PROFIT-SHIFTING ACTIVITIES IN THE MINING SECTOR: EVIDENCE FROM THE CZECH REPUBLIC

Daniel Anarfi[1], Danuše Nerudová[1]

[1] *Mendel University in Brno, Czech Republic*

EUROPEAN JOURNAL OF BUSINESS SCIENCE AND TECHNOLOGY

Volume 3 Issue 1
ISSN 2336-6494
www.ejobsat.com

ABSTRACT

The aim of this paper is to measure the magnitude of profit shifting in the Czech Mining industry. The paper source data from AMADEUS provided by the Bureau van Dijk for the 10-year period 2005–2014 to seek evidence of profit-shifting activities and measure the magnitude. The paper applies panel regression model in the analysis to seek evidence and measure the magnitude of profit shifting using random effect model estimations. The paper therefore analyses tax effects on capital structure of subsidiary firms as a means of profit shifting and the results was that, there is substantial evidence of profit shifting with different magnitudes in separate model specifications.

KEY WORDS

profit shifting, multinationals, Czech Republic

JEL CODES

H260

1 INTRODUCTION

The issue of international taxation and multinational tax planning has for some time now been gaining an unprecedented degree of political salience and public attention (Dharmapala, 2014). Several studies have tried to define tax planning but in simple terms Schäfer and Spengel (2004) defined it as the systematic inclusion of tax effects in the overall corporate planning decision making process with the objective of planning the company's activities in a way that effective tax rate is minimised without impairing the economic development of a company or underachieving possible changes of success. Economic theory assumes that the goal of all firms is to exist to maximise profit (Jensen and Meckling, 1976; Teece, 1982; Rumelt and Lamb, 1997; Shepherd, 2015; Liu et al., 2015). In other to achieve such a goal, MNCs employ mainly two basic strategies, increasing revenue and reducing cost, to maximise profit,

ANARFI, Daniel, and NERUDOVÁ, Danuše. 2017. Profit-Shifting Activities in the Mining Sector: Evidence from the Czech Republic. *European Journal of Business Science and Technology,* 3 (1): 5–12. ISSN 2336-6494, DOI http://dx.doi.org/10.11118/ejobsat.v3i1.72.

but since revenue flowing into the company is not guaranteed, they therefore devise strategies to control costs. Tax liability however also forms a major component of the cost composition of MNCs, and thus various tax planning strategies are used to reduce the tax to be paid.

There are several techniques MNCs used to engage in tax planning; that is shifting profits from high-tax countries to low-tax countries. One method which an MNC can use to shift profit is by manipulating its transfer prices for both international and intra-firm transactions (Cristea and Nguyen, 2014). Also, another method which can be used is that the multinational can affect the international allocation of accounting profits through its financial structure: when they assign (high-interest) debt to high-tax locales the multinational firm can reduce its worldwide tax bill (Huizinga and Laeven, 2008). Another way is when the multinational re-assigns common expenses to high-tax countries, resulting in a reduction of accounting profits in these countries (Huizinga and Laeven, 2008). When MNCs engage in tax planning a possible motive is shifting profits to erode the taxable base to locations where they are subject to more favourable tax treatment (OECD report, 2013) and a reduction of both corporate tax and withholding tax in the source country. It is on this issue that G20 members had committed themselves to fighting against when they endorsed the OECD's *action plan* against base erosion and profit shifting (BEPS).

The available empirical literature on base erosion and profit shifting (BEPS) has mostly concentrated on Europe and the U.S. (Hines, 1997; Hines, 1999; Devereux and Maffini, 2007) where the scope has also been on a country or multi-country level. There is however a gap in the focus at industry level. The aim of this paper therefore is to measure the magnitude of profit shifting by using data from a single industry sources contrary to previous papers where the subject matter has been based on the use of large multi sector and industry data.

2 METHODS AND DATA

This section indicates the data used for this study as well as the method and strategy used to identify profit shifting in the mining sector in the Czech Republic.

2.1 Data

In this study, the data on multinational mining companies was taken from the Amadeus database compiled by Bureau Van Dijk. The Amadeus database provides data on the financials, employees and ownership structure of private and publicly owned European firms as well as on their ownership relationships. The ownership structure data contained in Amadeus helps us to identify the ownership structure of the company. We define a firm as a subsidiary if the owners own at least a total of 50+1 percent of the total shares. In our selection of data from Amadeus, we restricted ourselves to the mining sector in the Czech Republic and we selected foreign subsidiary companies which meet our category. The mining sector was considered purposely because the industry contains quite substantial foreign-owned companies. The companies which fell under the mining industry are those involved in the mining of coal and lignite, the extraction of crude petroleum and natural gas, the mining of metal ores and other mining and quarrying activities. Other control variable data such as GDP, unemployment rate, exchange rate and inflation rate were taken from the World Bank database. Also, the corporate tax rate of parent and subsidiary companies were taken from the OECD corporate income tax rate database. In all, 24 companies were considered in this study for a period of 10 years over 2005–2014.

2.2 Identification Model

As reported by Dischinger (2010), only a few papers have used transfer pricing and estimations of deviation from arm's length prices

to find evidence of profit shifting (Dischinger et al., 2014; Clausing, 2015; Bernard et al., 2006). However, this study investigates whether multinational companies take advantage of the corporate tax differentials between the host country and the home country by using the pre-tax profits.

Research designs commonly used in the estimation of profit shifting literature are directly derived from early writers on the topic of multinational profit shifting and tax planning, namely Grubert and Mutti (1991) and Hines and Rice (1991). The most frequently used model is the Hines-Rice approach, from which several specific models are derived. Following this line of argument, this study will use HR analysis to investigate income shifting.

This approach can be represented by the following equation:

$$\begin{aligned} \mathrm{PBT}_{it} \quad = \quad & \beta_0 + \beta_1\,\mathrm{TAXDIFF}_{it} + \\ & + \beta_2\,\mathrm{CAP}_{it} + \beta_3\,\mathrm{LBR}_{it} + \\ & + \beta_4\,\mathrm{XA}_{it} + \beta_5\,\mathrm{XM}_{it} + \\ & + \rho_t + \phi_i + \epsilon_i. \end{aligned} \tag{1}$$

The basis of the HR approach to the identification of profit shifting is that the observed profit before tax (indicated in the model as PBT) which can be seen on the face of an income statement of an affiliate, represents the sum of "true" income and "shifted" income, where the latter can be either positive or negative (Dharmapala, 2014).

In firm theory, capital and labour inputs are used to generate true profit. The variable CAP_{it} defines the affiliate i's capital inputs (a proxy by fixed tangible assets) and LBR_{it} also defines the affiliate i's labour inputs (proxied for instance by employment compensation). The inclusion of capital and labour inputs in the model is to predict the counterfactual "true" level of income (Dharmapala, 2014). Conversely, Dischinger (2014) suggests that the inclusion of labour and capital does not significantly affect the coefficient estimate of the tax differential. The coefficient of interest β_1 is used to identify the shifted profit and the tax incentive to move profit in or out of the affiliate.

The variable $\mathrm{TAXDIFF}_{it}$ is the statutory corporate tax rate difference between affiliate i and its foreign parent in year t. This tax differential is derived by subtracting the parent tax rate from the subsidiary tax rate; XA_i is a vector of additional affiliate-level controls which are made up of affiliate's sales revenue (SAREV), financial leverage (LEV), net asset turnover (NAT) and firm size (SIZE). The paper also includes macroeconomic shocks indicated in the equation above as XM_{it}. These variables include GDP, GDP per Capita, Inflation rate, unemployment rate and exchange rate. Variable ϵ_i is the error term; β_0 is the constant and β_1, β_2, β_3, β_4, β_5 are the parameters of the independent variables. In this study, we expect $\beta_1 < 0$ to arrive at evidence of profit shifting. Variable ρ_t represents the year's dummies which control for shocks over time which affect all affiliates while unobserved characteristics on the firm and economy levels are represented by ϕ_i.

The panel nature of our data allows us to use a panel regression where the Hausman test is applied to help identify the appropriate model for this study. The above model's definition of profit shifting is also consistent with earlier models by Hines and Rice (1991), Hines (1999), Devereux and Maffini (2007), Huizinga and Laeven (2008), Klassen and Laplante (2012), Dyreng and Markle (2016), Dharmapala and Riedel (2013) and Merz and Overesch (2016).

3 RESULTS AND DISCUSSION

3.1 Evidence of Profit Shifting

We first perform a panel regression analysis for the period 2005–2014. The Hausman specification test was conducted, which helps us to identify that the Random Effect model is the appropriate one for this study. We regress various specifications with a combination of variables using the Random Effect model. Our basis for finding evidence of profit shifting as

Tab. 1: Evidence of profit shifting, random effect model – dependent variable: profit before tax (PBT ln)

Explanatory variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
CAP (ln)	−0.000225	−0.0602	−0.219	−0.148	−0.325
	(0.131)	(0.141)	(0.339)	(0.300)	(0.492)
LBR (ln)	0.897***	0.996***	0.713**	0.0735**	−0.346
	(0.163)	(0.177)	(0.407)	(0.414)	(0.623)
TAXDIFF	6.095*	5.039	8.656**	6.993**	4.909
	(2.773)	(2.819)	(3.233)	(2.465)	(3.275)
SAREV (ln)			0.136	0.111	1.648*
			(0.142)	(0.144)	(0.653)
LEV (ln)			−0.844***	−0.001	−1.181***
			(0.217)	(0.0027)	(0.279)
SIZE (ln)			0.0839	0.0179	−5.729*
			(0.813)	(0.186)	(0.186)
NAT (ln)			0.417	0.00437	(2.815)
			(0.217)	(0.0121)	(0.342)
GDP (ln)		0.686		−0.0511	−2.978
		(0.546)		(0.33)	(2.249)
INF (ln)				−0.663*	−0.354
				(0.305)	(0.835)
UNEMP (ln)				−0.235	−5.094
				(1.646)	(5.217)
EXR (ln)				12.84	−75.60
				(8.76)	(54.48)
GDPCAP (ln)		25.96		2.64	−12.48
		(24.04)		(5.206)	(52.76)
_cons	−1.811	−0.117	29.98	−96.5	30.76
	(1.096)	(0.42)	(27.33)	(98.22)	(27.43)
N	240	240	240	240	240

Note: The numbers in the parentheses indicate standard errors, * indicates a 10% significance level, ** indicates a 5% significance level, and *** indicates a 1% significance level.

used in the literature is that we expect the coefficient β_1 of the variable $\text{TAXDIFF}_{it} < 0$. We defined the variable TAXDIFF_{it} as the statutory corporate tax rate difference of affiliate i to its foreign parent in the year t.

In column (1) using the random effect model, we regress the variable of interest (TAXDIFF_{it}) with capital (proxied by fixed tangible assets) and labour inputs (proxied for instance by employment compensation) where the coefficient was expected to be negative showed a positive value indicating zero evidence of profit shifting in our results as shown in Tab. 1. These estimated results in which no evidence of profit shifting goes contrary to the results obtained for instance by Huizinga and Laeven (2008) and Dischinger (2010) who all found evidence of profit shifting using the same method. From Tab. 1, we estimated the Random Effect model of the tax difference to the parent together with other variables, but none of them resulted in evidence of profit shifting.

In column (2), we estimated only the control variables of capital inputs (log of fixed assets), labour cost (log of cost of employees) together with the tax difference with the parent and GDP, GDP per Capita which resulted in a positive higher coefficient of 5.0. This result seems very far from evidence of profit shifting. Again in column (3) which was the main point of interest, other variables such as the sales revenue of the firm (SAREV), the size of the firm (SIZE), net asset turnover (NAT) and leverage (LEV) serving as proxy for debt ratio were added to the model estimation as firm-level variables. Our main concern was to achieve

a result of a negative (−) coefficient of the tax difference to parent variables. It rather tends to be a positive significant value of 6.146 indicating zero evidence of profit shifting in the mining sector of the Czech Republic according to the sample of data used and the years under consideration and the same results runs across column (4) and (5).

The random effect results of this paper are not in line with the results of Dischinger (2010), in which the coefficient of the interest variable of tax difference to parent was a significant value of −0.735 as evidence of profit shifting. Dischinger (2010) used data from AMADEUS and employed a panel study for the years 1995 to 2005, while controlling for unobservable fixed firm effects on a sample of EU 25 member states (except for Cyprus and Malta) for the years 1995–2005. Our inability to obtain evidence of profit shifting activities may be a result of the small sample of data used as well as the focus on one industry and in one country. This calls for a broader scope when trying to find evidence of profit shifting.

3.2 Effect on Capital Structure

In further analysis, we analyse tax effects on capital structure of subsidiary firms as a means of profit shifting by employing leverage (LEV) as our dependent variable in the regression analysis. The regression results of this further analysis is depicted in Tab. 2. The pecking order theory states that it is appropriate for companies to finance investment projects by first using retained earnings and then follows with debt which is associated with a non-tax impact on profitability (Myers and Majluf, 1984).

Extant literature indicates that firms with high pre-tax profits prefers to use debt as a profit shifting mechanism because of deductible interest in order to reduce tax. This argument is supported with evidence found by Bartoloni (2013) and Loretz and Mokkas (2015). Before the results is discussed it is important to note our selection of control variables is in line with Frank and Goyal (2009) who identified that capital structure determinants must include among others firm size and inflation. The results are shown in Tab. 2.

In this analysis, we first start by regressing the tax difference of the subsidiary host rate to the parent tax rate with capital and labour inputs using leverage as our dependant variable. According to our results, we find evidence of profit shifting in column (1) with a high coefficient for the tax rate of 30.65 which means the leverage ratio of a subsidiary in the Mining industry falls by about 30 percentage point if the host tax rate increases by a percentage point. Similar results are found in column (2) and (3) with coefficients of 48 and 53 respectively when the variables of GDP and inflation are included to the model. In column (4), again we included firm level variables of size and net assets turnover and from our regression results in Tab. 3, we found evidence of profit shifting with the coefficient of 1.20. In comparing the magnitude of our tax effect in column (4), the magnitude of our evidence is higher. For instance, Feld et al. (2013) found evidence of 0.27 percentage point by employing a meta-analysis of 48 existing studies on the relationship that exist between capital structure of firms and taxation. Other empirical evidence which are consistent with our results include that of Keen and de Mooij (2012) and Heckemeyer and de Mooij (2013) who all found a magnitude of evidence of tax effect on capital structure.

4 CONCLUSION

The issue of international taxation and multinational tax planning has for some time now gained an unprecedented degree of political salience and public attention. Several methods (both direct and indirect) have been used to detect activities of profit shifting in different jurisdictions and most of these studies used large country data or cross country data as the sample for their work. This paper used prime data from AMADEUS on a single industry

Tab. 2: Effect on capital structure, random effect model – dependent variable: leverage

	(1)	(2)	(3)	(4)
CAP (ln)	−1.565	−1.706	−1.632	−0.264
	(3.080)	(4.091)	(4.598)	(0.232)
LBR (ln)	0.0877	0.144	−0.0869	0.183
	(3.864)	(5.144)	(5.812)	(0.242)
TAXDIFF	−30.65	−48.71	−57.47	−1.203
	(36.05)	(47.68)	(54.53)	(1.648)
GDP (ln)		−15.26	−48.41	−3.103**
		(18.36)	(52.05)	(1.013)
INF (ln)			7.17	−0.263
			(15.37)	(0.387)
SIZE (ln)				0.0629
				(1.007)
NAT (ln)				0.0561
				(0.110)
_cons	11.17	3,026.8	4,567.9	271.6***
	(6.242)	(1,885.3)	(2,753.1)	(59.94)
N	240	168	144	106

Note: The numbers in the parentheses indicate standard errors, * indicates a 10% significance level, ** indicates a 5% significance level, and *** indicates a 1% significance level.

(the mining sector) in one country (the Czech Republic) for the 10-year period 2005–2014 to seek evidence of profit-shifting activities.

This paper therefore applies the method identified by the early writers in its analysis and the result was that zero (0) evidence of profit shifting was identified in the estimations using the random effect model. However, a further analysis which analyses tax effects on capital structure of subsidiary firms as a means of profit shifting found substantial evidence of profit shifting with a magnitude of 30.65 percentage point. In another model specification, the results indicated evidence magnitude of 1.20.

These results seem to suggest that using a small sample of data to find evidence of profit shifting is difficult and it rather requires a large sample of national data, across an industry or across a country. However, in a further analysis, this paper finds evidence of profit shifting by analysing the tax effect on capital structure in the Czech Mining industry.

5 REFERENCES

Bartoloni, E. 2013. Capital Structure and Innovation: Causality and Determinants. *Empirica*, 40 (1), 111–151.

Bernard, A. B., Jensen, J. B. and Schott, P. K. 2006. *Transfer Pricing by U.S.-Based Multinational Firms*. NBER Working Paper No. 12493.

Clausing, K. A. 2015. *The Effect of Profit Shifting on the Corporate Tax Base in the United States and Beyond*. [online]. Available at: `http://ssrn.com/abstract=2685442`.

Cristea, A. D. and Nguyen, D. 2014. *Transfer Pricing by Multinational Firms: New Evidence from Foreign Firm Ownerships*. [online]. Available at: `http://ssrn.com/abstract=2517509`.

Devereux, M. P. and Maffini, G. 2007. *The Impact of Taxation on the Location of Capital, Firms and Profit: A Survey of Empirical Evidence*. Oxford University Centre for Business Taxation Working Paper No. 0702.

Dischinger, M. 2010. *Profit Shifting by Multinationals: Evidence from European Micro Panel Data*. Munich Discussion Paper No. 2007-30.

Dischinger, M., Knoll, B. and Riedel, N. 2014. The Role of Headquarters in Multinational Profit Shifting Strategies. *International Tax and Public Finance*, 21 (2), 248–271.

Dharmapala, D. 2014. What Do We Know About Base Erosion and Profit Shifting? A Review of the Empirical Literature. *Fiscal Studies*, 35 (4), 421–448.

Dharmapala, D. and Riedel, N. 2013. Earnings Shocks and Tax-Motivated Income-Shifting: Evidence from European Multinationals. *Journal of Public Economics*, 97, 95–107.

Dyreng, S. D. and Markle, K. S. 2016. The Effect of Financial Constraints on Income Shifting by U.S. Multinationals. *The Accounting Review*, 91 (6), 1601–1627.

Feld, L. P., Heckemeyer, J. H. and Overesch, M. 2013. Capital Structure Choice and Company Taxation: A Meta-Study. *Journal of Banking & Finance*, 37 (8), 2850–2866.

Frank, M. Z. and Goyal, V. K. 2009. Capital Structure Decisions: Which Factors Are Reliably Important? *Financial management*, 38 (1), 1–37.

Grubert, H. and Mutti, J. 1991. Taxes, Tariffs and Transfer Pricing in Multinational Corporate Decision Making. *The Review of Economics and Statistics*, 73 (2), 285–293.

Heckemeyer, J. H. and de Mooij, R. A. 2013. *Taxation and Corporate Debt: Are Banks Any Different?* IMF Working Paper No. 13/221.

Hines, J. R. and Rice, E. M. 1991. *Fiscal Paradise: Foreign Tax Havens and American Business*. NBER Working Paper No. 3477.

Hines, J. R. 1997. Tax Policy and the Activities of Multinational Corporations. In Auerbach, A. J. (ed.). *Fiscal Policy: Lessons from Economic Research*. MIT Press, Cambridge, pp. 401–445.

Hines, J. R. 1999. Lessons from Behavioral Responses to International Taxation. *National Tax Journal*, 52 (2), 305–322.

Huizinga, H. and Laeven, L. 2008. International Profit Shifting Within Multinationals: A Multi-Country Perspective. *Journal of Public Economics*, 92 (5), 1164–1182.

Jensen, M. C. and Meckling, W. H. 1976. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, 3 (4), 305–360.

Keen, M. M. and de Mooij, R. A. 2012. *Debt, Taxes, and Banks*. IMF Working Paper No. 12/48.

Klassen, K. J. and Laplante, S. K. 2012. Are U.S. Multinational Corporations Becoming More Aggressive Income Shifters? *Journal of Accounting Research*, 50 (5), 1245–1285.

Liu, C., Maslach, D., Desai, V. and Madsen, P. 2015. The First 50 Years and the Next 50 Years of A Behavioral Theory of the Firm: An Interview With James G. March. *Journal of Management Inquiry*, 24 (2), 149–155.

Loretz, S. and Mokkas, S. 2015. Evidence for Profit Shifting with Tax-sensitive Capital Stocks. *FinanzArchiv: Public Finance Analysis*, 71 (1), 1–36.

Merz, J. and Overesch, M. 2016. Profit Shifting and Tax Response of Multinational Banks. *Journal of Banking & Finance*, 68, 57–68.

Myers, S. C. and Majluf, N. S. 1984. Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have. *Journal of Financial Economics*, 13 (2), 187–221.

OECD. 2013. *Action Plan on Base Erosion and Profit Shifting*. OECD Publishing.

Rumelt, R. P. and Lamb, R. 1997. Towards a Strategic Theory of the Firm. *Resources, Firms, and Strategies: A Reader in the Resource-Based Perspective*, 131–145.

Schäfer, A. and Spengel, C. 2004. *International Tax Planning in the Age of ICT*. ZEW Discussion Paper No. 04-27.

Shepherd, R. W. 2015. *Theory of Cost and Production Functions*. Princeton University Press.

Teece, D. J. 1982. Towards an Economic Theory of the Multiproduct Firm. *Journal of Economic Behavior & Organization*, 3 (1), 39–63.

6 ANNEX

Tab. 3: Descriptive statistics for variables

Variable	OBS	MEAN	STD. DEV.	MIN	MAX
PBT	240	3.832	3.616	−2.56	11.934
CAP	240	6.282	3.974	0	12.666
LBR	240	4.907	3.173	−1.889	9.597
SAREV	240	6.622	4.031	−3.250	13.234
LEV	240	4.020	46.404	0	718.627
SIZE	240	6.909	4.0158	−1.926	13.218
NAT	240	2.649	10.594	0	121.474
TAXDIFF	240	−0.074	0.088	−0.201	0.26
GDP	240	0.868	0.721	0	1.928
GDPCAP	240	10.210	0.093	10.012	10.348
INF	240	0.598	0.745	−1.087	1.849
UNEMP	240	1.868	0.164	1.482	2.067
EXR	240	4.548	0.075	4.403	4.631

AUTHOR'S ADDRESS

Daniel Anarfi, Department of Accounting and Taxation, Faculty of Business and Economics, Mendel University in Brno, Zemědělská 1, 613 00 Brno, Czech Republic, e-mail: anarfidaniel@ymail.com

Danuše Nerudová, Department of Accounting and Taxation, Faculty of Business and Economics, Mendel University in Brno, Zemědělská 1, 613 00 Brno, Czech Republic, e-mail: d.nerudova@seznam.cz