

*UCD CENTRE FOR ECONOMIC RESEARCH*

*WORKING PAPER SERIES*

*2015*

**Negotiated Transfer Prices**

Johannes Becker, University of Münster  
Ronald B Davies, University College Dublin

WP15/27

November 2015

**UCD SCHOOL OF ECONOMICS  
UNIVERSITY COLLEGE DUBLIN  
BELFIELD DUBLIN 4**

# Negotiated Transfer Prices\*

Johannes Becker

University of Münster  
Institute of Public Economics  
Wilmergasse 6-8  
48143 Münster  
Germany

johannes.becker@wiwi.uni-muenster.de

Ronald B. Davies

University College Dublin  
G215 Newman Building  
Belfield  
Dublin 4  
Ireland

ronbdavies@gmail.com

November 5, 2015

## Abstract

The predominant model of tax induced transfer pricing is based on the assumption that profit shifting is due to insufficient enforcement. However, evidence shows that the firms responsible for most profit shifting are also among the most frequently audited. We present an alternative model based on negotiations that avoid costly, yet uncertain, formal proceedings (e.g. court procedures). This model predicts that profit shifting increases in the tax gap even though enforcement is perfect. Further, it suggests that current efforts to streamline international tax law may have the unintended effect of increasing profit shifting.

**JEL classification:** H25, H32, H87

**Keywords:** transfer pricing, Nash bargaining, tax avoidance, corporate taxation

## 1 Introduction

A large body of empirical evidence demonstrates that multinational firms shift profits from high- to low-tax locations by manipulating transfer prices and/or choosing adequate financial policies (see Huizinga and Laeven, 2008). In public and policy spheres, this is decried as harmful because it circumvents the legitimate raising of tax revenues from multinational firms. In response, a variety of initiatives, including the OECD's Base Erosion and Profit

---

\*We thank Hartmut Förster, Tom Gresik, Andreas Haufler, Carolin Holzmann, Kai Konrad, Yaron Lahav, Dominika Langenmayr, Nadine Riedel, Dirk Schindler, Michael Stimmelmayer and Robert Ullmann as well as participants at workshops and conferences at Mannheim, Brussels, Nuremberg and Oxford for helpful comments. The usual disclaimer applies.

Shifting (BEPS) Project, propose a variety of changes to the tax environment that enhance enforcement and streamline reporting.<sup>2</sup> However, drawing political and policy conclusions requires a clear understanding of the circumstances under which firms shift profits.

The prevalent model of tax-induced profit shifting via transfer pricing is a version of the Allingham and Sandmo (1972) model. In this model, firms may choose to deviate from a “true” transfer price and incur a concealment cost, often interpreted as accountants who “cook the books” and/or a penalty if the manipulation is detected. Profit maximization implies that the marginal tax saving equals the marginal concealment cost. As a consequence, an increase in the tax rate differential increases profit shifting. This *concealment model* is parsimonious and fits the empirical facts, i.e. the negative correlation of profit and tax rates (see Dharmapala, 2014). Thus it has become *the* model of tax-induced transfer pricing. Among its recommendations is that, to curb profit shifting, governments should increase enforcement.

However, the assumptions on which the concealment model rests are at odds with important aspects of the empirical reality. Large firms are both the most apt to shift profits (Davies, et al. 2014) and the most frequently audited.<sup>3</sup> Moreover, actual penalties are rarely imposed and, as the most prominent examples (Apple, Starbucks etc.) show, tax avoidance schemes are often within the legal limits and need not be concealed. There is thus a clear need for an alternative explanation of profit shifting. A simple alternative is to explain profit shifting as countries accepting generous transfer prices to prevent firm re-location (Becker, Davies and Jakobs 2014); i.e. assuming that transfer pricing is part of the set of strategic trade policy instruments. Moreover, profit shifting may be the outcome of a bilateral negotiation process, the so-called mutual agreement procedures (MAP) as described in the OECD Transfer Pricing Guidelines (2010) between tax authorities (Becker and Davies, 2014).<sup>4</sup>

This paper considers an explanation of profit shifting which is based on policy uncertainty arising from the incompleteness of international tax rules. As admitted by the OECD (2010), “*transfer pricing is not an exact science*” (pg. 2), with a range of acceptable methodologies resulting in a range of reasonable transfer prices (i.e. no “true” price exists). Due to this indeterminacy, the location of income within the firm is open for interpretation, with the firm and the high-tax country preferring opposite ends of this spectrum. In practice, such

---

<sup>2</sup>See <http://www.oecd.org/ctp/beps.htm>.

<sup>3</sup>The German Ministry of Finance (Bundesfinanzministerium 2014) reports a 20% probability for large firms of being audited, i.e. every five years. Since audits usually expand to previous accounting years, the detection probability is therefore close to certainty. Accordingly, in a recent ruling, the German Supreme Tax Court assumed that the average probability that the tax statement in an individual year is audited (i.e. in this year or in the future) is around 80% for large firms (see Bundesfinanzhof, 2012).

<sup>4</sup>In addition, generous transfer prices may be granted to induce the low-tax country to increase tax rates (Becker and Fuest, 2012).

disputes are generally settled via informal negotiations (PwC, 2013). Should these fail, the price is determined by a costly formal process and ultimately by a court decision which, given the ambiguity in the regulations, has an uncertain outcome.<sup>5</sup> In equilibrium, transfer prices are set to prevent this costly formal stage. Our model predicts that profit shifting increases in the tax differential even when auditing is perfect. The policy implications, though, differ diametrically from the concealment model. First, greater enforcement does nothing to curb profit shifting. Since there is no concealment in our setting – fitting the fact that, despite near frequent audits, large firms continue to shift profits – more frequent audits do not increase tax revenue. Second, policies that address the uncertainty or the cost of formal transfer pricing settlements will impact profit shifting. Surprisingly, a reduction in the cost of the formal procedure may increase profit shifting.

The remainder of the paper is organized as follows. The next section presents a stylized model of profit shifting based on negotiations between the firm and the tax authority. Section 3 concludes.

## 2 The Model

Consider a firm located in two countries,  $h$  and  $l$ , where the ranking of taxes is  $t_h > t_l$ . The firm maximizes world-wide after-tax profits whereas country  $h$  maximizes its tax revenue.<sup>6</sup> Country  $l$  remains passive.<sup>7</sup> The firm produces a fixed-input intermediate in  $l$  (e.g. R&D) at cost  $c$  which is used in  $h$  to produce a final product, yielding revenue  $\pi$ . The transfer price used for the intermediate is  $p$ . We assume that  $p \in [c, \pi]$ , i.e. declared profits cannot be negative in either location. This range admits the indeterminacy identified by the OECD (2010). After-tax profits are, given  $p$ :

$$\Pi(p) = (1 - t_h)(\pi - p) + (1 - t_l)(p - c) \tag{1}$$

while  $h$ 's revenues are  $R_h(p) = t_h(\pi - p)$ .

The transfer price is determined via a two step process. First, the firm and  $h$  informally negotiate over  $p$ . If they agree, after-tax profits and tax revenues are as above with  $p = p^N$  where superscript  $N$  denotes the negotiated value. Should they fail to agree, a second stage begins in which the transfer price is determined by a costly formal court process as described above. Given the complexity of the tax system and vagaries of the court, the price emerging

---

<sup>5</sup>Wrappe, Dougherty, and Hill (2000) discuss this for the US.

<sup>6</sup>Note that this makes the location of the firm's headquarters irrelevant.

<sup>7</sup>Since the firm and  $l$  both prefer to shift income to  $l$ , this simplification is reasonable. See Davies and Becker (2014) for a model where  $l$  is active.

from this process, denoted by  $p^C \in [c, \pi]$ , is uncertain. From the viewpoint of the firm and country  $h$ ,  $p^C$  is a stochastic variable, the underlying distribution function of which is subject to the agents' beliefs. Let the firm believe that  $p^C$  is drawn from a distribution  $F(\tilde{p}^C)$  with associated density  $f(\tilde{p}^C) = F'(\tilde{p}^C)$ , the tilde denoting potential values of  $p^C$ ; the government in  $h$  treats it as emerging from  $G(\tilde{p}^C)$  where  $g(\tilde{p}^C) = G'(\tilde{p}^C)$ . These beliefs can be the same or different (as might occur with private information). In addition, the formal process (i.e. going to court) entails a cost  $\delta_f > 0$  for the firm and  $\delta_h > 0$  for  $h$ . Thus, should negotiations fail, expected profits and tax revenues are, respectively,

$$E(\Pi) = (1 - t_h)\pi - (1 - t_l)c + (t_h - t_l)E_f(\tilde{p}^C) - \delta_f \quad (2)$$

$$E(R_h) = t_h(\pi - E_h(\tilde{p}^C)) - \delta_h \quad (3)$$

where  $E_f(\tilde{p}^C) = \int_c^\pi \tilde{p}^C f(\tilde{p}^C) d\tilde{p}^C$  and  $E_h(\tilde{p}^C) = \int_c^\pi \tilde{p}^C g(\tilde{p}^C) d\tilde{p}^C$ . Using the Nash bargaining solution,<sup>8</sup> the negotiated transfer price is the solution to:

$$\max_{\tilde{p}^N \in [c, \pi]} (\Pi(\tilde{p}^N) - E(\Pi))^\alpha (R_h(\tilde{p}^N) - E(R_h))^{1-\alpha} \quad (4)$$

where  $\alpha$  is the relative bargaining power of the firm. Solving for the equilibrium negotiated price,  $p^N$ , yields:

$$p^N = \hat{E}(\tilde{p}^C) + \alpha \frac{\delta_h}{t_h} - (1 - \alpha) \frac{\delta_f}{t_h - t_l} \quad (5)$$

where  $\hat{E}(\tilde{p}^C) = \alpha E_h(\tilde{p}^C) + (1 - \alpha) E_f(\tilde{p}^C)$  is the bargaining-strength weighted average of the two expected transfer prices, i.e. a kind of consensus measure of the expected  $p^C$ .

Before we consider policy effects, note that the extent of profit shifting crucially depends on the cost of formal procedures. If this cost increases sub-proportionally to the size of the transaction, our model can rationalize why large firms shift more. The reason is that their cost of going to court is smaller relative to the profit that can be gained. A similar point can be made for older firms since  $\delta_f$  may be expected to decrease in experience. Correspondingly, large and experienced tax administrations may be more successful in preventing profit shifting. Also note that it does not pay off to incur (part of) the cost  $\delta_f$  or  $\delta_h$  before the informal negotiations begin since, for example, a unit decrease in  $\delta_f$  only increases the firm's net profits by  $(1 - \alpha)$ .

---

<sup>8</sup>For simplicity, we assume that, in case that beliefs on  $p^C$  differ, the individual beliefs can be credibly revealed (we thus rule out strategic announcements of beliefs in order to manipulate the bargaining process).

Changes in taxes impact this transfer price as follows:

$$\frac{dp^N}{dt_l} = -(1 - \alpha) \frac{\delta_f}{(t_h - t_l)^2} < 0 \quad (6)$$

$$\frac{dp^N}{dt_h} = -\alpha \frac{\delta_h}{t_h^2} + (1 - \alpha) \frac{\delta_f}{(t_h - t_l)^2} \quad (7)$$

We can now state the following:

**Proposition 1.** (i) *The transfer price decreases in  $t_l$ .* (ii) *The transfer price increases in  $t_h$  if the government's cost ( $\delta_h$ ) is not much larger than the firm's and/or its bargaining power not much smaller than the firm's.* (iii) *A proportional increase in tax rates unambiguously increases profit shifting to the low-tax country.*

**Proof:** (i) This comes from (6). (ii) This follows from inspection of (7). For  $\alpha = 0.5$  and  $\delta_h = \delta_f$ ,  $t_h$  decreases in  $p^N$ . (iii) Adding the right hand sides of (6) and (7) yields the net effect  $-\alpha \frac{\delta_h}{t_h^2} < 0$ .

Note that, with the caveats in (ii), this matches the prediction of the concealment model that an increase in the tax gap leads to rising profits in the low-tax location. These caveats arise because an increase in  $t_h$  increases the firm's benefit from profit shifting which, under the Nash bargaining solution, must be shared between parties.

As there is no concealment, enforcement plays no role. Other policy changes, however, do. First, if the formal process is overhauled to clarify potential outcomes, this can shift  $\hat{E}(\tilde{p}^C)$ . For example, if pricing methods are altered to increase the minimum value of  $p$  and thus the expected price, it would increase the equilibrium price and reduce profit shifting. A change in only the variance of  $\tilde{p}^C$  has no effect, though, since agents are assumed to be risk neutral. However, if the firm's managers have some discretion vis-à-vis their shareholders and are risk averse due to undiversified human capital, a mean-preserving decrease in the variance can be shown to increase the firm's willingness to go to court and, thus, increases profit shifting in equilibrium. Similarly, if the OECD's BEPS initiative streamlines reporting regulations lowering the costs of the formal process to both parties, this would have an ambiguous impact on profit shifting (as inspection of (5) shows).

**Proposition 2.** *If the firm's bargaining strength is not much stronger than the government's,* (i) *a unit decrease in  $\delta_h$  and  $\delta_f$  decreases profit shifting;* (ii) *a proportional decrease in  $\delta_h$  and  $\delta_f$  decreases profit shifting as long as  $\delta_h$  is not much larger than  $\delta_f$ .*

**Proof:** Omitted.

Thus, especially if the firm's bargaining power is large relative to the government, then clarification of reporting rules may even increase profit shifting implying that the BEPS initiative would have the opposite of its intended effect.

### 3 Conclusion

The empirical fact that large firms are frequently audited and, at the same time, are most responsible for profit shifting is at odds with the predominant focus on profit shifting with concealment. We present a model that reconciles these two observations. It predicts larger profit shifting when the tax gap widens even when auditing is frequent. This matches the empirical facts yet results in dramatically different policy conclusions. First, when transfer prices are negotiated, the suggestion that increased enforcement will eliminate profit shifting is incorrect. Second, efforts to streamline the international tax code may actually increase profit shifting depending on relative costs and bargaining strength.

### References

- [1] Allingham, M.G. and A. Sandmo (1972). Income Tax Evasion: A Theoretical Analysis, *Journal of Public Economics* 1(3/4): 323-338.
- [2] Becker, J. and R.B. Davies, 2014. A Negotiation-Based Model of Tax-Induced Transfer Pricing, Oxford University Centre for Business Taxation Working Paper 14/09.
- [3] Becker, J., R. B. Davies and G. Jakobs (2014). The Economics of Advance Pricing Agreements, Oxford University Centre for Business Taxation Working Paper 14/26.
- [4] Becker, J. and C. Fuest (2012). Transfer Pricing Policy and the Intensity of Tax Rate Competition, *Economics Letters* 117(1): 146-48.
- [5] Bundesfinanzhof (2012). Urteil vom 6.6.2012, I R 99/10.
- [6] Bundesfinanzministerium (2014). Datensammlung zur Steuerpolitik, Ausgabe 2013, Berlin.
- [7] Davies, R. B., J. Martin, M. Parenti and F. Toubal (2014). Knocking on Tax Heaven's Door: Multinational Firms and Transfer Pricing, Oxford University Centre for Business Taxation Working Paper 15/02.

- [8] Dharmapala, D. (2014). What Do We Know About Base Erosion and Profit Shifting? A Review of the Empirical Literature, CESifo Working Paper No. 4612.
- [9] Huizinga, H. and L. Laeven (2008). International Profit Shifting within Multinationals: A Multi-Country Perspective, *Journal of Public Economics* 92(5-6): 1164-82.
- [10] OECD (2010). OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations 2010, OECD Publishing.
- [11] PwC (2013). International Transfer Pricing 2013/14, PwC Publishing.
- [12] Wrappe, S. C., J. A. Dougherty and C. A. Hill (2000). Resolving Transfer Pricing Disputes. *Corporate Business Taxation Monthly*, July 2000, 14-18.



*UCD CENTRE FOR ECONOMIC RESEARCH – RECENT WORKING PAPERS*

- [WP15/04](#) David Candon: 'Are Cancer Survivors who are Eligible for Social Security More Likely to Retire than Healthy Workers? Evidence from Difference-in-Differences' February 2015
- [WP15/05](#) Morgan Kelly and Cormac Ó Gráda: 'Adam Smith, Watch Prices, and the Industrial Revolution' March 2015
- [WP15/06](#) Kevin Denny: 'Has Subjective General Health Declined with the Economic Crisis? A Comparison across European Countries' March 2015
- [WP15/07](#) David Candon: 'The Effect of Cancer on the Employment of Older Males: Attenuating Selection Bias using a High Risk Sample' March 2015
- [WP15/08](#) Kieran McQuinn and Karl Whelan: 'Europe's Long-Term Growth Prospects: With and Without Structural Reforms' March 2015
- [WP15/09](#) Sandra E Black, Paul J Devereux, Petter Lundborg and Kaveh Majlesi: 'Learning to Take Risks? The Effect of Education on Risk-Taking in Financial Markets' April 2015
- [WP15/10](#) Morgan Kelly and Cormac Ó Gráda: 'Why Ireland Starved after Three Decades: The Great Famine in Cross-Section Reconsidered' April 2015
- [WP15/11](#) Orla Doyle, Nick Fitzpatrick, Judy Lovett and Caroline Rawdon: 'Early intervention and child health: Evidence from a Dublin-based randomized controlled trial' April 2015
- [WP15/12](#) Ragnhild Balsvik and Stefanie A Haller: 'Ownership Change and its Implications for the Match between the Plant and its Workers' May 2015
- [WP15/13](#) Cormac Ó Gráda: 'Famine in Ireland, 1300-1900' May 2015
- [WP15/14](#) Cormac Ó Gráda: 'Cast back into the Dark Ages of Medicine? The Challenge of Antimicrobial Resistance' May 2015
- [WP15/15](#) Sandra E Black, Paul J Devereux and Kjell G Salvanes: "Healthy(?), Wealthy, and Wise - Birth Order and Adult Health" July 2015
- [WP15/16](#) Sandra E Black, Paul J Devereux, Petter Lundborg and Kaveh Majlesi: "Poor Little Rich Kids? - The Determinants of the Intergenerational Transmission of Wealth" July 2015
- [WP15/17](#) Sandra E Black, Paul J Devereux, Petter Lundborg and Kaveh Majlesi: "On The Origins of Risk-Taking" July 2015
- [WP15/18](#) Vincent Hogan and Patrick Massey: 'Teams' Responses to Changed Incentives: Evidence from Rugby's Six Nations Championship' September 2015
- [WP15/19](#) Johannes Becker and Ronald B Davies: 'Learning to Tax - Interjurisdictional Tax Competition under Incomplete Information' October 2015
- [WP15/20](#) Anne Haubo Dyrberg: 'Bitcoin, Gold and the Dollar – a GARCH Volatility Analysis' October 2015
- [WP15/21](#) Anne Haubo Dyrberg: 'Hedging Capabilities of Bitcoin. Is it the virtual gold?' October 2015
- [WP15/22](#) Marie Hyland and Stefanie Haller: 'Firm-level Estimates of Fuel Substitution: an Application to Carbon Pricing' October 2015
- [WP15/23](#) Roberta Cardani, Alessia Paccagnini and Stefania Villa: 'Forecasting with Instabilities: an Application to DSGE Models with Financial Frictions' October 2015
- [WP15/24](#) Morgan Kelly, Joel Mokyr and Cormac Ó Gráda: 'Roots of the Industrial Revolution' October 2015
- [WP15/25](#) Ronald B Davies and Arman Mazhikeyev: 'The Glass Border: Gender and Exporting in Developing Countries' November 2015
- [WP15/26](#) Ronald B Davies and Neill Killeen: 'Location Decisions of Non-Bank Financial Foreign Direct Investment: Firm-Level Evidence from Europe' November 2015