Allowing firms to choose between separate accounting and formula apportionment taxation☆

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ABSTRACT

This paper analyzes the effect on firm behavior and national tax revenues of allowing multinational firms to choose to be taxed under separate accounting rules or an apportionment formula. Separate accounting always generates more profitable output and conditional labor demand distortions from tax differentials while either method can generate a more profitable income-shifting distortion. Both low-cost and high-cost firms can prefer separate accounting while medium-cost firms prefer formula apportionment. With symmetric countries, a firm's preferred method generates greater tax revenues in the country with the lower tax rate. With asymmetric countries, a firm's preferred method need no longer generate greater tax revenues in the lower-tax-rate country due to the fact that countries and firms now value tax base distortions differently. With this misalignment of preferences, some firms can choose the preferred method of both countries at fixed tax rates.

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1. Introduction

The OECD and the European Commission (EC) disagree about how countries should tax multinational profits. OECD (2010) favors a traditional separate accounting (SA) approach while EC (2011) favors using formula apportionment (FA). EC (2011) also contains a provision that allows each firm to choose between using a specified apportionment formula or a transfer price method (see page 5 and Chapter III, EC (2011)). In this regard, the EC proposal is similar to current Canadian policy that offers multi-province firms the option of allocating taxable income via an apportionment formula or via transfer prices.[1] The purpose of this paper is to develop a theory to identify what types of firms would prefer each option and to assess the effect of these choices on national tax revenues.

Heterogeneous firms may prefer different options because corporate income tax rates will distort a firm's final good production, conditional factor demand, and income-shifting decisions differently under SA and FA, and these differences can vary with each firm's economic characteristics. Even in relatively simple models, it is possible to generate many

different patterns of firm choice. These various patterns arise because the relative magnitudes of the above distortions need not change in a monotonic fashion. Thus, to say anything systematic about the effect of firm choice, one needs to focus not on the final selection patterns of firms but on the economic factors that influence these patterns.

To do this, I analyze a model in which a continuum of heterogeneous multinational firms can sell their final goods in each of two countries. The firms will differ in their economic cost of capital. Countries can differ in terms of their tax rates and their wage rates. Each firm chooses its intermediate good production in country 1 and its final good output and capital and labor demands in each country. Under SA, each firm also chooses a transfer price. With different tax rates, the transfer price for units of the intermediate good shipped to country 2 creates a channel through which a firm can shift taxable income into the country with the lower tax rate, and it can affect production and factor employment margins. FA rules do not use transfer prices but relative country sales and factor employment to determine a multinational's taxable income in each country. Firms can then shift income between the countries through their output and input decisions that are factors in the apportionment formula. Output and input distortions also arise with FA as it makes a firm's marginal tax rate endogenous. Thus, the linkages between marginal tax rates and each firm's output, input, and income-shifting choices are what will be important in determining the more profitable method for each firm.

One implication of the different linkage effects generated by SA and FA can be seen in firms with high capital costs that exclusively or

[1] See Mintz and Smart (2004).

predominantly sell their final goods in country 2 (while still producing the intermediate good in country 1). For these firms, SA is more profitable. At a given transfer price, a firm that sells more in country 2 can shift more income into the low-tax country because more country 2 sales requires more units of the intermediate good. With limited or no country 1 final good sales, a firm's ability under FA to change its effective tax rate is attenuated. This translates into limited income-shifting potential under FA. Thus, high capital cost firms operating near their country 1 extensive margin will strictly prefer SA.

For firms with lower capital costs, their choice is determined by how the two methods affect the firms' intensive margins for output, conditional factor demands, and income-shifting. To identify these effects, I exploit the fact that, at equal tax rates, both methods result in identical after-tax firm profit and identical rates at which a change in one country's tax rate affects after-tax firm profit. These baseline facts allow one to focus on how small tax rate and wage rate differences can affect a firm's profits under SA and FA.

Symmetric countries will have identical wage rates. Only their tax rates can differ. With symmetric countries, SA always generates more profitable output and conditional factor demand distortions because a firm's effective tax rate under FA is an average of the countries' statutory tax rates. This means that an increase in one country's tax rate increases a firm's effective tax rate under FA by a smaller amount than under SA. For a firm to earn greater profit under FA, FA must generate a more profitable income-shifting distortion than SA. However, a firm's ability to shift more income under FA is smallest for firms with very low capital costs. Low capital cost firms will sell more in country 2 and thus can shift more income under SA than firms with higher capital costs. With similar tax rates, the incentives for income-shifting under FA will depend on differences in final good sales in the two countries, which will be smaller for firms with lower capital costs because FA comes closer to being a pure profit tax system for these firms. Thus, a second implication of the difference in linkage effects between SA and FA is that lower-cost firms are more likely to prefer SA while firms with intermediate costs are more likely to prefer FA. Combined with the extensive margin results described above, what emerges is a selection pattern that is non-monotonic with respect to a firm's capital costs, even with similar tax rates and symmetric countries.

Wage rate differences alter the linkages between effective tax rates and firm decisions. I will show that a wage rate differential can change the preferences of firms selling significant amounts of their final goods in both countries under FA as wage rates differences can make final good sales in each country more sensitive to tax rate differentials. This increased income-shifting distortion improves firm profitability under FA-only if the country with the higher tax rate also has the higher wage rate because both differentials reinforce a firm's incentive to shift income.

Given the non-trivial choice patterns suggested by the above discussion, it is not obvious whether a country with the higher tax rate or the lower tax rate would benefit from firm choice. At equal tax rates, both methods generate the same tax revenues for each country. This means that the main difference in national tax revenues under each method depends on how each country's tax base responds to increases in the tax and wage rate differentials. With symmetric countries, the tax method that generates larger profit for each intensive margin firm is also the method that generates larger tax revenues for the country with the lower tax rate and smaller tax revenues for the other country. In this case, the high tax rate countries in the EU would be justified in thinking that firm choice would result in lower tax revenues for them. This need no longer be true with asymmetric countries. Now the method preferred by the country with the higher tax rate can be the method some intensive margin firms prefer.

With asymmetric countries, firm choices can be imperfectly aligned with the preferences of the low-tax country. It is also possible, at fixed tax rates, for the choices of some firms to be aligned with each country's preferred method. This alignment can occur if a firm's preferred method

increases its taxable income in each country through an efficiency effect. If the distribution of capital costs favors enough of these firms, choice will increase each country's tax revenues.

Firm choice will also have tax competition effects. For symmetric countries, giving firms the ability to choose their tax methods increases the incentive for each country to lower its tax rate to attract a larger tax base and results in lower equilibrium tax rates than would arise under either a system that imposes SA on all firms or a system that imposes FA on all firms.

1.1. Literature review

The only other paper to study firm choice between SA and FA is Mintz and Smart (2004). Rather than explaining each firm's choice, they take the choices of Canadian firms at the provincial level as given and use the choices to estimate separately the elasticity of taxable income with respect to tax rates for firms who use transfer prices and for firms that use an apportionment formula.

Most often, the literature that compares SA to FA compares the equilibrium allocations that result from a specific formula to those that result from a specific set of transfer price regulations in representative firm models. Key examples include Nielsen et al. (2003, 2010), Eichner and Runkel (2008, 2011), and Runkel and Schjelderup (2011).[2] Nielsen et al. (2003) shows that a shift from SA to FA can actually exacerbate income-shifting via transfer prices if the firm operates in oligopoly markets, while Nielsen et al. (2010) shows that tax revenues can either rise or fall from a shift to FA depending on the cost of income-shifting and the magnitude of pure firm profits. Eichner and Runkel (2008) provides sufficient conditions for a sales-only formula to increase tax revenues relative to SA. Eichner and Runkel (2011) endogenizes interest rates and shows that FA will generate higher tax revenues than SA if the elasticity of substitution between capital and labor is sufficiently large. Runkel and Schjelderup (2011) primarily study the choice of apportionment weights but also show that the optimal apportionment formula can increase tax rates, tax revenues, and national welfare relative to SA.

The main weakness with a representative-firm approach for the purpose of studying firm choice is that it admits no scope for differential firm choice. The only paper of which I am aware that compares SA and FA with heterogeneous multinational firms is Gresik (2010).[3] Although this paper does not allow each firm to choose its method of taxation, it does show that after-tax profit and tax revenue differences between SA and FA vary not only with differences in firm productivity but also with the location of a firm's intermediate good production and its final good sales. Moreover, the profit and tax revenue differences need not be monotonic with respect to firm productivity which suggests the potential for subtle firm selection patterns.

In what follows, Section 2 presents the model. Section 3 describes the profit-maximizing choices firms make under SA and Section 4 presents the same analysis under FA. A firm's optimal choice between SA and FA is studied in Section 5. Section 6 describes the effect of firm choice on national tax revenues. I offer concluding remarks in Section 7.

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[2] One exception is Riedel and Runkel (2007) in which a representative multinational must use a specified apportionment formula for income generated within a union of countries and transfer prices for income generated between union and non-union countries.

[3] A number of papers have studied optimal taxation and/or tax competition with heterogeneous firms in recent years. Burbidge et al. (2006) study profit tax systems with national firms. Becker (2013) and Haufler and Stähler (2013) study tax competition for FDI but do not address the issue of income-shifting. Krautheim and Schmidt-Eisenlohr (2011) study tax competition with income-shifting but do not specifically address the role of SA or FA. Bauer and Langenmayr (2013) formally model SA but not FA.