
DOCUMENT
DE TRAVAIL
N° 555

**PROFIT SHIFTING THROUGH TRANSFER PRICING:
EVIDENCE FROM FRENCH FIRM LEVEL TRADE DATA**

Vincent Vicard

May 2015



**PROFIT SHIFTING THROUGH TRANSFER PRICING:
EVIDENCE FROM FRENCH FIRM LEVEL TRADE DATA**

Vincent Vicard

May 2015

Les Documents de travail reflètent les idées personnelles de leurs auteurs et n'expriment pas nécessairement la position de la Banque de France. Ce document est disponible sur le site internet de la Banque de France « www.banque-france.fr ».

Working Papers reflect the opinions of the authors and do not necessarily express the views of the Banque de France. This document is available on the Banque de France Website “www.banque-france.fr”.

Profit shifting through transfer pricing: evidence from French firm level trade data*

Vincent Vicard[†]

*The paper was formerly circulated as “Transfer pricing of multinational companies, aggregate trade and investment income”. I thank Nicolas Coeurdacier, Guillaume Gaulier, Josh Heckemeyer, James Hines, Philippe Martin, Fabienne Rosenwald and seminar/conference participants at Banque de France, INSEE, Banca d’Italia, University of Tours and University of Orléans for fruitful discussions and suggestions, and Armando Rungi for sharing his data. This paper represents the views of the author and should not be interpreted as reflecting those of Banque de France.

[†]Banque de France, E-mail: vincent.vicard@banque-france.fr

Abstract

This paper provides direct evidence of profit shifting to low tax jurisdictions by multinational companies through transfer prices. Using detailed firm level export and import data by origin/destination and product for France, I show that the price wedge between arm's length and related party transactions varies systematically with the differential in corporate tax rate between France and the partner country. Profit shifting through transfer prices is estimated to have reduced the French corporate tax base by 8 bn USD in 2008. Its extent is growing in France over the 2000s. The related missing tax revenues amounts to 10% of the corporate tax paid by multinational groups located in France that trade with related party.

JEL classification: H26, H25, H32, F14, F23.

Keywords: Transfer pricing, Multinational firms, Tax avoidance, Base erosion, International trade, Investment income.

Résumé

Cet article montre que les entreprises multinationales manipulent leurs prix de transfert afin de localiser leurs profits dans des pays à faible taux d'imposition. L'utilisation de données détaillées d'exportations et d'importations des entreprises françaises par produit et pays d'origine/destination permet de montrer que l'écart de prix entre transactions intra-groupe et transactions entre entreprises indépendantes varie systématiquement avec le différentiel de taux d'impôt sur les sociétés du pays partenaire. Les résultats empiriques impliquent que la manipulation des prix de transfert réduit l'assiette d'imposition des sociétés françaises de 8 milliards de dollars en 2008, phénomène dont l'ampleur augmente depuis 2000. Cette stratégie d'évitement fiscal permet aux groupes multinationaux implantés en France et qui commercent avec des filiales à l'étranger de réduire leur impôt sur les sociétés de 10%.

Code JEL: H26, H25, H32, F14, F23.

Mots clés: Prix de transfert, entreprises multinationales, évitement fiscal, érosion des assiettes fiscales, commerce international, revenus d'investissement.

Non technical summary

The issue of tax base erosion and profit shifting is at the forefront of the public debate and the international policy agenda. Multinational companies have the ability to transfer incomes and profits across jurisdictions – through either intra-group loans, the location of intangibles (e.g. brand or patent licenses) or the manipulation of transfer prices –, and globalization has increased opportunities for tax avoidance through profit shifting to low tax jurisdictions. Because of multinational groups in economic activity, such strategies are non trivial for national economies, notably through their impact on the erosion of corporate tax bases and biased competition with domestic firms.

This paper focuses on transfer pricing in trade in goods, i.e. the prices set in international transactions between a parent and its affiliates or two affiliates of the same group, and uses detailed French firm level trade data to provide direct evidence of the manipulation of transfer prices.

France is an interesting case to study spillovers in international taxation. France ranks third among OECD countries in corporate tax level since 2008. On a trade weighted basis however, the French tax rate was close to the average level in 2000, suggesting large differences over time in the aggregate consequences of tax avoidance. In addition, France has a territorial tax system for corporations that provides a clear rationale for multinational companies to shift their profit to low tax jurisdictions. Finally, France has had increasing investment income inflows despite a deteriorating international investment position over the 2000s, generating an ‘excess return’ on foreign assets.

The French ‘excess return’ is shown to be in part the outcome of a positive return differential within the direct investment category, a pattern consistent with profit shifting by multinationals that repatriate the extra profits shifted in low tax jurisdictions. The positive correlation between the return differential on income from direct investment assets and liabilities and the corporate tax level in a sample of OECD countries provides further evidence of the aggregate relevance of profit shifting by multinationals.

Based on detailed French firm level trade data by product and destination, the paper then shows directly that multinational companies manipulate their transfer prices to shift profit to affiliates located in low tax countries in order to reduce their tax expenses. The identification strategy makes use of the price wedge between arm’s length and related party trade on a market (destination country and product) and its correlation with the corporate income tax rate of each partner country compared to France. According to the arm’s length principle, which is the standard in international taxation, the prices in international transactions between related parties should be comparable to those prevailing in ‘comparable uncontrolled transactions’ (CUT), i.e. similar transactions between the same firm and an independent firm or between two similar independent firms. A price wedge between arm’s length and related party transactions that varies systematically with the differential in corporate tax between France and the destination/origin country is therefore evidence of tax avoidance through transfer pricing by multinationals.

I find that a one percentage point positive differential in corporate tax rate between France and its trade partner reduces intra-firm export prices by 0.22% and increases intra-firm import prices by 0.24% in the baseline specification. A one percentage point increase in the tax differential with all partner countries would decrease the consolidated profit before interest and tax of multinational companies that trade with related party by 0.5%. This semi-elasticity of corporate profits

to tax differentials, computed from micro evidence on transfer pricing on trade in goods alone, is large compared to semi-elasticities estimated from indirect evidence of profit shifting based on balance sheet data, which include all instruments of profit shifting; it suggests an attenuation bias in studies based on indirect evidence from balance sheet data.

A counterfactual exercise shows that, in 2008 in France, the manipulation of transfer prices by multinationals decreases the value of exports by 0.8%, increases imports by 0.5% and worsens the trade deficit by 9.6%. The associated reduction of the surplus of the FDI income balance explains one fifth of the differential in implicit yield between FDI assets and liabilities. These results imply that the underreported taxable income due to transfer pricing strategies on both exports and imports of tangibles equals 8 billions USD in 2008, and is increasing over time in France. The related missing tax revenues amounts to 10% of the corporate tax paid by multinational groups located in France that trade with related parties.

1 Introduction

Anecdotal evidence of very low effective tax rate paid by prominent multinational companies have brought the issue of tax base erosion and profit shifting to the forefront of the public debate and the international policy agenda.¹ By their very nature, multinational companies are able to transfer incomes and profits across jurisdictions, and globalization has increased opportunities for tax avoidance through profit shifting to low tax jurisdictions. The prominence of multinational groups in economic activity makes these decisions non trivial for national economies, notably through their impact on the erosion of corporate tax bases and biased competition with domestic firms.

While numerous papers provide empirical evidence of profit shifting to low tax jurisdictions by multinational companies², we know little about the relative importance of the different instruments used by multinationals and the extent of profit shifting in the aggregates.³ Multinationals may shift profit through three main channels: intra-group loans, the location of intangibles (e.g. brand or patent licenses), or the manipulation of transfer prices. Identifying the relative importance of alternative channels of profit shifting is crucial to understand their impact on national economies and for the design and implementation of anti-avoidance rules.

This paper focuses on transfer pricing in trade in goods, i.e. the prices set in international transactions between a parent and its affiliates or two affiliates of the same group. Based on detailed French firm level trade data by product and destination, I show that multinational companies manipulate their transfer prices to shift profit to affiliates located in low tax countries in order to reduce their tax expenses. The second objective of the paper is to quantify the aggregate impact on the tax base and international imbalances.

France is a good candidate to study transfer pricing and its impact on the corporate tax base. France stands increasingly as a high corporate tax country, ranking third among OECD countries in corporate tax level since 2008. On a trade weighted basis however, the French tax rate was close to the average level of its trade partners in 2000, suggesting large differences over time in the aggregate consequences of transfer pricing. In addition, France has a territorial tax system for corporations which provides for a participation exemption on dividends distributed by foreign affiliates.⁴ Such system provides clear rational for multinational companies to shift their profit to low tax jurisdictions; such incentives are likely reduced in residential tax systems in which

¹In particular, the OECD has launched in 2013 with the support of the G20 an initiative aiming at addressing the issue of Base Erosion and Profit Shifting (BEPS).

²See in particular Hines and Rice (1994), Bartelsman and Beetsma (2003), Huizinga and Laeven (2008), Egger et al. (2010) and Dharmapala and Riedel (2013).

³Existing (indirect) evidence in the literature provide mixed conclusions regarding the relative importance of different channels in the erosion of tax bases. Based on a meta analysis, Heckemeyer and Overesch (2013) attribute 70% of the erosion of tax bases to transfer pricing and licensing by multinationals while Dharmapala and Riedel (2013) find that most is accounted by the use of debt instruments across affiliates.

⁴More precisely, under the participation exemption, parent companies may exclude up to 95% of the dividends distributed by their affiliates (of which they owns at least 5% of the shares) from their taxable profit. See Ministry of economics and finance, "The French tax system", http://www.impots.gouv.fr/portal/deploiement/p1/fichedescriptive_1006/fichedescriptive_1006.pdf.

corporations are taxed on their activities worldwide, like in the US case.⁵

Moreover, France has had increasing investment income inflows despite a deteriorating international investment position over the 2000s, generating an ‘excess return’ on foreign assets (Gaulier and Vicard, 2014), and is, in this respect, similar to the well documented US case (Gourinchas and Rey, 2007; Lane and Milesi-Ferretti, 2009; Obstfeld and Rogoff, 2005; Curcuru et al., 2008). I show in a first section that the French ‘excess return’ is partly the outcome of a positive return differential within the direct investment category. Such pattern is consistent with profit shifting by multinationals that repatriate the extra profits related to tax avoidance from their affiliates located in low tax jurisdictions.⁶ The positive correlation between the return differential on income from direct investment assets and liabilities and the corporate tax level in a sample of OECD countries provides further evidence of the aggregate relevance of profit shifting by multinationals.

Based on detailed firm level trade data, the paper then provides direct evidence of the manipulation of transfer prices by multinational companies to shift profit to low tax countries. The identification strategy makes use of the price wedge between arm’s length and related party trade on a market (destination country and product) and its correlation with the corporate income tax rate of each partner country compared to France. According to the standards of international taxation, multinational companies must conform to the arm’s length principle which states that international transactions within multinationals should be treated as if they had taken place between independent firms. The prices in international transactions between related parties should therefore be comparable to those prevailing in ‘comparable uncontrolled transactions’ (CUT), i.e. similar transactions between the same firm and an independent firm or between two similar independent firms. A price wedge between arm’s length and related party transactions that varies systematically with the differential in corporate tax between France and the destination/origin country would be evidence of tax avoidance through transfer pricing by multinationals. The comparison of prices between arm’s length vs. related party trade is assessed at the most detailed level available for France, i.e. within destination country, product (CN8) and year, for exports and imports. I consider as CUT transactions between unrelated parties on the same market (destination country and product) taking place the same year.

I find that a one percentage point positive differential in corporate tax rate between France and its trade partner reduces intra-firm export prices by 0.22% and increases intra-firm import prices by 0.24% in the baseline specification. A one percentage point increase in the tax differential with all partners would decrease the consolidated profit before interest and tax of multinational companies that trade goods with related party by 0.5%. Such large semi elasticity of profit to tax differentials, compared to the average

⁵Most countries worldwide, and in particular in Europe, apply a territorial system.

⁶Transfer pricing and the location of intangibles are expected to affect direct investment income flows through profits repatriated from foreign affiliates. Depending on how interests on intra-group loans are registered in the balance of payment statistics, the location of intra-group loans will affect the flows of direct or other investment income. Other explanations could also contribute to explaining the joint weak export performance and excess return. In particular, the French comparative advantage in services, which are served through FDI rather than exports, could increase investment revenues related to service exports through FDI.

semi-elasticity including all instruments of profit shifting of 0.8 found by Heckemeyer and Overesch (2013) in their meta analysis of the literature, points to an attenuation bias in studies based on indirect evidence from balance sheet data.

A counterfactual exercise shows that, in 2008 in France, the manipulation of transfer prices by multinationals decreases the value of exports by 0.8%, increases imports by 0.5% and worsens the trade deficit by 9.6% in 2008. The associated reduction of the surplus of the FDI income balance explains one fifth of the differential in implicit yield between FDI assets and liabilities. These results imply that the underreported taxable income due to transfer pricing strategies on both exports and imports amounts to 8 billions USD in 2008, and is increasing over time in France. The related missing tax revenues amounts to 10% of the corporate tax paid by multinational groups located in France that trade with related parties.

The existing literature provides mainly indirect evidence of transfer pricing behavior by U.S. multinationals (see e.g. Hines (1997), Swenson (2001) and Clausing (2003)).⁷⁸ Bernard et al. (2006) is an exception and provides direct evidence that the prices (unit values) of U.S. exporters in arm's-length relationships are substantially larger than those on related-parties trade and that the difference is correlated to the corporate tax differential. They use detailed US export transaction data that allow them to compare prices of arm's length vs. related party trade within firm, destination, product, month and mode of transport. Cristea and Nguyen (2015) highlights a downward bias in estimated transfer pricing due to the incentive for multinational firms to manipulate arm's length prices as well. Comprehensive data on arm's length and related party trade is however generally not available except for the US. Alternatively, in a paper contemporary to this work, Davies et al. (2014) use a survey of multinationals located in France available for a cross-section in 1999. In this paper, I propose a methodology to circumvent the lack of data measuring directly related party trade, which can be applied in most countries provided with firm level trade data, and apply it to both exports and imports of a large country applying a territorial tax system, France, to provide direct evidence and quantification of profit shifting through transfer prices.

Transfer pricing is one instrument of tax avoidance by multinationals among several: the literature provide evidence of the use of intra-group loans⁹, debt shifting, and the location of intangibles (Karkinsky and Riedel, 2012) and risks for profit shifting purposes (see Devereux (2007) for a review). Tax differentials may also impact investment decisions by MNEs (de Mooij and Ederveen, 2008; Devereux and Griffith, 2003); here the impact of tax differentials on price wedges is assessed for given location decisions.¹⁰

By quantifying the impact of transfer pricing on differentials in foreign asset returns, this paper also contributes to the international macroeconomic literature studying inter-

⁷On France, Quantin et al. (2009) provides indirect evidence of transfer pricing using intra-group trade balances of multinational firms for 1999. They find that a one percentage point increase in foreign business tax increases by two percentage points the bilateral normalized intra-group trade balance. Overesch (2006) focuses on German multinationals and subsidiaries and find evidence of transfer pricing using balance sheet items "accounts receivable from affiliated companies" and "accounts receivable from parent company" as proxy for intra-firm trade.

⁸For a theoretical approach to transfer pricing, see e.g. Bauer and Langenmayr (2013).

⁹See Nivat and Terrien (2010) for the relevance of intra-group loans in FDI flows and stocks.

¹⁰On the specific impact of tax havens, see e.g. Gumpert et al. (2011).

national asset returns. The higher apparent return of the US on its external assets than its external liabilities has generated a strong debate. This US ‘exorbitant privilege’ has been attributed to composition effects – US foreign assets are weighted towards equity and FDI, whose average returns are higher, whereas foreigners’ US assets are weighted towards bonds –, and within asset class returns’ differentials for FDI (Gourinchas and Rey, 2007; Lane and Milesi-Ferretti, 2009; Obstfeld and Rogoff, 2005).¹¹ Curcuru et al. (2008) discuss the size of the US excess return on methodological ground. Curcuru et al. (2013) attributes the differential in returns on US FDI assets and liabilities to differences in taxes, risk and the age profile of targeted firms. This paper provides evidence of significant return differentials within the FDI asset class for other countries and show that it is partly accounted by transfer pricing.

The paper is structured as follows. Section 2 show indirect evidence of profit shifting through the correlation between the return differentials on inward and outward stocks of FDI and corporate tax. Section 3 describes the empirical strategy and data. Section 4 presents the empirical results and section 5 a quantification exercise on the tax base and the trade and investment income balances.

2 Corporate tax, investment income and foreign asset return differentials

Profit shifting by multinationals through transfer prices inflates profits in low tax countries and reduces them in high tax ones. These profits are likely to be repatriated by the parent company or reinvested abroad, depending on specificities of the domestic tax system. In any case, in the balance of payment statistics, such operations would increase the inflows of FDI income (repatriated or re-invested) in high tax countries for a given level of FDI stock abroad and decrease outflows, the reverse being true for low tax countries. In presence of profit shifting through transfer pricing on tangibles or intangibles, the corporate income tax rate should therefore be positively correlated to the FDI income balance, for a given level of FDI stock. A measure of the latter is the differential at the country level on returns on FDI assets and liabilities.

The returns on each class of foreign assets and liabilities can be computed using balance of payment data on investment income inflows/outflows by class of investment and international investment positions on stocks of foreign assets and liabilities. The yields on assets and liabilities are computed separately as the implicit rates of return as follows:

$$i_t^A = \frac{InvIn_t}{A_{t-1}} \quad \text{and} \quad i_t^L = \frac{InvOut_t}{L_{t-1}} \quad (1)$$

where $InvIn_t$ are FDI income inflows, $InvOut_t$ are investment income outflows, and A_{t-1} and L_{t-1} are the stocks of gross foreign assets and liabilities.

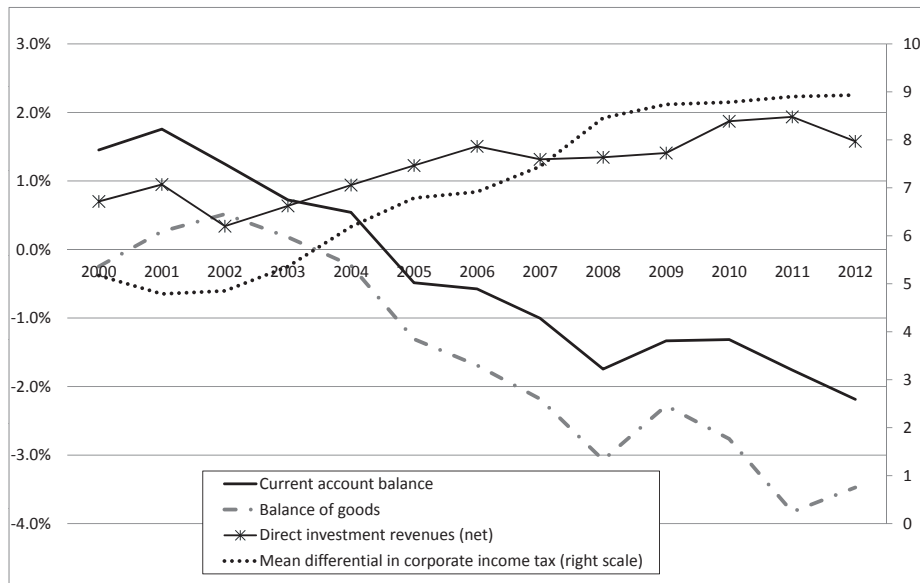
¹¹Habib (2010) investigates returns on net foreign asset positions for a larger sample of countries.

2.1 The French case

The French ‘excess return’ originates both from a composition effect – France hold a surplus in equity, especially direct investments, and a deficit in debt whose return is lower –, and a return differential within the direct investments category (Gaulier and Vicard, 2014). This section provides descriptive evidence on the return differentials within-class of assets for France, an increasingly high tax country over the 2000s. Data are from the Balance of payments and international investment position statistics of the Banque de France.¹²

Figure 1 shows that the French current account has evolved hand in hand with the average corporate income tax differential with other OECD countries over the 2000s. The increasing deficit of goods has been partly offset by increasingly positive balance of investment incomes, at a time of increasing tax differential beginning in 2002. Both trends could be related to transfer pricing behaviors by multinational companies. Besides, France has experienced weak export performance compared to the rest of the euro area, which is partly explained by the weak export growth of multinational groups located in France compared to independent firms over the period 1999/2007 (Bellas et al., 2010).

Figure 1: Components of the French current account (% of GDP)



Source: Banque de France and OECD

France has had increasing investment income inflows despite a deteriorating international investment position. At end 2000s, France has a negative international investment position and a positive investment income balance exceeding 1% of GDP.

¹²Note that investment flow as well as stock data are revised accordingly in France, contrary to the US case (Curcuro et al., 2008).

Turning to the computation of return differentials as defined in equation 1, an important statistical issue in the French case is to correct FDI stocks for intercompany debts because incomes related to intercompany debts are reported under the item “other investment income” of the current account. I therefore use only equity capital stock of FDI and allocate the stock of intercompany debt in the stock of other investments.¹³

Table 1 provides the returns for total foreign assets and liabilities by class of asset/liability. It shows a positive average return differential between assets and liabilities for FDI over 2000/2010, and especially 2004/2010, but not for other classes of assets. The return on FDI assets is 4.7% on average, against 2.9% on liabilities, yielding a 1.8 percentage point differential. The corresponding differential is -0.4 pp on portfolio equity, 0.4 pp on portfolio debt and 0.0 pp on other investments, confirming that the return differential is specific to FDI in the French case, consistently with the existence of tax avoidance through transfer pricing by multinationals.

Table 1: Yields on external assets and liabilities (2000-2010)

	Total	FDI (equity capital)	Portfolio equity	Portfolio debt	Other inv.*
Average 2001-2010					
Assets	3.3%	4.7%	1.5%	5.0%	2.4%
Liabilities	2.9%	2.9%	1.9%	4.6%	2.4%
Difference	0.4 pp	1.8 pp	-0.4 pp	0.4 pp	0.0 pp
Average 2004-2010					
Assets	3.6%	5.9%	1.6%	4.8%	2.3%
Liabilities	3.0%	3.9%	2.1%	4.5%	2.3%
Difference	0.6 pp	2.1 pp	-0.5 pp	0.4 pp	0.0 pp

Source: Banque de France. * including intra-group loans.

2.2 Further evidence on OECD countries

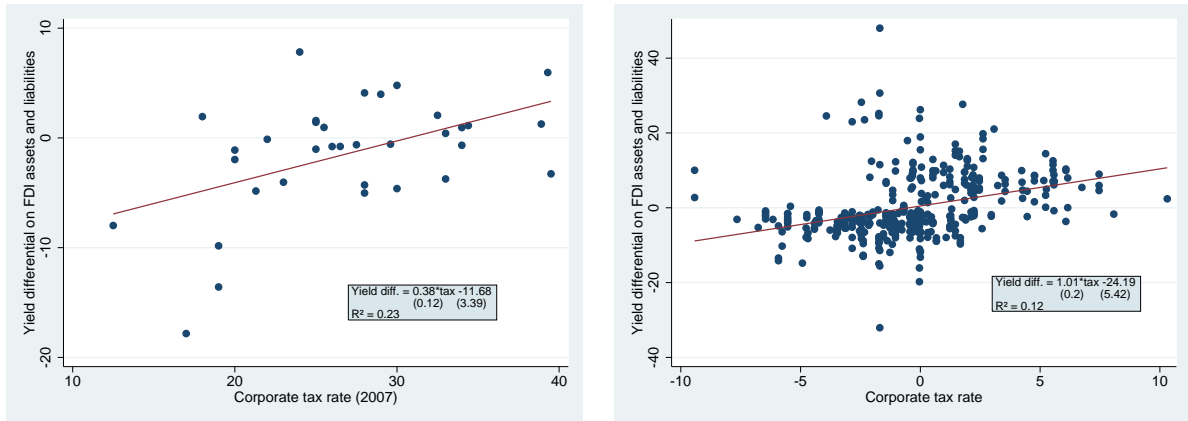
I now turn to cross-country evidence on a sample of OECD countries, using data from the IMF BOPS for the 34 OECD countries over the period 2000-2012. The left panel of figure 2 illustrates a pattern of correlation between the level of corporate tax rate and the excess return on FDI assets consistent with significant profit shifting by multinational companies.

Composition effects between FDI assets and liabilities may however generate yield differentials. Such concerns can be attenuated by using the panel dimension of the data. Focusing on the within class differentials for a given country also allows to circumvent issues of cross-country comparability in the level of yields on assets and liabilities related to differences in compilation methods (Curcuru et al., 2013). The right panel of figure 2 plots the residuals of regressions of yield differential and corporate tax rate respectively on a country dummy. It confirms the strong positive correlation between FDI return differential and the level of corporate income taxation.

¹³Average yields on FDI increase from 3.5% (total FDI) to 4.7% (equity capital) for FDI assets on average over 2000/2010, respectively 2% to 3% for FDI liabilities.

Table 2 present additional specifications of the regression of FDI yield differentials on the level of corporate income tax. Consistent with profit shifting behavior, column (1) shows a positive and significant correlation between the FDI yield differential and corporate tax level on the cross-section in 2007. Column (3) reports similar results on pooled data over 2000-2012. This correlation is robust to controlling for country specific determinants using country fixed effects (column (5)), as illustrated by figure 2. Columns (2), (4) and (6) present similar results on data trimmed for outliers, i.e. dropping observations with a yield differential exceeding +10/-10 percentage points.

Figure 2: Corporate income tax and FDI yield differentials



Source: IMF and OECD, author computation.

Table 2: Yield differential and corporate tax rate (2000-2012)

	(1)	(2)	(3)	(4)	(5)	(6)
Time period	2007		2000-2012		2000-2012	
Country FE	No	No	No	No	Yes	Yes
Sample		trimmed		trimmed		trimmed
Tax rate	0.38*** (0.122)	0.22** (0.102)	0.25*** (0.082)	0.34*** (0.053)	1.01*** (0.196)	0.66*** (0.112)
Constant	-11.68*** (3.388)	-6.45** (2.887)	-3.03 (2.494)	-8.95*** (1.397)	-24.19*** (5.423)	-17.79*** (3.101)
Observations	34	32	399	312	399	312
R-squared	0.233	0.129	0.033	0.270	0.121	0.295
Number of group	-	-	-	-	34	34

3 Empirical strategy and data

3.1 Corporate taxation and the arm's length principle

The arm's length principle is the international standard agreed by OECD countries that dictates pricing by multinational companies in their international transactions with related parties for tax purposes. It is defined in the article 9 of the 2010 OECD Model Tax Convention on Income and Capital:

[Where] conditions are made or imposed between the two [associated] enterprises in their commercial or financial relations which differ from those which would be made between independent enterprises, then any profits which would be made between independent enterprises, but for those conditions, have accrued to one of the enterprises, but, by reason of those conditions, have not so accrued, may be included in the profits of that enterprise and taxed accordingly.

The arm's length principle states that prices between related parties should be adjusted to reflect conditions which would have prevailed in comparable transactions between independent firms, i.e. should be compared to 'comparable uncontrolled transactions' (CUT). By treating affiliates of multinational companies as separate entities, the arm's length principle aims at putting multinational and independent firms on an equal footing for tax purpose. The 'comparability analysis' between controlled and uncontrolled transactions does not focus solely on prices and can make use of mark-up on costs, gross margins or net profit indicators. According to French law, CUT can be, for similar market characteristics, similar or identical transactions between the multinational and an independent firm or between two independent firms.¹⁴ In the empirical analysis that follows, CUT are transactions occurring the same year on the same market (product and destination) by two unrelated firms (either domestic or unrelated multinationals) located in the same origin and destination market. Note that relying on other's firms transactions on the same market as CUT overcomes the bias related to the potential simultaneous manipulation of related party and arm's length prices by multinationals emphasized in Cristea and Nguyen (2015).

The application of the arm's length principle is obviously more complicated in the case of highly differentiated goods and services and/or using intangibles than for homogenous products whose prices are set on international markets, leaving more room for manipulation of transfer prices. Such differences will be used as a robustness test in section 4.2.

3.2 Empirical strategy

The transfer pricing policies of multinational companies are analyzed through a difference-in-difference approach. The identification strategy makes use of the price wedge between arm's length and related party trade on a market (destination country and product) and its correlation with the corporate income tax rate of each partner country compared to France. Evidence of larger price wedges (between intra-firm and arm's length trade unit values UV_{ijkt}) for a given product in destinations with lower corporate tax rate would provide evidence of transfer pricing behavior by multinational firms. Bernard et al. (2006) derive similar predictions from a partial equilibrium model of transfer pricing incorporating tax and within firm incentives motives for the fixation of transfer prices in international exchanges with related parties.

More specifically, for a firm i exporting a product k in year t to a country j where an affiliate of the same group is located ($net_{ijt} = 1$) or not ($net_{ijt} = 0$), I estimate:

¹⁴<http://bofip.impots.gouv.fr/bofip/5549-PGP.html>.

$$\log UV_{ijkt} = \beta_0 + \beta_1 net_{ijt} + \beta_2 tax_{jt} * net_{ijt} + \delta_{ikt} + \gamma_{jkt} + \varepsilon_{ijkt} \quad (2)$$

where tax_{jt} is the difference in corporate income tax rate with France (a positive number means a lower corporate tax in the destination/origin country). δ_{ikt} are firm-product-time fixed effects controlling for all characteristics specific to a product made by a given firm, common across markets. γ_{jkt} are country-product-time fixed effects to control for all destination market characteristics likely to affect the price wedge between arm's length and related party trade. Standard errors are clustered at the country-year level.

The coefficient of interest, β_2 , is expected to be negative in the case of exports and positive when we consider imports. Note that the identification does not rely on the absolute level of price wedge between arm's length and related party trade, but on its correlation with the corporate tax differential. It therefore accommodates arguments implying a systematically lower price in related party trade (see e.g. [Bauer and Langenmayr, 2013](#)). Any difference between intra-firm and arm's length products that is common across destinations is picked by the net_{ij} dummy. In the robustness section, we test the sensitivity of our results to controls for characteristics of the destination markets (market structure, distance).

The comparison of prices between arm's length and related party trade is assessed at the most detailed level of destinations and products available, i.e. within destination country and product (CN8), in order to reduce the likelihood for prices to capture unobservable differences in market structure or product characteristics. It should be acknowledged that several dimensions are not measurable in our data: the mode of transport is likely correlated to the product quality ([Evans and Harrigan, 2005](#); [Hummels and Schaur, 2010](#)) or product characteristics may differ even within narrowly defined product categories (CN-8 digit level in our case) or embedded services. Note that these characteristics are accounted by the firm-product-time fixed effects to the extent that they do not vary across markets.

3.3 Data

Export and import data are from the French Customs, which provides firm level trade data (value and quantity) of firms located in France by destination and product. A product is defined by an 8 digit code of the Combined Nomenclature of the EU customs, the most detailed level of information available, which differentiate more than 10,000 different product categories. At this level of disaggregation, for instance in the heading 87 "vehicles other than railway or tramway rolling stock, and parts and accessories thereof", motors cars are differentiated according to their cylinder capacity, the fact that they are new or used, or their use of diesel or gasoline. The data set covers the universe of French exporters, subject to thresholds within the EU, and reports export and import data. Reporting quantity was however not mandatory for trade within EU over our time period, which results in missing values. Export and import prices are measured as unit values at the most disaggregated level, i.e. firm-product-destination.

We merge trade data with data on ownership of firms by multinational groups world-

wide from the Ownership database of Bureau Van Dijk. Direct and indirect links are traced up to the ultimate owner of any affiliate, allowing to identify links between a parent and all its affiliates as well as indirect links between two affiliates belonging to the same group (see [Altomonte and Rungi \(2013\)](#) for details on the methodology). Being able to link any two affiliates of the same group is particularly important since profit shifting occurs between a parent and its affiliates as well as between affiliates ([Markle, 2010](#)). We define related party trade as exports/imports by (French or foreign) affiliates of multinationals located in France to/from countries where an affiliate of the same group is located.¹⁵ The related party trade observed accordingly includes some arm's length trade flows. [Bernard et al. \(2006\)](#) indeed identifies differences within country/product/month/transport mode in UV between arm's length and related party exports, which implies an attenuation bias of our estimations since some firms conduct at the same time intra-firm and arm's length trade to a given destination.

[Altomonte et al. \(2012\)](#) provide details on the ownership database and descriptive statistics and show how our measure of intra-firm trade relates to aggregate evidence from other sources. The ownership data are for 2007-2009. In the final sample, intra-firm transactions represents 53% of exports and 46% of imports.

The data on corporate income tax rates are from the OECD Tax Database. We use the statutory (non-targeted) combined tax rate including central and sub-central corporate income tax rates. The data are annual and cover taxes levied in all 34 OECD countries. [Table 3](#) provides descriptive statistics on corporate tax differentials with respect to France and their evolution between 2000 and 2014. The average tax differential amounts to 8.7 percentage point in 2008, increasing significantly since 2000. A point worth noticing is that on a trade weighted basis, which would be a good benchmark when looking at transfer prices in trade in goods, France was in the average of OECD countries in 2000. The arithmetic average in 2000 is driven by small low tax countries whose share in France exports and imports is trivial. The differential with large trade partners has increased starting only from 2000, suggesting that the aggregate relevance of transfer pricing depends on the time period and would be more relevant at end 2000s for France.

The final data set covers exports of 9,695 different products to 32 OECD countries by 66,112 firms and imports of 9,799 products from 32 OECD countries by 78,011 firms.

Finally, balance sheet data on profit and corporate tax are from the Ficus-Fare database.

¹⁵[Krautheim \(2013\)](#) emphasizes the relevance of wholesale and retail affiliates in foreign sales of German manufacturing firms.

Table 3: Combined corporate income tax rate (central and sub-central (statutory) corporate income tax rate)

	Tax differential with France			Share (2008) in	
	2000	2008	2014	exports	imports
United States	1.6	4.8	4.7	5.7%	8.2%
Japan	3.1	5.1	2.6	1.9%	1.9%
Belgium	2.4	-0.4	-0.4	14.4%	11.3%
Portugal	-2.6	-7.9	-2.9	1.1%	1.6%
Germany	14.3	-4.3	-4.3	23.4%	18.6%
Australia	-3.8	-4.4	-4.4	0.3%	0.9%
Mexico	-2.8	-6.4	-4.4	0.2%	0.7%
Spain	-2.8	-4.4	-4.4	8.5%	10.6%
Luxembourg	-0.3	-4.8	-5.2	0.4%	0.7%
New Zealand	-4.8	-4.4	-6.4	0.1%	0.1%
Italy	-0.8	-6.9	-6.9	10.9%	10.5%
Norway	-9.8	-6.4	-7.4	3.0%	0.6%
Israel	-1.8	-7.4	-7.9	0.2%	0.5%
Canada	4.7	-3.0	-8.1	0.6%	1.1%
Greece	2.2	-9.4	-8.4	0.2%	1.0%
Austria	-3.8	-9.4	-9.4	1.2%	1.1%
Netherlands	-2.8	-8.9	-9.4	7.3%	5.2%
Denmark	-5.8	-9.4	-9.9	0.8%	0.8%
Korea	-7.0	-6.9	-10.2	0.8%	1.0%
Slovak Republic	-8.8	-15.4	-12.4	0.6%	0.7%
Sweden	-9.8	-6.4	-12.4	1.6%	1.7%
Switzerland	-12.8	-13.3	-13.3	3.1%	3.8%
Estonia	-11.8	-13.4	-13.4	0.0%	0.1%
United Kingdom	-7.8	-6.4	-13.4	6.3%	9.4%
Chile	-22.8	-17.4	-14.4	0.4%	0.2%
Finland	-8.8	-8.4	-14.4	0.6%	0.6%
Iceland	-7.8	-19.4	-14.4	0.0%	0.0%
Turkey	-4.8	-14.4	-14.4	1.3%	1.9%
Czech Republic	-6.8	-13.4	-15.4	1.1%	1.1%
Hungary	-19.8	-14.4	-15.4	0.8%	0.9%
Poland	-7.8	-15.4	-15.4	1.6%	2.1%
Slovenia	-12.8	-12.4	-17.4	0.3%	0.4%
Ireland	-13.8	-21.9	-21.9	1.2%	0.8%
Average	-5.3	-8.7	-9.4		
Avg. weighted by exports	1.0	-5.2	-6.0		
Avg. weighted by imports	0.1	-5.2	-6.1		

Source: OECD Tax Database. Tax differentials in percentage points. Share in French exports to (imports from) OECD countries.

4 Evidence of profit shifting through transfer pricing

4.1 Main results

Table 4 presents the baseline results for export transactions. They provide evidence consistent with tax avoidance through transfer pricing: multinational firms set lower prices in exports to related party than in CUT and these differences are systematically related to the corporate tax differential of the destination country. Without controlling for country-product-year fixed effects, results reported in column (1) of table 4 show a strong impact of the corporate tax differential on the wedge between related party and arm's length trade. A 1 percentage point lower corporate tax in a destination country compared to France decreases export prices by 0.30%. Controlling for destination market characteristics (country-product-time fixed effects) halves the coefficient and yields a semi elasticity of 0.15, significant at 5% level (column (2)). Column (3) shows that the pricing behavior of multinationals in their related party transactions do not change during the 2008/2009 crisis.

The heterogeneity between independent firms and affiliates of multinational companies may however question the relevance of the comparison group used in columns (1)-(3). In column (4), the sample is restricted to firms belonging to multinational groups, in order to control for potential structural differences between independent firms and affiliates. The CUT are therefore transactions by multinationals to markets (destination-and-product) where they do not own any affiliate. Restricting the comparison group to multinationals' transactions yields a slightly stronger impact of corporate tax differential: a 1 percentage point lower corporate tax in a destination country compared to France decreases export prices by 0.22%.

Another issue relates to the asymmetry of transfer pricing opportunities: since the French corporate tax ranks third in OECD countries behind Japan and the US, multinationals are likely to use transfer prices to locate profit only in countries where the corporate tax differential is positive compared to France, i.e. where the corporate tax is lower. In column (5), I therefore differentiate the impact of corporate tax on the price wedge depending on the sign of the corporate tax differential. The result confirm that transfer prices are used to shift profit toward destination countries with lower corporate tax rates only. The associated semi-elasticity reported in column (5) is -0.26.

Finally, column (6) distinguishes French multinationals from affiliates of foreign multinationals located in France. The results show a significant impact of corporate tax differentials on the price wedge only for French multinationals. Foreign groups may indeed have other instruments at their disposal to shift income abroad, because in particular their intangibles are more likely located outside France. Column (7) show a point estimate of -0.48 when focusing on transfer prices of French multinationals to destination countries with a positive tax differential.

Results on import transactions provide similar evidence that prices in related party transactions vary systematically with the corporate tax rate of the partner country. Column (1) of table 5 shows that without controlling for country-product-year fixed effects,

Table 4: Export prices and corporate tax differential

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample				Affiliates	Affiliates	Affiliates	Affiliates
Firm-prod-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination-product-time FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Network dum.	-0.036*** (0.011)	-0.035*** (0.007)	-0.037*** (0.012)	-0.026** (0.009)	-0.023** (0.010)	-0.029*** (0.009)	-0.027*** (0.008)
Corporate tax differential	-0.125 (0.096)						
Network*corporate tax diff	-0.299*** (0.096)	-0.151*** (0.056)	-0.153** (0.057)	-0.218** (0.076)		0.004 (0.081)	
Network*crisis			0.004 (0.015)				
Network*corporate tax diff - positive					-0.257*** (0.088)		0.044 (0.104)
Network*corporate tax diff - negative					0.129 (0.373)		
Corporate tax differential*FR						0.043 (0.095)	
Network*corporate tax diff*FR						-0.462*** (0.133)	
Network*corporate tax diff*FR- positive							-0.485*** (0.133)
Observations	3,471,689	3,471,689	3,471,689	1,302,545	1,302,545	1,302,545	1,302,545
R-squared	0.917	0.934	0.934	0.930	0.930	0.930	0.930

Note: Robust standard errors clustered by destination-year in parentheses. ***, ** and * denote respectively significance at the 1% 5% and 10% levels.

the coefficient on the interaction term between network and differential in corporate tax rate is positive as expected but not significant. When controlling for market characteristics through country-product-year fixed effects (column (2)), the coefficient however turns significant at the 5% level. A 1 percentage point larger corporate tax differential with a partner increases the import price by 0.19% in the whole sample. As for exports, the estimation on the more comparable sample of multinationals yields a larger semi-elasticity of 0.24.

Contrary to the case of exports, French multinationals do not appear to behave differently than foreign multinationals when setting their prices in import transaction with related parties (column (6)).

The estimates on export transactions presented in table 4 are in the lower bound of the existing literature. In particular, [Bernard et al. \(2006\)](#) find that a one percentage point increase in corporate tax rate in destination country increases the price wedge between arm's length and related party trade by 0.65% in their preferred specification. Our data however do not allow to differentiate simultaneous intra-firm and arm's length trade by a firm to a destination market as [Bernard et al. \(2006\)](#) do. Our group of intra-firm trade therefore includes some arm's length trade, likely to bias downward the estimated coefficients; the results of table 4 should therefore be considered as a lower bound.

Using balance sheet data, I am able to match export and import transactions to profits consolidated at the French level by group to estimate the impact of transfer pricing on trade in goods on reported profits of individual multinationals that trade

Table 5: Import prices and corporate tax differential

	(1)	(2)	(3)	(4)	(5)	(6)
Sample				Affiliates	Affiliates	Affiliates
Firm-prod-time FE	Yes	Yes	Yes	Yes	Yes	Yes
Destination-product-time FE	No	Yes	Yes	Yes	Yes	Yes
Network dum.	-0.004 (0.012)	-0.008 (0.010)	-0.011 (0.018)	-0.009 (0.012)	-0.006 (0.014)	-0.008 (0.013)
Corporate tax differential	-0.600** (0.250)					
Network*corporate tax diff	0.050 (0.124)	0.189** (0.083)	0.188** (0.086)	0.240** (0.119)		0.254 (0.173)
Network*crisis			0.004 (0.023)			
Network*corporate tax diff - positive					0.199 (0.175)	
Network*corporate tax diff - negative					0.391 (0.398)	
Corporate tax differential*FR						-0.156 (0.199)
Network*corporate tax diff*FR						-0.146 (0.280)
Observations	4,299,447	4,299,447	4,299,447	1,305,391	1,305,391	1,305,391
R-squared	0.941	0.954	0.954	0.947	0.947	0.947

Note: Robust standard errors clustered by destination-year in parentheses. ***, ** and * denote respectively significance at the 1% 5% and 10% levels.

with related parties.¹⁶ I consider earnings before interest and taxes (EBIT) to measure revenues before other forms of profit shifting through interest deductions and intra-group loans. A one percentage point increase in the tax differential with trade partners where affiliates of multinationals operating in France are located would decrease reported profits in France in 2008 by 0.5%.

The above semi-elasticity of corporate profits to tax differentials, computed from micro evidence on transfer pricing on trade in goods alone, is large compared to semi-elasticities estimated from indirect evidence of profit shifting based on balance sheet data, which include all instruments of profit shifting – Heckemeyer and Overesch (2013) find an average semi-elasticity of profit to tax rate differentials of 0.8. It suggests the existence of an attenuation bias due to the mismeasurement of tax differentials specific to each instrument when based on indirect evidence, likely particularly relevant here because the manipulation of transfer prices on international transaction on tangibles is constrained by actual trade flows and trade costs.

4.2 Robustness

This section performs a number of robustness exercises to test the sensitivity of the results to the type of products traded, the trade partners, the market structure and the

¹⁶A multinational group may own several legal units, identified by siren codes in the data, each filing independent corporate income tax statements. Since transfer pricing may also be used within multinational companies between legal units located in France, the relevant reported profit or corporate tax paid should be consolidated at the group level for the country as a whole. Using ownership information from Lifi, I match 134,795 legal units belonging to 22,297 groups for which at least one legal entity is exporting or importing goods in 2008 (the median number of legal units by multinational group is 2).

functional form of the tax differential.

Types of goods. The ability of multinationals to manipulate transfer prices depends on the availability of comparable uncontrolled transactions, which primarily depends on the nature of the good traded. The price of homogenous goods is readily observable and comparable in international transactions since they do not differ in their attributes. On the contrary, differentiated goods produced by different firms have specific characteristics that make the outright comparison of their price more difficult. The room for fixing transfer prices, and so the impact of corporate tax differentials on price wedges, should therefore be larger for differentiated than homogenous products. I use the Rauch classification (Rauch, 1999) updated in 2007 (liberal classification) that classifies products according to their degree of differentiation into homogenous goods, reference priced products and differentiated products. The results presented in table 6 show, as expected, a stronger impact of corporate tax differentials for differentiated products, and no significant impact on homogenous goods.

Table 6: Robustness by type of goods

Sample	(1)	(2)	(3)	(4)	(5)	(6)
	differentiated	Exports ref. priced	homogeneous	differentiated	Imports ref. priced	homogeneous
Firm-prod-time FE	Yes	Yes	Yes	Yes	Yes	Yes
Destination-product-time FE	Yes	Yes	Yes	Yes	Yes	Yes
Network dum.	-0.035*** (0.009)	-0.016 (0.010)	0.008 (0.038)	-0.000 (0.011)	-0.024 (0.020)	0.054 (0.056)
Network*corporate tax diff	-0.166** (0.070)	-0.190** (0.077)	0.205 (0.340)	0.219* (0.110)	0.153 (0.158)	0.142 (0.643)
Observations	2,106,456	545,543	55,734	2,537,034	724,595	75,501
R-squared	0.916	0.935	0.974	0.945	0.963	0.985

Note: Robust standard errors clustered by destination-year in parentheses. ***, ** and * denote respectively significance at the 1% 5% and 10% levels.

Trade partners, market structure and distance. Table 7 presents first results on different sample of trade partners for which the trade costs are likely to be reduced. Within the European Union, trade flows are free of import tariffs so that multinational companies have more incentives to use transfer pricing to shift profit abroad within the EU.¹⁷ In addition, trade costs are also lower within the euro zone: firms do not face any exchange rate costs or risks. For exports, the coefficient on the interaction term between network and tax differential is as expected larger in magnitude than in the benchmark case in both sub-sample of EU and euro zone countries. For imports, we find positive but not significant coefficients on these sub-samples.

Price wedges between arm's length and related party trade may also differ because of market structure. Bernard et al. (2006) show that firms with more market power or exporting to less competitive markets should exhibit larger price wedges. In column (3) and (7) of table 7, I first control for the distance to the destination/origin market as an indirect way of accounting for competition effects from French exporters. It is also a control for the endogenous choice of transport modes: farther destinations are

¹⁷Specifications (2) to (7) in Tables 4 and 5 however control for import tariffs differential by destination and products through country-product-time fixed effects.

more likely to be served by airplane and higher quality products are more likely to be shipped by airplane. The interaction term between distance and the network dummy is insignificant and leaves the results unchanged. Alternatively, specifications in columns (4) and (8) control for competition and its potential correlation with corporate tax through the number of French competitors exporting the same product to the same destination the same year. Again it confirms the robustness of evidence of the use of transfer prices by multinationals to transfer profit to low tax jurisdictions.

Table 7: Robustness by destination

Sample	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	EU-27	Exports			EU-27	Imports		
Firm-prod-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination-product-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Network dum.	-0.026*** (0.007)	-0.030*** (0.008)	-0.030 (0.025)	-0.045 (0.063)	-0.011 (0.012)	-0.016 (0.014)	-0.008 (0.034)	-0.072 (0.049)
Network*corporate tax diff	-0.183*** (0.059)	-0.220*** (0.069)	-0.150** (0.057)	-0.144** (0.067)	0.122 (0.108)	0.228 (0.143)	0.190** (0.085)	0.241*** (0.085)
Network*log distance			-0.001 (0.004)				0.000 (0.005)	
Network*log nbr exporters				0.001 (0.005)				0.005 (0.004)
Observations	2,721,156	2,045,460	3,471,689	3,471,689	3,640,812	3,177,134	4,299,447	4,299,447
R-squared	0.933	0.944	0.934	0.934	0.954	0.963	0.954	0.954

Note: Robust standard errors clustered by destination-year in parentheses. ***, ** and * denote respectively significance at the 1% 5% and 10% levels.

Non linearity. Finally, table 8 presents robustness on the functional form of the tax differential. In columns (1) and (3), the differential in corporate tax differential is introduced by bins instead of linearly. Five bins are distinguished according to the level of corporate tax of the partner country: lower than 21%, in between 21% and 26%, 26% and 30%, and 30% and 34.3%. The results suggest a stronger impact for partner countries whose corporate tax rate is lower than 30% for export and lower than 26% for imports. Additionally, columns (2) and (4) show the elasticity estimates.

5 Quantification and aggregate implications

One of the motivation of this paper is to understand the aggregate consequences of profit shifting by multinationals on the tax base and current account imbalances. This section quantifies the impact of tax avoidance through transfer pricing by estimating a counterfactual where the arm's length principle is perfectly enforced and multinationals cannot use their transfer prices to shift profit abroad.

Such exercise accounts only for the impact of transfer pricing and do not consider other instruments used by multinational companies to shift profit in low tax jurisdictions. It is worth stressing that these calculations rely upon several strong assumptions detailed below. In particular, it assumes that quantity traded are fixed, and considers that only import and export prices respond to changes in corporate tax differentials. The quantification results presented in Table 9 are based on specifications (7) in table 4 for

Table 8: Robustness: functional form

	(1)		(2)		(3)		(4)	
	Exports		Imports		Imports		Imports	
	non linear	log/log	non linear	log/log	non linear	log/log	non linear	log/log
Firm-prod-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination-product-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Network dum.	-0.030**	-0.036***	-0.015	-0.008	-0.014	-0.010		
	(0.012)	(0.007)						
Network*corporate tax ($i=30$ and $j34.3$)	-0.003		0.011		0.013			
	(0.011)		(0.013)					
Network*corporate tax ($i=26$ and $j30$)	-0.024*		0.015		0.016			
	(0.012)		(0.016)					
Network*corporate tax ($i=21$ and $j26$)	-0.023*		0.035**		0.014			
	(0.012)		(0.014)					
Network*corporate tax ($j21$)	-0.019		0.032		0.024			
	(0.016)		(0.024)					
Network*corporate tax diff (log)		-0.038**		0.052*		0.025		
		(0.014)		(0.025)				
Observations	3,471,689	3,471,689	4,299,447	4,299,447				
R-squared	0.934	0.934	0.954	0.954				

Note: Robust standard errors clustered by destination-year in parentheses. ***, ** and * denote respectively significance at the 1% 5% and 10% levels.

exports and specification (4) in table 5 for imports.¹⁸

In 2008, the manipulation of transfer prices is estimated to reduce the French corporate tax base (and the reported value added) by 8.4 billion USD. The base erosion results from both under-reported exports – the value of French exports decreases by 0.7% – and over-reported imports - the value of imports increases by 0.5%. The related missing tax revenues represent 10% of the corporate tax paid by multinational groups located in France that trade with related parties.

The extent of profit shifting through transfer pricing is increasing over time in France. The tax differentials between France and its trade partners has clearly increased over time, particularly on a trade weighted basis (see table 3), owing to the decrease in foreign tax rates from 2000 to 2008 – the corporate tax rates in OECD countries have decreased by 6.7 percentage points on average between 2000 and 2007 (and 7.7 percentage points in EU countries), while the French rate has decreased by 3.3 percentage points only –, and the increase of the French corporate tax for large groups between 2008 and 2014.¹⁹ The bottom panel of table 9 shows the impact of transfer pricing by multinationals in 2008 when applying the tax differentials of 2000 and 2014. Applying the corporate tax differentials prevailing in 2014 increases the underestimation of exports and the overestimation of imports. At 12.6 billion USD, the erosion of the French corporate tax base would be larger with corporate taxes of 2014 than of 2008. On the contrary, the impact of transfer pricing with corporate tax rates of 2000 would have amounted to USD 2.0 billion only.

¹⁸To estimate the counterfactual in USD, I assume a similar average impact on exports and imports to/from non-OECD countries than the one estimated on the sample of OECD countries. The OECD countries represent 78% of total French exports and 74% of imports.

¹⁹In 2014, a 10.7% surtax increases the corporate tax rate of companies whose turnover exceeds EUR 250 millions.

Table 9: Quantification: tax base erosion and the trade balance

	Tax base		Export		Import		Trade balance	
	percent	US\$ (mn)	percent	US\$ (mn)	percent	US\$ (mn)	percent	US\$ (mn)
2008	7.7%	8,388	0.8%	4,639	-0.5%	-3,749	-9.6%	8,388
2000	1.9%	2,053	0.4%	2,654	0.1%	600	-2.4%	2,053
2014	11.6%	12,628	1.1%	6,641	-0.9%	-5,987	-14.5%	12,628

Note: Estimations from specification (7) in table 4 for exports and specification (4) in table 5 for imports. Estimations in USD and for the trade balance assume a similar average impact on exports and imports to/from non-OECD countries.

In a second step, I estimate the impact of tax avoidance through transfer prices on the balance of FDI income and the differential on returns on foreign assets. I assume that the underreported taxable revenues from domestic activity (through both exports and imports) are profits that are then repatriated by French MNEs, after having been taxed at a lower rate in the foreign country, inflating accordingly the FDI income credit in the balance of payments.²⁰²¹ On the contrary, foreign multinationals are not expected to systematically repatriate their profits shifted abroad in France. I therefore assume that none of the profit shifted abroad is repatriated. Any additional profit of foreign multinationals located in France would however proportionally increase FDI income debit, after having been taxed at the French corporate tax rate.

The counterfactual reported in Table 10 assumes a similar average impact on exports/imports to/from non-OECD countries and FDI income inflows/outflows.²² As for the tax base and the trade balance, corporate tax differentials have a non-trivial impact on the French investment income balance. The FDI income inflows are reduced by 6.3% in 2008 and FDI income outflows increased by 4.3% compared to what is actually observed. These estimations imply that the balance of FDI income would deteriorate by 5.1 bn USD. While variations over time in tax differentials may have non trivial impact on the trade balance, the effect on the current account is therefore dampened by the (partially) countervailing impact on the investment income balance.

Such changes in the balance of FDI income involve a reduction in the implicit yield differential on FDI assets and liabilities highlighted in section 2. Absent profit shifting through transfer prices by multinational companies, the implicit yield differential between French FDI assets and liabilities would be 0.4 percentage point lower in 2008, i.e. a reduction of the differential by 20%.

²⁰Foreign income repatriation depends on investment opportunities in the domestic market and foreign markets as well as dividend policy. Dharmapala et al. (2011) however shows, in the context of the 2005 US tax break, that almost all repatriated earnings were distributed to shareholders.

²¹I assume that shifted profit are taxed at the statutory tax rate in foreign countries since they are marginal profits and taxed accordingly.

²²The share of OECD countries in total FDI income flows are computed from Eurostat data on FDI income credit/debit by origin/destination. Missing data are inferred from the share of each country in total FDI stock.

Table 10: Quantification on investment income and implicit yield differentials

	FDI income - Credit		FDI income - Debit		Balance		Yield differential	
	percent	US\$ (mn)	percent	US\$ (mn)	percent	US\$ (mn)	Actual	Corrected
2008	-6.3%	-3,985	4.3%	1,084	-13.4%	-5,069	2.2%	1.7%

Note: Estimations from specification (7) in table 4 for exports and specification (4) in table 5 for imports. Estimations assume a similar average impact on exports/imports to/from non-OECD countries and FDI income inflows/outflows.

6 Conclusion

This paper provides direct evidence of the use of transfer prices by multinational firms to shift profit in low tax jurisdictions. The identification strategy makes use of detailed firm level export and import data by destination and product for France to compare prices of arm's length and related party transactions. The empirical analysis shows that the price wedge between arm's length and related party trade varies systematically with the differential in corporate tax rate between France and the partner country. The wide coverage of the Ownership database of Bureau Van Dick allows replicating the methodology developed in this paper on other countries provided with firm level trade data.

The goal of this paper was also to quantify the extent to which profit shifting through transfer prices impacts the tax base and international imbalances. The manipulation of transfer prices by multinationals operating in France is estimated to decrease the value of French exports by 0.8% and increases imports by 0.5% in 2008. The underreported taxable income due to profit shifting through transfer pricing on both exports and imports is estimated at 8 bn USD in 2008, and is growing over time in France. Such pricing strategies enable multinational groups that trade with related parties located abroad to reduce the corporate tax they pay in France by 10% on average.

The empirical evidence provided in this paper imply that a one percentage point increase in the tax differential with all partner countries decreases the consolidated profit before interest and tax of multinational companies that trade with related party by 0.5%. Such a semi-elasticity of corporate profits to tax differentials, computed from micro evidence on transfer pricing on trade in goods alone, is large compared to estimates based on balance sheet data, which include all instruments of profit shifting; it suggests an attenuation bias in studies based on indirect evidence from balance sheet data.

The scope of base erosion raises the question of the appropriate international corporate tax system in an increasingly globalized world in which multinationals play a major role in the emergence of global value chains. The difficulty to enforce transfer pricing rules would give ground to proposals of common consolidated corporate tax base and formulae apportionment that mitigate opportunities for profit shifting, particularly in integrated regions such as the EU.²³

²³See Fuest et al. (2013), IMF (2014) and Zucman (2014) for discussions of alternative proposals of systems of international corporate taxation and their limits.

From a methodological point of view, the evidence presented here also suggest caution in using firm level balance sheet data to compare the performances of multinational companies in different jurisdictions with different level of corporate taxation or to compare within country the characteristics of large multinational companies to domestic firms.

References

- Altomonte, C., Di Mauro, F., Ottaviano, G., Rungi, A., and Vicard, V. (2012). Global value chains during the great trade collapse: A bullwhip effect? Technical report.
- Altomonte, C. and Rungi, A. (2013). Business groups as hierarchies of firms: determinants of vertical integration and performance. Working Paper Series 1554, European Central Bank.
- Bartelsman, E. J. and Beetsma, R. M. W. J. (2003). Why pay more? corporate tax avoidance through transfer pricing in oecd countries. *Journal of Public Economics*, 87(9-10):2225–2252.
- Bauer, C. J. and Langenmayr, D. (2013). Sorting into outsourcing: Are profits taxed at a gorilla’s arm’s length? *Journal of International Economics*.
- Bellas, D., Bricongne, J.-C., Fontagné, L., Vicard, V., and Gaulier, G. (2010). Une analyse de la dynamique des exportations des sociétés françaises de 2000 à 2009. *Économie et Statistique*, 438(1):239–265.
- Bernard, A. B., Jensen, J. B., and Schott, P. K. (2006). Transfer pricing by u.s.-based multinational firms. NBER Working Papers 12493, National Bureau of Economic Research, Inc.
- Clausing, K. (2003). Tax-motivated transfer pricing and U.S. intrafirm trade prices. *Journal of Public Economics*, 87(1):2207–2223.
- Cristea, A. D. and Nguyen, D. X. (2015). Transfer pricing by multinational firms: New evidence from foreign firm ownerships. *American Economic Journal: Economic Policy*, forthcoming.
- Curcuru, S. E., Dvorak, T., and Warnock, F. E. (2008). Cross-Border Returns Differentials. *Quarterly Journal of Economics*, 123(4):1495–1530.
- Curcuru, S. E., Dvorak, T., and Warnock, F. E. (2013). On returns differentials. NBER Working Paper Series 18866, NBER.
- Davies, R. B., Martin, J., Parenti, M., and Toubal, F. (2014). Knocking on Tax Haven’s Door: Multinational Firms and Transfer Pricing. Technical report.
- de Mooij, R. A. and Ederveen, S. (2008). Corporate tax elasticities: a reader’s guide to empirical findings. *Oxford Review of Economic Policy*, 24(4):680–697.
- Devereux, M. P. (2007). The Impact of Taxation on the Location of Capital, Firms and Profit: a Survey of Empirical Evidence. Technical report.
- Devereux, M. P. and Griffith, R. (2003). Evaluating tax policy for location decisions. *International Tax and Public Finance*, 10(2):107–126.
- Dharmapala, D., Foley, C. F., and Forbes, K. J. (2011). Watch What I Do, Not What I Say: The Unintended Consequences of the Homeland Investment Act. *Journal of Finance*, 66(3):753–787.

- Dharmapala, D. and Riedel, N. (2013). Earnings shocks and tax-motivated income-shifting: Evidence from European multinationals. *Journal of Public Economics*, 97(C):95–107.
- Egger, P., Eggert, W., and Winner, H. (2010). Saving taxes through foreign plant ownership. *Journal of International Economics*, 81(1):99–108.
- Evans, C. L. and Harrigan, J. (2005). Distance, time, and specialization: Lean retailing in general equilibrium. *American Economic Review*, 95(1):292–313.
- Fuest, C., Spengel, C., Finke, K., Heckemeyer, J., and Nusser, H. (2013). Profit shifting and 'aggressive' tax planning by multinational firms: Issues and options for reform. Technical report.
- Gaulier, G. and Vicard, V. (2014). The french excess return on net foreign assets. mimeo.
- Gourinchas, P.-O. and Rey, H. (2007). From World Banker to World Venture Capitalist: U.S. External Adjustment and the Exorbitant Privilege. In *G7 Current Account Imbalances: Sustainability and Adjustment*, NBER Chapters, pages 11–66. National Bureau of Economic Research, Inc.
- Gumpert, A., James R. Hines, J., and Schnitzer, M. (2011). The Use of Tax Havens in Exemption Regimes. NBER Working Papers 17644, National Bureau of Economic Research, Inc.
- Habib, M. M. (2010). Excess returns on net foreign assets: the exorbitant privilege from a global perspective. Working Paper Series 1158, European Central Bank.
- Heckemeyer, J. H. and Overesch, M. (2013). Multinationals' Profit Response to Tax Differentials: Effect Size and Shifting Channels. discussion paper 13-045, ZEW.
- Hines, James R, J. and Rice, E. M. (1994). Fiscal Paradise: Foreign Tax Havens and American Business. *The Quarterly Journal of Economics*, MIT Press, 109(1):149–82.
- Hines, James, R. (1997). Tax policy and the activities of multinational corporations. In Auerbach, A., editor, *Fiscal Policy: Lessons from Economic Research*, pages 401–445. MIT Press, Cambridge.
- Huizinga, H. and Laeven, L. (2008). International profit shifting within multinationals: A multi-country perspective. *Journal of Public Economics*, 92(5-6):1164–1182.
- Hummels, D. L. and Schaur, G. (2010). Hedging price volatility using fast transport. *Journal of International Economics*, 82(1):15–25.
- IMF (2014). Spillovers in International Corporate Taxation. Imf policy paper, International Monetary Fund.
- Karkinsky, T. and Riedel, N. (2012). Corporate taxation and the choice of patent location within multinational firms. *Journal of International Economics*, Elsevier, 88(1):176–185.
- Krautheim, S. (2013). Export-supporting FDI. *Canadian Journal of Economics*, 46(4):1571–1605.

- Lane, P. R. and Milesi-Ferretti, G. M. (2009). Where did all the borrowing go? A forensic analysis of the U.S. external position. *Journal of the Japanese and International Economies*, 23(2):177–199.
- Markle, K. (2010). A comparison of the tax-motivated income shifting of multinationals in territorial and worldwide countries. Technical report.
- Nivat, D. and Terrien, B. (2010). Application de la règle du principe directionnel étendu aux statistiques d’investissements directs. In Fontagné, L. and Toubal, F., editors, *Investissement direct étranger et performances des entreprises*, pages 93–115. Conseil d’Analyse Economique, la Documentation Française, Paris, France.
- Obstfeld, M. and Rogoff, K. S. (2005). Global Current Account Imbalances and Exchange Rate Adjustments. *Brookings Papers on Economic Activity*, 36(1):67–146.
- Overesch, M. (2006). Transfer pricing of intrafirm sales as a profit shifting channel: Evidence from german firm data. ZEW Discussion Paper No. 06-084.
- Quantin, S., Raspiller, S., and Serravalle, S. (2009). Commerce intragroupe, fiscalité et prix de transferts : une analyse sur données françaises. Document de travail de la Direction des Études et Synthèses Économiques G2009/07.
- Rauch, J. E. (1999). Networks versus markets in international trade. *Journal of International Economics*, 48(1):7–35.
- Swenson, D. L. (2001). Tax reforms and evidence of transfer pricing. *National Tax Journal*, LIV(1):7–25.
- Zucman, G. (2014). Taxing Across Borders: Tracking Personal Wealth and Corporate Profits. *Journal of Economic Perspectives*, forthcoming.

Documents de Travail

540. P. Andrade, C. Cahn, H. Fraisse and J-S. Mésonnier, "Can the Provision of Long-Term Liquidity Help to Avoid a Credit Crunch? Evidence from the Eurosystem's LTROs," March 2015
541. V. Bignon, R. Breton and M. Rojas Breu, "Monetary Union with A Single Currency and Imperfect Credit Market Integration," March 2015
542. W. Steingress, "Specialization Patterns in International Trade," March 2015
543. A. Berthou and L. Fontagné, "Variable Trade Costs, Composition Effects, and the Intensive Margin of Trade," March 2015
544. W. Steingress, "Entry barriers to international trade: product versus firm fixed costs," March 2015
545. S. Gabrieli, D. Salakhova and G. Vuillemeys, "Cross-border interbank contagion in the European banking sector," March 2015
546. F. Pappadà and Y. Zylberberg, "Austerity Plans and Tax Evasion : Theory and Evidence from Greece," April 2015
547. S. Avouyi-Dovi, G. Horny and P. Sevestre, "The stability of short-term interest rates pass-through in the euro area during the financial market and sovereign debt crises" April 2015
548. J. Ramos-Tallada, "Bank risks, monetary shocks and the credit channel in Brazil: identification and evidence from panel data" April 2015
549. A. Bergeaud, G. Cette and R. Lecat, "GDP per capita in advanced countries over the 20th century" April 2015
550. M. Bussière, G. Cheng, M. Chinn, N. Lisack, "For a Few Dollars More: Reserves and Growth in Times of Crises" April 2015
551. N. Berman, V. Rebeyrol and V. Vicard, "Demand learning and firm dynamics: evidence from exporters" May 2015
552. L. Arrondel, P. Lamarche et Frédérique Savignac, "Wealth Effects on Consumption across the Wealth Distribution: Empirical Evidence" May 2015
553. C. Jude and M. I. Pop Silaghi, "Employment effects of foreign direct investment. New Evidence from Central and Eastern European Countries" May 2015
554. F. Koulischer, "Asymmetric shocks in a currency union: The role of central bank collateral policy" May 2015
555. V. Vicard, "Profit shifting through transfer pricing: evidence from French firm level trade data" May 2015

Pour accéder à la liste complète des Documents de Travail publiés par la Banque de France veuillez consulter le site : www.banque-france.fr

For a complete list of Working Papers published by the Banque de France, please visit the website: www.banque-france.fr

Pour tous commentaires ou demandes sur les Documents de Travail, contacter la bibliothèque de la Direction Générale des Études et des Relations Internationales à l'adresse suivante :

For any comment or enquiries on the Working Papers, contact the library of the Directorate General Economics and International Relations at the following address :

BANQUE DE FRANCE
49- 1404 Labolog
75049 Paris Cedex 01
tél : 0033 (0)1 42 97 77 24 ou 01 42 92 63 40 ou 48 90 ou 69 81
email : 1404-ut@banque-france.fr