



Earnings shocks and tax-motivated income-shifting: Evidence from European multinationals

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ABSTRACT

This paper presents a new approach to estimating the existence and magnitude of tax-motivated income shifting within multinational corporations. Existing studies of income shifting use changes in corporate tax rates as a source of identification. In contrast, this paper exploits exogenous earnings shocks at the parent firm and investigates how these shocks propagate across low-tax and high-tax multinational subsidiaries. This approach is implemented using a large panel of European multinational affiliates over the period 1995–2005. The central result is that parents' positive earnings shocks are associated with a significantly positive increase in pretax profits at low-tax affiliates, relative to the effect on the pretax profits of high-tax affiliates. The result is robust to controlling for various other differences between low-tax and high-tax affiliates and for country-pair-year fixed effects. Additional tests suggest that the estimated effect is attributable primarily to the strategic use of debt across affiliates. The magnitude of income shifting estimated using this approach is substantial, but somewhat smaller than that found in the previous literature.

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1. Introduction

In recent years, global economic integration has been associated with increasing activity by multinational enterprises (MNEs). Over the period 1990–2006, for example, global foreign direct investment (FDI) by MNEs grew at an annual rate of 12.4%, much faster than the 5% annual rate of economic growth, and global FDI flows totalled \$1.3 trillion in 2006 (UNCTAD, United Nations Conference on Trade and Development, 2007). Thus, the effects of tax systems on MNEs are of growing interest and importance to scholars and policymakers. Differences across countries in tax rates and systems create opportunities for tax arbitrage by MNEs, in particular through the strategic choice of transfer prices for goods and services traded among affiliates and through the strategic use of debt financing across affiliates.¹ Anecdotal and empirical evidence suggests that MNEs avail themselves of these opportunities to shift profits from high-tax to low-tax jurisdictions.

In response, policymakers in many countries have sought to limit profit shifting activities through the introduction of transfer pricing regulations (e.g. Ernst and Young, 2010) and thin-capitalization rules (e.g. Buettner et al., forthcoming). The perceived problem of

cross-border income shifting has also given rise to proposals for more fundamental reforms of the current system of international corporate taxation. In 2001, the European Commission proposed the abolition of separate accounting rules for corporate taxation of MNEs within the borders of the European Union (EU), to be replaced by a system of profit consolidation and formula apportionment (European Commission, 2001). Avi Yonah and Clausing (2008) also propose a system of formula apportionment for Federal corporate taxation by the United States. Both these proposals are motivated by a desire to limit the opportunities for profit shifting that are believed to exist under current rules.

The empirical identification of the existence and magnitude of tax-motivated profit shifting is inherently fraught with difficulty. Most existing studies thus pursue an indirect identification strategy that measures the impact of variations in corporate tax rates on the profitability of multinational subsidiaries (e.g. Grubert and Mutti, 1991; Hines and Rice, 1994; Huizinga and Laeven, 2008). A small number of papers pursue more direct approaches that examine the effect of corporate tax rate changes on specific profit shifting channels, in particular on distortions of transfer prices and the debt-equity structure.² All of these existing studies rely on identification through variation in corporate tax rates. While statutory corporate tax rate changes are likely to be exogenous

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¹ In particular, MNEs have an incentive to charge relatively low prices for goods and services transferred from high-tax to low-tax affiliates, and to finance the activities of high-tax affiliates using debt issued by low-tax affiliates (a practice that is sometimes termed "earnings stripping"). See, for example, Dharmapala (2008) for a simple discussion of these strategies.

² Swenson (2001), Clausing (2003) and Bartelsman and Beetsma (2003) investigate how corporate tax rates affect the choice of intra-firm transfer prices. While Swenson's study finds only small effects, Clausing (2003) and Bartelsman and Beetsma (2003) report substantial responses of transfer prices to corporate taxes. Buettner and Wamser (2007) analyze how tax rate changes affect the corporate debt-equity structure and find significant although quantitatively small effects that are consistent with the profit shifting hypothesis.

with respect to firms' behavior, interpreting the estimated impact of corporate tax rate changes may not be straightforward for a number of reasons. Corporate tax rate changes impose a common shock to all firms in a country, and so may potentially be correlated with unobserved variables that also determine the profitability, transfer prices, and financing choices of MNEs. In addition, changes in the corporate tax rate may not only affect the MNE's incentive to engage in profit shifting, but may also impact other decision margins. A rise in the corporate tax rate may, for example, dampen incentives to exert effort and consequently lower corporate profitability.

In the existing literature (e.g. Weichenrieder, 2009), such potential confounding effects have been addressed by focusing on the tax rate differential between the home country (the location of the parent firm) and the host country (the location of the affiliate). Because the tax differential can change due to statutory tax rate changes in either country, this approach can potentially control for country-year effects (e.g. unobserved effects common to all MNE affiliates in Slovakia in 1998). However, it has not been possible in previous studies to control for unobserved country-pair-year effects – e.g. unobserved effects common to all Slovak affiliates of German parents in 1998 – as these are perfectly collinear with the tax differentials. Moreover, statutory tax rate changes tend to be relatively infrequent and episodic rather than continuous. Given the growing importance for public policy of MNE profit-shifting, it would also be valuable to complement the existing studies, all of which use identification strategies based on tax rates, with an analysis using a fundamentally different approach.

This paper develops an alternative approach to analyzing profit shifting behavior among MNEs. Our identification strategy exploits earnings shocks at the parent firm and analyzes how these shocks propagate across the affiliates of a multinational group. If MNEs engage in profit shifting behavior, an exogenous increase in the income of the parent firm should presumably be partially shifted towards affiliates in low-tax jurisdictions, assuming that the MNE has arranged its affairs so that some given fractions of the parent's profits are shifted. A simple theoretical model developed below shows that, under a very general formulation of the costs of profit shifting, the amount of profit shifted from the (high-tax) parent firm to low-tax affiliates is larger the higher are the parent's profits, for a given difference in the tax rates faced by the parent and the low-tax affiliate.

Of course, there are many reasons other than tax-motivated profit shifting – such as risk sharing within the MNE, or the operation of internal capital markets – for the propagation of earnings shocks through a multinational group. These alternative explanations, however, would (at least to a first approximation) apply to both high-tax and low-tax affiliates. This suggests an identification strategy that focuses on the shifting of exogenous earnings shocks at the parent firm to low-tax subsidiaries, *relative* to the corresponding shifting of exogenous earnings shocks at the parent firm to high-tax subsidiaries.

The challenge for this approach is of course to isolate a source of exogenous shocks to the income of the parent firm. We adapt for this purpose an approach developed in a different context by Bertrand et al. (2002) and construct an expected earnings shock variable based on the earnings of firms that operate in the same industry and the same country as the parent firm.³ This provides a measure of the parents' exogenous income before taxes and before profit shifting activities. To construct these earnings shocks, we use a large European micro dataset (the AMADEUS data from the Bureau van Dijk) which provides

detailed accounting and ownership information on 1.6 million firms within the countries of the EU. The data is provided in panel format and allows us to link information on parent firms and their subsidiaries. Importantly, the AMADEUS data is unconsolidated (i.e. data is reported separately for each affiliate, rather than being consolidated across the entire MNE). The analysis focuses on the impact on a multinational affiliate's income of an exogenous shock to its parent's income. The sample – which consists of over 18,000 observations on approximately 4800 multinational affiliates over the period 1995–2005 – is restricted to affiliates that operate in a different industry and country from their parent firms, so that the earnings shocks experienced by the parents do not directly impact the affiliates.

Our results show strong support for the profit shifting hypothesis. While the effect of earnings shocks at the parent firm on the income of high-tax affiliates is indistinguishable from zero, we find a significantly positive impact of earnings shocks at the parent firm on the income of low-tax affiliates (relative to the effect on the income of high-tax affiliates). This basic result is robust to the use of affiliate, year, industry-year, country-year, and country-pair-year fixed effects. The result also cannot be attributed to a number of potential alternative explanations relating to nontax differences between low-tax and high-tax affiliates (including differences in their industrial composition, differences in the degree of correlation between the economies of their host countries and those of their parents, and differences in the strength of the financial system in their host countries). Quantitatively, the estimates suggest that at the margin around 2% of additional parent earnings are shifted to low-tax subsidiaries. While substantial, this magnitude is somewhat smaller than that found in the previous literature.

Additional tests suggest that the estimated effect is attributable primarily to the strategic use of debt across affiliates. Unfortunately, AMADEUS does not separately report inter-affiliate and external debt, and so a direct test of debt-shifting is not possible. However, the financial income (which includes net interest payments, but excludes operating income) of low-tax affiliates increases relative to that of high-tax affiliates in the wake of positive parent earnings shocks. In contrast, there is no such effect for operating income. Moreover, the debt-to-asset ratio of parent firms responds more positively to positive parent earnings shocks when more of the parent's subsidiaries are located in low-tax countries.

The intuition underlying our approach extends beyond earnings shocks experienced by the parent firm – a positive earnings shock experienced by any high-tax affiliate should be associated with income shifting to low-tax affiliates. However, because AMADEUS data is restricted to European affiliates, it is not possible to construct worldwide earnings shocks to MNEs. Tests using the available (European) data yield results that are consistent with tax-motivated income shifting, albeit somewhat weaker than those using only earnings shocks experienced by parent firms.

More generally, several factors – including the inability to observe accounting data on tax haven affiliates outside Europe, the inability to observe the income reported to the tax authorities as distinct from accounting income on firms' financial statements, and the use of worldwide tax systems by some countries – potentially create a bias against the paper's findings. Excluding firms located in countries with a low degree of book-tax alignment (and the subsidiaries of parents located in these countries) leads to similar but quantitatively larger results. Excluding subsidiaries of parents located in countries with worldwide tax systems does not substantially affect the results.

The basic results are also robust to a variety of other checks. Thus, our analysis uses a very different approach from that in the previous literature to find support for the profit shifting hypothesis. In particular, we find evidence of profit shifting effects that are substantial in magnitude. That these effects are not larger, however, emphasizes the importance of the economic and legal frictions that constrain tax planning by multinational firms.

³ Bertrand et al. (2002) use their approach to analyze “tunneling” – the phenomenon of individual or family shareholders who control a group of firms shifting income from those firms in which they own a relatively small stake to those firms in which they own a relatively large stake. This approach has not previously been used to analyze tax-motivated profit shifting. As discussed in Section 5 below, tunneling is unlikely to be of much relevance in our sample, which is restricted mostly to affiliates that are wholly-owned by their parents. Moreover, the results are robust to the exclusion of firms with parents based in countries where tunneling may be more likely.

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