Economic integration and the optimal corporate tax structure with heterogeneous firms

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ABSTRACT

This paper links recent tax-rate-cut-cum-base-broadening reforms of corporate taxation to the closer integration of international trade. We study the corporate tax structure in a small open economy with heterogeneous firms, in a setting where it is optimal to subsidize capital inputs by granting a tax allowance in excess of the true costs of capital. Economic integration reduces the optimal capital subsidy and drives low-productivity firms from the small country's home market, replacing them with high-productivity exporters from abroad. This endogenous policy response creates a selection effect that increases the average productivity of home firms when trade barriers fall, in addition to the well-known direct effects.

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1. Introduction

Corporate tax reform has been a core issue on the agenda of most countries over the last decades. Starting with the tax reforms in the United Kingdom and the United States during the mid-1980s, a prominent type of tax reform among the OECD countries has been to combine a reduction in the statutory corporate tax rate with a broadening of corporate tax bases. On average, statutory tax rates in the OECD countries have fallen from roughly 50% in 1980 to 30% in 2010, while depreciation allowances for investment have simultaneously become less generous.[1] Klemm and van Parys (2012, Fig. 1) report evidence of similar reforms in a sample of 40 developing countries in Latin America, the Caribbean and Africa, where tax rate cuts have been combined with lower investment allowances and shorter periods of tax holidays.

Despite the popularity of tax-rate-cut-cum-base-broadening reforms, their motivation is still only imperfectly understood. The existing literature (referenced below) has explained these reforms as the result of increased international mobility of capital and firms, arguing that tax rate cuts help to attract highly mobile, multinational firms and their profits to the country undertaking the reform. Most of these analyses, however, keep either tax revenues or effective tax rates constant, and therefore do not offer an independent explanation for the base-broadening element of existing corporate tax reforms.[2]

In particular, an important stylized fact of many corporate tax systems in the early 1980s was the wide divergence of effective marginal tax rates (EMTRs) by sector, type of investment, and source of finance. King and Fullerton (1984) stress the substantial distortions caused by generous investment credits in conjunction with tax-deductible debt financing, which in several cases resulted in negative EMTRs.[3] The view is also widespread that the tax-rate-cut-cum-base-broadening reforms enacted subsequently led to a convergence of EMTRs that has improved both investment efficiency (Keen, 2002; p. 611) and tax equality across different sectors (Ottaviani, 2002). What has not been explained, however, is whether the initial introduction of large depreciation

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[1] See Devereux et al. (2002) for a detailed analysis and Auerbach et al. (2010) for a recent survey. Becker and Fuest (2011, Fig. 1) list a total of 12 tax-rate-cut-cum-base-broadening reforms in selected OECD countries that have taken place during the period 1982–2003. Similarly, for the period 1980–2004 and a larger sample of 29 OECD countries, Kawano and Slemrod (2012) report 37 instances where a tax rate cut was accompanied by a broadening of the tax base in the same year.

[2] See, for example, the critical comment on this literature by Ottaviani (2002).

[3] The EMTR is defined as EMTR $= (coc - r)/coc$, where coc is the after-tax cost of capital and r is the competitive interest rate (Devereux et al., 2002, p. 461). As a marginal investment just covers its financing cost, the deduction for the interest cost of debt fully offsets the taxation of the return to investment. Hence negative values for the EMTR result whenever investments are debt financed and the depreciation allowances exceed true economic depreciation.

allowances, as well as their subsequent (partial) repeal, can be rationalized as an equilibrium response to a changing tax environment.

Against this background, the present paper offers a different approach to explain the observed pattern of corporate tax reforms, which is based on the integration of international trade in a model with firm heterogeneity. Our argument relies on a two sector economy with monopolistic competition in the differentiated goods sector with heterogeneous firms, and a constant-returns-to-scale homogeneous goods sector in the background. This setting implies an inefficiently low output in the differentiated goods sector and offers a reason for governments to subsidize capital in this sector by means of generous depreciation allowances. The importance of imperfect competition in trade flows is well documented empirically, dating back to the seminal work of Grubel and Lloyd (1975).[4] Indeed, the current empirical trade literature takes the presence of imperfect competition as a given. In their recent review of this literature, Melitz and Trefler (2012) show that intra-industry trade, which serves as an indicator of imperfect competition, accounts for at least one third of world-wide trade flows (and nearly twice that when using broader definitions of intra-industry trade).[5]

Our first main result is that, as economic integration proceeds, the optimal capital subsidies are reduced for two different reasons. Firstly, economic integration implies that the benefits to consumers which result from capital subsidies increasingly accrue to foreigners. Secondly, cheaper imports from abroad mitigate the undersupply of goods in the imperfectly competitive sector that motivates the subsidy. The last argument is reinforced by firm heterogeneity, because foreign exporters have a higher average productivity than domestic producers.

The resulting cut in optimal capital subsidies can be achieved by a broadening of the corporate tax base, a reduction in the corporate tax rate, or by a combination of both. Overall, we thus show that the observed pattern of corporate tax reforms can be motivated in a setting with trade integration only, with no need to rely on the mobility of capital or firms. This is important because in an era of increasing trade liberalization, a failure to recognize the implication of trade flows in and of themselves for tax policy has the potential for missing critical aspects of policy formation.

By incorporating firm heterogeneity we are also able to analyze how changes in tax policy affect firms with different productivities. Our second main result is that the well-known productivity improvements brought about by falling trade barriers in the presence of firm heterogeneity (Melitz, 2003) will be enlarged when tax policy is endogenous. In particular, we show that the endogenous policy response in our model reinforces the selection effect arising from economic integration and thus strengthens the reallocation of resources towards the most productive firms. As the effective capital subsidy on marginal investment is reduced, this forces low-productivity firms in the home country to exit the market, adding to the effect of stronger foreign competition resulting from a more integrated economy.

There is some further, suggestive evidence that our trade-based explanation of corporate tax reforms captures empirically relevant effects. This comes from the development of additional, discrete investment incentives offered by 24 OECD countries during the 1980s and 1990s (see OECD, 1998). The OECD report stresses (p. 40) that out of 157 programs classified as offering general investment incentives, only one is solely directed towards direct investment from abroad. This suggests that investment incentives are primarily used to enhance domestic production and employment, rather than as a means to attract FDI. Moreover, for the period 1989–1993, the OECD report shows a

noticeable decline of roughly 12% in the expenditures on investment subsidies (Table 1, p. 27) and links this, among other factors, to the accelerating globalization of industrial activities (Murphy and Pretschker, 1997). The patterns underlying the development of these discrete investment incentives are thus very similar to the ones hypothesized here for the general corporate tax system.

Our results also offer two distinct explanations for the puzzling fact that statutory corporate tax rates have fallen significantly during the last decades while corporate tax revenues have simultaneously increased in many countries (see, for example, Sørensen, 2007). The first argument from our analysis is that the tax-rate-cut-cum-base-broadening reforms have unambiguously reduced effective subsidy levels for all investments facing negative EMTRs. This by itself increases corporate tax revenues. The second effect working towards higher revenues is that economic integration and the endogenous response of the tax structure both lead to a surge in the average profitability of firms, thus raising the base of the corporation tax.

Our analysis can be linked to several strands in the literature. A relatively small number of papers on corporate taxation simultaneously analyzes optimal tax rate and tax base policies in settings with capital and firm mobility. For example, Haufler and Schjelderup (2000), Fuest and Hemmelgarn (2005), Devereux et al. (2008) consider different models of income shifting within multinational firms and link this to the observed tax-rate-cut-cum-base-broadening patterns of corporate tax reforms. Becker and Fuest (2011) focus instead in the location choice of internationally mobile firms and show that the optimal combination of tax rate and tax base policies depends critically on whether mobile firms are more or less profitable than immobile firms. Egger and Raff (2011) analyze, both theoretically and empirically, tax competition via tax rates and tax bases for an internationally mobile monopolist.

With the exception of Becker and Fuest (2011), however, these models either hold corporate tax revenues or effective marginal tax rates on capital constant. Moreover, in all these models it is FDI that links countries, and the resulting tax changes come about from mobile multinational firms responding to taxation.

A second strand of research has analyzed the effects of *exogenous* trade and tax policies in open economies with heterogeneous firms. Demidova and Rodriguez-Clare (2009) compare the effects of import tariffs and export subsidies on aggregate productivity and welfare in a small open economy. Chor (2009) analyzes the effects of a production subsidy in an economy that competes for FDI, whereas Davies and Paz (2011) consider tariffs and value-added taxes in the presence of an informal sector. Closer to our setting, Baldwin and Okubo (2009) study the effects of tax rate and tax base policies on the location of internationally mobile firms. They show that a tax-rate-cut-cum-base-broadening reform that keeps the effective tax rate constant for the marginal firm always increases tax revenues. Finally, Finke et al. (2013) perform a microsimulation analysis to evaluate the impact of the German 2008 corporate tax reform, which followed a pattern of tax rate cut cum base broadening, on heterogeneous firms. They show that firms with low productivity benefitted least from the reform, because they were hit most by the reduction of depreciation allowances. These papers, however, do not endogenize optimal government policies.

A recent, third set of papers derives optimal tax policies in open economy models with heterogeneous firms. Pflüger and Südekum (2013) analyze optimal subsidies to market entry in an open economy model of policy competition. Davies and Eckel (2010) analyze tax rate competition for internationally mobile, heterogeneous firms, whereas Krautheim and Schmidt-Eisenlohr (2011) derive Nash equilibrium tax rates when the location of firms is fixed but profits can be shifted between countries. These papers focus solely on tax *rate* competition, however, rather than on the optimal tax structure. We are aware of only one other paper, Dharmapala et al. (2011), which analyzes the optimal combination of tax instruments in the presence of firm heterogeneity. Their setting, however, is very different from ours as they study

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[4] See Leamer and Levinsohn (1995) for a discussion of the early evolution of the empirical work on imperfect competition in international trade.

[5] An example of a more detailed analysis is Broda and Weinstein (2006), who document the increase in the number of traded varieties for the example of the United States.