

EVALUATION OF THEORETICAL AND EMPIRICAL RESEARCHES ON TRANSFER PRICING

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Abstract. *This article is structured as follows. The introduction provides a brief explanation of transfer pricing and its significance to practitioners and researchers. The purpose of transfer pricing is next considered. Then the conception and assignment of transfer pricing are discussed. This leads to a review of major theoretical and empirical researches on transfer pricing. The paper finally calls for further researches which should preferably be grounded on field work within a theoretical framework.*

Key words: *transfer pricing, the arm's length principle, theoretical researches, empirical researches*

Introduction

In the process of globalization, the role of multinational companies in world trade has increased dramatically over the last 20 years. As a consequence, the amount of cross-border transactions concluded between related parties exceeded 50% of all international trade.

The tax rates and tax accounting principles are different in various countries; therefore, multinational companies often set transfer prices that differ from market prices, i.e. prices which would have been applied by unrelated parties in similar transactions under similar conditions in the open market. The multinational companies have the incentive to increase its after-tax profits by shifting taxable income from high-tax to low-tax countries by altering transfer prices; thus, transfer pricing is significant for both taxpayers and tax administration purposes, because they determine in large part the income and expenses, and thus taxable profits, of associated enterprises in different tax jurisdictions.

Therefore, changes in the transfer price can substantially affect the revenue of the government in which it operates. In order to control these manipulations of transfer pricing, many countries regulate transfer pricing by means of the so-called arm's length principle. In case the group companies determine the transfer prices that are not in line with

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the arm's length principle, tax authorities may adjust these prices and impose a penalty. However, tax authorities often do have the problems when establishing 'fair' transfer prices; this is because a substantial part of intra-firm trade is in goods where arm's length prices are not easily established. Given the prominence of the profit shifting argument for government intervention in international trade and the significance of transfer pricing, it is not surprising that there is a substantial and sophisticated transfer pricing literature studying this phenomenon from both theoretical and empirical perspectives.

The purpose of this paper is to review the literature and researches on transfer pricing in order to make it an accessible topic for further studies and analysis. Researchers in management, accounting and tax disciplines, seeking an integrative focus, comprise the target audience.

Although in Lithuania the transfer pricing rules were legitimized in 2004, there are very few scientific publications about transfer pricing in this country. Only several Lithuanian authors (Kutut and Kutut, 2007; Navickas, 2010) deal with transfer pricing problems in their publications; however, to the author's best knowledge, no analysis of transfer pricing researches has been performed in Lithuania before.

While writing this article, the author applied the analysis of economic literature, comparison, grouping and summing-up methods.

Conseption and assigment of transfer pricing

Transfer pricing is the setting of prices for internal transactions (i.e. transactions between related parties) in goods, services, intangibles and capital flows within the multinational company. Transfer prices mean the value of goods and services, tangible and intangible property, set between or by two taxable entities – related parties or closely-held companies – in the course of their internal transactions involving transfer of such goods or rendering services across different tax jurisdictions worldwide where the related entities may be located.

Sometimes transfer pricing is linked to the shift of profits between different tax jurisdictions. Goods (or services) are priced in such a manner that the profits are shifted to the transferee and, consequently, the tax burden on the profits is lightened in the hands of the transferor. The profits may not be parked indefinitely with the transferee if the transferee is assessed to tax in a high-tax regime. The process may be repeated, and the profit-spread continues the same way till the destination is reached in a low-tax regime.

Transfer pricing serves two distinct purposes within multinational enterprises. It affects the incentives of divisional managers who are remunerated on the basis of their division's performance. Also, the economic reason for charging transfer prices is to be able to evaluate the performance of the group entities concerned. By charging prices for goods and services transferred within a group, managers of group entities are able to make the best possible decision as to whether to buy or sell goods and services inside or outside the group.

Second, transfer prices determine the tax liability of each division, thus affecting the overall tax exposure of the multinational enterprise (Hyde, Choe, 2003). The tax legislation has an impact on commercial transfer pricing; thus, if the commercial system is in conflict with the tax rules, companies may either adopt a fiscally correct system or, if allowed, maintain two systems:

- one for commercial / management purposes and
- another for tax purposes.

Therefore, all transfer pricing literature and researches can be grouped into two major areas: corporate management and tax. Each of these areas can be further divided into sub-categories, e.g., tax compliance, tax control, tax minimization, etc., which are presented in Fig. 1.

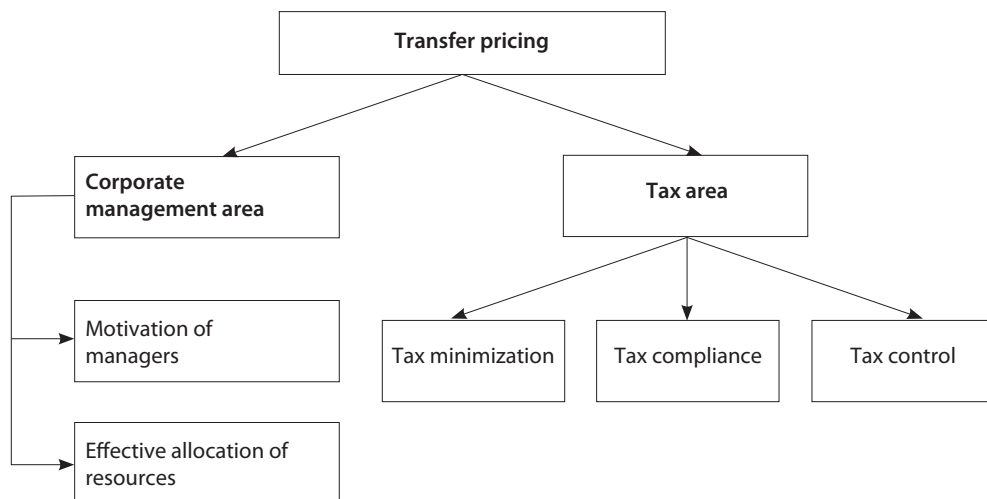


FIG. 1. Classification of transfer pricing

Source: compiled by the author.

It should be noted that the first transfer pricing researches, scientific publications, analyses were performed in the period 1950–1960. Such transfer pricing scholars as Dean (1955), Hirschleifer (1956), Argyris (1957), Heflebower (1960) analysed the transfer pricing mainly for corporate management purposes. However, in the last two decades most of transfer pricing researches were related to the tax issues as the tax authorities of many economically developed countries have become more and more stringent in enforcing various transfer pricing regulations. Therefore, in the present study, the focus is mainly on the researches performed for tax purposes.

Theoretical researches

The earliest established theoretical literature on transfer pricing is dominated by modelling approaches. Seminal economic modelling works are those of Hirschleifer (1956) and Gould (1964). Essentially, modelling provides the transfer price which will motivate buying and selling divisional managers to make and transfer internally the level of output that will maximize total company profits. This literature recommended the practitioners to adopt intermediate market prices as transfer prices as these prices are clearly specified in highly competitive markets. Where market prices are not available, marginal cost (the cost of an additional unit of output) at the optimal level of output should be used.

Economic theory suggests that multinational enterprises will maximize global after-tax profits by shifting revenues to low-tax and deductions to high-tax jurisdictions (Horst, 1971). Horst (1971) explored the profit maximization strategy for a monopolistic firm selling in two markets simultaneously in the presence of transfer pricing and how the firm reacts to a given set of tariff and tax rates.

Manipulation of transfer prices is widely believed to be the primary route for such income shifting. There has been a large theoretical literature on transfer pricing responses to income tax differentials (Horst, 1971; Halperin and Srinidhi, 1987; Eden, 1998, etc.). Capithorne (1971), Samuelson (1982), and Harris and Sansing (1998) examine the effect of tax-rate differences on production and pricing when a single agent is responsible for intra-company transactions.

Schjelderup and Sorgard (1997) extended the monopolistic model by introducing competition in the final good market in the host country. Also, they developed comparative static results for firms facing the Cournot and Bertrand competition to investigate how transfer prices are set. According to Schjelderup and Sorgard, in the absence of tax and tariff rates, under the Cournot competition the multinational company would set the transfer price below the marginal cost.

Eden (2000) explored the question what impacts can international intra-company trade have on the calculation of the export and import price indexes. The author developed a theoretical model of a multinational company's optimal intra-company trade and transfer pricing choices under free trade, tariffs and profit taxes. He also analyzed the transfer pricing regulations employed by customs and tax authorities to prevent transfer price manipulation, with a particular reference to the US customs and tax regulations.

Another important object of transfer pricing researches is the application of the formula apportionment system in order to prevent transfer pricing manipulations. The policy-makers and economists (Nielsen, Raimondos-Møller and Schjelderup, 2001; Wellisch, 2004; Shackelford and Slemrod, 1998) pointed out that the problems related to profit shifting and the transfer pricing, under separate accounting, warrant a switch to a formula apportionment system similar to that practiced by the US, Canada, Switzerland in domestic firms. When taxing domestic firms located in different states, the US does

not rely on separate accounting but instead on formulas to calculate the tax base applicable in individual states. These formulas in effect apportion the US assets, sales, and / or payroll to any individual state in which the firms operate, and then use these shares to compute the base applicable for taxation in that state. This system, called formula apportionment, is by many seen as a superior method of taxing multinationals, since it ensures that the companies cannot evade taxation in any single state as long as they have some activity going on in that state..

In his early theoretical contribution, Musgrave (1972) pointed out that formula apportionment could mitigate the problem of internal pricing within multinational corporations, and proposed that the United States should consider to extend their system to international investment. This was followed by the work of McLure (1980, 1981) and Gordon and Wilson (1986) which established the distortions arising from the allocation formula.

Along these lines, Goolsbee and Maydew (2000) argue that apportionment according to payroll exhibits the same effects as the labour tax. Anand and Sansing (2000) develop a theoretical model of tax competition in apportionment rules amongst the US states. The proposal of the EU Commission to apply the formula apportionment system to the European Union led to several contributions, including Devereux (2004), Sirensen (2004) and Mintz and Weiner (2003), who discuss the potential of the alternative proposals. Weiner (2002) and Gerard and Weiner (2003) investigate the impact of introducing the formula apportionment system on the European Union Member States.

The development of these transfer pricing models is presented in Table 1.

TABLE 1. Development of transfer pricing models

Period	1950–1970	1970–1990	1990–2010
Major developments and peculiarities of transfer pricing models	Transfer pricing was analysed mainly for corporate management purposes	Analysis of manipulations of transfer prices' impact on income shifting and transfer pricing responses to income tax differentials	Transfer pricing setting in monopolistic and oligopolistic markets; analysis and comparison of the arm's length and formula apportionment approaches; impact of transfer pricing on the calculation of the export and import price indexes
Authors	Hirshleife, 1956; Argyris, 1957; Heflebower, 1960; Gould, 1964	Horst, 1971; Musgrave, 1972; Halperin and Srinidhi, 1987; Capithorne 1971;. Samuelson, 1982	Nielsen, Raimondos-Møller and Schjelderup, 2001; Wellisch, 2004; Shackelford and Slemrod, 1998; Devereux, 2004; Sirensen, 2004; Mintz and Weiner, 2003; Goolsbee and Maydew, 2000

Source: compiled by the author.

Despite the large volume of published material on transfer pricing, it is possible to recommend a relatively small number of transfer pricing models that can provide an excellent background for empirical researches and the further development of transfer pricing models. These models are listed below:

- Landy's model (2006). In this model, the effects of varying tax / tariff rates on the transfer pricing behaviour of a multinational firm engaged in the Cournot competition are analysed;
- Hyde and Choe's model (2005). In this model, the effects of transfer pricing on economic incentives and tax compliance are examined for cases when the multinational company sets two transfer prices: one for managerial decision-making and the other for tax purposes;
- Gresik's model (2006). Gresik is the first who has incorporated private information in a comparison of both transfer pricing systems: separate accounting and formula apportionment.

Landy's model (2006). The author has introduced a model which analyses the effects of varying tax/tariff rates on the transfer pricing behaviour of a multinational firm which engages in the Cournot competition. The author focuses on the direct regulation of the transfer price. Landy introduces three types of government policy instruments:

- the trade policy instrument,
- the profit taxes and
- the government regulation on the transfer price.

The author first examines the effects of each policy instrument on the decision variables of a company (output and transfer price). Then he performs a comparative static analysis to assess the direct and indirect impacts of the change in government policy in relation to the profit tax, tariff rates and transfer price on the firm's behaviour. The author further introduces a penalty schema into the model that enables to derive interior solutions for the transfer price.

The author proves in his model that the institution of penalty has a substantial impact on the transfer pricing behaviour of a company. The optimal choice of the company in the presence of penalty is to set a transfer price above the marginal cost of production. Thus, the author concludes that the transfer price regulation by the government leads to overinvoicing with a fall in affiliate firm output.

Moreover, the author states that changes in the tax and tariff rates have both a direct and indirect impact on the nature of competition and the degree of substitutability between the final products. This is because the nature of the strategic interaction in the final market in the host country has a great influence on the desired choice of the internal transfer price. When the company overinvoices, the optimal behaviour of the host rival firm is to set a high price on its sales if it regards the final products as strategic comple-

ments. In the case of underinvoicing, sales of the local rival are reduced, weakening its competitive position vis-à-vis the multinational company.

Hyde and Choe's model (2005). Hyde and Choe examine the effects of transfer pricing on economic incentives (for corporate management purposes) and tax compliance (for tax purposes) in a model when a multinational company sets two transfer prices: one for managerial decision-making and the other for tax compliance.

The authors show in their model that both the incentive and tax transfer prices decrease as the penalty for non-arm's length pricing increases, or the profitability of being penalized increases. Thus, changes in the tax regime affect the tax transfer prices as well as the transfer prices used to provide incentives to the company (i.e. the prices used for corporate management purposes)..

It should be noted that the authors introduce the formula apportionment approach in their model. This approach refers to a formula based on consolidated sales, assets, payroll, and possibly other factors to allocate a consolidated taxable income among the group companies (in contrast, the separate entity approach treats each group company as if it acts as an independent entity applying the arm's length principle to determine taxable income of each company). The authors show that the two transfer prices (set for tax and corporate management purposes) are independent, regardless of whether or not penalties for non-arm's length pricing are applied. This stems from the fact that there is no role for a tax transfer price under this approach as the taxable income of each group company is calculated as an exogenously defined fraction of consolidated taxable income.

In contrast, in the separate entity approach, the two transfer prices are shown to be very much interdependent.

Gresik's model (2006). The author in his research is solving the problem of how best to apportion multinational profits between countries. This is inherently a private information problem. Most of the literature, while comparing separate accounting and formula apportionment, either assume complete information or private information only in a separate accounting analysis. Meanwhile, Gresik is the first to incorporate private information in a comparison of both systems. In addition, the author introduces actual compliance activities in a separate accounting model in the form of noisy auditing.

The auditing technology is structured to capture the idea that it is easier for a tax authority to detect income shifting from firms with extreme types than from firms with more average types. By focusing on the private information effects for both separate accounting and formula apportionment, the author identifies how a change from separate accounting to formula apportionment is affecting the firm's profit, and tax revenues collected from domestic and foreign firms vary with firm costs.

Assuming that the symmetric tax rate is the same or higher under separate accounting than formula apportionment, Gresik proves that all firm types would earn higher after-

tax profit under formula apportionment. As the common tax rate under separate accounting falls below the common tax rate under formula apportionment, the firm types in the tails of the type distribution will prefer separate accounting to formula apportionment. This is because the auditing technology distorts the production decisions of the extreme types less than the production decisions of middle types.

Finally, Gresik shows that the tax revenues not only exhibit type-specific differences, but also differences based on the parent company's home country. Domestic and foreign tax revenues are shown to respond to a change from separate accounting to formula apportionment in very different ways.

These three models have some common features as well as differences, which are provided in Table 2.

TABLE 2. Comparison of transfer pricing models

Transfer pricing models	Landy, 2006	Choe, 2005	Gresik, 2006
Similarities	Analyse the transfer pricing in separate entity approach for tax purposes		
Key differences	Introduction of the penalty schema into the transfer pricing model	Analysis of the effects of transfer pricing on economic incentives for corporate management purposes	Incorporation of private information in a comparison of both separate accounting and formula apportionment systems

Source: compiled by the author.

It should be noted that most of these theoretical models (especially the transfer pricing models in which the relation between transfer prices, income shifting and corporate tax rates are analysed) served as a basis in empirical researches on transfer pricing.

Empirical researches

The empirical literature on transfer pricing focuses almost exclusively on the relationship between corporate tax and import tariff rates and multinational firms' over- or under-invoicing in international trade. Most of these studies address this question indirectly by examining whether firms in relatively low tax jurisdictions are more profitable than firms in high-tax jurisdictions or whether economic activity varies across locations. Hines (1997) provides a survey of this literature, which typically finds a negative correlation between tax rates and firm profitability.

First of all, there are numerous studies that used either foreign direct investment (FDI) flows or profit-based measures to test whether multinational companies shift income to locations with lower corporate income tax rates (e.g., Bartlesmann and Beetsma, 2000; Grubert and Slemrod, 1998; Grubert and Mutti, 1991; Harris et al., 1993; Hines

and Rice, 1990). Harris et al. (1993), based on a sample of 200 US manufacturing firms, found that US multinational companies with subsidiaries in low-tax countries paid less US taxes and those with subsidiaries in high-tax countries paid relatively more US taxes per dollar of assets or sales. These studies provide, however, only indirect evidence of transfer price manipulation. For example, Harris et al. (1993) results can be explained by multinational companies shifting income from high- to low-tax locations, but also by cross-country differences in the multinational companies subunits' intrinsic location-specific profitability.

Most of these empirical studies on this topic have been macroeconomic in nature, using the USA FDI statistical data. An alternative approach is to analyze the impact of tax policy changes on stock market prices, using the event study methodology. Schipper, Thompson and Weil (1987), Cornett and Tehranian (1990), Malatesta and Thompson (1993), Barth, Pugh and Jahera (1995) and Harper and Huth (1997), for example, measure the impacts of government tax and regulatory changes on firms' abnormal returns.

Second, there have been two types of studies that directly searched for an evidence of transfer pricing manipulation. Some researchers have compared intra-company prices of selected imports directly to world or domestic prices of the same products. Vaitos (1974), for example, concluded that foreign companies overinvoiced inter-company imports into Colombia in order to avoid Colombia's foreign exchange controls. Natke (1985) found multinational companies to overinvoice imports into Brazil to avoid Brazil's extensive regulations which included price and credit controls, profit repatriation restrictions, and high corporate income tax rates.

Lecraw (1985) concludes that tariffs, relative tax rates, price and foreign exchange controls, and country risk are significant variables explaining the transfer-pricing behaviour of multinational companies. Pak and Zdanowicz (1994) have used the USA monthly merchandise export and import prices to look for outliers, estimating that the USA government lost \$33.1 billion dollars in tax revenues due to the unreported taxable income.

Swenson (2001) used the annual USA import data to test for the evidence of transfer pricing manipulation over 1981–1986. Prices were constructed by dividing reported customs values by quantities. She found that a five percent fall in foreign corporate income tax rates caused a tiny rise in the USA import prices.

Another direct route has been to test for transfer pricing manipulation a dataset that includes both arm's length and intra-company international transactions. Such datasets are rare. Bernard and Weiner (1990, 1992, 1996), using confidential transaction-level data on the US and Canadian crude petroleum imports, found a very weak evidence of transfer pricing manipulation in US and Canadian import prices, which might have been partly related to corporate income tax differentials. Clausing (2003) tested the links between corporate income tax differentials and transfer pricing manipulation, using confidential monthly export and import price data from the US Bureau of Labour Statistics

(BLS) for January 1997–December 1999. She found a strong relationship indicating tax avoidance: a tax rate by 1% lower in the country of destination / origin is associated with intra-company export prices which are by 1.8% lower and intra-company import prices which are by 2.0 % higher relative to non- intra-company goods.

Lastly, Eden and Rodriguez (2003) also use monthly import price data from the BLS to assess the impact of intra-company trade on international price indexes, arguing that transfer pricing manipulation should widen the gap between unit value indexes and price specification indexes. Their empirical work shows that a 10-percent increase in the intra-company trade share of the US imports widens the gap between the two indexes by 1.3 %, with transfer pricing manipulation strengthening the relationship.

In recent years, the most important transfer pricing empirical researches are considered to be the following ones:

- Eden L. (2003). Eden is testing how product characteristics and market structures affect transfer pricing manipulations.
- Overesch M. (2006). This research investigates whether the transfer pricing of intra-company sales within multinationals represents an important channel of company tax planning. The empirical analysis, based on a panel of German multinationals, considers directly the supposed tax response of intra-company sales.
- Hoonsawat R. (2007). This research has examined country sensitivity of transfer pricing as a result of differences in unilateral corporate tax rates to three factors described by the theoretical model: labour demand, capital endowment and remoteness.
- Bernard A., Jensen B. and Schott P. (2006). This research has provided some of the first evidences of the effect of exchange rates on pricing decisions inside and outside the firm.

Eden L. (2003). This empirical work has focused on tax-motivated income shifting, testing how product characteristics and market structures affect transfer pricing manipulations. Using the transaction-level US import data, the author found a direct evidence of aggressive transfer pricing in response to both market and government imperfections.

These empirical results show that the ability to manipulate transfer prices in response to government regulation can be a powerful motive for internalizing cross-border markets.

While previous researchers have investigated the effects of government policies on transfer prices, to our knowledge, our paper is the first to examine the relationship between market structure, product characteristics and transfer pricing.

The results support the hypothesis that transfer pricing manipulation is more likely where organized exchanges and reference prices do not exist, i.e. when products are differentiated. Second, transfer pricing manipulation is more likely for knowledge-intensive products such as high-tech manufactured goods. Third, the more important the

input to the buyer, the greater is the import price elasticity for intra-company transfers compared to arm's length transfers. And, lastly, the size also matters: large multinational enterprises are more likely than small multinational enterprises to engage in transfer pricing manipulation.

In terms of governments, we find a strong support for Horst's (1971) insight that tax differentials encourage transfer price manipulation. Where foreign corporate income tax rates are lower than the US rates, the multinational enterprise underinvoices the US imports in order to shift profits offshore, and the US tariff simply fixes this underinvoicing. On the other hand, where foreign corporate income rates are higher than the US rates, the multinational enterprises are faced with a trade-off: overinvoicing reduces overall tax payments but increases tariff costs. We have also found that tax treaties provide security against aggressive tax authorities, and therefore encourage overinvoicing of the US intra-company imports.

Overesch M. (2006). This paper investigates whether transfer pricing of intra-company sales within multinationals represents an important channel of company tax planning. A theoretical model considering profit shifting activities of a multinational company is used to obtain empirical implications. The empirical analysis, based on a panel of German multinationals, considers directly the supposed tax response of intra-company sales.

The analysis shows a significant negative impact of the local tax rate on the size of balance sheet items which reflect intra-company sales. Thus, the results suggest that transfer pricing of intra-company sales constitutes an important channel of companies' profit shifting activities.

Using the presented investigational approach which focuses directly on balance sheet items reflecting intra-company sales, it can be confirmed that transfer pricing of intra-company sales represents a relevant channel to shift profits. The regression results clearly confirm the expected impact of the tax rate on the size of 'accounts receivable from affiliated companies', as well as on 'accounts receivable from the parent company', and thus on intra-company sales. When interpreting the empirical results, it should be emphasized that it is not possible to identify the magnitude of the transfer pricing effect against the quantity effect. However, the estimated response of 'accounts receivable from affiliated companies' indicates that tax optimal transfer pricing is possible. This means that shifting works effectively despite anti-avoidance legislations and tax audits based on the arm's length principle.

Thus, the results suggest that multinationals can evade taxation in high-tax countries for the benefit of locations offering lower tax rates. It is shown that the transfer price response with regard to a one-percentage-point smaller tax rate might be more than one. Thus, reducing statutory tax rate differences seems to remain a promising strategy for countries trying to attract tax bases. Nevertheless, one should be aware that these can

only be rough estimates, since it is impossible to identify the magnitude of the transfer pricing effect against the quantity effect, which in turn does not constitute a direct effect on taxable profits.

Only the response of transfer price with regard to tax rate directly exerts an equal effect on reported taxable profits at the respective affiliate. However, the results are quite similar in comparison with the results of previous studies based on the US data. For companies, the tax impact on transfer prices is related with distortions due to inefficiencies of the misleading decentralized coordination.

Hoonsawat R. (2007). Hoonsawat R. examines the evidence of multinational firms' transfer pricing behaviour in response to their geographical location for a selection of 52 countries between the years 1978 and 2002. The study uses the method proposed by Bartelsman and Beetsma (2003) to disentangle the income-shifting effects from the effects of tax rates on real production activity. After adding transportation costs to the model, findings show that the sensitivity of transfer pricing is higher for countries having high wage rates and being close to their major markets.

Another finding is the evidence that differences in corporate tax rates induce firms to decrease their transfer prices. This behaviour leads to income-shifting which gives rise to a loss in tax revenue.

This research has examined a country's sensitivity of transfer pricing as a result of differences in unilateral corporate tax rates in three factors described by the theoretical model: labour demand, capital endowment and remoteness. To test the hypotheses, the author followed the novel method for isolating the pure effects of income-shifting, proposed by Bartelsman and Beetsma (2003) to estimate the sensitivity by country. Once the country's sensitivities have been estimated, they can be brought into hypotheses-testing of the country sensitivity with three country factors. This paper has provided an extension to the literature in certain directions.

First, the author has re-derived the micro-foundation behind the Bartelsman and Beetsma theoretical model with a few additional assumptions such as transportation and management costs, firm profit maximization with the externality of capital usage, etc. This micro-foundation allows us to test the hypotheses based on the theoretical predictions.

Second, even though Bartelsman and Beetsma paid attention to income-shifting among large economies (among the OECD countries), a number of small economies, e.g. developing countries and tax-haven countries, have been included in the observations. This inclusion might provide a broader view of transfer pricing activities in the whole world. The empirical analysis was based on the data for 1978–2002 and included 52 countries.

Finally, the author has tested the hypothesis that a country's sensitivity to transfer pricing increases with labour demand, capital endowment and remoteness.

The results suggest that the model with the Cobb-Douglas production function is preferable to the CES production function, which contradicts the BB results. With the regression of the model using the Cobb-Douglas production function, the average sensitivity among the observed countries has a significant negative sign which proves the existence of transfer pricing among countries. The back-of-the-envelope calculation indicates that if a government increases a unilateral corporate tax by 1 percentage point, the country will then lose as much as 92.4% of additional revenue from the tax rate increase. This regression also yields the sensitivities of transfer pricing for each country redeemed from the coefficients of the interactive variable between country dummies and tax differences.

Bernard A., Jensen B. and Schott P. (2006). The results of this research have shown that the multinational firms based in the U.S. report large differences in prices for arm's-length and related-party exports. These differences exist even for the same product produced by the same firm shipped to the same country in the same month by the same mode of transport. The authors have found that the price wedge between the arm's length and intra-company prices responds to differences in market structure, taxes, and tariffs. Commodity products show much smaller price wedges while those for differentiated products are large, averaging over 67%. Similarly, firms with characteristics indicating a greater market power, i.e. larger firms and firms with bigger export shares, have larger price differences.

Looking across the countries, the authors have found that the price wedge is larger when the number of exporting firms is smaller. Most of the interest in transfer pricing centres on the behaviour of firms in response to taxes and tariffs.

The authors also found significant differences in price wedges for the same product in countries with different tax and tariff rates. Lower corporate taxes and higher tariffs are associated with larger gaps between the arm's-length and related-party prices. The results suggest that transfer pricing may be playing an important role in aggregate national accounting, potentially reducing the reported value of exports and the current account (and thus GDP). The response of the price wedge to tax rates indicates that tax minimization may be an important part of transfer pricing decisions with consequences for the level of corporate tax revenue and strategic responses to changes in the tax code.

This research has also provided some of the first evidences on the effect of exchange rates on pricing decisions inside and outside the firm. The price wedge responds to movements in the real exchange rate: the appreciation of the dollar is associated with a substantial narrowing of the wedge. This result supports the hypothesis that intra-company trade plays a role in the determination of aggregate export price indices. More importantly, this suggests that intra-company trade may play a role in insulating multinationals from exchange rate movements.

The findings of this research are also important for future research on the role of the multinational corporations in both advanced and developing economies. The sizable gap

in prices may be playing an unobserved role in the perceived performance advantage of multinational firms both at home and abroad.

Summing up, most of the empirical transfer pricing researches presented in this article could be classified into the three major groups provided in Table 3.

TABLE 3. Major groups of transfer pricing empirical researches

Major groups of researches	Researches focusing on manipulation of transfer pricing using profit-based measures	Researches focusing on manipulation of transfer pricing using prices of arm's-length and intrafirm international transactions	Researches focusing on the impact of various factors (e.g., exchange rates, product characteristics, market structure) on transfer pricing
Authors	Schipper, Thompson and Weil, 1987; Cornett and Tehranian, 1990; Malatesta and Thompson, 1993; Barth, Pugh and Jahera, 1995; Harper and Huth, 1997; Overesch, 2006	Bernard and Weiner, 1990, 1992, 1996; Pak and Zdanowicz 1994; Swenson, 2001; Clausing, 2003; Eden and Rodriguez, 2003	Lecraw, 1985; Eden, 2003; Bernard, Jense and Schott, 2006; Hoonsawat, 2007
Conclusions of the researches	Indirect evidence of transfer price manipulation by multinational companies	A strong relationship between transfer prices and the corporate income tax differentials	Tax rates, exchange rates are significant variables explaining the transfer-pricing behaviour of multinational companies

Source: compiled by the author.

Most of these empirical researches were based on financial data of multinational companies based on the USA and Western European countries; therefore, there is a need for researches using the data of companies from other regions, e.g., Eastern European countries. Moreover, there are very few empirical researches on the application and impact of formula apportionment approach, although there are numerous theoretical researches on this topic. Thus, this issue should be the object of further transfer pricing empirical researches.

Conclusions

In the process of globalization, transfer pricing became one of the most important issues for multinational companies and tax authorities. The transfer pricing is an actual topic for both corporate management and tax areas.

The earliest established theoretical literature on transfer pricing mainly dealt with the transfer pricing as a divisional managers' motivation and effective resource allocation tool. Such studies were dominated by modelling approaches. However, in recent years, transfer pricing scholars are focusing more on the analysis of transfer pricing manipula-

tion. Thus, there are a lot of theoretical studies on transfer pricing responses to income tax differentials, i.e. studies on how multinational companies determine their transfer prices when the profit / income tax rates are changing.

Another important object of transfer pricing researches is the application of the formula apportionment system as an alternative system to the standard one (i.e. the system based on separate accounting) in order to prevent transfer pricing manipulations.

The empirical literature on transfer pricing focuses almost exclusively on the relationship between corporate tax and import tariff rates and multinational firms' over- or under-invoicing in international trade. Most of these studies address this question indirectly by examining whether firms in relatively low-tax jurisdictions are more profitable than firms in high-tax jurisdictions or whether economic activity varies across locations.

However, there are very few models and studies on the determination of transfer prices for multinational companies, i.e. how to set the arm's length transfer price for different types of inter-company transactions. Also, the author has found few transfer pricing researches prepared for tax authorities, e.g., researches that answer such questions as how to control the transfer prices for tax purposes, how to deal with transfer pricing manipulations, etc.

All these issues should be the objects of further transfer pricing researches.

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