Tax information exchange with developing countries and tax havens[*]

Julia Braun[†]and Martin Zagler[‡]

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Abstract

The exchange of tax information has received ample attention recently, due to widespread aggressive tax planning and tax evasion. Whilst both participating tax authorities will gain when foreign investments (FDI) are bilateral, we demonstrate that FDI receiving nations will lose in asymmetric situations. We solve a bargaining model that proves that tax information exchange will only happen voluntarily with compensation for this loss. We then present empirical evidence in a global panel and find that a tax information exchange agreement (TIEA) or a double tax treaty with information exchange (DTT) is more likely when the capital importer is compensated thru official development assistence (ODA). We finally demonstrate how the foreign account tax compliance act (FATCA) and similar international initiatives bias the bargaining outcome in favour of capital exporting countries.

Keywords: developing countries, tax havens, tax information exchange agreements.

JEL-Codes: K33, F53, H25, H87, D82.

1 Motivation

There are about 3,000 double tax treaties (DTTs) and more than 800 tax information exchange agreements (TIEAs) in the world (UNCTAD, 2011; OECD, 2013). These bilateral tax treaties govern a large majority of global cross-border investment flows (Radaelli, 1997) and, even though the Convention on Mutual Administrative Assistance in Tax Matters[1] has gained in importance recently, these bilateral agreements are still the main instruments enabling the exchange of information between tax authorities.

With rising cross-border capital flows, exchange of information between tax authorities is gaining in importance. Being able to receive information about a taxpayer's international activities is crucial in order to correctly assess its tax liability — especially as the majority of national tax systems are residence-based and source taxation rates have decreased considerably.

In the last two decades, developing economies have increasingly been integrated into the global DTT network. As of 2008, more than 50% of the DTTs were between a developing on the one and an industrialized economy on the other hand (Baker, 2014). Such agreements are likely to be asymmetric, with capital flowing predominantly from the industrialized to the developing country, and capital income flowing the other way. In this asymmetric case, the tax authority of the industrialized economy has a larger interest in receiving tax-related information from the other state than the other way round. Bar (2008) states:

> (...) under the common approach for tax treaties between developed
> and developing countries, the latter receive no real incentives to col-
> laborate and exchange information with the developed countries. The
> opposite may be true — the only immediate benefit that developing

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[1]The Mutual Assistance Convention was issued by the OECD in 1988 and came into force in 1995. In 2010, an amending protocol was opened for non-OECD signatory countries and entered into force in June 2011.

countries gain from the current treaties is when they don't comply with the exchange of information provisions. In fact, the only incentive developing countries are left with to attract foreign investors is to promise them (even if not officially) to shelter the information about their businesses from their residence country. (p. 7)

Besides DTTs, TIEAs are gaining in importance as instruments to exchange taxpayer-related information. While at the beginning of 2008, there were about 50 such treaties in place, more than 800 TIEAs had been concluded by 2013. These treaties are narrower in scope than DTTs as they only provide a basis for the exchange of tax-related information, and do not deal with the allocation of taxation rights. TIEAs are mostly concluded between industrialized economies and tax havens. As mainly resident companies of industrialized countries have affiliates in tax havens (and not the other way round), the industrialized country is more often interested in receiving information from a tax haven than vice versa.

This paper aims at identifying factors and patterns that drive the conclusion of such asymmetric agreements, both DTTs and TIEAs. In particular, we are interested in the exchange of information between tax authorities. When information is exchanged on the basis of such a bilateral tax treaty, the provider of the information is typically not compensated. However, information is a tradable good which is costly to generate (i.e. receive from the firms) and to provide.

Paolini *et al.* (2015) show theoretically that an asymmetric DTT is expected to be signed voluntarily only if some cost and revenue sharing takes place. In this paper, we set up a simple Nash bargaining model that specifically investigates a situation of asymmetric exchange of information. This model predicts that very little information will be exchanged in case of an asymmetric treaty with no compensation for the information provided. We then test the model empirically with our hypothesis being that giving bilateral development assistance may be a way to compensate countries for providing information (see Braun & Zagler, 2014). Using panel data econometrics we find that higher flows of official development

assistance increase the likelihood of an OECD country and a developing country to have a tax treaty in place. For tax treaties between OECD countries and tax havens, we do not find such a connection.

The paper proceeds as follows. The next section (Section 2) overviews the previous literature. In Section 3, we set up a simple Nash bargaining model analyzing the supply of tax-related information as provided for in bilateral tax treaties. After a brief presentation of the data the hypothesis derived from the theoretical model is tested empirically (Sections 4 and 5). Section 6 shows an extension of the model offering a perspective on the Foreign Account Tax Compliance Act (FATCA) as currently being promoted by the United States. Section 7 concludes.

2 Literature

Generally, states sign tax treaties with states with which they have close historical and economic ties (see e.g. Egger *et al.* , 2006; Lang, 2012; Lejour, 2014; Taylor, 2011). Also geography influences the probability of two countries to sign a tax treaty. While the distance between two countries has a significantly negative effect on the likelihood of treaty formation, spatial interdependence generates positive spillovers. Using a global sample of OECD and non-OECD countries Barthel & Neumayer (2012) find evidence that the likelihood of a country-pair to sign a DTT depends also on the number of DTTs signed by their regional competitors in terms of export product structure.

Baistrocchi (2008) analyzes the strategic motives driving the spread of asymmetric DTTs using game theory. According to him developing countries are willing to sign DTTs because they find themselves in a prisoner's dilemma situation. From a joint perspective of all developing countries, it would be better for developing countries not to sign DTTs with capital exporters due to the associated tax revenue losses. If a developing country's competitors however conclude DTTs with capital-exporters, the country is individually worse off if it does not sign a DTT,

because without a DTT it is less attractive for foreign investors compared to the other countries that have signed a DTT.

Ligthart *et al.* (2012) empirically study the determinants of DTT formation for a large country sample covering both industrialized and developing countries. They conclude that being able to exchange information is not so much of a motivation for countries to sign DTTs. The reduction of double taxation seems to be a more important incentive.

Using administrative data on information exchange in the Netherlands, Ligthart & Voget (2009) study the factors that determine the number of cases of information exchange taking place with other tax administrations. The authors find evidence that there are more cases of information exchange, the higher the domestic income tax rate, the higher the marginal cost of public funds, and the bigger the share of a country's interest-bearing deposits held abroad are. Exchange of tax-related information is also found to be predominantly reciprocal.

Bilicka & Fuest (2014) empirically analyze how tax havens choose their partners for signing TIEAs with. Finding that tax havens conclude TIEAs also with economically relevant partner economies, the authors conclude that TIEAs might have the potential to effectively fight tax evasion and avoidance. Focusing on exchange of information, Elsayyad (2012) theoretically and empirically studies the decision of tax havens whether or not to sign tax treaties with OECD countries. Further she analyzes which factors influence whether a DTT or a TIEA is signed. She shows that "the main determinants of treaty signing are a haven's bargaining power and good governance"(Elsayyad, 2012, p.1).

Bacchetta & Espinosa (1995, 2000) theoretically analyze the incentives for exchanging tax-related information using a game-theory framework. Bacchetta & Espinosa (1995) find that "large countries have an incentive to transmit information through strategic motives"(p. 276). Bacchetta & Espinosa (2000) show that repeated interactions among governments may provide incentives to supply information. They then also analyze the factors impacting the probability of an

information clause being added to a tax treaty or not. Their model of two asymmetric countries shows that "no information exchange clause may be added to the tax treaty when there is a reciprocity requirement, when there is a high cost of negotiation, or with one-way capital flows"(abstract). This paper aims at contributing to this literature novel insights about the incentives to exchange tax-related information in asymmetric tax treaties.

3   A model

If a resident in one country (call it Homeland) pursues economic activities in another country (call it Foreignnation) that are liable to taxation in his country of residence, this country requires information on the tax base and the amount of taxes due. There are several options to obtain this information. First, the tax authority can ask the tax subject herself. For obvious reasons, it may not get the correct reply. As opposed to economic activity in its own territory, the tax authority in Homeland cannot investigate abroad due to a lack of jurisdiction. However, it can ask the tax authorities abroad to assist in verifying the information of its tax subject. Foreignnation may be reluctant to supply this type of information, due to direct and indirect costs. Direct costs obviously include information collection and audit costs. Indirect costs are effects that impact Foreignnation, as agents will require excess withholding taxes back as a next step, or move their business to a third country, thus withdrawing tax base and foreign direct investment from Foreignnation, leading to repercussions on GDP and employment. Foreignnation will therefore supply very little information to other jurisdictions, as indicated by ample empirical evidence **?**. A third alternative would be to invoke the information from third parties, as currently considered in the US Foreign Account Tax Compliance Act (FATCA), to be discussed in chapter 6.

We assume that Homeland can tax foreign income with a constant average tax rate τ, so that every unit of tax base information has the same value to Homeland.

We can think of τ as the reservation price above which Homeland would no longer be willing to purchase information. Foreignnation by contrast has different costs of information procurement, starting at nothing (in case the information is readily available, and increasing due to the size of the economic activity (the larger the easier it should be per unit), and the complexity of the underlying business activity. We will rank information according to their procurement cost for Foreignnation, from the cheapest to the most costly[2], according to the following cost function,

$$C = c(q) \tag{1}$$

with $c(q) \geq 0$, $c'(q) \geq 0$. We define average costs as $C/q = c(q)/q = a(q)$. There is a rent of information sharing if and only if the maximum willingness to pay of Homeland exceeds the marginal cost of procurement of Foreignnation,

$$c'(q) \leq \tau \tag{2}$$

Under perfect competition, information would be exchanged until equation (2) is satisfied with equality, and, due to perfectly elastic demand, the price for information would be equal to the gain for Homeland from the information, $p^{pc} = \tau$. This is the exact opposite of the current practice in double tax treaties and tax information exchange agreements, where information should be shared free of charge, $p^{tiea} = 0$. Note that in the latter case, Foreignnation would therefore willingly share only information that comes at no cost, and this may be the reason for the low number of information exchanges registered empirically.

We are, however, not in a situation of perfect competition. As this information is only available to one country, and only useful to another, the two governments would negotiate over the information. We will therefore use Nash bargaining to solve for the price at which information would be shared willingly Foreignnation and purchased willingly by Homeland. We can define the surplus for Homeland as the difference between the gain from information, τq, minus the price paid for

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[2]For the sake of simplicity, we assume full divisibility of information.

that information, pq,

$$S_H = (\tau - p)q \tag{3}$$

Similarely, the surplus for Foreignnation is equal to the revenue from selling information, pq, minus the cost of information procurement, C,

$$S_F = pq - c(q) \tag{4}$$

Defining the bargaining power of Homeland with $0 \le \beta \le 1$, the Nash maximand reads

$$N = (S_H)^{\beta}(S_F)^{1-\beta} = (\tau - p)^{\beta}q^{\beta}[pq - c(q)]^{1-\beta} \tag{5}$$

where both S_H and S_F must be positive, or $a(q) \le p \le \tau$. Taking the first order condition with respect to the price p gives

$$-\beta(\tau - p)^{\beta-1}q^{\beta}[pq - c(q)]^{1-\beta} + (1 - \beta)(\tau - p)^{\beta}q^{\beta+1}[pq - c(q)]^{-\beta} = 0$$

Upon rearranging, we find the bragaining price,

$$p = \beta a(q) + (1 - \beta)\tau \tag{6}$$

It turns out that the result is a weighted average between the reservation price of Homeland, τ, and average cost of providing this information, $a(q^*)$, for Foreignnation. For the price to be less than Homeland's reservation price τ, we must have $a(q^*) \le c'(q^*)$, or average costs must be below marginal costs. This condition ensures that there exists some economic rent that can be divided between the two countries.

The price will equal the reservation price of Homeland, $p = \tau$ if the bargaining power of Homeland is null, $\beta = 0$. In this case Foreignnation can extract all rents for itself. The price will equal average costs of Foreignnation if the bargaining power of Foreignnation is null, $\beta \to \infty$. In this case Homeland can extract all rents for itself. The price will be null if and only if average costs are zero and the bargaining power β equals unity.

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Coincidentally, this is the current legal situation in Tax Information Exchange Agreements and Double Tax Treaties with provisions for the exchange of information. Whilst this may not pose a problem in situations where both countries posses a similar amount of information[3], when the countries are asymmetric, with one country the predominant provider of information and the other country the predominant receiver, the above model predicts very little information to be exchanged. This asymmetric situation is typical for developing countries, which are capital importers and therefore should be able to retrieve information requested by the captial exporting developed country. We therefore suggest that TIEAs and DTTs should include cost[4] and revenue sharing to succeed in retrieving information.

Maximizing equation (5) with respect to the amount of information exchanged q yields

$$\beta(\tau - p)^\beta q^{\beta-1}[pq - c(q)]^{1-\beta} + (1 - \beta)(\tau - p)^\beta q^\beta [pq - c(q)]^{-\beta}[p - c'(q)] = 0$$

Simplifying and rearranging yields,

$$p = \beta a(q) + (1 - \beta)c'(q) \qquad (7)$$

which differs from the bargaining outcome (6) only in the last term. From equations (6) and (7) we can conclude that the quantity of information exchanged in a Nash bargaining is therefore given by $c'(q^*) = \tau$, and is equivalent to the amount of information exchanged under perfect competition. Nash bargaining therefore does not distort the optimal amount of information exchanged. Rearranging equation (3) gives the price for which information would be exchanged,

The following graph illustrates the argument. We have depicted the reservation price of Homeland as a horizontal green line. We have also drawn the marginal

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[3]In two separate bargaining problems, neither country would be willing to provide information that comes at a cost, but in a joint bargaining problem, our educated guess is that information will be exchanged willingly.

[4]As mentioned above, costs are opportunity costs and include both direct and indirect costs.

cost curve of Foreignnation as an upward sloping red line. At the intersection of these two curves, point B, we identify the quantity of information exchanged in the bargaining model. Finally, we have drawn three different average cost curves of Foreignnation, which differ only in the amount of fixed costs. $a_2(q)$ has a minimum above the reservation price, and hence there exists no solution where information is exchanged.

The average cost curve $a_1(q)$ has its minimum below the reservation price, and therefore permits the exchange of information[5]. The minimum amount at which Foreignnation is willing to sell information is indicated by point A. The difference between A and B indicates the total economic rent that can be gained from bargaining. The division of this rent depends on relative bargaining power. If Foreignnation has all the bargaining power, $\beta = 0$, according to equation (6), the exchange would happen in point B. If Homeland has all the bargaining power, $\beta \to \infty$, the price would be set at point A. In both cases, the price exceeds zero.

The only possibility to have exchange of information at zero cost is depicted by average cost $a_0(q)$, where fixed costs and marginal costs below a certain threshold q_0 are null. Here, if Homeland has all the bargaining power, the bargaining outcome would be a corner solution, and a quantity q_0 of information would be exchanged at a prize $p = 0$. In this case, information exchange is inefficient, as Homeland would be willing to pay for additional information and Foreignnation would be willing to provide additional information at that price.

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[5]Bargaining will not lead to the maximum amount of information exchanged, which would be where the average cost curve $a_1(q)$ intersects the reservation price τ. Instead, information is exchanged at a lower level, as additional cost for providing information would exceed the willingness to pay. Information exchange in a bargaining model is therefore efficient.
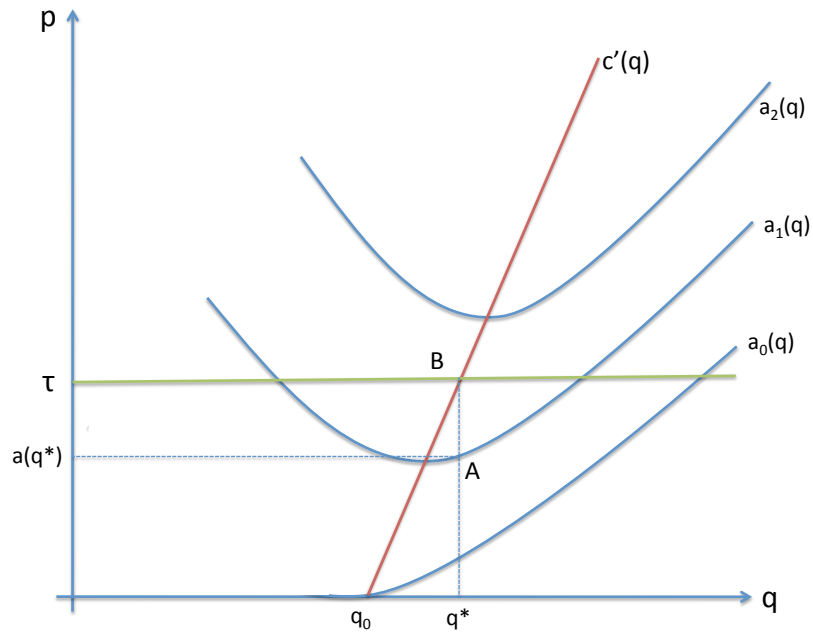
4 The data

We construct a panel dataset covering the period 2005 to 2013. The dataset consists of 34 OECD member countries, 131 developing countries and 23 tax havens.[6] All country-pairs consist of an OECD country on one side and a non-OECD country, be it a developing country or a tax haven, on the other side. 4,158 unique country-pairs with a total of 1,262 DTTs and 181 TIEAs are covered in this analysis. The descriptive statistics are depicted in Table A.1 in the annex.

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[6]List of Tax Havens included in the analysis: Aruba, Andorra, Antigua and Barbuda, Bahrain, The Bahamas, Belize, Bermuda, Costa Rica, Dominica, Grenada, St. Kitts and Nevis, Liberia, St. Lucia, Marshall Islands, Mauritius, Malaysia, Panama, Philippines, Samoa, San Marino, Uruguay, St. Vincent and the Grenadines, Vanuatu.

5   Empirical evidence

Using a panel probit model, we estimate the probability of two countries having a bilateral treaty in place allowing the exchange of taxpayer-related information, i.e. a DTT or a TIEA. The regression model, which is estimated using the maximum likelihood method, looks as follows

$$prob(treaty_{ijt}) = pr[y_{ijt} = 1|X] = \alpha_{ij} + \beta_1 * x_{1ijt} + \beta_2 * x_{2ijt} + \ldots + \eta_t + u_{ijt} \quad (8)$$

The dependent variable y_{ijt} is a binary variable taking the value of one if a country-pair ij has an effective tax treaty in place in the year t and zero otherwise; α_{ij} stands for the individual (i.e. country-pair-specific) effect, x_{jit} are the explanatory variables relating to each country-pair, and u_{ijt} stands for the error term. We estimate a random-effects model, i.e. the individual-specific effects α_{ij} are assumed to be distributed independently of the regressors. Year-fixed effects (η_t) are also included and the data are clustered at the country-pair level. All time-variant explanatory variables are lagged by one year.

The choice of the explanatory variables is based on an extended version of the classical gravity model, which explains the economic activity between two countries, such as bilateral trade or investment, with the size of the two economies and the distance between them. Besides such economic and geographical factors, also historical and political aspects are included in the analysis.[7]

The baseline regression results are presented in Table 1. All covariates have the expected signs. Distance (ln_dist_{ij}) has a negative sign and is statistically significant. To capture geographical interdependence, we use specific target contagion and specific source contagion. Barthel & Neumayer (2012) have shown that these specific geographical spillovers are important determinants of the spread of DTTs. The variable "specific source contagion"($source\_contagion$) tests whether

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[7]The sources of the data are depicted in Table A.2 in the annex.

the probability of an OECD member country j having a DTT with a specific developing country i is affected by the fact that other OECD member countries m already have signed a DTT with the specific developing country i. Numerous reasons are conceivable for this interdependence. The OECD country j may want to offer its residents an investment environment at least as attractive as other OECD countries m do. Besides, the OECD country j may want to reduce the appeal of treaty shopping for its residents, *i.e.* prevent that they invest in country i via another country in order to benefit from that country's DTT when investing in country i. Further, the fact that other OECD countries m already have a treaty in place with country i may indicate that this country offers attractive business opportunities to international investors.

Table 1: Baseline Regression Results

	(1)	(2)	(3)	(4)	(5)
ln_dist	-1.326***	-0.948***	-1.742***	-1.186***	-2.436***
	(-4.31)	(-4.98)	(-3.76)	(-4.23)	(-2.61)
target_contagion	16.04***	13.67***	24.97***	20.31***	29.74***
	(9.10)	(14.31)	(6.05)	(12.04)	(2.73)
source_contagion	19.78***	14.78***	20.16***	17.32***	26.43***
	(11.78)	(24.70)	(6.49)	(14.67)	(2.80)
ln_gdp_sum	0.438***	0.320***	1.101***	0.421***	1.397***
	(2.77)	(3.13)	(3.66)	(3.03)	(2.74)
ln_trade	0.00594				
	(0.89)				
ln_fdi	0.0284***	0.0209***	0.0327***	0.0264***	
	(5.27)	(5.05)	(4.99)	(5.52)	
ln_netFDI					0.028***
					(3.48)
*netFDI*ODA*					0.001**
					(2.00)
comlang_off	2.372***	2.480***	4.398***	3.149***	4.243**
	(4.10)	(7.69)	(4.27)	(6.10)	(2.45)
colony	7.281***	4.725***	4.713***	4.682***	6.570**
	(6.63)	(6.62)	(3.95)	(5.50)	(2.28)
ln_oda	0.0181**	0.0187***	0.0279***	0.0281***	0.0597***
	(2.42)	(3.28)	(3.06)	(4.02)	(3.15)
ln_gdppc_diff	0.519***	0.309***	0.265	0.0681	0.246
	(3.11)	(2.59)	(1.27)	(0.48)	(0.89)
corruption			0.0362***	0.0229***	0.0294*
			(4.32)	(4.31)	(1.85)
haven				5.116***	7.075***
				(8.88)	(2.84)
year FE	yes	yes	yes	yes	yes
constant	yes	yes	yes	yes	yes
Wald test	7,673.83	5,592.10	8,120.95	5,610.76	
(p-value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
observations	43,045	43,045	36,207	36,207	34,500
no of clusters	5,120	5,120	4,494	4,494	5060

Notes: The dependent variable is a dummy indicating whether a country-pair has a treaty in place, all time-variant explanatory variables are lagged by one period, t statistics in parentheses, * p<0.10, ** p<0.05, *** p<0.01, random effects estimation, time period 2005 - 2013, all regressions are clustered at the country-pair level;

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Second, we account for "specific target contagion" ($target\_contagion$), i.e. that a specific developing country i may be more likely to sign a DTT with a specific OECD country j, if the developing country's neighbouring countries k have already entered into a DTT with that specific OECD country j. For companies resident in OECD country j, two neighbouring developing countries in, say, South East Asia may represent close substitutes when making an investment in the South East Asian region. Thus, country i may be more ready to sign a treaty with a specific OECD member country j if its neighbouring countries already have a treaty in place, so not to be at a competitive disadvantage.

Further, a higher combined bilateral GDP of the two economies in question (ln_gdp_sum) increases the likelihood of a country-pair to have a tax treaty in place. Also economic ties matter for the conclusion of a tax treaty. While the volume of bilateral trade (ln_trade) does not have a statistically significant impact on the likelihood of a tax treaty, the sum of bilateral FDI stocks (ln_fdi) proves to be positive and statistically significant.

Historical links are captured by the two variables $colony$ and $comlang\_off$. The results indicate that if a developing country used to be a colony of an OECD country ($colony$) or if both countries share a common official language ($comlang\_off$), the probability of the two countries to have a tax treaty in place is higher.

The regression results further suggest that the amount of bilateral assistance given from the OECD to the non-OECD country (ln_oda_{ijt}) impacts the likelihood of a tax treaty. The more ODA a developing country receives from an OECD country, the more likely these two countries are to have a tax treaty in place. In order to control for the fact that this effect may only capture the difference in GDP per capita between the two signatory states, we also include the difference in GDP per capita between the two countries ($ln\_gdppc\_diff_{ijt}$). This variable is however only statistically significant if the variable proxying the level of corruption in both countries is not included.

Columns 3 to 5 then also include this variable depicting institutional quality

(*corruption*). This variable measures the level of corruption in a country. It is an index with higher numbers corresponding to lower levels of corruption. We included the joint level of corruption of both treaty partners. The variable is positive and statistically significant, indicating that two countries are more likely to conclude a tax treaty the lower the joint level of corruption in both countries is (also see Braun & Zagler, 2014). In Column 4, a binary variable *haven* is added which takes the value one if one country of the country-pair is a tax haven and zero otherwise. It proves to be statistically significant and positive, indicating that tax havens are more likely to sign a treaty providing for the exchange of information than other non-OECD economies.

Whereas the previous regressions simply include the sum of bilateral FDI stocks of a country-pair, column (5) includes the variable $netFDI$ that depicts the difference in inward FDI minus outward FDI from the perspective of the capital-importing country. This regression only comprises of these country-pairs for which this difference is zero or positive. We would expect that the more asymmetric a bilateral investment position is, that is, the higher $netFDI$, the more asymmetric is also the information flow, as the capital-exporting country is likely to request more information. To test this hypothesis we include an interaction term of the variables ODA and $netFDI$. This interaction term is statistically significant and positive, indicating that capital-importer that receives a lot of FDI from an OECD-country also receives more ODA from this country.

Reverse causality – in particular with respect to FDI – may pose a problem for our regressions. To address potential simultaneity, all time-variant explanatory variables have been lagged by one period. Potential reverse causality of the FDI variable entails that the other coefficients may be underestimated, which implies that the coefficients, including the coefficient of interest ODA, can be interpreted as lower bound.

	(1)	(2)	(3)	(4)	(5)	(6)
	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
dependent variable	ln_fdi	treaty	ln_fdi	treaty	ln_fdi	treaty
diff_schooling_gross	-0.460***		-0.515***		-0.368***	
	(-5.34)		(-5.03)		(-4.22)	
ln_fdi_1 (iv)		0.525**		0.638*		0.351
		(2.44)		(1.83)		(0.81)
corruption			0.0110	0.0185		
			(1.61)	(1.64)		
ln_dist	-2.118***	-0.616	-2.084***	-0.729	-2.244***	-1.398
	(-7.50)	(-1.01)	(-6.87)	(-0.83)	(-8.05)	(-1.30)
target_contagion_1	3.666**	18.13***	5.105***	23.55***	4.355***	22.32***
	(2.49)	(4.59)	(3.23)	(8.39)	(2.96)	(8.11)
source_contagion_1	10.42***	15.67***	9.732***	20.10***	11.01***	19.95***
	(16.40)	(3.94)	(14.73)	(5.70)	(17.43)	(4.06)
ln_gdp_sum_1	2.634***	-0.646	2.765***	-0.349	2.620***	-0.0589
	(20.18)	(-1.11)	(19.64)	(-0.35)	(20.18)	(-0.05)
ln_oda_1	0.00817	0.0261**	0.00595	0.0589***	0.0146	0.0425**
	(0.91)	(2.21)	(0.61)	(2.71)	(1.62)	(2.19)
comlang_off	-0.175	3.835***	-0.297	3.836***	-0.550	3.858***
	(-0.39)	(3.65)	(-0.62)	(4.29)	(-1.22)	(4.88)
colony	6.442***	2.424	6.696***	2.077	6.490***	5.262*
	(5.96)	(1.40)	(5.91)	(0.82)	(6.05)	(1.77)
ln_gdppc_diff_1	-0.336**	0.587**	-0.585***	0.209	-0.301*	0.593**
	(-2.08)	(2.27)	(-2.90)	(0.56)	(-1.90)	(2.02)
haven					3.477***	5.249***
					(8.14)	(3.08)
year FE	yes	yes	yes	yes	yes	yes
constant	yes	yes	yes	yes	yes	yes
year-fixed effects	yes	yes	yes	yes	yes	yes
Wald-test	2175.04	3882.28	2121.06	5837.75	2369.31	2058.43
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
observations	24,692	25,238	21,751	22,271	24,692	25,238
clusters	4387	4403	3963	3980	4387	4403

Notes: The dependent variable is a dummy indicating whether a country-pair has a treaty in place, all time-variant explanatory variables are lagged by one period, t statistics in parentheses, * p<0.10, ** p<0.05, *** p<0.01, random effects estimation, time period 2005 - 2013, all regressions are clustered at the country-pair level;

To mitigate the problem of reverse causality, we instrument the FDI variable using the skill-difference between the home and the host country as instrument (see Table 2). The skill-difference per se should not have an influence on treaty formation, it impacts however the volume of bilateral FDI: Countries with a better skilled labour force, i.e. with a lower skill difference to the home country, are expected to attract more FDI, hence the negative sign in the first stage.

We run three different specifications: without including *corruption* (columns 1 and 2), including *corruption* (columns 3 and 4), and additionally including a tax haven dummy (columns 5 and 6). All estimations are in line with the previous results, indicating a positive correlation between bilateral ODA and the likelihood of signing a treaty that allows for the exchange of information between tax authorities.

Table 3 then presents regressions for separate samples for developing countries and tax havens. Column 1 excludes tax havens from the sample. The results remain largely unchanged. Columns 2 shows the same regression — but this time including only the country-pairs consisting of an OECD country on one and a tax haven on the other side. For these country-pairs, ODA does not have a statistically significant impact on the likelihood of treaty formation. Columns (3) to (6) present IV-estimations as above, corroberating previous findings.

Table 3: Seperate Samples: Developing Countries and Tax Havens

	(1)	(2)	(3)	(4)	(5)	(6)
	developing countries only	tax havens only	developing countries only		tax havens only	
			1st stage	2nd stage	1st stage	2nd stage
dependent	treaty	treaty	ln_fdi	treaty	ln_fdi	treaty
diff_schooling_gross			-0.484***		-0.297	
			(-4.25)		(-1.25)	
ln_fdi_1 (iv)				0.714		-0.881
				(1.63)		(-0.71)
ln_dist	-1.253*	-2.250***	-2.631***	-0.692	-2.091**	-5.014
	(-1.71)	(-3.06)	(-8.19)	(-0.54)	(-2.02)	(-0.91)
target_contagion	27.10***	15.34***	2.845*	31.76***	29.53***	52.86
	(10.44)	(4.37)	(1.72)	(10.89)	(5.48)	(0.88)
source_contagion	24.94***	14.09***	10.44***	24.45***	7.285***	29.09
	(13.59)	(5.99)	(15.12)	(5.10)	(3.25)	(0.90)
ln_gdp_sum	0.599**	0.327	2.937***	-0.273	1.591***	1.790
	(2.09)	(1.26)	(19.85)	(-0.21)	(3.70)	(0.75)
ln_fdi	0.0449***	0.0127				
	(5.55)	(1.06)				
comlang_off	3.741***	2.707***	-0.185	4.448***	-1.596	3.117
	(2.98)	(3.20)	(-0.36)	(3.91)	(-1.39)	(0.58)
colony	8.811***	1.810	6.854***	6.679**	3.768	7.629
	(2.79)	(1.47)	(5.63)	(2.05)	(1.30)	(0.91)
ln_oda	0.0703***	-0.002	0.009	0.0797***	0.0278	0.0224
	(5.12)	(-0.15)	(0.96)	(3.06)	(0.76)	(0.56)
ln_gdppc_diff	-0.267	1.733***	-0.327	-0.323	-1.544***	1.035
	(-1.24)	(3.22)	(-1.54)	(-0.84)	(-2.88)	(0.38)
corruption	0.0165*	0.0339***	0.007	0.024*	-0.0176	0.0249
	(1.90)	(2.74)	(0.90)	(1.86)	(-0.80)	(0.57)
year FE	yes	yes	yes	yes	yes	yes
constant	yes	yes	yes	yes	yes	yes
Wald test	5532.68	468.75	2182.88	5932.16	217.99	681.76
(p-value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
observations	32645	3562	19,272	19,741	2479	2530
no of clusters	3988	506	3,461	3,476	502	504

*The dependent variable is a dummy indicating whether a country-pair has a treaty in place, all time-variant explanatory variables are lagged by one period, t statistics in parentheses, * p<0.10, ** p<0.05, *** p<0.01, randon effects estimation, time period 2005 - 2013, all regressions are clustered at the country-pair level;*

Summing up, we find that there is a correlation between asymmetric bilateral tax treaties and development aid when it comes to developing countries, but not when tax havens are involved. For developing countries, ODA may constitute a sort of compensation for providing information to the tax authority in the capital-exporting country. For tax havens, conversely, which usually are rather rich jurisdictions with stable institutions and good governance (Hebous, 2014), it may rather be political pressure (for instance in the form of blacklisting) that drives these jurisdictions to engage in information exchange.

6 A perspective on FATCA

In chapter 3, we have discussed tax information exchange agreements (TIEAs) between governments. As an alternative to these bilateral TIEAs, a comprehensive automatic exchange of information framework, the so-called Foreign Account Tax Compliance Act (FATCA), was introduced by the US government in 2010. FATCA aims at ensuring effective taxation of the worldwide capital income of all US persons. To this end, FATCA unilaterally obliges all foreign financial institutions (FFIs) doing business with the US to conform to US reporting standards. Any FFI not complying with these standards faces a 30% withholding tax on a wide range of outgoing payments from the US. Also non-financial entities are affected. They have to provide information about their substantial US owners in order to avoid the 30% withholding tax.

In order to participate in the FATCA, every FFI and non-financial institution has to register with the Internal Revenue Service (IRS), i.e. sign an agreement in which it pledges to provide the requested information. In order to make possible or facilitate the implementation of these rules, the US government has entered into bilateral agreements, so-called Intergovernmental Agreements (IGAs), with a number of countries. States can basically choose between two types of agreements. Depending on which of the two models its resident state agrees to sign, an FFI (i)

either reports the requested information to its national competent authority which then provides it to the IRS (Model 1A), or (ii) provides the information directly to the IRS (Model 2).[8]

This changes the bargaining model substantially, as the threat point, which describes the fallback option in case an agreement fails, drops dramatically. Instead of the foreign government, it is now foreign firms that would bargain with the US government. Firms may incur different (opportunity) costs when collecting information for the US government, which we will denote with $\tilde{c}(q)$. In case foreign firms do not comply with the FATCA requirements, they will suffer sanctions from the US government, which will reduce their profit by an amount f. The firms surplus therefore equals,

$$s_f = pq - \tilde{c}(q) + f \tag{9}$$

We had to add f as foreign firms would not have to forfeit this amount if they comply with FATCA. Note that as opposed to a foreign government, Homeland now faces foreign firms, so it is very likely that the bargaining power of Homeland, $\tilde{\beta}$, increases. By contrast, by blocking foreign firms to do commerce in the US, the US forgoes gains from trade, which we will denote by h and deduct from Homeland's surplus,

$$s_h = (\tau - p)q + h \tag{10}$$

Maximizing the Nash maximand (5) with respect to the price, yields after some rearrangement,

$$p = \tilde{\beta}\left[\tilde{a}(q^*) - \frac{f}{q}\right] + (1 - \tilde{\beta})\left[\tau + \frac{h}{q}\right] \tag{11}$$

Once again, the bargaining outcome is a weighted average Whilst the cost from loosing US business, f, reduces the price for which information is exchanged, the loss from gains from trade in the US, h,would increase that price. An increase in the bargaining power of the US, $\tilde{\beta}$, reduces the importance of h, whereas it

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[8]For more information on FATCA and the two IGA Models please refer to Somare & Wöhrer (2014).

increases the importance of f. This price could now be less or equal to zero. We can think of h as shifting the horizontal τ locus in figure 1 upward, and f to shift the average cost curve downward. FATCA can change the bargaining situation by deteriorating the threat point of the developing country and increasing US bargaining power. Full exchange of information could thus be realized at zero cost.

Maximizing the Nash maximand (5) with respect to the quantity exchanged, yields after some rearrangement,

$$p = \tilde{\beta} \left[\tilde{a}(q^*) - \frac{f}{q} \right] + (1 - \tilde{\beta})\tilde{c}'(q) \left[1 + \frac{h}{s_H} \right] - (1 - \tilde{\beta})\frac{ph}{s_H} \qquad (12)$$

Comparing the two first order conditions (11) and (12), we find that equation (2) still holds, and bargaining remains efficient, $\tau = \tilde{c}'(q^*)$.

7 Conclusions

This paper has analyzed, both theoretically and empirically, the determinants of the conclusion of tax information exchange agreements and double tax treaties with information exchange, with a particular focus on asymmetric situation, where one country is a capital exporter and another country is the capital importer.

We have demonstrated in a simple bargaining model, that if countries would freely negotiate an agreement, a capital importing country - and hence information exporting country - would only voluntarily sign such an agreement if it is being paid a compensation. The compensation will depend positively on average costs of revealing information and the potential (tax revenue) gain of the receiving country, but negatively on the bargaining power of the information provider. Only in the absence of information acquisition costs and without any bargaining power for the information provider could compensation be foregone. The bargaining outcome will always be efficient, that is information will be exchanged as long as marginal costs of revealing the information is less or equal to the global marginal gain from such an information exchange.

We then constructed a panel comprising of 34 OECD countries, 131 developing countries and 23 tax havens, ranging from 2005 to 2013, and estimated the probability that a tax information exchange agreement or a double tax treaty with information exchange will be signed. Our hypothesis is that a treaty is more likely if a capital exporting country is being compensated. We use bilateral data for official development assistance to account for this compensation. As control variables, we use a set of geographical (distance, neighborhoud effects), political (colonial past, common language, corruption, tax havens) and economic variables (trade, FDI, GDP). As a treaty may lead to a change in FDI, our estimators for other variables, in particular our variable of interest, official development assistance, may be biased downward. Nonetheless, official development assistance shows the correct sign and is statistically significant. In order to account for the aforementioned reversed causality between FDI and a treaty, we instrument FDI and confirm our hypothesis that developing capital importing countries get compensated for the cost of gathering information and the potential loss of tax base thru official development assistence (and potentially other means).

International tax transparency does not stop with tax information exchange agreements, and several noteworthy initiatives have recently emerged. We discuss the foreign account tax compliance act (FATCA) within our bargaining framework to demonstrate that by altering the threat point, capital exporting countries can actually reduce the amount of compensation required in order to obtain tax information, and we expect this to show up in future analysis of the data.

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8   Annex

Table A.1: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ln_dist	43,045	8.76	0.69	4.71	9.88
target_contagion	43,045	0.29	0.16	0.02	0.77
source_contagion	43,045	0.24	0.28	0	1
ln_fdi	43,045	-15.39	12.31	-23.03	12.63
comlang_off	43,045	0.11	0.31	0	1
colony	43,045	0.03	0.17	0	1
ln_gdppc_diff	43,045	9.95	0.88	0.66	11.38
ln_oda	43,045	-11.11	11.80	-23.03	9.33
ln_gdp_sum	43,045	26.93	1.37	23.21	30.82
ln_trade	43,045	12.55	13.08	-23.03	27.04