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The effect of taxes on foreign direct investment: a survey of the empirical evidence

Johannes Voget
University of Mannheim

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Author Biography

Johannes Voget is Professor of Taxation and Finance at the University of Mannheim. He was previously a Research Fellow at the Oxford University Centre for Business Taxation and at the Alfred Weber Institute at Heidelberg University. He received his Ph.D. in Economics from Tilburg University.

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Key findings

- A decrease in the statutory corporate income tax rate by one percentage point increases the number of multinationals which are hosted by about 2.5 percent with a 95% confidence interval ranging from 0.6 percent to 4.4 percent.

- The effect on the scale of multinationals' investments is somewhat smaller as a one percentage point tax cut increases the asset size of multinational affiliates by about 1.6 percent with a 95% confidence interval ranging from 0.9 percent to 2.3 percent.

- Greenfield investments react more strongly to taxes than cross-border acquisitions because host country taxes are capitalized in acquisition prices.

- Multinationals from countries taxing worldwide profits are relatively more active in high tax locations compared to multinationals which are not taxed on profit repatriations.

- Higher home country taxes decrease the capital stock of foreign affiliates as parent firm activities are an important input for the whole group.

1. Introduction

When Ireland had to apply for rescue funds from other EU countries and the IMF in November 2010, it came under political pressure to increase its corporate income tax rate of 12.5% in return. Ireland defied these calls stating that its corporate tax regime is non-negotiable and a red line because it is absolutely fundamental to the country's tax base for foreign direct investment and it remains a key component of its industrial policy.[1] This illustrates a strong belief that low taxes have been instrumental in securing the strong inflow of foreign direct investment which Ireland has experienced over the last 20 years. On the other hand, Markusen (2002, p.6) – an expert on FDI and multinational enterprises – holds the contrasting view that "Taxes appear to be of second-order importance" for FDI. As views on this topic can differ quite a bit, this report will survey the state of empirical research about the effect of taxes on foreign direct investment in order to inform and to give some guidance to policy discussions.

The setup of this paper is as follows. Section 2 gives a brief overview of the various FDI components. Section 3 describes the potential benefits of FDI and the conceptual effect of taxes. Section 4 turns to the empirical evidence investigating the relative importance of different aspects of tax regimes for foreign investors. Section 5 concludes.

2. What constitutes foreign direct investment?

For a better understanding of the complex relationship between taxes and foreign direct investment, it is important to get a grasp of what FDI actually represents. FDI flows have been analyzed quite frequently because they are

[1] Treanor (2010), Kelsey (2011).

conveniently available from countries' balance of payments records. It is generally defined as investment in assets or firms by foreign entities – mainly multinationals but also individuals or governments – given that they own a lasting interest (more than 10 percent of shares) in the enterprise. Upon closer inspection, it turns out that this is somewhat of a catch-all definition which comprises very heterogeneous types of transactions, which may have different benefits for the host economy and which may also react very differently to taxes:

- Greenfield investment: This is probably the classic example of FDI in which a multinationals buys capital goods for cash to establish new production facilities abroad. The eventual size of FDI depends on the source of financing. Only foreign source equity or debt contributes to FDI. Debt financing by local banks does not. It is also important to note that greenfield investment does only increase a host country's capital stock to the extent that it induces the host economy to provide more capital goods. In the polar case, greenfield investment could crowd out domestic investment. Even then, greenfield investment still involves a change in ownership of capital goods which the new foreign owner employs more productively.

- Cross-border mergers and acquisitions: For this mode of FDI, it is more apparent than for greenfield investment that the transaction is first of all a change in ownership. Changes in the stock of capital – downsizing or follow-up investments – may then occur as a consequence of the change in ownership. In case of cash acquisitions, the size of FDI may be much smaller than the total size of the acquisition to the extent that debt financing is provided by local markets. In case of acquisitions by share swaps, the whole volume is recorded as an FDI flow from the acquirer to the target country. However, it is accompanied by a corresponding foreign portfolio flow from the target country to the acquirer's country as only titles of ownership are exchanged. This corresponding flow may instead also count as FDI if the target is so sizeable and shareholdings in the target so concentrated that a 10 percent share in the acquirer is established. Especially, corporate inversions may fall in this latter category.

- Income flows: Reinvested earnings which are not repatriated increase FDI. If there are barriers to repatriation, FDI flows increasingly reflect the profitability of a multinational's foreign operations. Furthermore, repatriation tax holidays may decrease FDI flows considerably.

- Intra-group financing: Debt and equity financing between fellow enterprises also counts as FDI. Capital in transit due to intermediate holding companies – and as a special case round tripping capital – result in a concurrent increase in FDI inflows and outflows without material consequences. In particular, the debt component of FDI is sensitive to the location of treasury or cash pooling facilities within multinationals and it is more volatile than the equity component of FDI.

- Other changes in FDI: Exchange rate movements, price changes (capital gains and losses), and writeoffs are also important determinants for changes in FDI, although these effects are mostly beyond the control of investors.

3. Benefits of FDI and the conceptual effect of taxes on FDI

In theory, capital should flow from countries with surplus savings to countries with a surplus of valuable investment opportunities until investment returns are equalized. Countries compete for the mobile stock of capital by setting their tax policy. Higher taxes drive a wedge between the gross return and the net, after-tax return and capital starts to flow out until the net return to the remaining capital has increased back to the required rate of return. Vice versa, lower taxes attract capital until the net return has decreased back to the worldwide level of net returns. A larger stock of capital is beneficial to a country's economy economy because it raises the productivity of the input factors which are assumed to be immobile, in particular labor. Hence, a larger stock of capital raises wages.

Smaller countries may set their tax policies more competitively because they take the world interest rate as given and the supply of capital is perfectly elastic (i.e. infinite) at that rate. On the other hand, larger countries may be aware that their tax policy affects the worldwide interest rate and that higher tax rates feed back to lower required rates of return. As they face a less elastic supply of capital, larger countries may therefore set somewhat higher taxes.

Although these types of models[2] are quite stylized, they illustrate the basic mechanics by which taxes could affect FDI

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[2] See, for example, Zodrow and Mieszkowski (1986) or Wilson (1991).

flows as multinationals distribute their assets across countries to maximize their return. They also point out a particular benefit which countries derive from the presence of multinationals as it raises the productivity of all the other input factors. Other benefits from the presence of multinationals include the following:

- Ownership advantage: multinationals are more productive types of firms. In contrast to foreign portfolio investment, foreign direct investors can employ input factors more efficiently because they own a lasting interest in the enterprise.

- Knowledge spillovers: the presence of highly productive foreign direct investors also increases the productivity of the host country's domestic sector due to positive externalities (i.e. learning or some type of agglomeration effect)

- Lower volatility: in contrast to foreign portfolio investment flows, FDI is less volatile. These types of investment may be partly irreversible or subject to high liquidation costs.

- More variety, more competition: Foreign firms entering the host country's market may result in a larger variety of products becoming available. The increased competition may keep mark-ups smaller and products more affordable.

- Less resources spent on trade costs: Foreign firms which produce in local markets avoid trade costs of having to export goods abroad.

In most cases, the general interest in FDI flows is ultimately based on gaining access to one or more of the benefits listed above. Greenfield investments and cross-border M&As may offer these benefits to different degrees. Greenfield investments are thought to add more to a country's productive capacity especially if there are idle resources. A new entrant also tends to increase the level of competition more than the take-over of an existing firm. On the other hand, knowledge spillovers to the domestic sector are found to be larger in the case of cross-border acquisitions probably due to the target firm's pre-established linkages within the industry.[3]

Conceptually, the use of the statutory tax rate as a measure for the tax burden is unsatisfactory because the rate should always be considered in conjunction with the definition of the tax base. Deductions and exemptions should be taken into account to arrive at an effective measure of the tax rate. For example, corporate income tax rates can be designed such that the level of statutory tax rates does generally not distort investment decisions – for example by implementing a cash flow tax.

If multinationals can slice and dice their investment projects without incurring any fixed costs, then the relevant parameter for the optimal size of local operations is a country's effective marginal tax rate (EMTR) which applies to the marginal investment that just breaks even. Reducing the EMTR would increase the optimal size of a multinational's local operations, which should be reflected in larger FDI flows.

However, if the investment process involves discrete decisions with mutually exclusive options due to investment

[3] Balsvik and Haller (2011).

projects being lumpy, incurring fixed costs, or earning economic rents, then the relevant parameter for location decisions is the effective average tax rate (EATR). For example, one plant may serve a region more efficiently than smaller plants in every country. Similarly, a patent cannot be split in pieces. A decrease in the effective average tax rate would be reflected in larger FDI flows as the country becomes a more profitable investment location relative to other options. The EATR also depends on the profitability of a project. The EATR is frequently lower than the statutory tax rate due to deductions etc. However, with increasing project profitability, the EATR increases towards the statutory tax rate as deductions become irrelevant in comparison to the size of profits.[4]

4. Empirical evidence

Aggregate measures of FDI exhibit a negative correlation with host country taxes. However, this result is difficult to interpret due to the heterogeneous components of aggregate FDI as laid out in section 2 above. FDI flows amalgamate different decision margins such location decisions, scaling decisions as well as financing decisions.[5]

4.1 Location decisions and the size of projects

Due to these difficulties in identification, researchers have turned to firm-level data which allows to separate the different decision margins. Especially location decisions have been investigated quite thoroughly, either by counting the

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[4] See Devereux and Griffith (2003).

[5] The survey study by De Mooij and Ederveen (2008) finds semi-elasticities of -2.5 for statutory tax rates, - 4.0 for EMTRs, and -5.9 for EATRs.

number of new foreign subsidiaries across host countries per year or by analyzing the choice of location of the new subsidiary. The picture which emerges is very stable across different settings: the EMTR apparently does not play a role in location decisions. On the other hand, a cut in the EATR by one percentage point increases the number of subsidiaries by about 2.5 percent. Interestingly, the effect of the statutory tax is in the same ballpark and the evidence is even more robust than for the EATR.[6]

The relevance of the statutory tax rate could reflect that the new subsidiaries are particularly profitable. And indeed, taking the taking the location of foreign affiliates as given, lowering tax rates by one percentage point is found to increase measured pre-tax profitability by 1.3 percent.[7] Is this finding due to newly founded financial subsidiaries which may be very mobile because they are not bound to the location where the main production activity takes place? However, this would not be in line with two other pieces of evidence: First, at least one study explicitly excluded financial subsidiaries and holding companies and focused on firms with at least some property, plant, and equipment assets on the balance sheet. Hence, the additional subsidiaries engage in productive activities.[8] Second, when distinguishing newly established subsidiaries with low profitability from newly established subsidiaries with high profitability, the latter type is actually less sensitive to differences in tax rates in its location choice.[9] This finding warrants further investigation. It

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[6] Devereux and Griffith (1998), Büttner and Ruf (2007), Overesch and Wamser (2009), Barrios et al. (2012).
[7] Becker et al. (2012).
[8] Buettner and Ruf (2007).
[9] Barrios et al. (2012).

could imply that some of the multinationals' rents are location-specific and relatively immobile.

Having decided on the investment location, what is the optimal level of investment and how much is it affected by taxes? Evidence based on European firm-level data suggests that a decrease in the host country statutory tax rate by one percentage point increases affiliates' assets by 1.0 percent in the short run and by 1.6 percent in the long run.[10]

To summarize, decreasing the EATR by cutting the statutory rate is a viable policy to increase the genuine engagement of multinationals – with the side effect of more profits being retained there as well. It is still an open question how much of the increase in foreign investment derives from a global increase in investment and how much comes at the cost of neighboring countries.

4.3 Greenfield investment versus acquisitions

Firms can expand their operations in another country either by engaging in greenfield investment or by acquiring another firm. Depending on the circumstances, entries by acquisition may be especially desirable because they facilitate industry consolidation across borders necessary for an efficiently functioning common international market– as aspired by the

[10] Becker et al. (2012), Becker and Riedel (2012). The 95% confidence interval for the semi-elasticity extends from 0.9 to 2.3. Very similar semi-elasticities are estimated when considering effective marginal tax rates instead of statutory tax rates. However, this could also be due to an omitted variable bias. Devereux and Lockwood (2006), for example, don't find the EMTR to be relevant for the volume of investment when the EATR is taken into account as well.

European Union. On the other hand, greenfield investments may be warranted because there is room to increase a country's productive capacity, for example due to resources being idle. In this context, the question arises if the two modes of entry – greenfield investment and acquisitions – react similarly to tax policy.

Greenfield investment and acquisitions can be directly compared using German outbound FDI data. The first important insight is that the bulk of foreign direct investment between developed economies does indeed take place by means of M&As. Two thirds of new affiliates were acquired whereas only one third was established by means of greenfield investment. Second, M&As are only half as responsive to taxes than greenfield investment. A tax decrease in the host country by one percentage point increases the number of acquisitions by 1.2 percent while the number of greenfield investments increases by 2.1 percent.[11] Hence, acquisitions by foreign firms are less sensitive to taxes but do not react fundamentally different than greenfield investment. This difference in tax sensitivity may reflect taxes being capitalized in acquisition prices. Alternatively, the set of potential target firms may be constrained: the tax sensitivity is smaller if a particular target firm is necessary to realize the ownership advantage. This would make the rent location-specific as there is no outside option except for having no deal at all.

From a policy perspective, the higher sensitivity of greenfield investment to taxes may be particularly interesting as more productive firms tend to enter a foreign market by greenfield

[11] Hebous et al. (2011). The semi-elasticities are derived from a tax elasticity of -0.324 with respect to acquisitions and from a tax elasticity -0.557 with respect to Greenfield investment.

investment rather than by an acquisition.[12] However, it has not yet been investigated empirically whether positive externalities for host countries are indeed larger for the former mode of entry than for the latter.

4.4 International taxation

The previous discussion has focused on the host country's tax policy but the picture would be incomplete if tax parameters of the investors' country were not taken into account. Conceptually, multinationals from countries imposing worldwide taxation by means of a tax credit system should to some extent be shielded from changes in host country taxes. Lower taxes may not represent such a strong incentive to these multinationals if the home country attempts to subject foreign investments to the same level of taxes as domestic investments by imposing additional taxes on foreign-source profits. This also implies that these multinationals should be underrepresented in low tax locations relative to their counterparts for which lower host country taxes are attractive as their home countries exempt foreign-source profits from taxation.

In practice, it is an empirical question if there still exist relevant differences in international taxation in the presence of institutional details such as check-the-box regulations, lenient rules for deferral, and infrequent repatriation tax holidays. The incidental reports of multinationals stockpiling their foreign profits virtually untaxed abroad could leave the impression that the difference in home country taxation is immaterial. However, there is ample empirical evidence from various settings that the difference does matter. Foreign direct investors from tax credit countries (i.e. Japan and

[12] Nocke and Yeaple (2008), Raff, Ryan, and Stähler (2009).

United Kingdom) have a relatively stronger presence in high tax U.S. states than foreign direct investors from exemption countries (i.e. France, Germany).[13]

For cross-border M&As, the number of acquisitions by foreign investors increases by 1.9 percent if the host country's corporate income tax rate is decreased by one percentage point. However, this does not apply to the number of acquisitions from countries with a tax credit system and a higher tax rate than the host country. The benefit of lower host country taxes is almost exactly canceled out by the prospects of higher repatriation taxes.[14]

The same phenomenon has been found when analyzing the choice of country in which a new subsidiary is founded. Lower corporate income taxes increase the probability of hosting new subsidiaries but not in the case in which the subsidiary's ultimate parent resides in a country with a tax credit system and a higher tax rate than the potential host country.[15]

High repatriation taxes may in some cases even invert FDI flows, although without obvious implications with respect to exploitation of ownership advantage or knowledge spillovers. This is best illustrated by the wave of corporate inversions in 2013/2014 in which a number of US multinationals were matched with significantly smaller firms, frequently from Ireland. Technically, the smaller Irish firm acquired the US multinational such that the ultimate parent firm of the combined multinational ended up in Ireland. Research on cross-border M&As shows that inversions may just be a drastic example of a wider although less apparent

[13] Hines (1996)
[14] Huizinga and Voget (2009).
[15] Barrios et al. (2012).

phenomenon: whenever two firms join their operations, there is an incentive to choose that firm as the acquirer which is located in the country with the more advantageous tax regime.[16]

Additional taxes on repatriated profits are the result of two interacting policy parameters. First, withholding taxes, which are set by the host country and often negotiated to lower levels by bilateral tax treaties. Second, potential taxation of the parent firm's received profits by the home country. When the two sources of repatriation taxes are distinguished, the evidence for the inhibiting effect of the latter source of repatriation taxes is very robust. On the other hand, the effect of withholding taxes is pretty uncertain.[17] This could reflect that particularly high withholding tax rates can be avoided by using intermediary holding companies in third countries – as has been found for German outbound investment[18] – and also by repatriating funds in the form of interest or royalties. However, the taxing right of the home country is only deferred in any of these cases.

The mixed evidence on withholding taxes ties in with the research about the effect of bilateral tax treaties, which failed to find any straightforward effects of tax treaties on the

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[16] Huizinga and Voget (2009). In a simulation of the U.S. unilaterally eliminating worldwide taxation, the U.S. would provide the acquiring party in 58 percent of cross-border M&As instead of 53 percent of cases.

[17] Huizinga and Voget (2009), Barrios et al. (2012).

[18] Mintz and Weichenrieder (2010) find that high withholding tax rates between Germany and a partner country increase the probability that subsidiaries in the partner country are held via an intermediate holding company in a third country.

volume of foreign direct investment.[19] Very recently, it has been shown that one of the main benefits of the tax treaties may be the Mutual Agreement Procedures which the treaties institutionalize. These rules can be called upon by firms to procure an agreement between the involved tax authorities if conflicting transfer price regulations result in double taxation of profits. Especially multinationals trading in differentiated goods appear to profit from tax treaties as disagreements about the appropriate arms-length price emerge frequently.[20]

4.6 The parent firm's corporate income tax

When firms evaluate if they want to enter foreign markets and if they want to do so by exporting or by establishing foreign affiliates, they also have to take the level of taxes in the home country into account. Higher home country taxes could tip the scale in favor of foreign direct investment because profits would accrue at home in case of exporting but they could accrue abroad when producing directly in another country. Evidence for this kind of effect has been found for aggregate FDI flows. An increase in the home country's EATR by one percentage point increases FDI outflows by 4 to 5 percent.[21]

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[19] Blonigen and Davies (2004).

[20] Blonigen et al. (2014). Taking firm heterogeneity into account, a bilateral tax treaty is found to increase the sales of US multinationals' foreign affiliates in the partner country by 20 million US dollar or by about 12.5 percent. It also doubles the rate of entry at which new affiliates are established. An effect on the amount of assets employed could not be investigated, which leaves the question if profit shifting plays a role in the observed patterns as well.

[21] Benassy et al (2005), Egger et al(2009).

As pointed out in the previous discussion of aggregate FDI flows, it is difficult to pinpoint the underlying reason for the positive relationship of FDI and home country taxes. It could reflect a genuine increase in foreign operations either in the form of greenfield investments or by means of acquisitions because investing abroad is more attractive with higher taxes at home. Alternatively, the increase in FDI is caused by a change in the financing of foreign operations: instead of relying on local sources in host countries for debt financing, funds are provided directly or via intermediate firms by the parent as the increased home country tax rate gives an incentive to increase leverage there. The latter alternative is probably the relevant explanation because home country taxes have not been found to affect the number of acquisitions that take place between two countries.[22] Furthermore, when analyzing the acquirer's country of origin for a given target firm, the acquirer is apparently less likely – not more likely – to come from a country which keeps the corporate income tax rate at a high level.[23]

Last – and in most contrast with the results based on aggregate FDI flows – a decrease in the parent country's tax rate by one percentage point is found to increase foreign affiliates stock of capital by 0.6 percent when firm-level data is considered.[24] Headquarters apparently provide an ownership advantage as a sort of public good to all affiliates in the group. Higher taxes at home could then reduce the supply of this intra-group public good and therefore affect investment of foreign affiliates as well. In line with this, the effect is only observed if the parent firm owns at least some

[22] Huizinga and Voget (2009).
[23] Feld et al. (2013).
[24] Becker and Riedel (2012).

intangible assets (as a proxy for the presence of ownership advantages).

5. Conclusions

The surveyed empirical research suggests that lowering taxes is a viable policy option to attract more investment by multinationals, especially with respect to greenfield investments. For the major part, foreign direct investment is the result of discrete location decisions – not only about the location of production but also about the location of profits. Therefore, the most robust choice for policy implementation would be a reduction of the EATR by cutting statutory tax rates as this is found to be relevant for all decision margins of a multinational investor. A reduction of the rate by one percentage point appears to increase increase the number of foreign-owned affiliates by about 2.5 percent – with the 95% confidence interval ranging from 0.6 percent to 4.4 percent –, the size of affiliates increases by about 1.6 percent with the corresponding confidence interval ranging from 0.9 percent to 2.3 percent. Due to the discrete nature of the decisions, marginal tax rates are somewhat less relevant, although they may still have some effect on the scale of individual investment projects. Hence, even if tax reforms have to be kept revenue neutral, a tax rate cut in conjunction with a broadening of the tax base could still attract more foreign direct investment. An extended tax treaty network also helps in attracting FDI not necessarily due to lower withholding taxes but also due to non-rate aspects of tax regimes such as Mutual Agreement Procedures to avoid double taxation.

From a national perspective the benefits of attracting more FDI would have to be traded off against the loss of tax revenue and other functions of the corporate income tax: for example, as a backstop to profit shifting from personal to corporate income or as a sort of withholding tax on capital income. From a global perspective, lowering taxes to attract FDI would only be desirable to the extent that it increases FDI on a global scale and does not result in a zero-sum game.

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