and Lockwood (2016).

[64] Further considerations arise when noncompliance is accounted for: see Kanbur and Keen (2015).

[65] See though Kanbur and Keen (2015), who show there can be disadvantages in aligning thresholds for distinct taxes (in aggravating the bunching of taxpayers just below them).

[66] As part of their credit-invoice method VATs, approximately two-thirds of OECD countries allow small businesses to elect to be exempt from VAT. Because small businesses exempt from the credit-invoice method VAT cannot claim input credits, and purchases from small businesses do not provide input credits, exempting small businesses generally does not provide a significant distortive advantage to those businesses. A small business exemption is more problematic in a DBCFT or subtraction-method VAT, because purchases from exempt small businesses may still be deducted by registered traders (Grinberg (2010), 342-43). This last feature means that one of the incentive to register voluntarily under the invoice-credit VAT- to enable crediting of the input tax on the inputs of a supplier selling to registered businesses - will not apply under the DBCFT.

by the costs and risk of controlling taxpayers who are a call upon rather than contributors to public funds.

b. Real versus financial flows under an R base, and debt v equity under an R+F base

As set out above, a DBCFT would likely best be structured to have R-base treatment for all cash flows but with special rules for flows between a taxed financial company and non-taxable entities. This then requires rules to counter attempts to avoid taxation by disguising R flows as F flows.

It is important to note, however, that this avoidance opportunity does not arise when both parties to a transaction are subject to tax. In that case – as set out above - the cash flow tax liabilities that would arise on financial transactions under an R+F base would net out. In such cases, the vendor's incentive to disguise R flows as F flows would be countered by the purchaser's incentive to treat the whole price as an R flow. Whilst the portion of the R disguised as an F would not be included in a vendor's inflows, it would also not be included in a purchaser's outflows meaning the latter would not obtain the corresponding relief.

So the avoidance opportunity arises only where one of the two parties to a transaction is not subject to the tax (being a tax exempt entity, for example, or an individual subject to an income tax), where the two parties are subject to the tax at different tax rates, or if full loss relief is not available and one of the parties has a taxable loss.

Rules to differentiate real and financial flows in these cases would need to be supplemented by rules to differentiate between flows related to debt and equity in the case of applying the R+F base to transactions with tax exempt entities. As equity flows are not part of the tax base under an R+F base, companies have an incentive to disguise debt as equity – for example, through the use of hybrid financial instruments - thus keeping financial payments out of the base entirely. But if the R+F base is limited to transactions of financial companies with tax exempt entities and individuals, the importance of this distinction is equally limited.

Turning to the alternative VAT based strategy, as discussed above, the starting point is that financial businesses are typically exempt from VAT; this means that they do not charge VAT on lending or other financial transactions, but neither are they permitted to reclaim VAT paid on inputs. It is generally recognised that this treatment is not ideal. The analysis above suggests that – as proposed for instance by Huizinga (2002) – business-to-business financial transaction be zero-rated, while cash flow treatment (along R+F lines) be applied for transactions with consumers or other non-taxable entities. In respect of financial transactions too, the VAT plus payroll subsidy approach could therefore be used to implement a reform which economically equivalent to a DBCFT; but this would require a significant reform of commonly-applied systems of VAT.

c. Losses

The issue of losses and negative tax bases arises in three contexts under the DBCFT.

Domestic

Because of immediate expensing, negative tax bases can arise under a cash flow tax even for successful companies operating in a purely domestic setting. Take for instance a rapidly growing company engaging in substantial capital investment in a particular year: immediate expensing of those investments could easily lead to a negative tax base, even if the company is projected to increase its revenue streams substantially as a result of its investment in the near future. If a cash flow tax is to be neutral with respect to marginal investment decisions, full relief, or some alternative equivalent, should be given. Box 2 illustrates this key point.

As this example highlights, providing relief for losses is critical to attaining one of key attractions of cash flow taxation. However, relief in the form of immediate refund could prove politically unattractive. Permitting the taxable loss to be carried forward indefinitely with an interest markup[67] does not in practice perfectly replicate the effect of immediate refunds, because of the possibility of company insolvency before the loss carried forward is actually used - but it does significantly alleviate it. Other

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[67] Bond and Devereux (1995, 2003) address the question of what interest rate is needed in the presence of risk; they show that a markup at the risk-free rate is sufficient as long as the amount carried forward is certain to be paid to the company. Where it is not, then a higher rate would be required that covered that specific risk.

possible solutions include: allowing the marketing of unused tax benefits associated with these activities, although this is not without its pitfalls, as the U.S. experience with "Safe Harbor Leasing" from the early 1980s illustrates;[68] allowing taxable losses to be used in the context of mergers with profitable businesses; or allowing taxable losses to be set against other taxes paid by the business, such as payroll taxes.[69]

Box 2. The Treatment of Losses

The table below illustrates the simple case of a company that makes an investment of 100 in period 1, and earns a total return of 120 in period 2. Suppose that the rate of interest is 5%, and that the company uses this rate of return to compare cash flows in the two periods. In this case, the 100 of investment in period 1 is equivalent to an outflow of cash in period 2 of 105. The economic rent earned by the investment in period 2 terms is therefore 15: the inflow of 120 less the marked-up outflow of 105.

Now consider alternative ways of taxing this investment, with a tax rate of 30%. Under a classic R-base cash flow tax, the initial investment would be immediately expensed, and so the tax payable in period 1 would be -30. If necessary, this could take the form of a payment of 30 to the company by the government. The period 2 value of this to the company, given the 5% interest rate, would be 31.5. The tax in period 2 would be 36. The period 2 value of the two elements of the tax combined is therefore 4.5. This is 30% of the economic rent, as is intended under a cash flow tax.

Now suppose that no rebate is available for the first period tax loss, but that it is instead simply carried forward to set against second period income. In this case, the tax base in period 2 would be 20 – the return of 120 less the carried forward loss of 100 – and so the tax would be 6. This tax base (20) exceeds the economic rent earned (15). The investment will still be attractive to the investor, since after-tax profit is positive; but this would not have been the case, for instance, had the project been only marginally profitable in the absence of tax. This effect can be removed by marking up the loss by the interest rate as it is carried forward. In this case, the loss brought forward into period 2 would be 105, and the period 2 value of the tax would revert to 4.5.[70] Note that this is similar in effect to the case where an allowance is given for the cost of finance, as under an allowance for corporate

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[68] See Warren and Auerbach (1982).

[70] This treatment has been proposed by, among others, the President's Advisory Panel (2005) and Carroll and Viard (2012).

equity (ACE). For suppose that relief for the cost of the investment is not available until the return is made, but that there is relief in period 2 for the opportunity cost of finance; this is the foregone interest of 5. In this case, the tax in period 2 is again 4.5, 30% of the economic rent.

Illustration of properties of alternative treatment of losses

	Period 1 cash flows	Period 2 cash flows	Period 2 value of investment/tax
Capital investment, and total return on investment	-100	+120	15
R base tax with immediate expensing, and full refund	-30	36	4.5
R base tax with immediate expensing, and loss carried forward	0	6	6
R base tax with immediate expensing, and loss carried forward with interest markup at 5%	0	4.5	4.5

The example in Box 2 does not include labour costs, so the position under a VAT would be exactly as the first row in the table, with an immediate rebate of expenses. An analogous problem thus arises, as is very familiar, under a VAT. It may seem rather different in kind, since the VAT rebate is as a refund of VAT paid on capital inputs purchased. If the firm purchasing the capital equipment had no sales in that period, then it can generally reclaim the VAT paid on that input. Combining this with a reduction in the tax on wages and salaries would yield exactly the same outcome as permitting a rebate for the negative tax charge under a cash flow tax. It may appear different because the negative VAT charge can be seen as a rebate of VAT already paid. However, the same broad principle also applies to a cash flow corporation tax charge, since the supplier would also be subject to the cash flow tax.

International

This issue of losses becomes more pronounced in an international setting, because the DBCFT taxes domestic sales less domestic expenses. So if a company produces in country A and sells all its produce in country B, then it would have a negative tax base in country A. That is because the expenditure incurred to provide goods and services both domestically and for export is set against revenues from domestic sales and not exports. The tax bases of firms that export a high percentage of their goods or services can thus easily be negative. This could be a permanent state of affairs for such firms, in which case they will not be helped by carrying losses back or forward with interest. In such situations, the options of allowing refunds in respect of negative tax bases or cross-crediting against other taxes, such as payroll taxes, become more important. [71]

If full relief were not provided the DBCFT would be likely to distort location decisions, losing an important aspect of its efficiency properties. To see this, consider the simple example in Table 11. Suppose that there are two countries, both operating a DBCFT, and both at the same tax rate, 30%. A company has expenditure of 100 and sales of 120. (For simplicity, in this example assume that these flows happen in the same period). Its sales are in country A, but it can choose whether to produce in A or B. If it chooses to produce in A then its tax base will be 20 and it will pay tax of 6. If it chooses to produce in B it will have a taxable loss in B of 100, and a taxable income in A of 120. If it receives a full refund in respect of the 100 of expenditure in B then its location decision will not depend on tax; it will continue to pay tax of 6. But if it receives no relief for the cost in B, then its tax base effectively becomes 120, with a tax liability of 40. Thus the treatment of losses in this case can be highly important for location decisions.[72]

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[71] Under this latter approach, it is of course conceivable that credit due on losses may exceed the amount of other taxes remitted. And where tax administration is weak, reliable cross-crediting may be difficult to achieve.

[72] Note that the distortion does not come from differences in the treatment of losses: as in this example, a common but imperfect treatment distorts because some locations choices imply losses while others do not. The symmetric treatment of losses is also important for the effects on exchange rates, or prices under a fixed exchange rate regime, which, discussed above, are important for the efficiency properties of the DBCFT.

Table 11. Illustration of effects of not receiving relief for expenditure

	Produce in A	Produce in B
Expenses in A	-100	-
Expenses in B	-	-100
Sales in A	120	120
Tax base in A	20	120
Tax base in B with full offset	-	-100
Tax base in B with no offset	-	0
Total tax base with full offset	20	20
Total tax base with no offset	20	120

There may be some doubt as to the willingness of countries to provide relief for expenditure incurred to produce revenue which they will not tax. However, three considerations should be kept in mind.

First, some countries have been willing to accept similar situations under the existing corporate tax system. For example, they have allowed relief for interest expenses on domestic loans used to equity finance the activities of foreign subsidiaries even when they exempt the dividends paid back from the foreign subsidiaries. The UK has presented such generous treatment of interest expense as a competitive advantage.[73]

Second, under a DBCFT countries would also tax domestic sales by foreign firms. So while countries may find themselves giving relief for expenditure incurred to produce revenue they will not tax, they may also collect tax revenues reflecting business expenditure for which they did not provide relief. From the country's perspective, the revenue consequences should be seen at an aggregate level, where an element of quid pro quo is at play, and not at the level of an individual company. In aggregate the net effect on the tax base hinges on the relative magnitude of exports and imports; this question was addressed in the previous section.

Third, competitive forces provide countries with a powerful incentive to provide full relief under a DBCFT. Failure to do so would place them at a competitive disadvantage in attracting business activities relative to countries which give full relief. To take the

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[73] HM Treasury (2010).

example in Table 11 above, if B did not provide relief for the expenditure, the company would have an incentive to locate its activities in A. This would be true for most companies that aimed to supply an export market. In fact, the opposite problem might arise in that countries which are particularly keen on attracting certain activities, such as manufacturing, would have an incentive to compete by going beyond full relief through overly generous expensing rules or interest rates on losses carried forward.

Note that the same issues arise if reform takes the form of a VAT plus a payroll subsidy. A domestic firm that exports all of its output is generally permitted to reclaim any VAT that is has paid on inputs. In general, this rebate would be less than that required under a DBCFT since the VAT does not give relief for labour costs. But combining the VAT with a payroll subsidy would automatically also give the same relief for labour costs as under the DBCFT. Under normal VAT rules then, the VAT plus payroll subsidy approach would be equivalent to giving a full rebate for the taxable loss described above. There is perhaps a difference in perception here, in that the VAT rebate itself would be separate, and is generally seen as a repayment of VAT paid at an earlier stage of production. But, given the matching reduction in taxes on (or subsidy to) wages and salaries, the VAT plus payroll subsidy approach would of course be equivalent to giving a full rebate under the DBCFT.

Financial institutions

We saw merit above in applying an R base for financial firms when transacting with non-financial firms subject to tax at the same rate, and an R+F base when transacting with non-taxable entities. That is, financial companies would be taxed on their net financial inflows from non-taxable entities, less all real costs (for example, for purchases of labour and other inputs) that it incurs. As described at length above, *all* real costs would be allowable against tax, since in effect the economic rent generated from lending to taxed businesses is taxed in the hands of the borrower. An advantage of this approach is that non-financial firms do not need to keep track of their financial flows for tax purposes (although they do need to distinguish real and financial flows). But, if a financial firm does not have a sufficient and positive net cash flow from tax exempt entities and individuals, then it may be left with a negative tax base. This does not mean that it is not profitable, nor that tax has not been levied on the total profit generated; it simply means that some important income will be taxed in the hands of

the borrower, not the lender. At an aggregate level, total tax collected will be the same as under an R+F base applied to all businesses.

Just as above, efficiency requires financial companies that find themselves in this position to be refunded in respect of their negative position. From an implementation perspective this might raise some concerns. In particular, again it is possible that countries may be unwilling to pay tax refunds to financial firms in a taxable loss position. As with the problem of international flows in the previous subsection, this taxable loss may be permanent, and so cannot be dealt with through carrying the loss back or forwards, even with an interest mark-up.

A different solution to dealing with the taxable losses of financial companies therefore needs to be found: while the problem mirrors that of dealing with the taxable losses of exporters discussed above, it is amplified by the non-taxation of some domestic transactions by financial institutions. One approach might be to allow taxable losses of financial institutions to be transferred to non-financial businesses that are in a taxpaying position. This could in principle be achieved, in effect, by making the netting of business-to-business financial transactions optional, although introducing this option would complicate the system and could introduce distortions if transferability still left financial institutions in loss positions.[74] Another approach would again be that of allowing financial institutions to offset their taxable losses under this cash flow tax against other taxes to which they are subject, for example, payroll taxes or special taxes levied on the financial sector.

In an international setting, with banks lending to non-domestic tax exempt entities, the position is the same as for other exporters; relief should be given for costs incurred domestically, even though there may be no taxable income to match those costs. This would be true if the R+F base were applied generally, as well as under the mixed R and R+F approach discussed here. Once again, it is necessary to find a way to reimburse the loss, in order to preserve economic efficiency. Again, this could be done by crediting the taxable loss against other taxes, such as payroll taxes or special taxes levied on the financial sector.

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[74] In that case, financial firms would have an incentive to net flows that would have increased taxes on nonfinancial firms (e.g., payments to them by financial firms) and not to net flows that reduce taxes on nonfinancial firms (e.g., payments by them to financial firms), as there would be immediate tax consequences of these choices only for the nonfinancial firms involved.

As noted above, VAT is generally levied only on real flows, and not financial flows. The combination, however, of a VAT reformed along the lines described above – zero-rating B2C and applying cash flow treatment to B2B transactions – and payroll subsidy would be equivalent to giving an immediate tax rebate under the DBCFT.

d. Destination

A central element in the implementation of a DBCFT would be operationalizing the relevant notion of "destination", identifying "exports" to be taken out of tax and "imports" to be brought in. In setting about this, the design of a DBCFT can usefully draw on experience under the VAT, for which notions of destination have been most fully discussed and developed.[75]

The OECD defines the destination principle as the "principle whereby internationally traded services and intangibles should be subject to VAT in their jurisdiction of consumption" (OECD, 2013).[76] This clearly identifies the VAT notion of "destination" as a proxy for the place of consumption. However, the fundamental principle underlying the DBCFT is not that the tax should be levied in the place of consumption per se, but that the tax rate that is ultimately important should be that of a place of relative immobility; and a more immobile location than the place of consumption is likely to be the place of residence of the consumer, rather than the place of consumption.

The use of proxies is a near-universal feature of VAT systems, recommended by the OECD as an appropriate way in which to establish destination. The complexity of this approach varies. For example, the European VAT system has been particularly complex, with determination of the place of taxation of any specific transaction depending on such issues as: whether the supply involved goods or services; the identity of the acquirer, in particular whether she is a VAT registered person; the timing of the supply; the location of the supply; and the nature of the goods or services supplied.[77]

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[75] It has to be said, however, that there has been endless scope for confusion in the VAT context in the both the usage of the term 'destination' and the notion of 'consumption': see Keen and Hellerstein (2009-10).

[76] OECD *(*2013), as above, p. 3.
[77] See de la Feria (2009).

For the purposes of implementing a DBCFT, Devereux and de la Feria (2014) analyse in some detail the use of proxies for "destination" in VAT. Taking into account the aim of having a relatively immobile tax base, they recommend the use of the customer location proxy, defined as "the location, residence, or place of business of the customer, the person to whom the seller has a contractual legal obligation to supply the goods." They propose this for goods and services and for both business-to-business (B2B) and business-to-consumer (B2C) transactions.

For cross-border trade in goods, they argue that this would achieve a definition of destination in most cases with minimal complexity.[78] It is possible that in some cases the customer location proxy might not lead to taxation in the country of destination. But for simplicity, and as long as this does not create administrative difficulties or opportunities for avoidance or fraud, using a single proxy avoids many of the common problems in existing systems of VAT.

Establishing the destination of services can be more complex,[79] and a challenge for VAT design is how to identify the destination of services in the absence of physical flows.[80] For implementing a DBCFT, Devereux and de la Feria (2014) argue that the customer location proxy would work well in most cases, and this is indeed recommended by the OECD as the main rule for B2B transactions. In B2B transactions this proxy can be easily applied by reference to the business agreement, though it can be problematic where the customer has establishments in more than one jurisdiction and the services are used by one or more establishments under an internal recharge arrangement.[81]

B2C transactions in cross-border services create difficulties for administrative obligations, since applying the customer location proxy may result in a requirement to register for VAT purposes in every jurisdiction where services are received. If these administrative obligations can be overcome then the customer location could work as a good proxy for establishing destination, without any need to use further proxies. However, Devereux and de la Feria propose that in exceptional circumstances the

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[78] Using this proxy alone may not lead to taxation in the country of consumption. For example, when an intermediary buys goods to be consumed by someone else, other proxies are often used in conjunction, such as the place of effective use or enjoyment. This however is not a problem for the DBCFT since destination is not proxy for consumption.

[79] The OECD has issued several guidelines on how to apply the destination principle to services, culminating in the release of a complete set in 2015; see OECD (2013).

[80] Keen and Hellerstein (2009-10).

proxy used vary from the customer location proxy, particularly for B2C transactions where that rule would be too burdensome. This will be the case where the supply of services requires the physical presence of both the supplier and the customer in some way, such as restaurant services, concerts and sports events. In such cases they recommend the place of performance of a service or the place of location of a good as a proxy, since the destination is readily identifiable as the place where the supply is carried out, and applying the customer location proxy could potentially lead to distortive results and fraud, as well as being burdensome for suppliers. However, the use of this proxy in these cases creates a minor distortion between cross-border shopping - where the place of location proxy is used - and e-commerce - where the customer location proxy would be used.

Of course, if the the reform took the form of an increase in the rate of an existing VAT combined with a payroll subsidy, then it would appear to be more straightforward simply to use the existing VAT law, rather than to introduce reforms to the definition of "destination." Increasingly, however, countries are in any case likely to model their rules around the OECD Guidelines. For countries that do not currently have a VAT, such as the US, then there is no such easy route to increasing use of the destination principle. In these cases, the discussion above about how to define destination holds irrespective of the form the reform takes.

e. Collection

The collection of the DBCFT raises some challenges. A DBCFT could leave B2B transactions between entities taxed in distinct countries out of the tax base entirely. Exports would be zero-rated, and as discussed above, imports purchased by businesses could be ignored (either taxed but with relief, or neither). So the challenges for collecting revenue under a DBCFT relate primarily to cross-border B2C transactions. (And, of course, one issue is to be able to identify whether a transaction is B2B or B2C).

The DBCFT would tax imports purchased by individual consumers and non-taxable entities. Where a customer purchases a good or service directly from a business in another country, a tax should be levied at the rate of the destination country. Two options open to the destination country are to collect the tax from the exporting company or from the consumer. The former appears to be the more realistic option,

although not without difficulties of its own, especially in the absence of fiscal borders, or for digital products, as is clear from the operation of VAT. These are, in any case, issues that already arise under the VAT.

The DBCFT could be seen as a tax on the net domestic inflows of domestic businesses, plus a tax on non-resident businesses that export to domestic consumers. This is a familiar problem for VAT systems based on destination. In principle it would be necessary for the company to register for tax in the country into which it is exporting the good or service; this is difficult to administer for relatively small exporters, particularly when the good or service can be downloaded electronically, or where there are no customs operations at borders. The exporter must also identify the location of its customer, and whether the customer is a business or a consumer. The tax authority must identify companies from around the world that export to its country, and also guard against any opportunities for fraud if final consumers pretend they are businesses. For this purpose, gathering information from intermediaries such as credit card and other payment companies will be an important enforcement tool, both for a DBCFT and a VAT.

One innovation in the EU that could be applied amongst cooperating countries is a "one stop shop", as proposed by Devereux and de la Feria (2014) and the Gaspar Committee (2014). Under such a system a company selling into several separate countries would need to register in only one; in many cases that is likely to be the origin country from which the company exports. The tax authority in that country would administer the DBCFT at the rate of the country to which the good or service is exported. Going beyond what has yet been achieved in Europe, one could envisage a clearing arrangement at the aggregate level, where payments are made between tax authorities in recognition of the appropriate recipient of the tax. Such cooperation would clearly create a significant administrative simplicity relative to the case in which the exporter is required to register and pay tax in each country in to which it exports.

It is worth noting that the one-stop-shop approach makes the need to deal with a negative tax base in a specific business less likely. Suppose, for example, that a business in A exports to a consumer in B. The tax authority in A charges tax on sales in B at B's tax rate, net of relief for expenses incurred in A and A's tax rate. As long as the business is profitable overall, and tax rates are not too different, then it is likely that the business will have a positive tax base in A. The implicit negative tax base in A

would be netted against similar implicit negative tax bases in B for business in B exporting to A, and would be cleared at an aggregate level.

The implementation of collecting a tax on imports by individuals is broadly similar whether the DBCFT is introduced in its corporation tax form, or as a VAT plus payroll subsidy.

f. Tax Treaties and the WTO

It is unclear whether the DBCFT would be considered as an income tax which would fall within the ambit of bilateral tax treaties. If so, then it would clearly be in violation of a number of provisions of such treaties. In this case, the two parties to the treaty may be able to renegotiate the treaty provisions, but if that were not possible, it is possible that the treaty would be terminated. If the DBCFT was considered not to fall within the ambit of the treaty, then the treaty could continue, but the non-DBCFT country would not be obliged to give any credit against tax levied by the DBCFT country.

It is also critically important to recognize that many (e.g., Schön, 2016) have argued that a DBCFT would be inconsistent with WTO rules. The primary concern with the DBCFT under WTO rules relates to the deduction for labour costs. Compare the purchase of an imported good with that of an identical domestically-produced good. The labour costs of the latter are allowed as a deduction in the country of sale – since in this case it is also the country of origin. But no comparable relief is given in the country of sale for the labour costs incurred in producing the imported good. It is argued that this makes the DBCFT incompatible with WTO rules.

In contrast, a credit-invoice VAT on a destination-basis is unambiguously WTO compliant since it does not give relief for either form of labour costs. So too, of course is reducing payroll taxes, or even instituting a general wage subsidy. The VAT cum payroll subsidy equivalent to the DBCFT would thus face no prospect of legal challenge in the WTO or any need for re-negotiation of trade agreements (President's Advisory Panel, 2005; Hufbauer, 1996; Schön, 2016.)

To economists, of course, this legal distinction between two equivalent tax structures makes no sense. The only difference in practical terms is that the relief for labour

costs is given inside the DBCFT, but as a standalone measure under the VAT cum payroll subsidy approach. But there may also be equivalent intermediate approaches under which the relief for labour costs is more of a standalone measure. As we have argued above in Section II (1)(a), due to exchange rate movements or wage and price adjustments under a fixed exchange rate, neither reform option creates any discrimination in favour of domestically produced goods. A reduction in payroll taxes does encourage domestic production to the extent that it lowers domestic production costs; but this is true of any reduction in source-based tax rates.

The fact remains, however, that because WTO compliance is determined by interpretation of existing legal agreements and not by virtue of economic equivalences, it is unlikely that a DBCFT, drafted with an integrated wage subsidy, would, if challenged, be held to be WTO compliant. Without a separation of the wage component, a renegotiation of those agreements would therefore be likely to be required.

g. Transitional issues

Moving to a cash flow tax base would introduce well-known transitional issues of implementation. For example, there is a question of how to treat the pre-enactment basis in existing assets, including plant, equipment, and inventory. Proponents of cash-flow taxes have typically recommended deductions over time for a business's pre-enactment basis.[82] Similar issues arise in how to treat pre-enactment debt, pre-enactment loss carry-forwards and unused business tax credits. We do not explore these here, though none seems unmanageable.

Consideration also needs to be given to the possible announcement effects of reform. In a fixed exchange rate regime context, for example, with sticky wages one might expect forward purchasing, particularly of durables, in advance of the expected increase in consumer prices[83] (which then may itself be to some degree brought forward). With a flexible exchange rate, the nominal appreciation from BTA would be

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[82] President's Advisory Panel (2005) (who proposed a five-year period for deduction of basis) and Carroll and Viard (2012) (who proposed a 10-year period).
[83] Evidence of such effects can be found in Danninger and Carare (2008) and Büttner and Madzharova (2016).

expected to start in advance of implementation, bringing forward balance sheet and wealth effects and influencing trade as well.

As noted above, either the DBCFT or the VAT plus payroll subsidy approach could be introduced gradually. But perhaps most easily, it could be introduced by a gradual increase in the rate of VAT (although this would be subject to concerns about multiple rates), a gradual reduction in the payroll tax and a gradual reduction in the rate of existing corporation tax. Indeed, in the absence of any fundamental reform, it seems likely that trends in this direction – similar to the fiscal devaluation discussed above - will continue, prompted by strong underlying economic forces of competition between countries. While this process continues, VATs and corporate income taxes could co-exist. For countries that wish to maintain corporate income taxes – to counter the possibility that a DBCFT would serve to shelter capital income of the business's investors, or because they would like to continue to tax domestic production – then increasing VAT and reducing corporate income taxes and payroll taxes may be an attractive alternative to the full implementation of a DBCFT.

h. Other issues in comparing the two approaches

A variety of other issues also arise in choosing between the introduction of a DBCFT and the alternative approach of increasing the rate of an idealized VAT (or introducing a new one).

The credit-method VAT has an advantage over the DBCFT approach, which is similar to that of a subtraction-method VAT, since it has now been put in place in more than 160 countries worldwide. There is therefore considerable experience of how they work best. By contrast, there is little experience with a DBCFT approach, or with the subtraction-method VAT.[84] As noted above, there is an advantage of the invoice-credit approach where small businesses, non-profit organizations, and/or state and local governments are exempt from the tax.[85]

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[84] Many analysts have described the Japanese VAT as a subtraction-method tax. See, e.g., Bartlett (2009), Grieco and Hufbauer (2005). Alan Schenk and Oliver Oldman more accurately describe it as a "credit-subtraction" VAT, as opposed to the "sales-subtraction VAT"; see Schenk and Oldman (2007).
[85] See, for example, Grinberg (2010), Weisbach (2000) and McLure (1997, 1987).

The invoice-credit approach also has an advantage where it is desired to have more than one rate, although in general, the presumption would be that the DBCFT should apply at the same rate for all goods. Indeed, one problem with relying on existing VATs is that they generally exclude many goods and services from the tax base. This would suggest that the VAT approach would be more attractive in countries which have a broader VAT base or no VAT at all.

For a country without an existing VAT that wants to continue to tax production and so does not wish to eliminate its source-based corporate tax, adopting a DBCFT would seem to require two business tax regimes, which could be administratively burdensome. However, if the country were willing to convert its existing corporate tax to a cash flow tax that is only partially destination-based, administrative burdens would be minimised. For example, if a country adopted a cash flow tax system generally with a 25% tax rate and provided that exports were 40% zero-rated for the tax and imports were 40% non-deductible, then the system would be equivalent to a DBCFT at 10% plus a source-based cash flow tax on production at 15%. (Indeed one could envisage this a structure for gradual movement towards a full DBCFT, gradually increasing that 40%). The tax on production would be similar to a corporate income tax, but by allowing expensing and disallowing interest deductions, it would avoid the distortions created by debt financing and depreciation deductions.

A VAT, unlike the DBCFT, taxes consumption out of all wage income, including high wage income, as well as out of rents from capital. In some countries, political barriers may limit high tax rates on wage income. In such instances, coupling a VAT with payroll tax relief for low and moderate wage earners may achieve more progressivity than a DBCFT with wages taxed only at the individual level.

In the previous section we discussed the problem that exporting firms would have a negative tax liability under the DBCFT, and possible approaches to this. A lack of refunds in a DBCFT might create distortions in the locations of both production and corporate residence. The problem is reduced in the case of a combination of VAT and payroll subsidy. But as noted above, the VAT and payroll subsidy approach would in effect be equivalent to giving an immediate rebate for taxable losses under the corporation tax or subtraction-method VAT approach. In effect the potential tax "loss" observed in the DBCFT due to wage expenses not being matched by income is incorporated into the reduction in the payroll tax.

Unlike a VAT, a DBCFT – and a payroll subsidy or tax reduction - must identify and give relief for wages. As noted above, this is generally problematic for all taxes on the income derived by closely held businesses, in that wages must be distinguished from non-deductible payments to the firm's suppliers of capital. In general, this problem cannot be solved completely without some form of rules that distinguish between returns to capital and returns to the labour of capital providers. In the U.S., for example, the Internal Revenue Service has tried to limit wages to "reasonable compensation." Since partnerships and other flow-through entities are typically taxed on their capital and labour income, this problem has not arisen for such entities. But where business income is taxed at substantially lower rates than wage income, rules distinguishing the two are necessary. This is true regardless of whether a country adopts a DBCFT or VAT with payroll subsidy; rather it is a function of whether after either form of tax is adopted, wages are taxed at higher rates.

One further issue is how the two alternative approaches would be treated in financial accounting. The treatment of credit-invoice VATs is well settled: the tax has no effect on earnings reported to shareholders. But the financial accounting of the DBCFT is uncertain. It could be treated as an operating expense. Alternatively, it could be treated as an income tax. The latter treatment could lead to serious distortions if behaviour is driven by profits as reported in the financial accounts, due to the innumerable timing differences between a cash flow tax and an income tax.

3. Final Thoughts

The DBCFT is an unfamiliar concept to many, and its economic consequences – especially the impact of the border tax adjustment on exchange rates and prices – are difficult to explain and to understand. Yet the destination element of the DBCFT is taken from the VAT, which was also once unfamiliar – and may continue to be in countries that have not yet adopted one. We believe that there is a need for clear, dispassionate analysis of the complex issues involved in discussing international tax and its potential reform; that is what this paper - and the book of which it is to be part - has tried to provide.

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Appendix. Cash flow treatment v mark-up treatment for financial flows

In our discussion of the treatment of financial flows, we mentioned the possibility of defer tax liabilities on financial inflows until the deductions for the corresponding outflows arise. The deferred values would be identified in a "tax calculation account" (TCA).[86]

We illustrate this idea in the Table below. In the table a company borrows 100 from a bank in period 1; the tax rate is 30%. Under the R+F base, the bank would receive tax relief of 30, and the borrower would pay tax of 30. In period 2, borrower repays 110, including 10 of interest. Again, under the R+F base, the bower would receive tax relief of 33, and the bank would pay tax of 33. Under the TCA, however, the period 1 liabilities would be deferred and carried forward to period 2. Assuming a markup of 5% on the carried forward amounts, the bank would have a brought forward deferred asset in period 2 of 31.5, and the company would have a brought forward deferred liability of 31.5. These would be set against the notional tax payment of 33 for the bank, and notional tax relief of 33 for the company. This implies that the only tax liabilities would be in period 2; a tax charge of 1.5 for the bank offset by tax relief of 1.5 for the company.

Treatment of Financial Flows under the TCA

		Period 1: Lending	Period 2: Repayment with interest
Pre-tax cash flows	Bank	-100	+110
	Borrower	100	-110
Carried forward deferred tax asset or liability	Bank	30	-
	Borrower	-30	-
Tax	Bank	0	1.5
	Borrower	0	-1.5

More generally, the bank's tax liability in period 2 would be positive or negative depending on whether the interest rate on borrowing was less than, or greater than, the rate of markup. As long as the rate of markup matched the company's discount

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[86] See Poddar and English (1997), Merrill (2011).

rate, then this approach would generate exactly the same net present value of tax payments as the R+F base.

The timing of the TCA approach more closely resembles that of the current approach to interest deduction and taxation, with no immediate tax consequences of borrowing or lending. Since we are advocating R-base treatment for financial flows between tax-paying entities, the application of TCA treatment would only be on transactions between a financial company and tax exempt entities and individuals. in the example above with a tax exempt entity, the bank would simply pay tax of 1.5 in period 2.

An advantage of the F approach over the TCA approach is that it removes the need to determine the appropriate interest rate to use for the markup in the TCA account. As is clear from the example above, the rate of markup is crucial in determining the size of the total tax associated with borrowing, including whether the tax is positive or negative. If the rate is set too low, then there could be an effective subsidy to the use of debt. Correspondingly, if it is set too high, then the tax would partly fall on normal income as well as economic rent.

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Problems with Destination-Based Corporate Taxes and the Ryan Blueprint

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DRAFT 1/15/17

**PROBLEMS WITH DESTINATION-BASED CORPORATE TAXES
AND THE RYAN BLUEPRINT**

**Reuven S. Avi-Yonah[1]
Kimberly Clausing[2]**

ABSTRACT

With the election of Donald Trump and the Republican Party's domination of Congress, House Speaker Paul Ryan's blueprint for fundamental tax reform requires more careful analysis. The Ryan blueprint combines reduced individual rates with a destination-based cash flow type business tax applicable to all businesses. The destination based Business tax at the center of the blueprint has several major problems: It is incompatible with our WTO obligations, it is incompatible with our tax treaties, and it will not solve the problems of income shifting and inversions it is designed to address. In addition, these proposals generate vexing technical problems that are not easily fixed as well as significant political problems. Finally, due to the tax rates that have been proposed, the plan is likely to generate large revenue losses and a less progressive tax system. We conclude by recommending better tax policy solutions to our current corporate tax problems.

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1. Introduction

This section describes the Ryan proposal in more detail, describing in particular the plan's destination-basis corporate tax. Section 2 discusses problems of WTO compatibility and trade distortions under this plan. Section 3 discusses issues surrounding tax treaty compatibility, and Section 4 discusses the lingering potential for profit shifting under the plan. Section 5 describes technical problems associated with implementing the plan. Section 6 addresses effects on the progressivity of the tax system and on government revenues, and Section 7 concludes and offers other suggestions for reform.

House Speaker Paul Ryan's (R-WI) blueprint to reform the tax code is gaining new prominence because of the Republican ascendancy in Washington following the 2016 election.[3] Since President Trump is likely to sign any tax reform passed by a Republican Congress, it is worth serious consideration.

The introduction to the Ryan proposal (the "Blueprint") states that:

> This Blueprint represents a dramatic reform of the current income tax system. **This Blueprint does not include a value-added tax (VAT)**, a sales tax, or any other tax as an addition to the fundamental reforms of the current income tax system. The reforms reflected in this Blueprint will deliver a 21st century tax code that is built for growth and that puts America first.[4]

This statement is important, because as will be discussed below, the business part of the proposal can be seen as a modified subtraction method VAT. If it were a VAT, it would not have problems with tax treaties or with the WTO rules. But since it declares itself not to be a VAT, and has at least one crucial feature that differs from a VAT, it may have problems with both.

The individual tax section of the Blueprint is not a structural change, although it is quite regressive and would lead to massive budget deficits.[5] It envisages a lower rate structure for ordinary income (up to 33%), a capital gains and dividends and interest rate that is half the rate for ordinary income (up to 16.5%), and abolishing the individual AMT and estate tax. For pass through businesses, the Blueprint envisages a rate of 25%, with special provisions to prevent shifting of wage income to pass throughs.

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[3] https://abetterway.speaker.gov/_assets/pdf/ABetterWay-Tax-PolicyPaper.pdf ("A Better Way").

[4] A Better Way, 15 (emphasis added).

[5] See the TPC analysis, which estimates that the Blueprint would decrease revenue and increase the debt by $3 trillion over the first decade. http://www.taxpolicycenter.org/sites/default/files/alfresco/publication-pdfs/2000923-An-Analysis-of-the-House-GOP-Tax-Plan.pdf.

A particularly radical portion of the Blueprint is the corporate section. In addition to cutting the corporate tax from 35% to 20%, the Blueprint envisages three major reforms.[6] First, businesses will be allowed to expense capital expenditures, resulting in a zero rate for the marginal return on investment:

> This Blueprint will provide businesses with the benefit of fully and immediately writing off (or "expensing") the cost of investments. This represents a 0 percent marginal effective tax rate on new investment..[7]

Second, businesses will not be able to deduct net interest expense:

> Under this Blueprint, job creators will be allowed to deduct interest expense against any interest income, but no current deduction will be allowed for net interest expense. Any net interest expense may be carried forward indefinitely and allowed as a deduction against net interest income in future years.[8]

Third, the Blueprint will be destination based, i.e., be fully imposed on imports (without any deductions) and not imposed at all on exports:

> This Blueprint eliminates the existing self-imposed export penalty and import subsidy by moving to a destination-basis tax system. Under a destination-basis approach, tax jurisdiction follows the location of consumption rather than the location of production. This Blueprint achieves this by providing for border adjustments exempting exports and taxing imports, **not through the addition of a new tax but within the context of the transformed business tax system**. The Blueprint also ends the uncompetitive worldwide tax approach of the United States, replacing it with a territorial tax system that is consistent with the approach used by our major trading partners.[9]

This means that imports will be taxed and exports exempted. In addition, the Blueprint will enable dividends from foreign subsidiaries of US based multinationals to be fully exempt, but will maintain the current Subpart F provisions for passive income, eliminating only the base company rule and section 956:[10]

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[6] As explained below, if the Blueprint proposal reduced profit shifting opportunities as its proponents believe, it is not clear why a rate cut is indicated since the main rationale to cut corporate tax rate is reducing base erosion and profit shifting (BEPS).

[7] A Better Way, 25.

[8] A Better Way, 26.

[9] A Better Way, 27 (emphasis added).

[10] The base company rule (IRC sec. 954) provides that selling goods or services through a "base company" in a low-tax jurisdiction triggers US tax to the parent, and IRC section 956 provides that using income otherwise eligible for deferral to invest in US property (including a loan to the parent) triggers US tax to the parent. The latter rule has been under

Today, all of our major trading partners raise a significant portion of their tax revenues through value-added taxes (VATs). These VATs include "border adjustability" as a key feature. This means that the tax is rebated when a product is exported to a foreign country and is imposed when a product is imported from a foreign country. These border adjustments reduce the costs borne by exported products and increase the costs borne by imported products. When the country is trading with another country that similarly imposes a border-adjustable VAT, the effects in both directions are offsetting and the tax costs borne by exports and imports are in relative balance. However, that balance does not exist when the trading partner is the United States. In the absence of border adjustments, exports from the United States implicitly bear the cost of the U.S. income tax while imports into the United States do not bear any U.S. income tax cost. This amounts to a self-imposed unilateral penalty on U.S. exports and a self-imposed unilateral subsidy for U.S. imports.

Because this Blueprint reflects a move toward a cash-flow tax approach for businesses, which reflects a consumption-based tax, the United States will be able to compete on a level playing field by applying border adjustments within the context of our transformed business and corporate tax system. For the first time ever, the United States will be able to counter the border adjustments that our trading partners apply in their VATs. The cash-flow based approach that will replace our current income-based approach for taxing both corporate and non-corporate businesses will be applied on a destination basis. This means that products, services and intangibles that are exported outside the United States will not be subject to U.S. tax regardless of where they are produced. It also means that products, services and intangibles that are imported into the United States will be subject to U.S. tax regardless of where they are produced. This will eliminate the incentives created by our current tax system to move or locate operations outside the United States. It also will allow U.S. products, services, and intangibles to compete on a more equal footing in both the U.S. market and the global market.[11]

The Blueprint then addresses the potential WTO issue as follows:

The rules of the World Trade Organization (WTO) include longstanding provisions regarding the use of border adjustments. Under these rules, border adjustments upon export are permitted with respect to consumption-based taxes, which are referred to as indirect taxes. However, under these rules, border adjustments upon export are not permitted with respect to

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pressure recently because of the $2.5 trillion in deferred income of foreign subsidiaries of US parents located in low-tax jurisdictions.

[11] A Better Way, 27 (emphasis added).

income taxes, which are referred to as direct taxes. This disparate treatment of different tax systems is what has created the historic imbalance between the United States, which has relied on an income tax – or direct tax in WTO parlance – for taxing business transactions, and our trading partners, which rely to a significant extent on a VAT – or indirect tax in WTO parlance – for taxing business transactions. Under WTO rules, the United States has been precluded from applying the border adjustments to U.S. exports and imports necessary to balance the treatment applied by our trading partners to their exports and imports. **With this Blueprint's move toward a consumption-based tax approach, in the form of a cash-flow focused approach for taxing business income, the United States now has the opportunity to incorporate border adjustments in the new tax system consistent with the WTO rules regarding indirect taxes.[12]**

This approach is similar to the one taken by the 2005 advisory panel on tax reform in the Growth and Investment Tax (GIT) proposal. Under the GIT, corporations were subject to a cash flow tax with expensing and no deduction for interest, but wages were deductible. The GIT was destination based, but for revenue estimating purposes, the revenue associated with border adjustments was disregarded because of concerns about WTO compatibility. Since the US has a large trade deficit, this represented a difference of **$775 billion dollars** in revenues over the ten-year budget window.[13]

2. **Is the "Better Way" proposal compatible with the WTO?**

Under the WTO Subsidies and Countervailing Measures (SCM) Agreement, a tax may only be border adjustable if it is an "indirect" tax. A border adjustable "direct" tax is a prohibited export subsidy that can subject the US to trade sanctions.

Annex I of the SCM includes as a prohibited export subsidy:[14]

> (e) The full or partial exemption remission, or deferral specifically related to exports, of direct taxes (58) or social welfare charges paid or payable by industrial or commercial enterprises (59).

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[12] A Better Way, 28 (emphasis added).
[13] The President's Advisory Panel on Federal Tax Reform, "Simple, Fair, and Pro-Growth: Proposals to Fix America's Tax System," Brookings, November 2005, https://www.brookings.edu/wp-content/uploads/2015/10/presidents_advisory_panel_report_2005.pdf, p. 114
[14] In addition, it is likely that the Blueprint would constitute prohibited discrimination against imports and in favour of domestic production under Article 3 of the GATT, because foreign businesses exporting to the US would be pressed to move production to the US in order to get a deduction for wages. This is particularly true for manufacturing units in emerging/developing countries, where you do not have sufficient local sales to compensate with.

Footnote 58 provides:

> For the purpose of this Agreement:
>
> The term "direct taxes" shall mean taxes on wages, profits, interests, rents, royalties, and all other forms of **income**, and taxes on the ownership of real property; ...
>
> The term "indirect taxes" shall mean sales, excise, turnover, **value added**, franchise, stamp, transfer, inventory and equipment taxes, border taxes and **all taxes other than direct taxes** and import charges.

Footnote 59 provides:

> The Members recognize that deferral need not amount to an export subsidy where, for example, appropriate interest charges are collected. The Members reaffirm the principle that prices for goods in transactions between exporting enterprises and foreign buyers under their or under the same control should for tax purposes be the prices which would be charged between independent enterprises acting at arm's length. Any Member may draw the attention of another Member to administrative or other practices which may contravene this principle and which result in a significant saving of direct taxes in export transactions. In such circumstances the Members shall normally attempt to resolve their differences using the facilities of existing bilateral tax treaties or other specific international mechanisms, without prejudice to the rights and obligations of Members under GATT 1994, including the right of consultation created in the preceding sentence.
>
> Paragraph (e) is not intended to limit a Member from taking measures to avoid the double taxation of foreign-source income earned by its enterprises or the enterprises of another Member.

The business tax regime of the Blueprint can be seen as a *modified* version of a consumption tax-specifically, a subtraction method VAT (although the Blueprint explicitly denies that it is a VAT). Specifically, the Blueprint imposes tax on cash flow, allows expensing of capital expenditures, and disallows net interest expense. All of these are also features of a subtraction method VAT.[15]

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[15] A subtraction method VAT is a cash-flow tax that includes all sales but allows a deduction for all outlays, except for interest and wages. In principle, it has the same tax base as the normal invoice-credit VAT, as adopted by most countries. In an invoice-credit VAT, tax is paid at each stage of production on the sale price of outputs, with a credit given for tax on inputs. Both methods can be origin or destination based, but all existing VATs are destination based (imports are taxed and exports are exempt). The main difference is administrability: In an invoice-credit VAT, no credit is given unless tax was paid on the input, as shown on an invoice. In a subtraction method VAT, care must be taken not to allow a deduction unless there is a corresponding inclusion by the provider of goods, services or

However, the Blueprint does allow a deduction for wages, while a subtraction method VAT would disallow them. This feature probably makes the Ryan tax not WTO compatible.[16] Fundamentally, we need to consider the reason why a VAT, whether using a credit-invoice or subtraction method of calculating the tax, is border adjustable. Sales taxes, excises and VATs are border adjustable because there is no distortion introduced by the tax; goods receive like tax treatment in the domestic market irrespective of where they are produced. Both the tax component in exports and the price of imports are measurable, and the border adjustment does not exceed the tax that is levied because (in the case of import) the full tax is levied at the border, and (in the case of exports) the refunded amount in an invoice-credit VAT is only the amount that was levied at previous stages, as shown on the invoice. By so limiting border adjustments, the WTO reduces opportunities for countries to subsidize exports or overtax imports.

The Ryan Blueprint's treatment of purchases (including capital and inventory) and labor highlights the difference between a tax on value added and Ryan's tax on an income base.

If the factors of production employed at each stage of production and distribution of goods are totaled up, they should equal the retail sales price of the goods. A traditional VAT is imposed mainly on two factors of production, labor (about 2/3 of base) and income from capital or rents (extra profits above the normal return to capital). Under a sales-subtraction method VAT, taxes are collected and remitted to the government by business at each stage of production and distribution. The resulting tax should be equal to the tax imposed on the retail price of taxable goods under a single-stage retail sales tax. Purchases taxed at a prior stage of production or distribution are deductible, so that this value is not taxed again. Under that method of calculating VAT, the cost of labor is not deductible so that this factor of production can be included in the tax base. In contrast, under the Ryan Blueprint tax, a business can take an immediate deduction for its wage expense, leaving that factor of production out of the tax base. Workers bear tax at multiple rates on that labor income under the individual income tax. Even if the tax paid by the workers

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intangibles. This difference explains why no country has adopted a subtraction method VAT. The Blueprint proposal is based on a subtraction method VAT, but with a deduction for wages.

[16] For similar conclusions see Schoen, Wolfgang, Destination-Based Income Taxation and WTO Law: A Note (January 2016). Working Paper of the Max Planck Institute for Tax Law and Public Finance No. 2016-3. Available at SSRN: https://ssrn.com/abstract=2727628 or http://dx.doi.org/10.2139/ssrn.2727628 ; Cui, Wei, Destination-Based Cash-Flow Taxation: A Critical Appraisal (September 30, 2015). Available at SSRN: https://ssrn.com/abstract=2614780 or http://dx.doi.org/10.2139/ssrn.2614780 ; *2016 TNT 173-7 CUI, DESTINATION-BASED TAXATION IN THE HOUSE REPUBLICAN BLUEPRINT. (Release Date: AUGUST 10, 2016) (Doc 2016-15835)*; Sheppard, *2016 TNT 157-1 NEWS ANALYSIS: FREEDOM FRIES: THE HOUSE REPUBLICANS' CASH FLOW TAX. (Section 954 -- Foreign Base Company Income) (Release Date: AUGUST 11, 2016) (Doc 2016-16348).*

may be viewed as a surrogate for a business' tax on labor, that surrogate tax cannot be accurately measured and that tax cost does not enter the tax-inclusive prices of the business' outputs. Giving a full deduction for labor costs effectively subsidizes exports and overtaxes imports.

For example: Assume that a domestic grape grower has no business inputs. He has labor costs of 30 and profit of 10. He sells the grapes to a wine producer for 30+10=40. Since labor is deductible, the grape grower pays tax only on his profit. The tax is 10 x 20% = 2, so the tax inclusive price is 40 + 2 = 42.[17] The wine producer buys the grapes for 42. She has labor costs of 45 and profit of 15. She sells the wine to a domestic consumer for 42+45+15 = 102, and pays tax only on the profits of 15 since the other elements are deductible. Total tax paid by the wine producer is 15 x 20% = 3, and the tax inclusive price to the consumer is 102 + 3 = 105.

If the wine producer instead exports the wine by selling it to a foreign customer, she has 100 in exempt income, or zero income (assuming no other income). She also has 40+45 = 85 in deductible costs, so in principle she should get a check from the Treasury of 85 x 20% = 17.[18] The foreign customer, assuming that his country also charges 20% VAT on imports, will pay 100 plus VAT of 100 x 20% = 20, and the tax inclusive price will be 120. Note that this is a higher price than the price to the domestic wine consumer, because in the domestic sales the costs of goods sold and the labor are deductible whereas in the foreign sale they are not.

Now let us compare this to a normal invoice credit VAT of 20%. In the domestic case, the grape grower has 30 in labor costs and 10 of profit, and he will charge the wine producer a tax inclusive price of 40 + (40 x 20%)= 48. The wine producer will pay 48 to the grape grower and has 45 of labor costs and 15 of profits, so she will charge a tax inclusive price of 48 + 45 + 15 = 108 minus 8 refund of VAT paid on inputs, or 100 + (100 x 20%) = 120.

In the export case with an invoice-credit VAT, the grape grower still charges the wine producer 48. The wine producer adds labor costs of 45 and profits of 15 and since the wine is exported in a zero rated sale she receives a refund of 8 and the sale price to the foreign consumer is 48 + 45 + 15 – 8= 100, plus 20% foreign VAT or 120.

If we compare the two cases, under the Ryan tax the domestic consumer pays 105 and the foreign consumer 120. The difference of 15 is the tax on the deductible U.S. labor costs, (=(30+45)*.20). But if the wine producer wants to undercut wine

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[17] In this example, we assume that the tax gets passed on to consumers in the form of higher prices.
[18] Under the Blueprint NOLs are carried forward with an interest charge, rather resulting in an actual refund, but the end result should be the same. Still, many exporters may never show positive income under this tax system, so they may not be able to use NOLs.

produced in the foreign country, she can easily afford to sell for less than 100. Specifically, she could sell for as low as (100-17) + 20%, or $99.60 (tax inclusive). This demonstrates the export subsidy, which results from the ability to deduct labor costs in the US, whereas such costs are not deductible in the normal VAT in the foreign country. Under the normal VAT, the prices to the domestic and foreign customers are the same (120 domestic, 120 foreign) and there is no check from the Treasury other than the refund of VAT actually paid.

The reason for the export subsidy in the Ryan tax is that labor costs are deductible. In theory this should not make a difference if we could be sure that labor is subject to at least a 20% tax rate, since then the deduction and inclusion would offset each other. However, much labor income is taxed at lower rates due to the progressivity of the federal income tax as well as the earned income tax credit. Ryan also envisages a zero bracket of the first $24,000 of income and a 12% rate for those currently in the 10 or 15% brackets, so it is likely that many of the employees of the grape grower and the wine producer will be subject to individual tax at less than 20%.

Thus, the Ryan Blueprint **should be classified as a modified consumption-style tax imposed on an income base. As such, it is not a border adjustable tax under the WTO rules, as currently interpreted.** If the U.S. treated a Ryan-type tax as border adjustable, we can expect our international competitors to challenge the tax at the WTO before it takes effect.

Economists, however, argue that exchange rate changes may offset this, because US dollar appreciation would undo the export subsidy.[19] But the exchange rate offset will not be perfect since the tax treatment will depend on individual firm circumstances, and the exchange rate only affects the overall prices of imports relative to exports. In particular, different goods will receive the export subsidy to different extents, because not all goods have the same share of labor in their production costs, and different tax rates apply to corporate and pass-through business. Yet any exchange rate changes will affect all goods equally.

Even more important, the literature on exchange rate determination makes any exchange rate offset hardly predictable or clear cut. Empirical studies in international finance makes it quite clear that exchange rates movements are divorced from most coherent theories of exchange rate determination. As noted by Rogoff[20]:

> The extent to which monetary models, or indeed, *any* existing structural models of exchange rates, fail to explain even medium term volatility is difficult to overstate. The out-of-sample forecasting performance of the

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[19] See, e.g., file:///C:/Users/avi-yonah/Downloads/Auerbach%20HoltzEakin.pdf.
[20] Rogoff, Kenneth, "Perspectives on Exchange Rate Volatility," in *International Capital Flows*, Feldstein, Martin, ed.1999, 441-53.

models is so mediocre that at horizons of one month to two years they fail to perform a naïve random walk model (which says that the best forecast of any future exchange rate is today's rate). Almost incredibly, this result holds even when the model forecasts are based on actual realized values of the explanatory variables. (p.444)

This may be due in part to the huge speculative component of exchange rate trading. The foreign exchange market has transactions that exceed $5 trillion each day; the U.S. dollar is involved in 88% of these currency trades.[21] Compare the size of the world economy, with an annual GDP of about $75 trillion. All of world GDP could be purchased with about 15 days of foreign exchange! Thus, the bulk of exchange rate trading is not related to the purchase of goods or even assets, but rather to financial market trading. This may help explain why exchange rate movements are difficult to predict with standard theories or macroeconomic models. Indeed, macroeconomists have a dismal record of predicting exchange rate movements based on any fundamental theories of exchange rate determination. Thus, there should be grave doubts that exchange rate changes will smoothly offset the effects of the border adjustment.

The exchange rate offset argument is sometimes made by noting that trade must balance in the long run, or by simply assuming balanced trade. Yet while trade must balance in the long run, there is no reason why countries can't run persistent trade deficits and surpluses. Indeed, the United States has experienced a trade deficit for every year of the last 40 years. Our persistent trade deficit is due to macroeconomic considerations, and in particular, the fact that U.S. savings are low relative to our private investment desires and government borrowing.[22] If nothing changes those macroeconomic variables, then our trade deficit should remain constant, so the exchange rate offset must offset any trade distortions introduced by the tax changes. *Still,* it is far from clear that a tax change of the magnitude imagined here would not affect macroeconomic variables such as savings, investment, tax revenues, and government spending.

In addition, many countries do indeed fix their exchange rates, and this will also slow any adjustment to the introduction of the Ryan tax. Auerbach and Holtz-Eakin recognize that, but they note that most countries do this for reasons of "competitiveness" and therefore could be expected to adjust pegs accordingly. We disagree. Most countries peg to achieve other macroeconomic goals, and in

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[21] See the Triennial Central Bank Survey of foreign exchange turnover. September 2016. http://www.bis.org/publ/rpfx16fx.pdf.

[22] The borrowing that occurs from abroad is the "flip side" of the trade deficit. In particular, basic national income accounting indicates that EX-IM (the trade balance) must always equal the sum of the private savings/investment balance (S-I) and the government budget balance of tax revenues relative to government spending (T-G). In the case of the United States, our trade balance is often negative since our savings (S) fall short of demand for loanable funds due to private Investment (I) and government borrowing (G-T).

particular to import creditability with respect to monetary policy, to target inflation, to enhance exchange rate stability, etc. It is far from clear that competitiveness is the determinative motive in most cases. (And often pegs will have the opposite effect, when countries intervene to support overvalued currencies.)

Further, often trade contracts are set in advance in dollar terms, so *even if* exchange rates were to adjust immediately and fully, there would still be a disruptive lag in terms of effects on those engaged in international trade. This shock could be quite damaging to retailers in the short run. Also, if lags in exchange rate adjustment convince trading partners to undertake protectionist trade measures in response, those measures are likely to prove more long-lasting.

In addition, one shouldn't be sanguine about the effects of a large dollar appreciation, as this redistributes wealth away from U.S. owners of foreign assets (since their assets are now worth less in dollar terms) and toward foreign owners of U.S. assets. These wealth effects can involve amounts in the trillions of dollars.[23] Dollar appreciation can also have dire fiscal consequences for emerging economies that are borrowing in dollars; indeed U.S. dollar appreciation played a large contributing role in several past developing country debt crises, including the Latin American debt crises of the mid 1980s and the Argentine debt crisis and default of 2001.

We are not aware of any empirical evidence on the exchange rate mechanism, but that should be provided before adjustment is taken on faith. Indeed, it seems dangerous to "bet" entire sectors of the economy on such untested grounds, especially when no other major country has adopted this type of corporate tax. The only empirical study, by Desai and Hines, in fact suggests that trade effects may be counter to expectations. According to Desai and Hines, "[e]conomic theory implies that exchange rate adjustment prevents destination-based VATs from affecting exports and imports. Indeed, this proposition is so well accepted among economists that it has not been subjected to serious prior testing." Still, Desai and Hines found that countries that relied on VATs actually had worse export performance (and also lower imports), and this finding typically (but not always) persists when control variables and country fixed effects are included.[24]

Desai and Hines note that the real world features of VATs can explain their finding, since VATs tend to fall more heavily on traded goods than non-traded goods, and export rebates are often incomplete, thus discouraging trade. These two explanations also likely apply in the Ryan tax context. For reasons explained below, the unlikelihood of exporters getting full rebates for their export "losses" are even

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[23] See, e.g., the blog post by Alan Viard. https://www.aei.org/publication/border-tax-adjustments-wont-stimulate-exports/

[24] Mihir Desai and James Hines, Value-Added Taxes and International Trade: The Evidence, Working Paper, November 2002.

stronger in the Ryan tax context than in a traditional VAT[25], and there is reason to believe that the Ryan tax will be imposed differentially on tangible goods than on services and intangibles (discussed below).

There are other WTO related problems with the Blueprint as well. First, the Blueprint explicitly declares up front that it is not a VAT but a corporate income tax ("This Blueprint does not include a value-added tax (VAT), a sales tax, or any other tax as an addition to the fundamental reforms of the current income tax system"). Second, the retention of territoriality (on top of the destination basis) and subpart F and the imposition of tax on some interest and dividends make the Blueprint look more like a corporate income tax. In contrast, VATs are purely destination based and do not apply to any foreign source income, so territoriality is not needed, and financial flows are disregarded.

Auerbach and Holtz Eakin argue that –

> There is an open question whether a destination-based cash flow tax (DBCFT) would be determined to be compliant with the rules of the World Trade Organization. There are two primary issues here. First, WTO rules currently limit border adjustments to "indirect" taxes – taxes on transactions (e.g., sales, payroll, etc.) rather than "direct" taxes on individuals or businesses. It is not clear that a DBCFT would be successfully characterized as an indirect tax, even though it is economically equivalent to a policy based on indirect taxes (a VAT and a reduction in payroll taxes), and even though the distinction between direct and indirect taxes has little meaning and no bearing on any economic outcomes. In addition, there might be concern under existing WTO rules regarding the combination of border adjustments with a deduction for domestic labor costs, since the border adjustment assessed on imported goods applies to the entire cost of the imports, with no deduction for the labor costs that went into the production of these imported goods. Some might see this treatment as favoring domestically produced goods over imported ones. But such an inference makes little sense from an economic perspective. Again, consider the equivalent policy of introducing a VAT and reducing payroll taxes, both elements of which are compatible with WTO rules. A reduction in payroll taxes would indeed encourage domestic production and employment to the extent that it lowered domestic production costs. But this is true of any reduction in taxes on US production, and it is difficult to comprehend why international trade rules should dictate the tax rate a country applies uniformly to its own domestic economic production activities.[26]

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[25] Under the Blueprint NOLs are carried forward with an interest charge. This may or may not result in an eventual payment. Many exporting firms may not ever show a taxable profit under this system.

[26] Auerbach and Holtz Eakin, supra.

Given these arguments, one might legitimately query why proponents have not simply suggested replacing the corporate tax with the combination of a VAT and a cut in payroll taxes.[27] Still, regardless of the merits of such equivalence arguments, which neglect real world features of modern payroll taxes, it is unlikely that they will sway the WTO. WTO decisions tend not to respect this type of argument even if economists find this "difficult to comprehend." The whole point of introducing the Ryan tax, as Auerbach and Holtz Eakin concede, is to make the United States into a giant tax haven from the perspective of our trading partners, and induce their multinationals to move operations into the US.[28] Given the likely harm to their tax revenues from such a shift following the initial introduction of the Ryan tax, our trading partners, and especially the EU, are likely to sue. The result will be years of litigation with an uncertain outcome and potentially large trade sanctions.

Such an outcome would be very worrisome for several reasons. First, we are already in an environment where the gains from trade are being threatened by a President (elect) that frequently urges the imposition of tariffs. Adding protectionist features to the tax code, *even if* some economists are convinced that there would be no net effect on prices, risks misunderstanding and increases the probability of retaliatory tariffs. Indeed, some countries have already pledged tariff retaliation if the United States moves forward with this plan. Protracted and contentious litigation could also reduce the U.S. political backing for the WTO, harming both the long run prospects for an open trading system and our international relations.

Second, the ambiguities of whether these tax provisions would pass muster with the WTO creates a far more uncertain investment climate, making it more difficult for companies to resolve investment and location decisions.

Finally, if the WTO authorizes trade sanctions in response, such sanctions may lead to an endgame result where the U.S. government complies with the WTO by turning the Ryan tax into a "normal" VAT by denying the deduction for labor. This would make the tax far more regressive than the proposed cash-flow corporate tax it replaces.[29]

3. **What About Tax Treaties?**

There are three problems with tax treaties in the Blueprint, assuming that the proposed tax is an income tax subject to the treaties. The first problem is that if the

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[27] The real reason, one suspects, is the widely-held belief in the political implausibility of enacting a VAT in the United States. Given the WTO issue facing any border-adjusted tax that is not a VAT, this belief may be misguided. See Avi-Yonah, The Inexorable Rise of the VAT: Is the U.S. Next?, 150 Tax Notes 127 (Jan. 4, 2016).

[28] Auerbach and Holtz Eakin, 12-14.

[29] See Sheppard, 914. Also, note that the border adjustment feature could not be dropped without huge revenue losses as well as opening the door for much larger tax avoidance and profit shifting problems.

business tax is an income tax covered by the treaties and we are serious about taxing on a destination basis goods and services imported into the US, we need to do away with the permanent establishment (PE) limitation in Article 7, because we need to be able to tax importers without a PE (or physical presence required under domestic law). While we believe that this is a long overdue reform, bringing the income tax treaty into the 21st century and the age of electronic commerce,[30] it should be recognized that it involves a massive treaty override of a crucial aspect of the treaty bargain, which was considered and rejected by our treaty partners in the BEPS context.

The second problem is that if the business tax is an income tax, in order to levy it on a destination basis and include all imports, it must be imposed not just on goods and services (under Article 7) but also on intangibles that produce royalties (Article 12) and other types of deductible payments that can substitute for royalties (e.g., payments on derivatives, generally classified as Other Income under Article 21). While interest and dividends are not deductible, allowing royalties and derivatives to escape the tax on imports invites abuse (since there will always be lower tax jurisdictions). This requires another treaty override that can be avoided if the business tax is a VAT.

Finally, it could be argued that because the Ryan tax advantages domestic companies that export from the US over similar foreign companies that import into the US, the Ryan tax is a violation of the non-discrimination provision of the treaties.[31]

An important related question is how our treaty partners will react to such sweeping changes and treaty overrides (which they regard as violations of international law). Given that the new US tax (20% rate with expensing, territoriality, border adjustments) will create a strong attraction for foreign-based multinationals to shift profits into the US, it is likely that they will (a) refuse to give credit for the US tax under tax treaties because (given expensing) it is not an income tax, (b) apply their CFC rules to US affiliate operations by their multinationals, which cannot invert in response because of exit taxes. The possible end result could be a collapse of the treaty-based international tax regime.[32]

4. **Tax Avoidance, Income Shifting and Inversions**

The Better Way proposal argues that:

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[30] Avi-Yonah, International Taxation of Electronic Commerce, 52 Tax L. Rev. 507 (1997).
[31] Sheppard, 909-910.
[32] See Avi-Yonah, The International Implications of Tax Reform, 69 Tax Notes 913 (Nov. 13, 1995); Avi-Yonah, From Income to Consumption Tax: Some International Implications, 33 San Diego L. Rev. 1329 (1996).

Taken together, a 20 percent corporate rate, a switch to a territorial system, and border adjustments will cause the recent wave of inversions to come to a halt. American businesses invert for two reasons: to avail themselves of a jurisdiction with a lower rate, and to access "trapped cash" overseas. Those problems are solved by the lower corporate rate and the territorial system, respectively. In addition, border adjustments mean that it does not matter where a company is incorporated; sales to U.S. customers are taxed and sales to foreign customers are exempt, regardless of whether the taxpayer is foreign or domestic.[33]

We do not believe the Blueprint proposal will completely stop the incentive for US corporations to shift income overseas, because even with a 20% rate and expensing, rents (e.g., from intangibles like Apple's "Irish" profits) can still be located in zero tax jurisdictions and then repatriated tax free. While this problem can be minimized if it is limited to rents from exploiting foreign markets (which would be exempt even if carried out from the US), we are doubtful that the line between US and foreign markets can be drawn precisely where services and intangibles are concerned, where there can be no enforcement of the tax at the border. Even a normal (invoice credit) VAT has issues where imports of services and intangibles are concerned, since it is difficult to collect the tax from consumers who are not eligible for deductions or input credits.[34]

Moreover, experienced tax practitioners have already suggested ways of gaming the Blueprint. For example:[35]

1. A US pharmaceutical with foreign subsidiaries could develop its intellectual property in the United States (claiming deductions for wages, overhead and

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[33] Better Way, 26.

[34] For the serious problems raised by application of VAT to cross-border trade in services and intangibles, see the OECD's *International VAT/GST Guidelines* (OECD 2015) [recommended by the Council in September 2016]. In an invoice credit VAT, exports are zero-rated in the country of origin, so a business importer does not get a tax credit on the purchase. If there is an output tax to the final consumer, it is simply charged and paid (like a typical retail sale under the U.S. RST). This means that unlike the typical VAT situation, the entire collection even in a B2B context depends on the final sale to the consumer, and experience with retail sales taxes has illustrated that at high rates this becomes an avoidance problem (as anyone living in states that border states that do not tax sales can attest). The real problem in the B2C domain is simply that there is no jurisdiction to enforce the B2C tax, because there is no jurisdiction over the remote supplier. In the B2B context, the answer is the reverse charge, where the business purchaser self-assesses the tax and therefore gets an input tax credit on any further sale. In the B2C context, relying on the consumer to self-assess the tax amounts to a tax on honesty (like the U.S. state use tax where there is no collection by the remote seller). In general, determining exports and imports and tracking purchases of those engaged in cross-border business is not trivial. It is difficult to judge where services are consumed and to trace location of downloaded services.

[35] Thanks to David Miller for suggesting these.

R&D), and then sell (i.e., export) the foreign rights to its Irish subsidiary (at the highest price possible). The proceeds would not be taxable. Ireland would allow that subsidiary to amortize its purchase price. This creates tax benefits in each jurisdiction by reason of the different regimes. If the Irish subsidiary manufactures drugs, the profits could be distributed up to the US parent tax-free under a territorial system. If the Irish subsidiary is in danger of becoming profitable for Irish tax purposes, the US parent would just sell it more IP.

2. If an Irish parent owns a US subsidiary, the Irish parent can issue debt to fund the purchases of the IP. The US subsidiary then invests the cash to generate more IP (expensing all equipment and deducting all salaries) and sells the IP to its parent.[36]

3. If an Irish parent has purchased the US IP rights, it would not want to license the rights to the US subsidiary (income for Irish parent under Irish tax law and no deduction for US subsidiary). So it just contributes the rights to another US subsidiary. Could the US subsidiary amortize the parent's basis under the Blueprint? When one US subsidiary licenses to another, no net tax would be paid. Any royalties would be taxable to the licensor but deductible for the payor.

4. How does the Blueprint work for services? If a US hedge fund manager provides services to an offshore hedge fund, is that considered an export that is tax exempt? What if the US manager develops a trading algorithm and sells it (or licenses) it to an offshore hedge fund? Are the proceeds and royalties exempt? If so, then the hedge fund becomes a giant tax shelter to the manager, because he would not pay 25% on this income- he would pay zero, with no further tax. This is much better than the current carried interest provision, which has attracted bipartisan condemnation because it enables individuals with income of many millions to pay a reduced rate. The Blueprint result is much worse.

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[36] As Miller argues, this example suggests that inversions would in some cases still be valuable. Moreover, to the extent the Blueprint retains Subpart F, inversions can be helpful in avoiding it. For example, if an Irish subsidiary of a US parent licenses intangibles to consumers in the US and because it is difficult to enforce the tax on the consumers the IRS relies on Subpart F to tax the royalties, this rule (which is included what remains of Subpart F in the Blueprint) can be avoided by an inversion.

5. **Vexing Technical Problems**

First, this tax system is very difficult to explain to public or, even, experts. This creates a risk that loopholes will be easier to design due to the deliberate exploitation of the system's complexity by savvy tax planners and lobbyists. Yet if the system is implemented in a more theoretically pure form, without opening the door to loopholes, it is not clear that the MNC business community would support the proposed changes. The net effect would be a tax increase for the intangible-intensive MNCs that had previously succeeded in achieving single-digit tax rates by gaming the old system (and shifting U.S. profits abroad). It is also a tax increase for highly-leveraged firms, since debt-financed investments would no longer be subsidized. Retailers that import into the US and manufacturers that import parts are likely to object to a new tax system that means they cannot deduct their cost of goods sold.

Second, there is an increased likelihood that many profitable firms would show losses. This is especially the case for exporters, since they may have deductible expenses, but no taxable revenue. Exporting firms with persistent losses will find the credits do them no good, which would affect export incentives. While economists would support a refund system in order to keep tax neutral, there is a large potential for fraud, and politically it seems unlikely that the government could issue large checks to profitable corporations on a permanent basis. The alternative suggested by the Blueprint is unlimited carry-forwards, but this doesn't solve the problem for businesses with losses that may not be offset. Exporting companies could of course merge with non-exporters in order for the losses to be more useful, but inducing a slew of tax-motivated mergers would be inefficient.

Auerbach and Holtz-Eakin recognize that this would be a large problem for exporting firms. They suggest allowing firms to use credits to offset payroll taxes, or have a system of refundable border adjustments, but both of these solutions are problematic and difficult to implement.

Third, there are myriad technical problems that remain to be worked out. For example, financial institutions require separate treatment. The pure form of this tax leaves out financial flows entirely. An augmented form of the tax can capture financial transactions in the base, but this would introduce complexity as all companies would need to keep track of financial transactions, as well as whether the transactions occurred with foreign companies. There is also substantial ambiguity between what transactions are real and what are financial, and such ambiguity raises both technical considerations as well as opportunities for tax avoidance.[37]

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[37] For a more detailed treatment of these complex issues, see Weisbach, David. "A Guide to the GOP Tax Plan – The Way to a Better Way." Coase-Sandor Institute for Law and Economics Working Paper No. 788. January 2017.

Fourth, there are likely to be important impacts on state government corporate tax systems, and these have also not be carefully considered. Fifth, there are large transition effects associated with moving to a destination-basis cash flow system that would need to be carefully considered.[38]

6. **Progressivity and Revenue Effects**

An essential problem with the Ryan blueprint concerns the tax rates that were chosen. These very low tax rates make the system likely to lose a large amount of revenue in a regressive manner.

Indeed, the corporate rate chosen is intellectually incoherent. One of the purported advantages of a destination-basis corporate cash flow tax is that it is supposed to curb profit shifting by removing the incentive for shifting profits and activities abroad. But, if that is the case, why is the rate cut needed? If tax burdens truly depend only on the location of immobile customers, why not keep the corporate rate at the same level as the top personal rate? The usual argument for the lower rate relies on the international mobility of income and competitiveness concerns. If such concerns are moot, then there is no reason to tax at a low rate.

Further, the discrepancy between the top personal rate and the business rate will create new avoidance opportunities as wealthy individual seek to earn their income in tax-preferred ways, reducing their labor compensation in favor of business income. Companies would be inclined to tilt executives compensation toward stock-options and away from salary income, and high-income earners would be inclined to earn income through their businesses in pass-through form.

The Ryan proposal exempts the normal return from capital, giving these returns zero-tax treatment. Further, excess returns (profits above the normal level) are taxed through the business tax system, but at rates far lower than the top personal income tax rate. The theoretical rationale for justifying such a favorable tax treatment for rents (excess profits) is simply absent. From an efficiency or an equity perspective, taxing rents at a higher rate makes sense.

Recent evidence from Treasury suggests that now about 75% of the corporate tax base is rents/extra-normal profits; this fraction has been steadily increasing.[39] If

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[38] Absent relief, consumption taxes generate a tax on the initial capital stock; while this is an efficient tax (since it is an unexpected lump sum tax on the capital stock), it is arbitrary. However, attempts to provide relief would be expensive and would reduce the progressivity of the tax system, since the capital stock is concentrated in the upper part of the income distribution. See Weisbach.

[39] See Power, Laura and Austin Frerick. December 2016. "Have Excess Returns to Corporations Been Increasing Over Time?" *National Tax Journal*. 69(4). 831-845.

destination-based taxes are meant to fall solely on rent, this implies a higher ideal optimal tax rate, since taxing rents is far more efficient than taxing labor or capital.[40]

Further, the regressive nature of these tax changes is unjustifiable given the increases in economic inequality over the previous decades and the large surge in the share of income earned by the top 1% of the income distribution. Capital income, and rents, are far more concentrated than labor income.[41] Cutting taxes on capital and rents so dramatically risks further exacerbating recent increases in income inequality.

The Tax Policy Center calculates the distributional effect of the Ryan plan, which benefits the wealthy disproportionately. The average federal tax rate falls by about 0.4 percentage points for the bottom 80% of the population, but it falls by 3.4 percentage points for the top quintile, and by 9 percentage points for the top 1%. The top 1% get a tax cut that averages $213,000. The tax cut of the bottom 80% averages $210.[42]

Finally, the Ryan proposal loses large amounts of tax revenue. The business tax features of the proposal are a large share of the ten-year $3 trillion revenue loss, according to the Tax Policy Center. Prior research by Auerbach suggests that this type of corporate tax reform would not change revenue very much at the same corporate tax rate, and work by Devereux has suggested that the tax base would be smaller under a DBCT, but that this could be compensated for by higher rates. Under the Ryan plan, however, the rate is much lower, leading to large deficits.

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[40] Also note that double-taxation arguments are vastly overstated since about ¾ of US corporate equity income is not taxed at the individual level. See Rosenthal, Steven M., and Lydia S. Austin. 2016. "The Dwindling Taxable Share of U.S. Corporate Stock." *Tax Notes*, May, 923–34 and Burman, Leonard and Kimberly Clausing. "Is U.S. Corporate Income Double-Taxed?" November 2016.

[41] The U.S. Treasury reports that the top 5% of tax units report 24% of income in 1986 (the earliest year available), increasing to 37% in 2012. (See https://www.irs.gov/uac/soi-tax-stats-individual-statistical-tables-by-tax-rate-and-income-percentile) Indeed, capital income is much more concentrated that labor income. Data from the Tax Policy Center for 2012 indicate that the top 5% of tax units report 68% of dividend income and 87% of long-term capital gains income. (See http://www.taxpolicycenter.org/model-estimates/distribution-capital-gains-and-qualified-dividends/distribution-long-term-capital-2). The U.S. Treasury also reports data on the top 400 taxpayers. This particularly small group of taxpayers reports 1.48% of total income in 2012, but 0.16% of total wage and salary income, 8.3% of total dividend income, and 12.3% of total capital gain income. (See https://www.irs.gov/pub/irs-soi/13intop400.pdf). The overall share of this tiny group has more than doubled since 1992 (when the data series begins). The wage income share has been flat, while the capital gains share has more than doubled, and the dividends share has more than quadrupled.

[42] See Table 4 of http://www.taxpolicycenter.org/publications/analysis-house-gop-tax-plan/full.

7. **Conclusion**

The Ryan Blueprint destination based cash-flow tax is not ready for prime-time. No other country had adopted a similar tax, and as the above analysis makes clear, there are myriad issues that would need to be worked through before any such tax were adopted. These issues are not small: the plan is incompatible with trade rules in a manner which harms our trading partners, it is incompatible with our treaty obligations, it is unlikely to put an end to income shifting, it generates political problems due to large numbers of companies that would experience adverse tax treatment changes, it makes the tax system less progressive at the proposed tax rates, and it is likely to generate large revenue losses. In addition, there are important issues surrounding how exporters with losses would be handled (which could lead to inefficient mergers), how financial firms and financial transactions would be handled, how U.S. state corporate tax systems would be affected, and how the transition to the new tax system would be handled.

One pressing problem is that the Ryan blueprint is incompatible with WTO rules. And this incompatibility is no mere technicality. U.S. trading partners are likely to be hurt in several ways. The effects of the wage deduction render the corporate cash-flow tax different from a VAT, and these differences have the net effect of increasing the incentive to operate in the United States, as both proponents and economists recognize. In addition, such a tax system would exacerbate the profit shifting problems of our trading partners, since the United States will appear like a tax haven from their perspective. If multinational firms shift profits to the United States on paper, this will reduce foreign revenues without affecting US revenues.

While economists have argued that exchange rate changes may reduce the trade-distorting effects of such tax law changes, there are several reasons to suspect that such exchange rate changes will not be sufficient to neutralize the effects of such a tax law change. First, exchange rate changes are uniform, yet the export subsidy component of the DBCT plan would treat different firms differently, based on their labor content of their goods. Second, exchange rate markets are very large, exchange rate movements are not well predicted by economic fundamentals, and many countries fix their exchange rates, all factors that would reduce hopes of smooth countervailing exchange rate adjustment. Third, exporting firms may receive incomplete loss offsets, and that would cause trade-distortions.

However, even if these economic effects were disregarded, it is clear that the DBCT is on shaky legal ground with respect to both WTO rules and our tax treaties. The WTO is likely to recognize that this DBCT is non-equivalent to a VAT, and thus a direct tax, where border adjustments are not allowed. This will likely lead to years of litigation and perhaps an endgame whereby the DBCT is simply jettisoned in favor of a VAT. This would convert one of the most progressive tax instruments in our tax system into a regressive consumption tax. In the meantime, we are likely to face the prospect of retaliation by our trading partners, in an environment where

the incoming U.S. administration has already provided ample reason to fear trade wars.

Given these concerns, we would recommend that Congress reject the Ryan Blueprint. Instead, it should focus on a revenue neutral tax reform that reduces the corporate tax rate and eliminates the major corporate tax expenditures including deferral, taxing accumulated offshore earnings in full. Eliminating deferral would eliminate the incentive to earn income in low-tax countries, by treating foreign and domestic income alike for tax purposes. Pairing that reform with a lower corporate tax rate need not raise tax burdens on average, although it would create winners and losers among corporate taxpayers. A more fundamental reform would require worldwide corporate tax consolidation; this would better align the tax system with the reality of globally-integrated corporations.

Taxing foreign income currently also eliminates the incentive to build up large stocks of unrepatriated foreign income, now estimated at $2.6 trillion. This income is often invested in U.S. capital markets, and it increases the credit-worthiness of U.S. multinational corporations, who can easily finance worthy investments. But corporations are inhibited from repatriation by the prospect of more favorable tax treatment if they delay, so this makes it difficult for them to return profits to shareholders. Indeed these concerns about repatriation are likely to give the multinational business community a large interest in corporate tax reform. Settling the future tax treatment of foreign income should be a key goal of these efforts.[43]

In terms of more incremental reforms, even a minimum tax would be a big step toward reducing profit shifting toward tax havens and protecting the corporate tax base. A minimum tax would currently tax income earned in the lowest tax countries, and work by Clausing (2016) suggests that 98% of the profit shifting out of the United States is destined for countries with foreign tax rates below 15%.[44] Other helpful incremental steps include stronger "earnings-stripping" rules and anti-corporate inversion measures such as an exit tax.

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[43] Toward this end, the U.S. Congress did a great disservice when they enacted a one time holiday on dividend repatriation as part of the U.S. Jobs Creation Act of 2004. Ever since, companies have been more likely to delay repatriation in the hope of future holidays (or permanently more favorable treatment).

[44] See Clausing, Kimberly A. "The Effect of Profit Shifting on the Corporate Tax Base in the United States and Beyond." 2016. *National Tax Journal*. December. 69(4). 905-934.

THE EFFECT OF PROFIT SHIFTING ON THE CORPORATE TAX BASE IN THE UNITED STATES AND BEYOND

Kimberly A. Clausing

This paper estimates the effect of profit shifting on corporate tax base erosion for the United States, using Bureau of Economic Analysis survey data on U.S. multinational corporations during 1983 to 2012. I find that profit shifting is likely costing the U.S. government between $77 and $111 billion in corporate tax revenue by 2012, and these revenue losses have increased substantially in recent years. The paper also considers an extension of this analysis to other countries, finding that corporate tax base erosion is likely a large problem in countries without low tax rates. The paper discusses suggested reforms.

Keywords: international taxation, income shifting, tax avoidance, corporate tax revenue

JEL Codes: H25, H26, H73

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I. INTRODUCTION

Corporate tax base erosion due to profit shifting is a large and consequential problem. Reduced revenues from one source must be compensated for by higher tax revenues from other sources, or lower government spending, or increased budget deficits; none of these possibilities is particularly attractive.

Beyond revenue consequences, corporate tax base erosion and profit shifting also affects the larger integrity of the tax system. National (or subnational) governments set tax policies, yet in an increasingly global world economy, the effects of these policy actions stretch beyond borders. Multinational firms adroitly respond to differential tax treatment, changing the geographic location of both economic activity and profits. Governments, realizing the mobility of global business, set tax policies that explicitly (or often, less transparently) lower tax rates on global firms. Such tax competition pressures are discussed elsewhere, but they suggest that international tax system design needs updating in the face of globalization.[1]

Further, corporate tax base erosion has consequences for the distributional burden of the tax system as a whole, consequences that are noteworthy due to the large documented increases in income inequality in recent decades. Most relevant evidence suggests that the corporate tax falls largely on capital or shareholders, but even if one assigns a fraction of the burden of the corporate tax to workers, it is still a more progressive tax instrument than other major sources of revenue. Further, much capital income goes untaxed at the individual level, since a majority of such income is held in non-taxable form.[2] Thus, the corporate tax has an essential role in taxing capital income, which is far more concentrated than labor income.

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[1] See, e.g., Clausing (2016a) and other contributions to Dietsch and Rixen, eds. (2016).
[2] Rosenthal and Austin (2016) show that only 24% of C Corporation equity is held in taxable accounts in 2015. Gravelle and Hungerford (2011) note that a majority of individual passive income in the United States is held in tax-exempt form through pensions, retirement accounts, life insurance annuities, and non-profits.

In this context, it is important to estimate the size of the problem at hand. Almost all observers, both in the press and in academic research, describe corporate tax base erosion and profit shifting as an increasing problem. Indeed, the analysis below suggests that base erosion and profit shifting is a larger problem today than ever before. The revenue cost to the U.S. government from profit shifting has been increasing steadily over the previous decades, reaching $77 to $111 billion by 2012. For the world as a whole, including the United States, revenue losses may be in excess of $280 billion in 2012.[3]

The results here are broadly consistent with prior published findings in the literature discussed in Section II below. (See, e.g., Dowd, Landefeld and Moore (2014), OECD (2015), Crivelli, Keen, and de Mooij (2015), de Mooij and Ederveen (2008) and de Mooij (2005).) Though there is some work using financial statement data, particularly from Europe, that suggests that the profit shifting problem may be shrinking, this work is based on incomplete data.[4]

The paper proceeds as follows. In Section II, I briefly review current knowledge on base erosion and profit shifting. In Section III, I present estimates of the size of the problem for the United States, and in Section IV, I extend those estimates for a speculative estimate of base erosion consequences for other countries. Finally, Section V discusses policy implications.

II. PRIOR WORK

There is a large body of work on international profit shifting, indicating that the corporate tax base is quite sensitive to tax rate differences across countries. An early review of literature in this area is provided by Hines (1999) and subsequent reviews by de Mooij and co-authors (see de

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[3]The following analysis is limited to the other countries of the world that act as headquarters to major multinational firms.

[4] Often this research uses the Orbis data, which has extremely limited data on tax haven countries. Even when observations exist, key data fields are often missing. Analysis using these data excludes the observations that are driving most of the income shifting behavior.

Mooij and Ederveen (2003), de Mooij (2005), and de Mooij and Ederveen (2008)) have confirmed a large and increasing problem of income shifting. My prior work has provided evidence of the tax sensitivity of transfer prices (see Clausing (2001, 2003, 2006)) as well as the consequences of profit shifting behavior for U.S. government revenues (see Clausing (2009, 2011)).

This work provides a preface to more recent estimates of the base erosion and profit shifting problem, including those found by the OECD. The OECD (2015) finds that the annual net tax revenue loss from tax planning is about $100 to $240 billion, and compares their estimates with those of the IMF, the JCT, and others; see OECD (2015, p.104-5).

Three IMF economists (Crivelli, Keen, and de Mooij (2015)) finds that base erosion problems are quite large in developing countries, and likely to be more important (as a share of GDP) in this group of countries then in OECD countries. Their calculations indicate large revenue losses from base erosion due to profit shifting. Short run estimates are quite comparable to those found here; OECD countries lose $207 billion in revenue (0.23% of GDP) and developing countries lose $105 billion in revenue (0.84% of GDP). Long-run estimates are $509 billion for OECD countries, 0.6% of their GDP, and $213 billion for developing countries, 1.7% of their GDP.

Keightly and Stupak (2015) describe the large and increasing problem of base erosion and profit shifting in the United States and elsewhere. Using several data sources including BEA survey data as well as international data on foreign direct investment from the IMF and the UN Conference on Trade and Development, they view the problem through several different lenses, all of which are consistent with a large magnitude of profit shifting.

Indeed, the stylized facts are overwhelming in their confirmation of the scale of the profit

shifting problem. For U.S. multinational firms, the share of income reported in foreign countries

has been steadily increasing, and income booked in low-tax countries is implausibly high by any

reasonable metric. As reported by Gravelle (2015), U.S. affiliate firm profits were 645% of

Bermuda's GDP and 547% of the Cayman Islands GDP in 2004.[5] As absurd as these numbers

are, they increased by 2010, to 1614% for Bermuda and 2,065% for the Caymans. Further,

estimates indicate that U.S. multinational firms have accumulated over $2 trillion in permanently

reinvested earnings in low-tax locations, over $1 trillion of which is held in cash.[6]

Due to the large amounts of income booked in low-tax countries and havens, the

estimated costs of deferral has been increasing in recent years, and the JCT now estimates this

tax expenditure at $83.4 billion for 2014. OMB estimates are somewhat lower, at $61.7 billion in

2014.[7] Zucman (2014, 2015) uses balance of payments data to conclude that profit-shifting to

low-tax jurisdictions is reducing U.S. corporate taxes by about 20%, or about $130 billion

annually.

Further, there is no question that this issue extends beyond U.S. multinational

corporations. Americans are clearly not the only tax planners. In fact, analyses using Orbis data

on disproportionately European firms, even when it can not examine tax haven affiliate

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[5] Similar stylized facts regarding the scale of the problem are reported by many sources, including Keightly (2013) and OSPIRG/Citizens for Tax Justice (2015).

[6] See, e.g., Kleinbard, Edward D., "Why Corporate Tax Reform Can Happen", March 23, 2015, and Wall St. J., CFO Journal, *Indefinitely Reinvested Foreign Earnings on the Rise,* May 7, 2013. These funds are often held in US financial institutions, and are thus available to US capital markets, but US multinational corporations are constrained in their use of these funds. These funds are assets of the firm that increase the firm's credit worthiness; however, firms cannot return the cash to shareholders as dividends or share repurchases without incurring US corporate tax liabilities upon repatriation.

[7] This represents the estimated revenue cost associated with allowing deferral of the U.S. tax on foreign income until it is repatriated. See Joint Committee on Taxation, *Estimates of Federal Tax Expenditures for FY 2014-2018*, available at https://www.jct.gov/publications.html?func=startdown&id=4663 and Office of Management and Budget, *FY2016 Analytical Perspectives of the U.S. Government*. Available at https://www.whitehouse.gov/sites/default/files/omb/budget/fy2016/assets/spec.pdf.

observations in detail, still finds substantial magnitudes of income shifting, as shown by OECD

(2015) and others.

Of course, one of the difficulties in estimating the scale of the profit shifting problem is

the limited data that are available, as well as the difficulty associated with establishing the

counterfactual levels of profit in each country absent profit shifting incentives. In the OECD

(2015) report on *Measuring and Monitoring BEPS,* they describe this problem in detail, noting

that existing data sources are far from ideal. For example, the report highlights the difficulties

associated with using financial reporting data to make inferences regarding profit shifting

behavior.

> What is striking is that when one looks into the micro-data available, much of this newly
> revealed information does not appear to be visible – either because certain affiliates are
> not included or, where they are included, the financial information is missing. This
> reveals a clear disconnect between the information revealed through targeted public
> enquiries of some MNEs and the limited available tax information for those same MNEs
> from consolidated financial statements. (p.30-31)

Importantly, data are particularly likely to be missing for tax haven countries, and there are few

if any observations of affiliate firms in havens that include the relevant data fields.[8] Since tax

havens are the destination for much profit shifting activity, making inferences on the scale of

profit shifting from data that exclude such observations can be problematic. As an example, my

estimates below suggest that 82% of profit shifting by U.S. multinational firms is destined for

just seven tax haven locations.

OECD (2015, p.33-4) also discusses other sources of information on base erosion and

profit shifting activity. They highlight both U.S. BEA data, the data used in the present analysis,

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[8] Cobham and Loretz (2014) document that data coverage in these financial data sets, and in particular Orbis, can be
particularly weak or nonexistent where tax havens and less developed countries are concerned. Dowd, Landefeld,
and Moore (2014, p.3) note an important weakness of studies relying on financial reporting data: "It can be difficult
to get information on subsidiaries incorporated in some tax havens, such as Bermuda and the Cayman Islands, and
therefore studies using this data leave out some of the major locations for income shifting." Discussions with several
researchers that use these data have confirmed that this is a large problem.

and tax return data as examples of best practices in data collection for analyzing base erosion and profit shifting.

In one example of nearly ideal data, Dowd, Landefeld, and Moore (2014) provide a careful study on the scale of profit shifting using U.S. tax return data from 2002-2010. Interestingly, and plausibly, they find a nonlinear tax response, with far more responsiveness at lower tax rates than at higher ones. Findings indicate tax semi-elasticities of -4.7 at corporate tax rates of 5% and -0.6 at tax rates of 30%.

Yet others have smaller estimates of the profit shifting problem. Heckemeyer and Overesch (2013) provide a meta-analysis of income shifting studies in their working paper. From this analysis, they conclude that their best prediction of the tax semi-elasticity of corporate profits is -0.8, much smaller than what the above estimates and literature indicate. However, their meta-analysis relies on 25 studies, and the vast majority of the estimated elasticities use financial data, which are not well-suited to studying the question at hand for reasons just discussed.

Dharmapala (2014) also argues that the income shifting problem is likely diminishing relative to the findings of earlier studies, basing his conclusion in part on the Heckemeyer and Overesch survey.[9] While he acknowledges that Orbis data are (perhaps solely) responsible for the lower estimates in the recent literature, as well as the sense that the problem itself may be shrinking over time, he views the strengths of the data positively without focusing on the

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[9] Dharmapala (and others) have noted that corporate tax revenues are a small share of revenue for most developed countries, and that revenues have been relatively stable despite claims of increasing base erosion and profit shifting. Yet, as pointed out by Zucman (2014, p.133), it is important to remember that corporate profits have been increasing in recent years. "How can we reconcile the sharp decline in the effective corporate tax rate with the widely noted fact that corporate tax revenues have not declined as a share of US national income over the last 30 years…? The answer is that corporate profits have risen as a share of national income over time, from about 9 percent in the 1980s ... to about 14 percent in 2010-2013."

drawbacks associated with relying on these data.[10] He does note the inconsistency between these findings and the stylized facts regarding income shifting activity.

My estimates below confirm the large scale of the profit shifting problem, alongside the work of OECD (2015), Crivelli, Keen, and de Mooij (2015), Keightley and Stupak (2015), Dowd, Landefeld, and Moore (2014), Zucman (2014, 2015) and many earlier studies reviewed in de Mooij and Ederveen (2008). The estimates below rely on U.S. BEA survey data; these data are more suited to capturing the profit shifting problem than many data sources.

III. THE MAGNITUDE OF INCOME SHIFTING

A. Data and Regression Analysis

The U.S. Bureau of Economic Analysis (BEA) does annual surveys of U.S. based multinational firms and their affiliated firms abroad. These data indicate a large discrepancy between the physical operations of U.S. multinational firm affiliates abroad and the locations in which they report their income. For example, Figure 1 shows the top locations of U.S. multinational firm affiliate gross profits in 2012; gross profits are net income with foreign income tax payments added.[11] Of the top nine locations, seven of them are tax havens with effective tax rates less than 5%: Netherlands, Ireland, Luxembourg, Bermuda, Switzerland, Singapore, and the UK Caribbean Islands (including the Caymans). Effective tax rates are calculated as foreign income taxes paid by all affiliates in a given country relative to their gross income (net income plus foreign tax payments). These countries alone account for 50% of all foreign income earned by affiliates of U.S. multinational firms, but they only account for 5% of

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[10] Dharmapala places a large emphasis on the importance of controlling for firm-specific fixed effects. Still, due to the heterogeneity of the firms themselves, as well as the difficulty of capturing income shifting incentives based on changing firm tax treatments over time, it is likely that estimates using firm-level fixed effects may be a lower bound on income shifting behavior, even ignoring the substantial flaws and limitations of the Orbis data.

[11] 2012 is used since it is the most recent year with publicly available (albeit preliminary) data. Other recent years display similar patterns.

all foreign employment of such firms. Further, the economic size of these countries is quite small relative to this disproportionate profit; their combined population is less than that of Spain, or California. [FIGURE 1 NEAR HERE.]

Some have critiqued this particular data series. The data include "income from equity investments", some of which are counted more than once if there are tiers of ownership within the same country. Unfortunately, with existing data, it is not possible to account for this double-counting accurately. Still, one can use an alternative data series, also from the Bureau of Economic Analysis, on direct investment earnings. This data series excludes all income from equity investments.[12] While eliminating the possibility of double counting, this series is also incomplete, since income from investments is excluded.

Figure 1 also shows top countries in terms of this direct investment earnings series, and it shows a similar pattern as gross income. The same seven tax haven countries with low effective tax rates are in the top nine countries. Together, they account for 52% of all foreign direct investment earnings. In contrast, as shown in Figure 2, the top employment countries are all large economies with big markets. Effective tax rates are not particularly low for this set of countries; none have effective tax rates below 12%. [FIGURE 2 NEAR HERE.]

Regression analyses confirm these patterns. Table 1 presents an econometric analysis of the location of U.S. multinational firms' employment, sales, property plant and equipment, assets, gross income, and direct investment earnings. [TABLE 1 NEAR HERE.] The data from the BEA surveys of U.S. multinational corporations cover the period 1983 to 2012. The scale of economic activity (employment, sales, plant/property/equipment, assets, and income) is modeled as depending on the size of the economy (measured by GDP), the average income of the

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[12]Also, direct investment earning data are pro-rated by the ownership share of U.S. parents, and the data are after-tax. In addition to these differences, there are other technical differences between the series.

population (measured by GDP per-capita), the distance between the country and the United States, and the effective tax rate paid by U.S. affiliates. In the top half of Table 1, employment and PPE (plant, property and equipment) do not show a statistically significant relationship with the effective tax rate, but sales, assets and – especially – income and earnings, are negatively related to effective tax rates.

The bottom half of Table 1 also includes country-specific fixed effects. Country fixed effects may be important, since country-specific influences are surely essential determinants of multinational firm activity, and econometric tests indicate that their inclusion is warranted. However, in these specifications, the relationships between effective tax rates and the dependent variables are estimated based solely on variation in tax rates *within* countries over time, since *between* country variation in tax rates (and other matters) are captured by the country-specific fixed effects. In these specifications, assets, income, and direct investment earnings continue to show large and statistically significant negative tax effects. For example, a one percentage point increase in the effective tax rate reduces gross income by 1.9%.

The evidence in these regressions is consistent with a long literature in the field of public finance that has emphasized a *hierarchy* of behavioral response to taxation, whereby timing and financial decisions are more tax-sensitive then real decisions about levels of economic activity.[13] While some measures of economic activity are not particularly tax sensitive, profits are very sensitive to tax rate differences across countries, as shown in Table 1.

B. Estimating the Revenue Consequences of Income Shifting Behavior

This section will use regression analysis and simple computations to estimate how U.S. government revenues are likely impacted by profit shifting activity. The analysis begins with

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[13] Saez, Slemrod and Giertz (2012), Slemrod and Bakija (2008) and Auerbach and Slemrod (1997) summarize a vast body of research on taxation that suggests this hierarchy of behavioral response.

regressions that relate affiliate profits to tax rates. The results from the regressions are used to calculate how the distribution of profits would differ absent tax rate differences among countries. Then some fraction of the lower foreign profits is attributed to the United States tax base.

The first step is a regression analysis to generate semi-elasticities between profits and tax rates of foreign countries. As always, there are some judgment calls involved in selecting the ideal elasticity for these calculations. Table 2 present eight options for the reader to consider. These options come with tradeoffs; the top half of the table reports pooled specifications and the bottom half of the table reports fixed effects specifications. As discussed, country fixed effects are valuable since they allow investigators to control for unique country characteristics that may affect affiliate profitability. However, such specifications only consider variation in tax rates within countries over time, not employing the variation between countries in tax rates.

Likewise, different specifications in columns (1) to (4) include different control variables: column (2) includes macroeconomic controls, column (3) includes controls that relate to the capital and labor use of affiliates in each country, and column (4) includes both types of controls. While it may seem ideal to include as many control variables as possible, it is also possible that income shifting itself can affect the scale of employment and investment in plant, property, and equipment in each country, or even in the case of havens, affect GDP measurements. For instance, some real economic operations may be required in order to shift income, and the ability to shift income to low-tax destinations increases the attractiveness of such destinations as bases for real activity. Also, GDP figures for tax havens are likely to be distorted by profit shifting activity. Thus, including these controls may underestimate the tax-sensitivity of profits, if some of that sensitivity is captured by the control variables. [TABLE 2 NEAR HERE.]

Nonetheless, the estimates of Table 2 all indicate large, negative, and statistically significant relationship between gross profits and effective tax rates.[14] The semi-elasticities range from -1.85 to -4.61, with an average estimate of -2.92. Estimated elasticities are quite similar if one instead uses data on the BEA direct investment earnings series. This average is in line with much of the prior literature on tax base elasticities, and it is similar to those found in the meta-analyses of de Mooij and Ederveen (2003, 2008) and de Mooij (2005).

As noted above, Dowd, Landefeld, and Moore (2014) have argued that elasticities are likely to be non-linear. Using the best possible data available, US tax return data at the firm level, they find tax semi-elasticities of -4.7 at corporate tax rates of 5% and -0.6 at tax rates of 30%. Following Dowd, Landefeld, and Moore, I also ran specifications that allowed for a non-linear tax response, and I too found results that indicated higher elasticities at lower tax rates. Replacing the calculations below with calculations using nonlinear tax elasticities always raises the magnitude of my estimates of profit shifting. This is not surprising, since the majority of income is booked in countries with very low effective tax rates. *Nonetheless, to err on the side of caution, I use linear elasticities here. However, this consideration strengthens the case for using a higher benchmark elasticity.*

As previously discussed, some studies using financial/Orbis data have found smaller elasticities, but one should also note that these studies are using data that neglects the very observations that are driving the profit shifting phenomenon, affiliates operating in tax havens. There is very little information on such operations in the financial databases.

This elasticity is then used to calculate what profits would be in the countries of operation of U.S. affiliates absent differences in tax rates between foreign countries and the United States.

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[14] Effective tax rate differences between the foreign and US country could also be used as an independent variable. If the US effective tax rate is not changing over time, this will lead to identical estimates as those presented here.

The United States has a statutory tax rate of 35% in most years of this analysis, though in this analysis, I assume that the U.S. effective tax rate would be 5 percentage points lower (30% in most years) and that this lower tax rate would apply to any increased income in the U.S. tax base.

Table 3 shows the major locations where income is shifted. In cases of high-tax rate countries with effective tax rates above my assumed U.S. rate (e.g., in 2012, Denmark, Argentina, Chile, Peru, India, Italy, Japan, and others), foreign profits would be higher in the counterfactual, but in many other cases, foreign profits would be lower. In 2012, it is estimated that profits in high-tax countries were "too low" (due to income shifting incentives) by $26 billion, profits in medium-tax (15-30%) countries were "too high" by $36 billion, and profits in the lowest tax countries (with effective tax rates less than 15%) were too high (due to tax incentives) by $595 billion. As these numbers quickly indicate, most of the profit shifting is done with respect to the lowest-tax countries, and this finding corresponds with the stylized facts above. [TABLE 3 NEAR HERE.]

Indeed, the estimates of excess income booked in just the seven important tax havens highlighted in Figure 1 account for 82% of all of the total. Of the income booked in the Caymans ($41b), the Netherlands ($172b), Switzerland ($58b), Luxembourg ($96b) and Bermuda ($80b), this method suggests that profits absent income shifting incentives would instead be $9b in the Caymans, $33b in the Netherlands, $15b in Switzerland, $15b in Luxembourg, and $10b in Bermuda. As a comparison, profits booked in France and Germany are presently $13b and $17b, respectively.

Once these profit adjustments are made, a fraction (38.7% in 2012) of the hypothetically lower foreign profits (on aggregate) are attributed to the U.S. tax base. The assigned fraction is based on the share of intrafirm transactions that occur between affiliates abroad and the parent

firm in the United States, relative to all intrafirm transactions undertaken by affiliates abroad (with both the parent and affiliates in other foreign countries). Thus, in 2012, foreign affiliates of U.S. parent multinational firms undertook 38.7% of their affiliated transactions with the United States; the remaining 61.3% were with other affiliated firms abroad. Of course, this fraction itself is just a plausible benchmark.

Finally, this number is scaled up, under the assumption that foreign multinational firms also engage in income shifting out of the United States. While the data do not allow a separate estimate of their profit shifting behavior, I assume that it would increase the revenue costs of income shifting by a factor that is based on the ratio of the sales of affiliates of foreign-based multinational firms in the United States (a proxy for the ability of foreign multinational firms to shift income away from the United States) to the sales of affiliates of U.S. based multinational firms abroad (a proxy for the ability of U.S. multinational firms to shift income away from the United States). Sources of underestimation and overestimation are discussed below.

Table 4 summarizes these estimates, including the main estimate using the BEA gross income series as well as an alternative estimate using the BEA direct investment earnings series. Column 2 shows the total income earned abroad by foreign affiliates of U.S. firms. Column 3 shows the estimated U.S. tax base increase if income shifting incentives were eliminated. Column 4 shows the reduction in U.S. corporate income tax revenues due to income shifting, assuming that marginal revenues are taxed at 30%; revenue estimates would of course be higher if one assumed that marginal additional profits would be taxed at the statutory rate. Column 5 shows actual corporate tax revenues in the corresponding year, as a comparison. By 2012, the revenue cost of income shifting behavior is estimated at $111 billion. [TABLE 4 NEAR HERE.]

The alternative estimate uses the BEA direct investment earnings series. This series avoids double-counting, but also eliminates some types of income shifting. Column 2 indicates total direct investment earnings abroad over the period 2004-2012; data from the BEA are adjusted to include foreign taxes paid and to reverse the BEA's adjustment of the data by the US parent equity ownership percentage. Column 3 shows the estimated increase in the U.S. tax base, again employing the methodology used for the main estimates. Using this series, the resulting revenue reduction estimates are lower, due to the combined effects of the elimination of double-counting and the omission of some types of income. Unfortunately, with available data, one can not separate these two effects.

Figure 3 illustrates the changes in these estimates of revenue loss due to profit shifting over the period of the study, 1983 to 2012. The strong upward trend is not a reflection of increasing tax responsiveness in terms of the elasticity of the tax base with respect to a given tax rate difference, since that is assumed to be constant over this period. Instead, it is due to two factors. First, and most important, the total amount of foreign profits is increasing dramatically over this period. Income of all foreign affiliates was $525 billion in 2004, and it grew to $1.2 trillion by 2012; direct investment earnings increased by similar magnitudes, more than doubling in eight years. Second, the average foreign effective tax rate has continued to fall over this time period, also contributing to income shifting incentives. [FIGURE 3 NEAR HERE.]

C. Sources of Uncertainty

There are several assumptions required for this analysis that generate uncertainty surrounding these estimates. Below, I enumerate the sources of uncertainty and discuss their possible effects on the estimates.

1. The analysis begins with a regression of gross profits (net income plus foreign taxes) on effective tax rates. Eight specifications are presented, and all yield large semi-elasticities, between -1.85 and -4.61. I have chosen to present estimates based on a semi-elasticity of -2.92, the average of estimates presented in Table 2. This elasticity is also consistent with studies reviewed in de Mooij and Ederveen (2003, 2008) and de Mooij (2005). Allowing for non-linear responses, as suggested by the work of Dowd, Landefeld, and Moore (2014), would generate even larger estimates of profit shifting, due to larger elasticities applying to the bulk of the foreign income.

2. The analysis assumes that, absent income shifting incentives, lower foreign profits would be earned, and a fraction of those profits would be earned instead in the United States. That fraction is calculated each year as the ratio of foreign affiliate sales to parent firms in the United States relative to foreign affiliate sales to both parents and affiliated firms in other countries. In 2012, this fraction is 38.7%. There is no particularly good reason to think that exactly this fraction of the excess income would be earned in the United States. However, in considering the potential to shift income, the terms and nature of intrafirm transactions provide one essential method for shifting income. Thus, the assumption here is that income would be shifted across destinations in proportion to these intrafirm transactions.[15]

3. The final estimate is scaled up to account for the income shifting of foreign multinational firms. This is based on the ratio of the sales of affiliates of foreign based multinational firms in the United States to the sales of affiliates of U.S. based multinational firms abroad. This is an arbitrary scaling that is based on a rough proxy for the ability of each type of multinational firm to shift income out of the U.S. tax base: in particular, the degree of their

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[15]This proxy could lead to an understatement of U.S. tax base erosion if, e.g., a U.S. parent transfers intellectual property to a foreign affiliate to shift profit out of the United States, and that transfer increases foreign-to-foreign affiliate transactions.

affiliated firm sales.[16] Still, there is some evidence that foreign multinationals are more able to use interest stripping to move income out of the U.S. tax base, one motive for recent corporate inversions.[17]

4. There is some double-counting in the BEA gross income data of Table 4. The data include "income from equity investments", some of which are counted more than once if there are tiers of ownership within the same country. With existing data, it is not possible to account for this double-counting accurately. An alternative data series on direct investment earnings from the Bureau of Economic series excludes all income from equity investments, but this series is incomplete, since income from investments is left out. Table 4 also reports alternative estimates that are based on this series. The alternate estimates may understate the size of the profit-shifting problem due to some omitted income, but the first estimates may overstate the size of the problem due to some double-counting.

5. This analysis assumes the U.S. corporate tax rate that would apply to any increased tax base is five percentage points lower than the statutory rate (typically 30%); likewise, it uses this lower rate when calculating the tax rate difference between the U.S. rate and the foreign effective tax rate. If the statutory rate were used instead, the calculated revenue losses would be higher. If a lower effective tax rate were used for the United States, the revenue losses would be lower. The analysis assumes that there will be little residual tax collected by the

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[16] For example, in 2012, affiliates of foreign-based multinational firms in the United States had $4.09 trillion in sales, and foreign affiliates of U.S. parents had $6.98 trillion in sales. So for 2012, that would suggest scaling up by 58.5%. This implies that affiliates of foreign-parent firms operating in the United States are generating a bit over a third of the total income shifting out of the U.S. tax base.

[17] See, e.g., Department of the Treasury (2007).

United States on foreign income earned in lightly-tax jurisdictions; this assumption is consistent with the evidence on this question.[18]

6. This analysis would not capture methods of tax avoidance that might reduce worldwide taxable income. For example, Mintz and Weichenrieder (2010) demonstrate how indirect financing structures avoid taxation by maximizing interest deductions. Kleinbard (2011) also discusses the importance of stateless income, whereby firms create income that is not taxed in any jurisdiction. It is unclear how much of this income would appear in the BEA data.

In summary, item 1 is addressed by providing an average estimate based on different elasticities, but it generates a lower overall tax responsiveness than one would find allowing for non-linear responses to low-tax rate jurisdictions. Items 2, 3, and 5 have no clear direction of bias. Item 6 suggests that the estimates of Table 4 may be underestimates of the true size of the revenue costs of income shifting. Item 4 suggests that the first set of estimates of Table 4 may be an overestimate of the revenue costs of income shifting. However, an alternative estimate is also provided in this table, using a data series that likely provides an underestimate since it does not include all sources of income.

IV. A SPECULATIVE EXTENSION TO THE WORLD

As noted above, these estimates pertain only to the behavior of U.S. multinational firms. Nonetheless, the overall scale of the problem for the world at large can be approximated by relating these estimates to larger aggregates. While the precise magnitudes of the problem are likely unknowable, one can nonetheless approximate the scale of corporate base erosion and profit shifting for major countries.

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[18] As Altshuler and Grubert (2013, p.31) report, using 2006 data, only $32b is collected on *all* foreign source income, amounting to less than 4% of foreign income. "But the amount raised from dividends represents only a very small portion of this revenue. Indeed if dividends are removed from taxable foreign income, total U.S. tax revenue increases by about one billion. The dividends taxable on the margin after credits are more than offset by the credits originating with dividends that currently spill over to other income." (The quote is from a draft version of the paper.)

Of course, a serious hurdle in scaling up the estimates for the United States is the absence

of comparable publicly-available survey data for most countries. However, one can utilize data

from the Forbes Global 2000 list of the world's largest corporations; these data indicate the

location of corporate headquarters and the overall level of worldwide profits for the world's

biggest corporations. Still, the present extension is limited by data constraints to the major

countries that headquarter large multinational firms. Data on less developed countries is sparse.

Table 5 summarizes the major countries that headquarter the world's largest firms. 62

countries are home to the world's largest 2000 firms, but this fact masks even greater

concentration, since 25 countries are home to 95% of the profits earned by this group of firms.

Table 5 shows these countries, alongside their share of Global 2000 profits in 2012. [TABLE 5

NEAR HERE.] Figure 4 shows the distribution of the profits of Global 2000 firms, organized by

headquarters country. Note that this does *not* show where profits are booked for tax purposes,

merely the headquarters locations of the world's most profitable firms. The headquarters of 72%

of the world's profits are in OECD countries, and 92% are headquartered in OECD countries and

the other big economies that include Brazil, China, India, Indonesia, Russia, Saudi Arabia, and

South Africa. Another 4% of world profits are headquartered in six major haven destinations:

Bermuda, Caymans, Channel Islands, Cyprus, Hong Kong, Singapore, although Singapore and

Hong Kong could also be classified as big economies in their own right. Less than 4% of

headquarters are in the other countries of the world. [FIGURE 4 NEAR HERE.]

I use this collection of countries to estimate the global scale of corporate tax base erosion.

This estimation, while only indicative of approximate magnitudes, proceeds as follows.

1. Since we do not have detailed data on the location of affiliates of worldwide multinational

    firms, I proceed from the assumption that all multinational firms have affiliates in two types

of countries: low-tax countries and high-tax countries. For example, for the United States in 2012, multinational firms report 1.2 billion in income abroad, of which $800 billion is booked in 17 low-tax countries. These are the countries that I consider destinations for artificial income shifting abroad. Not all of these countries are havens, but all have effective tax rates that are less than 15%, which is the arbitrary cut-off that I use for low-tax countries.[19] As shown in Table 3, these countries are the destinations for 98% of the estimated profit shifting for United States multinational firms.

2. For countries that are headquarters to Global 2000 firms, but that are not low-tax countries, I assume that their share of income booked in low-tax countries is proportionate to the share of U.S. multinational firm foreign income that is booked in low-tax countries. For example, since the United States headquarters 33.3% of the global profits of Global 2000 firms, and Germany headquarters about 3.3% of the global profits of Global 2000 firms, I assume that German multinational firms have about 10% of the U.S. level of profits in low-tax countries, or about $80 billion.[20]

3. I assume that foreign country tax rates are five percentage points less than their statutory rates (inclusive of sub-federal taxation). For example, in the Japanese case, the statutory tax

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[19] It is assumed here that Forbes Global 2000 firms are likely operating throughout the world, and have some operations in tax havens. This population of firms is used to estimate where major multinational firms are headquartered. Income shifting is then assumed to take place, away from higher-income countries and towards those with effective tax rates under 15%.

[20] This assumption is most reasonable if foreign headquartered multinational firms are similarly tax-responsive as their U.S. counterparts. However, there are some reasons to doubt that this will be the case in every instance. First, some countries have tax cultures that are more compliant than the U.S. tax culture. As an example, Japanese multinational firms are thought to be more dutiful in their attitude toward tax. Second, some countries have tougher CFC laws than those in the United States, and this may reduce the incentive for multinational firms headquartered in such countries to shift profits abroad.

rate (including subfederal taxation) is 39.5% in 2012, so I assume a tax rate of 34.5% on corporate profits, allowing for some degree of tax base narrowing.[21]

4. Then, I model profit shifting between the higher-tax headquarters countries and the low-tax countries identified in step one, which on average have an effective tax rate of 6.6%. I use this average tax rate to calculate the tax difference between the headquarters country and the low-tax countries, apply a semi-elasticity of 2.92 (as used above) with respect to tax rate differences, and then calculate the likely magnitude of profit shifting to low tax countries. While this elasticity is based on the U.S. estimates above, it is a reasonable benchmark, since the focus here is solely on the subset of countries with very low tax rates, and tax elasticities with respect to foreign country tax rates are likely non-linear.[22]

5. Estimates from step 4 are used to create a global estimate of how much excess income is booked in low tax countries. In the United States case, this method suggests that, of the $800 billion booked in the 17 low-tax countries, about $545 billion would not be booked in such countries absent the tax rate difference. For the group of big headquarters countries that are not low-tax countries, including the United States, the total is $1,076 billion.

6. The excess $1,076 billion is assigned to the tax bases of higher-tax headquarters countries based on their share of GDP for this higher-tax group of countries. For example, Germany has 6.3% of the higher-tax headquarters countries' total GDP, so they are assumed to recoup 6.3% of the $1,076 billion that is artificially in low-tax countries, as a higher German corporate tax base. The assumed German revenue gain is then the German effective tax rate

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[21]Clearly, this assumption is arbitrary, and depends a great deal on provisions of particular country tax codes that create divergences between statutory and effective tax rates. Observers have noted that foreign tax bases are defined more broadly than the U.S. counterpart, but this varies by country.

[22]The non-linear elasticities suggested by Dowd, Landefeld, and Moore (2014) would suggest using a higher elasticity, since the average tax rate of the low-tax countries here is 6.6%, suggesting a semi-elasticity in excess of 4. If one instead employs a smaller elasticity of 2, one finds the total excess income in low tax countries would be $739 billion, generating a revenue loss for the group of $192 billion. This can be compared with results in Table 6.

(assumed to be five percentage points less than the statutory rate) multiplied by this additional tax base, or $17 billion.[23]

Under these calculations, the United States recoups 29% of the excess $1,076 booked in low tax countries, which assuming a 30% effective tax rate, generates a revenue loss due to profit shifting of $94 billion. Note that the United States result is different from those in Table 4, since it employs a different assumption about how excess income in low-tax countries would be booked in the counterfactual (that is based on GDP shares rather than affiliate transaction shares). The present analysis also employs a more aggregated estimate of income shifting, based on shifting between the home country and a group of 17 low-tax countries, whereas the analysis in Section III considered bilateral shifting incentives instead. Yet the estimate here is similar to those of Table 4, falling between the two estimates of $77 billion and $111 billion.

Table 6 shows the results of these calculations for other countries. While this analysis is more broad-brush than the analysis for the United States, it does give an approximate estimate of the magnitude of this problem for other countries without low tax rates. Overall, revenue losses total $279 billion for this group of countries, 20% of their total corporate tax revenues. This estimate is in line with the short run estimates of Crivelli, Keen, and de Mooij (2015). [TABLE 6 NEAR HERE.]

Of course, the sources of uncertainty are larger here than they are for the United States analysis, so these estimates should be viewed as merely indicative. Regarding the assumptions

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[23] In the analysis for the United States in Section III, I was able to assign a fraction of the excess income in havens to the United States based on the share of affiliate transactions that occur between the affiliate and the United States, relative to affiliates throughout the world. Here, since there are no comparable data for other countries, I simply assume that higher-tax countries would recoup lost tax base in proportion to their share of higher-tax country GDP. While this is an arbitrary assumption, it may be reasonable since corporate income may be proportionate to the size of the underlying economies that generate the income. That said, some of this excess income may belong in countries outside the sample, including less developed countries.

above, some are simpler than others. Key sources of uncertainty are discussed in footnotes accompanying each step.

I also provide an alternative estimate that uses a smaller tax elasticity in footnote 22. To the extent that foreign multinational firms have a more compliant tax culture or more effective corporate tax base erosion protections, the alternative estimate may be more appropriate.[24] Still, the Dowd, Landefeld, and Moore (2014) analysis suggests that higher tax elasticities may apply, since the income shifting is occurring with respect to very low-tax countries.

V. POLICY OPTIONS

A. The OECD/G20 BEPS Process

Both the prior literature, and the present analysis, indicate that profit shifting is likely eroding the corporate tax base in many countries. In response to pressing concerns about income shifting, evidenced by priority in recent G-8 and G-20 meetings, the OECD undertook the BEPS project, where BEPS stands for base erosion and profit shifting. The OECD made a Herculean effort to develop concrete action plan recommendations to help countries address the problems of corporate profit shifting. The final BEPS project reports were issued in October 2015, totaling nearly 2000 pages. These attempts to better connect taxable profits to economic activity are helpful, and the suggested measures are likely to incrementally curb profit shifting activity. The OECD/G20 process is commendable for pushing forward international cooperation in this area.

However, there are many reasons to suspect that profit shifting problems are not over. Country adoption of the proposals is likely to be uneven and incomplete, since the OECD recommendations are not binding. Also, fundamental problems will likely continue to vex policy-makers in years ahead. An essential difficulty lies in the problem of establishing the source of income for firms that are truly globally integrated. The very existence of multinational

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[24] Clausing (2015) reviews evidence on the comparative strength of foreign CFC laws.

firms is testament to the fact that the global integration of business generates profit above and beyond what would be generated if domestic businesses merely interacted at arms' length. Since multinational firms earn more than their component parts would have earned alone, it is an arbitrary exercise to figure out where the additional profit should reside.

Modern notions of economic value also impede this exercise, as firms often generate value that is based on ideas and innovations that are truly intangible. The intangible nature of much intellectual property makes it even more difficult to establish the source of economic value.[25]

These conundrums are compounded by the fact that multinational firms have every incentive to redirect profits to low-tax locations through clever financial and accounting arrangements. The tax departments of major multinational firms are widely thought of as profit centers, and armies of accountants and lawyers work to develop innovative tax minimization strategies, often several steps ahead of government treasuries.

Thus, while there are many helpful parts of the OECD recommendations, including the steps toward country by country reporting, one wonders if the requisite political will can be mustered to close the loopholes that enable pervasive profit shifting. It remains to be seen whether these efforts will be sufficient to reduce the problem substantially.

B. More Fundamental Reforms:

1. Worldwide Consolidation

Under worldwide consolidation, discussed in Joint Committee on Taxation (JCT) (2011), and favored by Kleinbard (2011b) and Avi-Yonah (2013), a multinational firm would be required to consolidate the income earned across the parent firm and its affiliates, and all income

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[25] A particularly colorful description of this problem is found in O'Keefe and Jones (2015), "How Uber plays the tax shell game", *Fortune,* 22 October 2015.

would be taxed currently, allowing a credit for foreign taxes. JCT (2011, p.100-101) summarizes

the approach, applied to the United States:

> The U.S. group would include on its return the foreign corporation's items of income, gain, deduction and loss, the character of such items would be preserved, and the foreign tax credit would be retained…. under the consolidation approach, losses of foreign subsidiaries would be included on the U.S. return.... the consolidation regime would apply only to U.S. corporate shareholders of foreign subsidiaries.

A worldwide consolidation approach has several benefits relative to the current system:

there would be less tax-motivated shifting of economic activity or book income to low-tax

locations, since such shifting would be less likely to affect a multinational firm's overall tax

burden.[26] There would thus be fewer concerns about inefficient capital allocation or corporate tax

base erosion. Also, there would be no "trapped cash" problem since income would be taxed

currently.

However, depending in part on the corporate tax rate that would accompany this change,

the proposal may raise competitiveness concerns for high-tax countries if firms would face rising

foreign tax burdens under consolidation. Some also worry that this proposal would put stress on

the definition of residence. Although some (e.g., Shaviro (2011)) have argued that residence is

increasingly elective, others argue that relatively simple legislation would make it difficult to

change residence for tax purposes. Governments could require that corporate residence indicate

the true location of the "mind and management" of the firm; a similar U.K. definition of

residence is deemed effective by both Avi-Yonah (2013) and Kleinbard (2011b). It is also

feasible to develop anti-inversion measures along the lines of those suggested by Clausing

(2014), Kleinbard (2014), or Shay (2014).

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[26] For firms with excess tax credits, there would still be an incentive to avoid earning income in high-tax countries and to earn income in low-tax countries. Excess tax credits are only likely if the average effective foreign income tax rate exceeds the residence country tax rate.

Finally, while there is little real-world experience with such a system, it still falls within international norms, since double taxation is prevented through foreign tax credits. The proposal could be implemented without disadvantaging major trading partners, and it could be adopted unilaterally, though Avi-Yonah (2013) recommends that countries take a multilateral approach.

2. Formulary Apportionment

Under formulary apportionment, worldwide income would be assigned to individual countries based on a formula that reflects their real economic activities. Often, a three-factor formula is suggested (based on sales, assets, and payroll), but others, including Avi-Yonah and Clausing (2008), have suggested a single-factor formula based on the destination of sales.[27]

The essential advantage of the formulary approach is that it provides a concrete way for determining the source of international income that is not sensitive to arbitrary features of corporate behavior such as a firm's declared state of residence, their organizational structure, or their transfer pricing decisions. If a multinational firm changes these variables, it would not affect their tax burden under formulary apportionment.[28]

Importantly, the factors in the formula are real economic activities, not financial determinations. Saez, Slemrod and Giertz (2012), Slemrod and Bakija (2008) and Auerbach and Slemrod (1997) summarize a vast body of research on taxation that suggests this hierarchy of behavioral response: real economic decisions concerning employment or investment are far less responsive to taxation than are financial or accounting decisions. For multinational firms, this same pattern is clearly shown in the data analyzed in Table 1. There is no doubt that

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[27] As an example, if a multinational company earned $1 billion worldwide, and had 30% of their payroll and assets in the United States, but 60% of their sales in the United States, their U.S. tax base would be $400 million under an equal weighted formula $(((.3+.3+.6)/3) * \$1$ billion), and $600 million under a single sales formula $((.6) * \$1$ billion).
[28] This assumes that the multinational firm has a taxable presence (i.e., nexus) in the locations where it has employment, assets, and sales.

disproportionate amounts of income (compared to investment, sales, or employment) are booked in low-tax countries.

With a formulary approach, firms have no incentive to shift paper profits or to change their tax residence, since their tax liabilities are based on their real activities. However, concerns may remain. Under a three-factor formula, there is still an incentive to locate real economic activity in low-tax countries, which raises concerns regarding efficient capital allocation. This is somewhat less of a concern under a sales based formula, since firms will still have an incentive to sell to customers in high-tax countries regardless.[29] Also, prior experience in the United States, which uses formulary apportionment to determine the corporate tax base of U.S. states, has indicated that formula factors (payroll, assets, and sales) are not particularly tax-sensitive.[30]

If all countries were to adopt formulary apportionment, there would be few concerns about competitiveness. Multinational firms would be taxed based on their real economic activities (in terms of production and sales) in each country, so firms would be on an even-footing with other firms (based in different countries) that had similar local operations. If only some countries adopt formulary apportionment, competitive effects depend on the circumstances of particular firms.[31] Ideally, formulary apportionment would be adopted on a multilateral basis. However, if some countries adopt, there are mechanisms that would encourage other countries to follow early adopters.[32]

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[29] This is particularly the case for final goods. For intermediate goods, this is more problematic.

[30] See Clausing (2016b) for an in-depth analysis of this question. Whether this tax-insensitivity would hold at higher corporate tax rates is an empirical question. Still, the forces of tax competition (mobility of production, competitive pricing, etc.) are likely stronger between U.S. states than between foreign countries.

[31] This also generates the potential for double-taxation or double non-taxation, although that is also a problem under the present system.

[32] There is a natural incentive for countries to follow suit, as discussed in Avi-Yonah and Clausing (2008). In particular, once some countries adopt formulary apportionment, remaining separate accounting (SA) countries would lose tax base to formulary apportionment (FA) countries, since income can be shifted away from SA countries to FA countries without affecting tax burdens in FA locations (since they are based on a formula).

Another related approach is to utilize a formulary profit-split method. The tax base would be calculated as a normal rate of return on expenses, with residual profits allocated by a sales-based formula. With careful implementation, such an approach might lessen concerns regarding tax competition under a formulary approach. Elsewhere, I provide more detail on the advantages and disadvantages of formulary approaches.[33]

VI. CONCLUSION

This paper undertakes a comprehensive analysis of corporate tax base erosion due to profit shifting. Using survey data from the Bureau of Economic Analysis, I find that profit shifting is likely to cost the U.S. government between $77 and $111 billion annually by 2012. The scale of the revenue loss is commensurate with several stylized facts about the size of the problem, including the large magnitudes of income booked in tax havens. In 2012, foreign affiliates of U.S. multinational firms booked $800 billion of income in countries with effective tax rates less than 15%; the average effective tax rate for these countries was 6.6%.

Estimates of the revenue cost of income shifting are increasing over time. This trend reflects the increasing magnitude of profits booked in low-tax countries as well as continued corporate tax rate reductions abroad.

These estimates have the advantage of using comprehensive survey data that includes operations in many tax haven countries, unlike many studies that rely on financial data. While all such estimates entail numerous assumptions, I have attempted to err on the side of caution in my assumptions, and I also provide alternative estimates.

In addition, using data on the Forbes Global 2000 list of the world's largest corporations, the paper provides a speculative extension of the estimates to other countries. I assume that multinational firms based in other countries also shift income to low-tax destinations in

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[33] This work includes Avi-Yonah and Clausing (2008) and Avi-Yonah, Clausing, and Durst (2009).

proportion to the tax rate difference between the home market and the low-tax country group. Estimates indicate that profit shifting to low-tax countries may be costing headquarters countries without low tax rates approximately $280 billion annually, including revenue losses to the United States. These estimates entail several assumptions that are likely more speculative than those in the analysis for the United States. If foreign multinational firms are based in countries with tough tax base protections, or if these firms are simply less responsive to tax rate differences, that could lower these estimates.

Still, the world is larger than the set of countries that act as headquarters to major multinational firms, and other countries are ignored in this analysis, understating the scope of the profit shifting problem. Crivelli, Keen, and de Mooij (2015) discuss how profit shifting problems are likely to be especially pressing in less developed countries, relative to the size and affluence of their economies. Further, less developed countries are likely to have insufficient institutional capacity to handle the myriad enforcement difficulties associated with profit shifting behavior.

These concerns highlight the importance of policy action to address the problems associated with tax competition and corporate tax base erosion. The OECD/G20 BEPS process has promising elements, and it is a useful step forward. Still, we face essential difficulties in establishing the source of income in an increasingly global world economy. More fundamental reforms, such as worldwide consolidation or formulary apportionment, are likely to be more successful at stemming corporate tax base erosion in an era of globally integrated business and agile taxpayers.

ACKNOWLEDGEMENTS

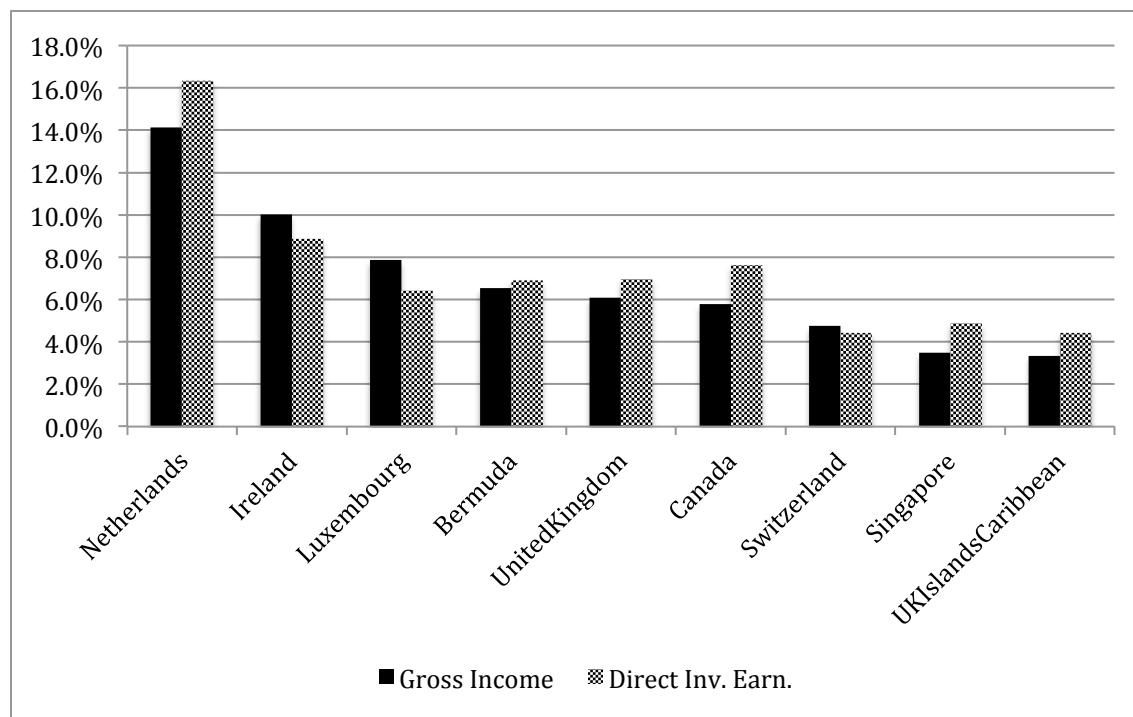## References

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Figure 1
Top Gross Income and Direct Investment Earnings Countries,
Affiliates of U.S. Multinational Firms, 2012
(Shown as Share of Total Income)

Note: Gross income is net income with foreign tax payments added; differences with the direct investment earnings series are described in the text. The figure shows the top nine gross income and direct investment earnings countries; the list of top countries is the same for both series, thought there are small changes in ordering. Seven of the top nine countries (for both series) have effective tax rates under 5% in 2012: Netherlands, Ireland, Luxembourg, Bermuda, Switzerland, Singapore, and UK Islands. Together, these seven countries account for 50.1% of all foreign profits and 52.3% of all direct investment earnings.
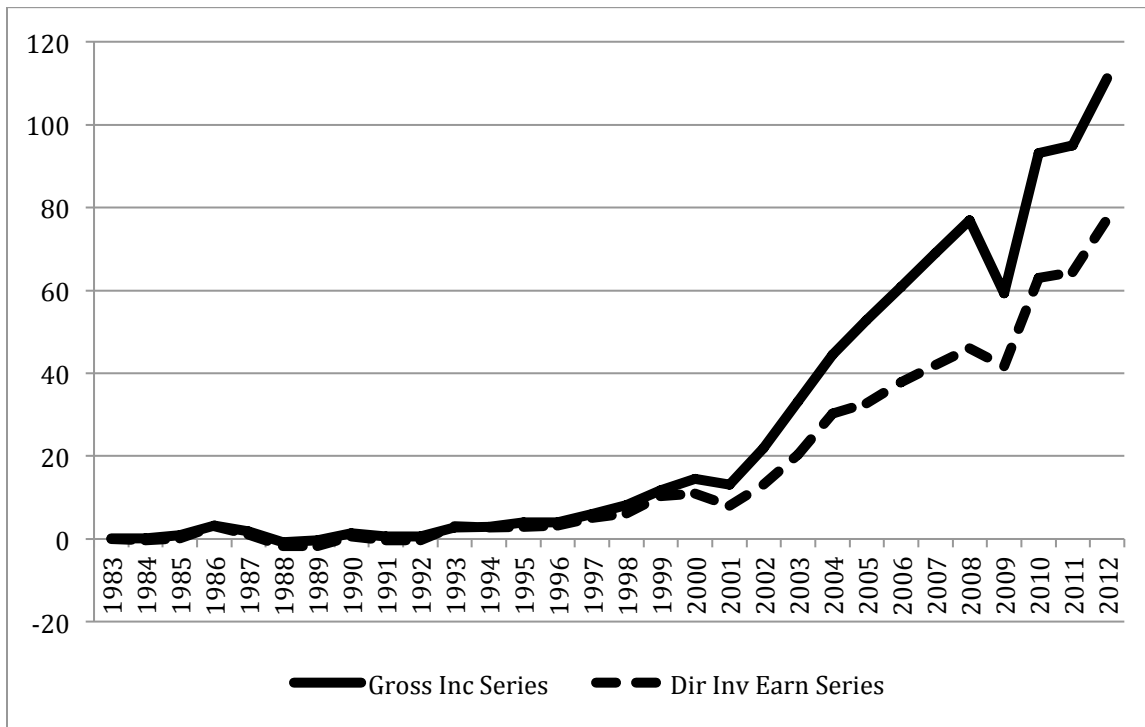
Figure 2
Top Employment Countries, Affiliates of U.S. Multinational Firms, 2012
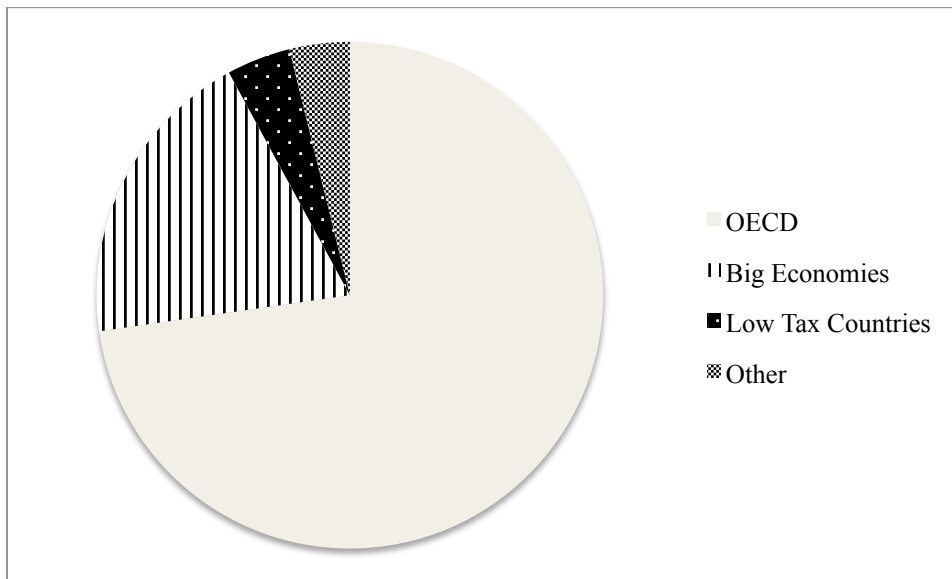(Share of Total Employment)
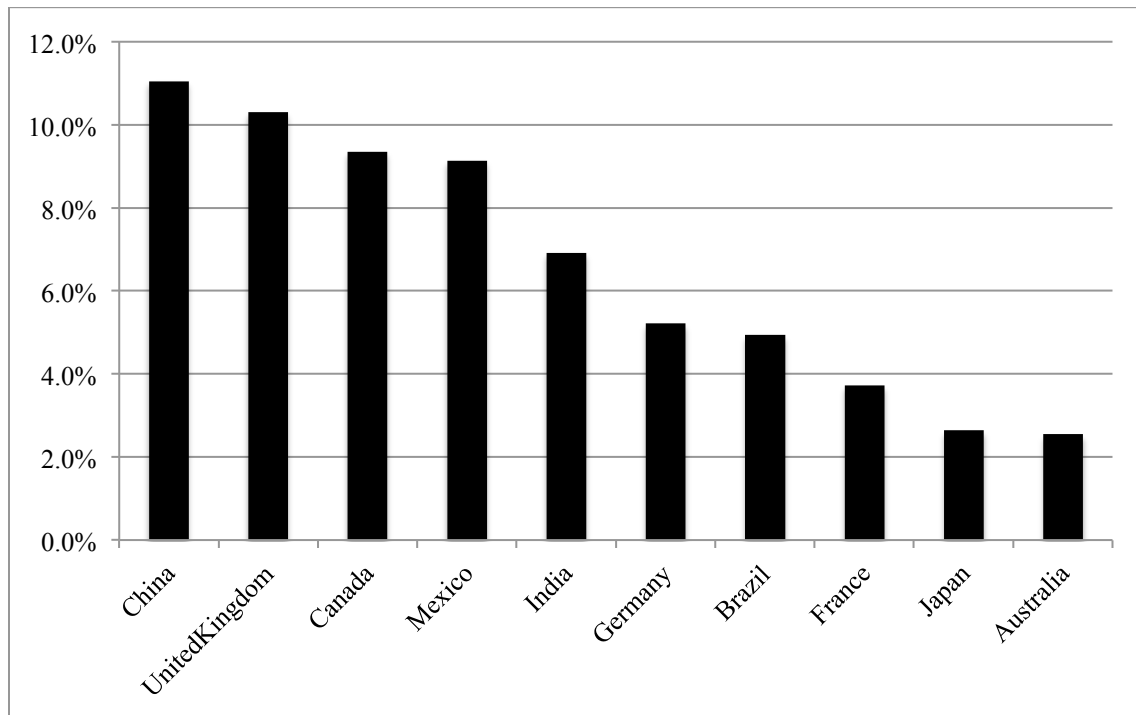
Note: None of the top ten countries have effective tax rates under 12% in 2012.

Figure 3
Estimates of Revenue Loss due to Income Shifting, billions USD
(estimates using U.S. BEA gross income and direct investment earnings series)

Figure 4
Distribution of Forbes Global 2000 Firms Headquarters, 2012
(by share of worldwide profits)

Note: Profit shares refer to the *global* profits of these Forbes 2000 firms, by headquarters country, regardless of where the profits are ultimately booked. "Big Economies" include Brazil, China, India, Indonesia, Russia, Saudi Arabia, and South Africa. Low-Tax Countries include Bermuda, Caymans, Channel Islands, Cyprus, Hong Kong, and Singapore; Hong Kong and Singapore could also be classified as "big" economies. Other countries are generally small economies; they have individual shares of the worldwide total that always under half of one percent.

Table 1
Regressions Explaining Activity Levels, 1983-2012

	(1) ln(empl.)	(2) ln(sales)	(3) ln(PPE)	(4) ln(assets)	(5) ln (gross income)	(6) ln(d. inv. earn.)
Pooled Regressions						
Effective Tax Rate	0.0374	-1.412[*]	-0.264	-3.337[*]	-3.252[*]	-3.313[*]
	(0.237)	(0.246)	(0.255)	(0.277)	(0.263)	(0.253)
ln(GDP)	0.309[*]	0.326[*]	0.325[*]	0.319[*]	0.294[*]	0.231[*]
	(0.0133)	(0.0138)	(0.0143)	(0.0155)	(0.0149)	(0.0142)
ln(GDP Per-capita)	-0.0600[*]	0.112[*]	0.0247	0.201[*]	0.162[*]	0.122[*]
	(0.0146)	(0.0151)	(0.0157)	(0.0170)	(0.0162)	(0.0158)
ln(distance)	-0.0195	-0.00219	-0.0497	-0.0510	-0.0246	-0.180[*]
	(0.0406)	(0.0422)	(0.0438)	(0.0475)	(0.0451)	(0.0449)
N	1436	1439	1439	1439	1438	1370
R^2	0.31	0.30	0.27	0.33	0.31	0.29
Fixed Effects Regressions						
Effective Tax Rate	-0.181	-0.0292	0.0119	-1.505[*]	-1.929[*]	-1.833[*]
	(0.102)	(0.102)	(0.147)	(0.168)	(0.170)	(0.175)
ln(GDP)	1.053[*]	2.393[*]	2.682[*]	3.237[*]	2.091[*]	1.278[*]
	(0.100)	(0.100)	(0.143)	(0.163)	(0.167)	(0.170)
ln(GDP Per-capita)	-0.416[*]	-1.302[*]	-1.833[*]	-1.787[*]	-0.666[*]	-0.0422
	(0.123)	(0.123)	(0.176)	(0.201)	(0.205)	(0.208)
N	1436	1439	1439	1439	1438	1370
R^2 (Within)	0.48	0.76	0.57	0.72	0.66	0.57

[*] $p < 0.05$. Standard errors in parentheses. PPE stands for plant, property, and equipment. Gross income is net income plus foreign taxes paid.

Table 2
Regressions Estimating Gross Profits, 1983-2012

Pooled Regressions	(1)	(2)	(3)	(4)
Effective Tax Rate	-2.709* (0.274)	-3.252* (0.263)	-3.496* (0.152)	-2.980* (0.152)
ln(GDP)		0.294* (0.0149)		0.0288* (0.0102)
ln(GDP Per-capita)		0.162* (0.0162)		0.123* (0.00962)
ln(distance)		-0.0246 (0.0451)		0.0223 (0.0260)
ln(PPE)			1.093* (0.0286)	1.000* (0.0277)
ln(employ)			-0.318* (0.0298)	-0.215* (0.0299)
N	1457	1438	1452	1433
R^2	0.06	0.31	0.73	0.77

Fixed Effects Regressions				
Effective Tax Rate	-4.613* (0.237)	-1.929* (0.170)	-2.530* (0.166)	-1.848* (0.154)
ln(GDP)		2.091* (0.167)		0.777* (0.168)
ln(GDP Per-capita)		-0.666* (0.205)		0.146 (0.191)
ln(PPE)			0.608* (0.0308)	0.373* (0.0322)
ln(employ)			0.556* (0.0478)	0.299* (0.0461)
N	1457	1438	1452	1433
R^2 (Within)	0.21	0.66	0.65	0.72

* $p < 0.05$. Standard errors in parentheses. PPE stands for plant, property and equipment. Column (2) is the same as column (5) in Table 1.

Table 3
Key Locations of Profit Shifting, 2012

Country	Gross Income Reported, $ billions	Estimate of Gross Income without Shifting, $ billion	% of Total Excess Income in Location
Netherlands	172.3	33.0	23.0%
Ireland	122.3	23.6	16.3%
Luxembourg	96.1	15.0	13.4%
Bermuda	79.7	9.9	11.5%
Switzerland	57.9	14.6	7.2%
Singapore	42.4	10.5	5.3%
UK (Caymans)	40.9	8.7	5.3%
All Others Under 15%	188.6	89.8	16.3%
Total Under 15%	800	205	98.4%
All Others with Data[34]	267	257	1.6%

Table 4
Estimates of Reduced Revenue due to Income Shifting, 2004-2012

Year	2. Total Reported Income/Earnings in Foreign Affiliates (billions)	3. Estimated Increased U.S. Tax Base without Income Shifting (billions)	4. Reduction in Revenue due to Income Shifting (billions)	5. Actual Corporate Tax Revenue, Federal Level (billions)
Estimate Using Gross Income in Foreign Affiliates				
2004	525	148	-$44	189
2008	925	257	-$77	304
2012	1,219	371	-$111	242
Alternate Estimate Using Direct Investment Earnings Data				
2004	422	101	-$30	189
2008	754	154	-$46	304
2012	923	258	-$77	242

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[34] Note that the total of gross income in 2012 ($1,219 billion) is larger than the income that is reported in particular countries analyzed here ($1,067 billion); some income is earned in "other" countries that are not designated.

Table 5
Major Countries with Forbes Global 2000 Firms, 2012 Data

Country	Profit Share (of global 2000 total)
Australia	2.82%
Brazil	2.96%
Canada	2.97%
China	8.52%
France	3.77%
Germany	3.35%
Hong Kong	3.22%
India	2.29%
Italy	1.29%
Japan	5.41%
Malaysia	0.50%
Mexico	0.60%
Netherlands	2.29%
Norway	0.80%
Russia	3.61%
Saudi Arabia	0.77%
Singapore	0.74%
S Africa	0.90%
S. Korea	2.37%
Spain	1.38%
Sweden	1.04%
Switzerland	2.51%
Taiwan	0.94%
U.K.	6.37%
U.S.	33.33%
25 Countries with Share > 0.5%	94.75%

Table 6
Speculative Estimates of Corporate Tax Base Erosion, 2012

	Estimated Profits in 17 low-tax Countries, $ billion	Assumed Tax Rate (Combined Statutory Rate - 5%)	Excess Income Booked in Low-tax Countries, $ billion	Revenue Loss (tax rate * share of group GDP * $1,076b), in $ billion	Share of *all* Corporate Revenue, including subfederal
Australia	67.7	25%	36.3	7.4	9%
Brazil	71.1	29%	46.4	13.5	17%
Chile	4.3	15%	1.1	0.8	
China	204.5	20%	79.7	32.7	11%
Czech R.	1.9	14%	0.4	0.6	8%
Denmark	7.2	20%	2.8	1.3	13%
Finland	5.3	20%	2.0	1.0	18%
France	90.5	29%	60.2	15.3	23%
Germany	80.4	25%	43.5	17.2	28%
Greece	2.2	15%	0.5	0.7	26%
India	55.0	27%	33.3	9.7	14%
Indonesia	7.4	20%	2.9	3.6	8%
Italy	31.0	23%	14.3	9.0	16%
Japan	129.9	35%	105.7	39.8	18%
Mexico	14.4	25%	7.7	5.7	
Norway	19.2	23%	9.2	2.3	4%
Poland	8.4	14%	1.8	1.3	13%
Portugal	8.2	27%	4.7	1.1	19%
Russia	86.7	15%	21.1	5.8	7%
S. Arabia	18.5	15%	4.5	2.1	
S. Africa	21.6	25%	11.3	1.9	9%
S. Korea	56.9	19%	20.8	4.5	10%
Spain	33.1	25%	17.7	6.6	24%
Turkey	10.6	15%	2.6	2.3	14%
U.S.	800.2	30%	545.3	93.8	26%
Total	1,836		1,076	279	20.1%

Note: For countries other than the United States, the tax rate is the combined rate of federal and subfederal rates (when countries have sub-federal taxation); for the United States, I use the same assumption as the above analysis. Corporate tax revenue data are not available for all countries.

Tax Competition: BEPS, the EU, and Individual Country Responses

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GEORGETOWN LAW

What is Tax Competition?

- Competition over…
  - Statutory corporate rates?
  - Effective corporate rates?
  - Preferential rates for certain taxpayers or income?
- Competition for…
  - Revenues and other resource flows (firms, people, jobs)?
  - Spillovers (intellectual capital)?

Two Possible Responses

(1) Enter the competition

- – Lower statutory or effective rates

- – Implement preferential regimes

- – Redesign the tax system

- – Compete on non-tax elements

(2) Prevent the competition

- – Implement ***anti-tax-competition measures***

Recent Trends

- Anti-tax-competition measures that target "harmful tax competition"

- Measures that target tax avoidance, particularly by multinationals

- Multilateral and unilateral responses

OECD/G20 Responses to Tax Competition

- Action 5:

  – Nexus approach for patent boxes

  – Spontaneous exchange of rulings

EU Responses to Tax Competition

- Nexus approach from OECD

- Recent state aid investigations

- List of non-cooperative jurisdictions

Anti-avoidance measures

- OECD/G20
  - Other BEPS Action Items focused on taxpayers

- European Union
  - Anti-Tax-Avoidance Directive
  - Common Base Proposals (CCTB/CCCTB)

- UK Diverted Profits Tax

- Australian Multinational Anti-Avoidance Law

Lessons from Recent Responses

- Anti-tax-competition measures as a form of tax competition

- Anti-avoidance rules as anti-tax-competition measures

GEORGETOWN LAW

BEPS and International Tax Competition

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University of Toronto

February 2017

Introduction and overview

The OECD/G20 BEPS Initiative is a major change in the global approach to international tax planning by multinational corporations:

- tackles double non-taxation of cross-border investments in a real and consequential way
- specific country actions seem to be coalescing around this approach

The BEPS initiative preserves the traditional focus of international taxation on the source principle – tax income where it is earned.

- a difficult idea in the modern global economy, and fundamental pressures on national tax systems seem inevitable

We need to think about likely responses to the initiative, including:

- How will MNCs respond?
- How will governments respond?

A key message: Beware the Law of Unintended Consequences...

International Trends in Corporate Taxation
I. Headline corporate tax rates

The last 20 years has seen a substantial rise in MNC activities in low-tax countries – and a concomitant fall in corporate tax rates in high-tax countries.

Caveats:

- Economic consequences of reducing corporate taxes are far from clear
  - ▶ Role of the corporate tax in the broader tax system
  - ▶ Rate reductions vs. base broadening
  - ▶ International pressures – or domestic concerns?
- Tax changes driven by international tax competition concerns are unlikely to be optimal from a global perspective
- Profit tax revenues have remained stable
  - ▶ This does not look like a crisis

Statutory and effective corporate tax rates in the OECD
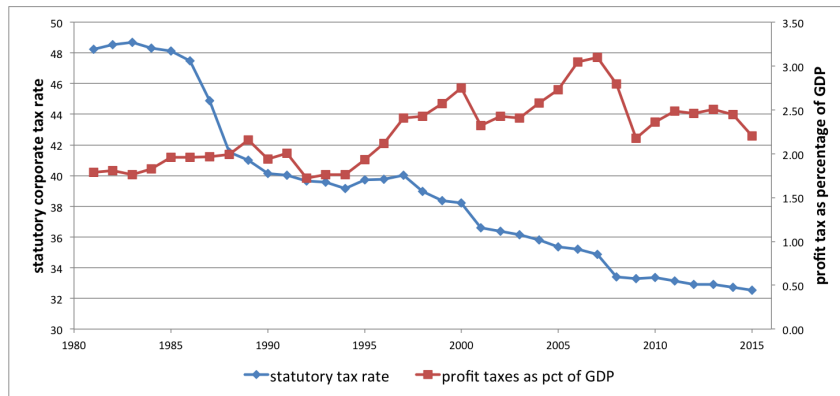
Note: GDP-weighted average of OECD countries, excluding eastern Europe/Asia.
Source: OECD, Tax and Revenue Statistics.

International Trends in Corporate Taxation
II. Targeted tax measures

As well as general rate reductions, many narrow tax preferences appear aimed at mobile income of corporate groups:

- Headquarters tax regimes
- Weak or non-existent CFC rules
- Patent boxes
- Bilateral tax treaty networks and rise in treaty shopping
- Hybrid mismatch arrangements

While some of these activities and entities have a real business purpose for MNCs, the potential for international tax avoidance is clear. In many cases governments have been slow to act in dealing with the issues.

Tax competition and corporate behaviour

There is now substantial evidence that both corporate taxable income and real cross-border investment is highly responsive to tax rules and tax rate differentials

- i.e. responses through both real business decisions and *pure avoidance* (profit shifting) responses

Both real and pure avoidance responses have the potential to erode the tax base and reduce revenues in high-tax countries. But their economic efficiency implications may be quite different:

- as profits become more mobile through pure avoidance, outsourcing pressures may decline
- e.g. Mintz and Smart (2004): location of profits of income shifting firms in Canada respond more to taxes than other firms – but real assets respond *less*
- does this induce governments in high-tax countries to tacitly tolerate profit shifting?

BEPS in a nutshell

The OECD/G20 initiative seeks to restrict tax avoidance opportunities in the tax codes of member and non-member states.

- focus on "double non-taxation"
- specific and substantive actions on patent boxes, debt shifting, hybrids, CFC rules, etc.
- emphasis on international coordination and transparency through arbitration, multilateral instrument, and country-by-country reporting

Overarching goal is to tighten the link between reported incomes and economic substance – and thereby reinforce the source principle as the key to international taxation

The future of BEPS

The OECD/G20 initiative appears to have shifted the debate on double non-taxation in a real and consequential way. Recent responses in the EU and elsewhere suggest the landscape for international tax planning is changing.

If enacted, what will these changes mean?

- How will MNCs respond?
  - A tighter link between tax and economic substance could make mobile capital more sensitive to international tax rate differentials
  - Potential for *greater* economic distortions, even as tax base erosion is discouraged
  - e.g. patent boxes and nexus – implications for location and tax treatment of R&D
- How will governments respond?
  - Greater sensitivity of real investment to tax $\implies$ greater downward pressure on rates in high-tax countries?
  - If countries cannot use existing targeted regimes, how will they compete instead?

Concluding remarks
BEPS and the source principle

The BEPS initiative is a "conservative" reform, aimed at preserving the source principle while targeting double non-taxation.

Can the source principle be saved? Should the source principle be saved?

- Many economists untroubled by a decline in taxation of mobile capital
  - as long as shareholder-level taxation remains practical on a residence basis
- If correctly designed, the corporate tax can still serve a role, nationally and globally, in taxing pure economic profit
  - e.g. IP and resource rents

Concluding remarks
The source principle ... and the destination principle

If mobile capital is increasingly hard to tax on a source basis, the ultimate economic burden of taxes will fall on internationally immobile bases: workers and consumers ... and perhaps rents

There is evidence that corporate taxes today serve to reduce labour incomes rather than shareholder incomes

- outsourcing pressures, reduced capital intensity and productivity

Current proposals to abandon the source principle would then shift the economic burden of taxes from workers to consumers, and from export-oriented to import-competing sectors

- workers and consumers are (increasingly) not the same people – particularly in skill-intensive export sectors
- complex distributional implications

The Welfare Implications of Tax Competition

Ronald B. Davies (UCD)

It's all about the pie.

- ## What is welfare? It's all about pie.
  - ### How big is the pie:
    - Income, jobs, growth
  - ### Who gets what share
    - Across countries, public/private, groups (different tax bases, firms, consumers, etc.)
- ## To answer the question, we need to ask what tax competition does to policy and what policy change does to the size and distribution of the pie.
- ## My argument: the main debate is over the distribution of pie across countries

What does competition do to policy?

- Lowers tax rates
  - 1pp fall in other taxes leads to .7pp fall here
    - Devereux, Lockwood, Redoano (2008, *JPubE*)

- Other tax-reducing policies
  - Patent/knowledge box
  - APAs
    - Becker, Davies, Jakob (2017, *JEBO*)
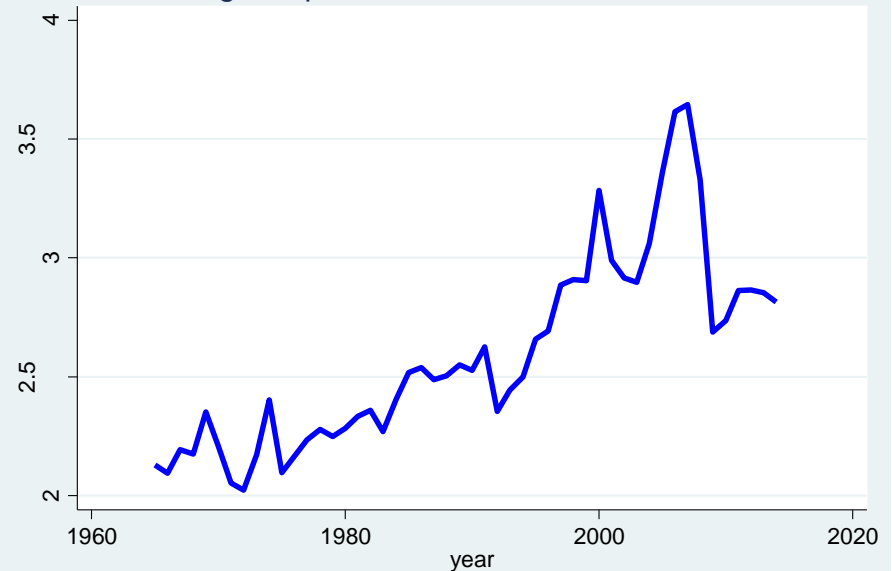
- Tax Environment, not just rates

Avg. Taxes in OECD 2000-2016
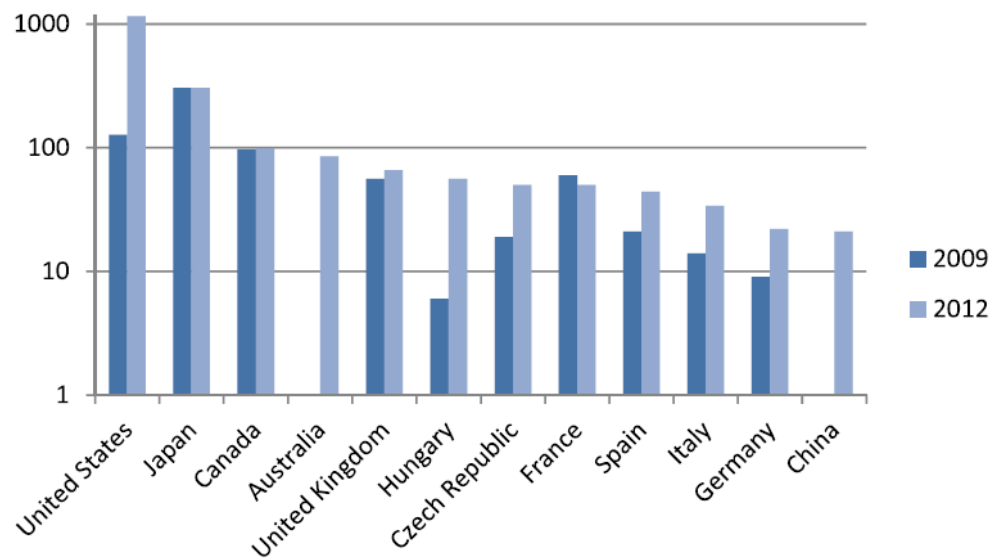
- # Mix between public and private
  - ## Fairly steady share of revenues to GDP

Avg. Tax/GDP in OECD 1965-2015
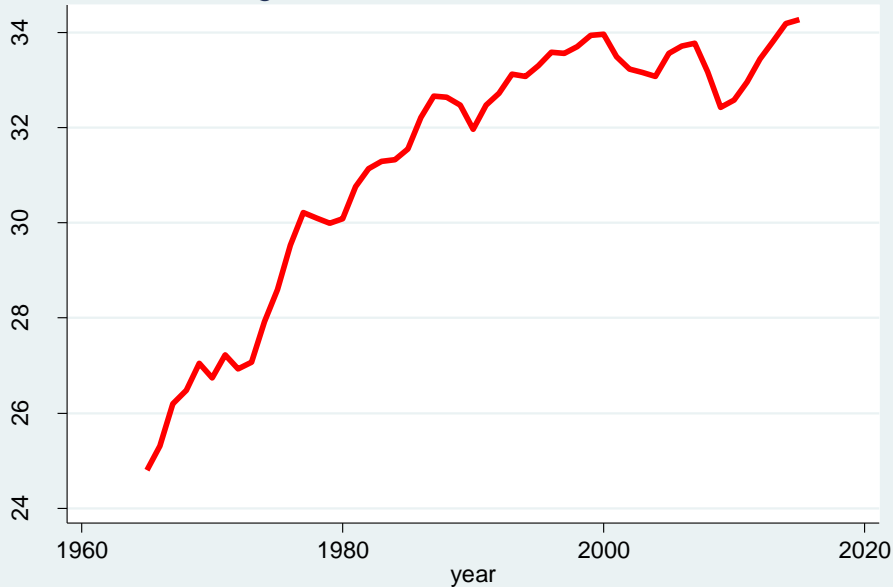
Avg. Corp. Tax/GDP in OECD 1965-2014

- Likewise, no clear shift of tax burden from firms to consumers
  - Within group shifts?
  - Apple tax case and APAs:
    - Preferential treatment
    - APA affecting the market (other firms and consumers)
- Allocation across nations
  - Impact on where the *benefits* (not just investment) of FDI go

Allocation of FDI across countries

- How to measure FDI?

  - FDI: Profits, number of investments, capital, employment, patents

    - Competition: Number of firms

- Either way, taxes deter FDI

  - Host tax: Literally *thousands* of papers

  - Home tax: Barrios, et al (2012, JPubE); Davies, Siedschlag, Studnicka (2016); Davies, Desbordes, Ray (2015)

Competition for investment or firms?

- ## Studies examine location *or* size

- ## Davies, Siedschlag, Studnicka (2016)
    - ### Intra-EU FDI, 2004-2013
    - ### Examines extensive (location) and intensive (size) in a single framework
    - ### Long-run home and host taxes reduce FDI
        - Host: 84% of aggregate changes in extensive
        - Home: 64% of aggregate changes in extensive
        - Bulk of reduction in investment is *fewer* not *smaller* firms
        - Implications for competition (Apple)

- ## Competition for firms, not investment

Greenfield vs. M&A
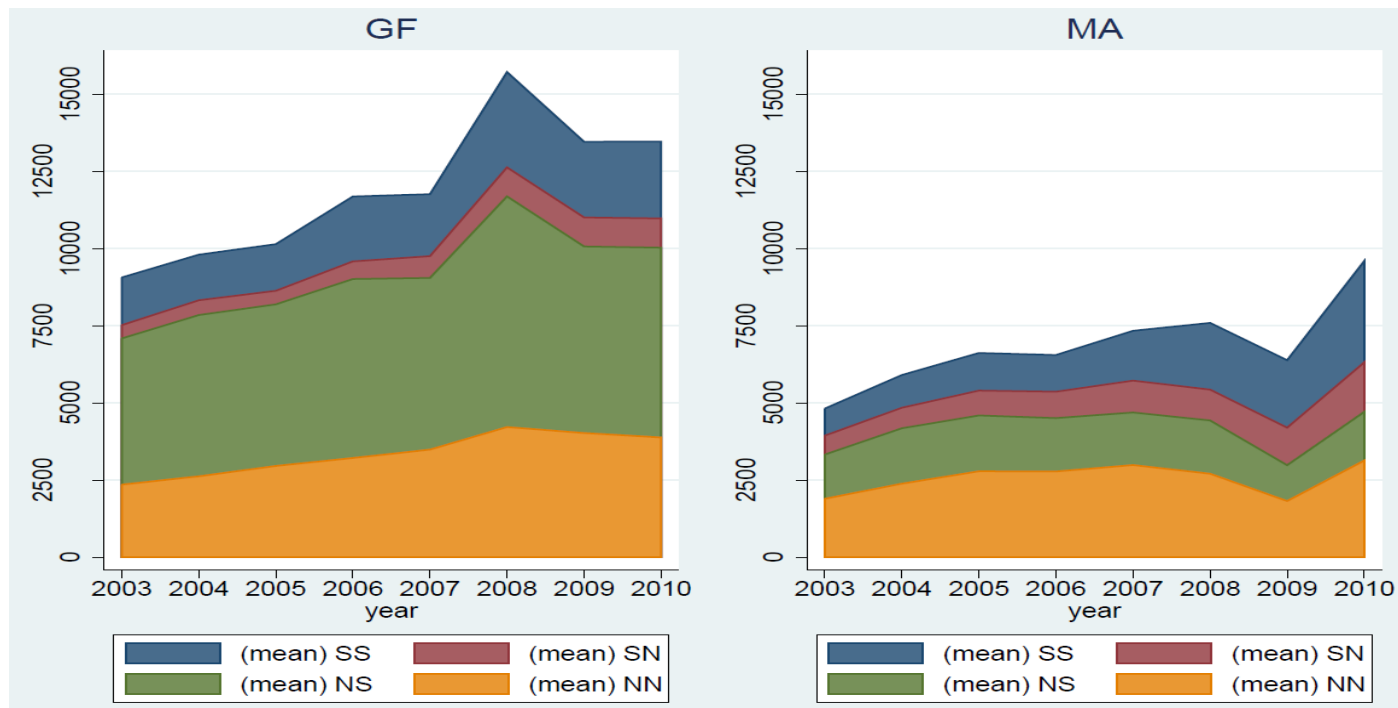
- GF is 63% of projects, 20% of investment

- Taxes only affect GF (host: 1%; home: .7%)
  - Becker and Fuest (2010, *IER*); Davies, Desbordes, Ray (2016)

Greenfield vs. M&A

- GF seems to have more economic impacts in labour markets and on growth
  - Davies and Desbordes (2015, *CJE*)
  - Harms and Meon (2014)
- Increases Local investment (Borenzstein, De Gregorio, Lee, 1998, *JIE*)
  - Crowding-in
- Outbound FDI has positive productivity effects
  - van Pottelsberghe de la Potterie and Lichtenberg (2001, *REStat*)

Patent boxes

- ## Not much evidence (yet)

  - Bradley, Dauchy, Robinson (2015): 1 pp fall in tax results in 3% increase in patent applications; no impact on location

- ## Effects on innovation type

  - Patent boxes reward *successful* and *profitable* innovations

  - Ernst, Richter, and Riedel (2014, *ITAX*): subsidize cost increases quantity, subsidize income stream increases quality (not profitability)

APAs

- No evidence on the impacts of these
  - Theory points to efficiency gains (BDJ, 2017); empirics stymied by confidential information
  - But: firms have to ask for an APA and APAs are costly so might just apply to the already big players (Apple)

- So if tax competition lowers the tax burden:
  - The pie gets bigger, potentially at home and in the host
    - Leaves out non-hosts
  - Can shift benefits across hosts, especially for valuable greenfield
    - This should be the primary conversation

- OECD and EU discussion:

  - Not about tax rates, but about taxing where rents are generated; "Fair" tax competition

- "Level playing field" on an uneven pitch

  - FDI responds to a lot more than taxes

    - Access to consumers

    - Worker quality, wages, and energy costs

    - Trade and cultural barriers

    - Shadow banks (Davies and Killeen, 2015)

  - Is tax competition unfair when some countries have "unfair" natural advantages?

- ## Reducing tax competition doesn't eliminate competition

  - Labour Standards: A 1 point cut in collective bargaining rights everywhere else reduces local rights by .7 (*de facto*, not *de jeur*)
    - Davies and Vadlammanati (2013, *JDevE*)

  - Environmental Standards: Size of effect varies according to the policy
    - Eliste and Fredriksson (2004, *JEEM*), Levinson (2003, *NTJ*), Davies and Naughton (2014, *ITAX*)

  - ***Tax*** competition may increase the pie, these might have very different impacts

Conclusion

- Tax competition lowers tax burdens
- This increases the size of the pie but shifts the share to low-tax hosts
- This shifts the debate to "fair competition" but on an uneven field
  - How to distribute the benefits as well as revenues when distribution is a concern
- Awareness of limited tax competition creating second best competition

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Tax Competition and the DBCFT

Alan Auerbach

February 3, 2017

Outline

- **Key provisions of the DBCFT**
- **How it may affect international tax competition**

Two Key Elements of Proposal

- **Cash flow tax**
  - Replace depreciation deductions with expensing
  - Eliminate interest deductions
- **Destination basis**
  - Drop foreign-source income from base, as under a territorial system.
  - Border adjustments effectively take export receipts and import costs out of business tax base
- **Result: a tax on domestic cash flows**
  - Like a VAT, but with a deduction for labor costs

Properties of DBCFT

- **Much simpler to administer**
  - No need to keep track of asset bases
  - Offshore & cross-border transactions ignored
- **No tax on US-source income**
  - Expensing means tax only on returns above normal return to capital (e.g., rents)
  - Destination basis means rents taxed based on location of purchaser, so no tax on rents based on source

Many Issues to Deal With

- **Financial companies**
  - Can also use border adjustments for financial flows, and limit domestic financial company taxation to transactions with individuals and entities not subject to the DBCFT:

    http://eml.berkeley.edu//~auerbach/CBTWP1701.pdf

- **Losses and border adjustments**
- **Transition provisions, including interest on existing debt, depreciation & dollar contracts**

Economic Responses

- **Border adjustment should be offset by dollar appreciation**
  - No direct change in competitiveness for exports or imports
  - No significant impact in the trade balance
- **But important changes in international competition in other dimensions**

Elements of Tax Competition

1. **No longer any US tax on foreign source income**

2. **US tax rate no longer relevant for decisions regarding location of profits and activities**

3. **Interest no longer deductible in the US**

Effects on Firm Behavior

Elimination of tax on offshore income should

1. Encourage repatriations to the US
   - No longer any tax on such repatriations

2. End tax-induced corporate inversions out of US
   - Residence no longer relevant to US tax calculation
   - Residence-based features in other countries' tax systems should induce inversions <u>into</u> US

Effects on Firm Behavior

Zero tax on US-source income should encourage companies to

1. Make new investments in the US rather than elsewhere, for existing operations

– Cash flow tax means zero tax rate on additional investments

Effects on Firm Behavior

Zero tax on US-source income should encourage companies to

2. Locate profitable activities in the US rather than elsewhere

– Border adjustment means a zero US tax on profits relocated to the US

Effects on Firm Behavior

Zero tax on US-source income should encourage companies to

3. Use transfer pricing to shift profits <u>into</u> US (even from Ireland)

– Border adjustment means overstatement of US imports or understatement of US exports to related parties has no effect on US tax base, but reduces foreign tax base

Effects on Firm Behavior

Elimination of interest deduction should encourage companies to

1. Use more equity finance in US

   – Debt and equity now on an equal footing

2. Shift borrowing to other countries where at least some deduction may be possible

   – Any deduction is better than none

A Leap in the Tax Competition Game

- **The DBCFT is approximately equivalent to repealing the corporate income tax, introducing a subtraction method VAT plus a wage subsidy**
- **Little incentive for US to compete by lowering its corporate tax, since it's now based on customer location**
  - Only reason would be to compete for consumers

The Perspective from Abroad

- **Further pressure on their tax systems**
  - Note: they are already ahead of the US right now in the tax competition game, with VATs and lower corporate tax rates
  - But lower than 35% can still be a lot higher than 0.
- **Little incentive for US to help them protect their tax bases**
  - E.g., we no longer have any incentive to crack down on tax havens

The Choice: To Fight or Switch

- **Switch**
  - Other countries can adopt the DBCFT
  - Response can also be done incrementally, by raising VAT, lowering employment taxes, and reducing corporate tax rate

- **Fight**
  - Complain to the WTO and hope that they will honor form over substance

Which Outcome is Likely?

- **For an individual country, the decision <u>should</u> depend on whether it benefits more from keeping the current US system rather than reforming its own**
  - For example, small, low-tax countries have little to gain by adopting DBCFT themselves, but a lot to lose if the US does

Which Outcome is Likely?

- **But initial inclination to fight may also arise from other factors**
  - Desire to maintain status quo with respect to international agreements
  - Misunderstanding of the DBCFT as trade intervention
  - Reaction to the decision of US to act unilaterally, rather than through cooperation via international organizations

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