

A Note on the Taxation of Capital Income in the Czech Republic and Poland

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I. INTRODUCTION

The transition of the eastern European countries into market-based economies and their potential integration into the European Union raise questions about how their capital income tax systems should be structured and to what extent they are in line with the rest of Europe. This note presents a brief analysis of the tax systems currently in place and considers what issues should be of concern in setting tax policy in the future. The impact capital income taxes have on the incentives for firms to invest in the Czech Republic and Poland is described using a marginal effective tax wedge and an average effective tax rate. Simulations of some simple reforms are also presented. First, some brief comments are made on what the optimal tax policy for smaller capital-importing countries might be and how this should inform policy in the transition economies.

The standard theoretical literature on optimal taxation in a small open economy suggests that residence-based taxation is optimal, implying that the tax

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rate on inward investment should be zero. This depends on the assumption that capital is perfectly mobile and that investors seek to earn the same post-tax rate of return in all locations. In simple models, an increase in capital taxes leads to an outflow of capital which drives up the pre-tax rate of return until the post-tax rate of return is again equal to that in other locations. This means that the incidence of the tax is not on the owners of mobile capital. Instead, as capital flows out of the country, the return on immobile factors declines, implying that the burden of taxation falls on these immobile factors. A dead-weight loss arises as a result of the lower utilisation of capital, which would be avoided if the immobile factors were taxed directly.² One case where this may not hold is when the capital-exporting country operates a credit system for taxing foreign-source income. In this case, the optimal tax rate on inward investment for the capital-importing country is the same as for the capital-exporting country.³ This is because, under a credit system, the income earned abroad will be taxed at home but with a credit given for any foreign taxes paid on that income. The effect of reducing tax on inward investment to zero is simply to transfer tax revenue from the capital-importing to the capital-exporting country. In practice, countries operate a range of systems, as indicated in Table 2. This makes setting policy difficult, since the optimal tax on inward investment from some countries will be zero, while from other countries it will be positive, although a partial solution could be to charge withholding taxes at differential rates on income repatriated to different countries.

One modification of the simple framework is when firms can earn economic rent.⁴ The level of economic rent may vary between locations for a number of reasons, and governments can, in principle, capture the economic rent that is specific to their location. So, for example, if a firm locating in country A earns a higher rate of return than if it operated in B because of the proximity of some natural resource, then country A would be able to raise tax up to the point where the post-tax rates of return in the two countries were equal, without affecting the firm's investment decision.

While the theoretical literature does not give any clear policy recommendations, it does seem to imply that, in general, small capital-importing countries should not have higher effective tax rates than large capital-exporting countries, and indeed they may want to have lower tax rates in some cases. It should be noted, however, that there are reasons for taxing capital that have not been addressed here that may lead to a positive tax rate being optimal. For example, capital income taxes can act as an anti-avoidance device against the

² See Diamond and Mirrlees (1971) and also Zodrow and Mieszkowski (1986), Bucovetsky and Wilson (1991) and Razin and Sadka (1991). Devereux (1995) and the Ruding Committee (1992) survey the theoretical tax literature in this context.

³ See Gordon (1992) and Mintz and Tsiopoulos (1991) among others.

⁴ Economic rent is profit earned above the required real rate of return.

non-payment of labour income taxes. It may also be that, for administrative or other reasons, it is difficult to raise revenue from other forms of taxation.

Before turning to a description of the tax systems, consider what the appropriate measure of tax is. The theoretical literature in general is concerned with the *marginal* effective tax rate. This is the marginal tax rate on the marginal investment — that is, an investment that just earns the post-tax required real rate of return. There are at least two other measures that may be relevant for different reasons. The *average* effective tax rate (AETR) is the appropriate measure for considering incentives to locate economic-rent-earning investments. Consider a firm choosing between several locations to build a single factory from which it expects to earn an economic rent. The cost of capital will influence the optimal level of output chosen by the firm. However, the proportion of the profits that the firm keeps after tax depends on the AETR. Therefore both marginal (through the cost of capital) and average effective tax rates will influence the firm's locational decision. The *statutory* tax rate can provide a good approximation to the AETR for high economic-rent-earning investments and is also the relevant measure for considering incentives to shift income between jurisdictions — for example, through transfer pricing. All three of these measures are considered below.

The next section describes the tax systems currently in place in the Czech Republic and Poland, while Section III investigates the burden of tax on investment. The results indicate that tax rates on capital income are currently higher in the Czech Republic and Poland than in the other countries considered. Some simulations of the impact of simple policy reforms are presented to give an indication of the magnitude of change that might be needed to bring taxes in the Czech Republic and Poland into line with those of the main OECD countries.

II. THE TAX SYSTEMS

Tables 1 and 2 summarise the corporate tax systems in place in the Czech Republic and Poland in 1995, along with those in France, Germany, the Netherlands, the UK and the US.⁵ These additional countries are considered because they are large capital-exporting countries. The statutory tax rates in the Czech Republic and Poland are higher than those in the other countries (with the exception of the rate applying to retained earnings in Germany). In addition, in both the Czech Republic and Poland, depreciation allowances are low, implying that the tax base is larger than in the other countries. Another important feature of corporate tax systems is the method for valuing inventories. There are two

⁵ These tax data are largely taken from the Price Waterhouse 'Doing business in ...' guides. See OECD (1991), the Ruding Committee (1992), Devereux and Pearson (1995) and Chennells and Griffith (1996) for more detailed descriptions of EU and OECD tax systems. For some discussion of eastern European tax systems, see Mintz and Tsiopoulos (1991) and Heady, Rajah and Smith (1994).

TABLE 1
Summary of Corporate Taxes

	Summary rate ^a	Depreciation: buildings ^b	Depreciation: plant and machinery ^c	Inventory valuation	Inflation ^d
France	33%	5%	31.3% using DB for three years, 12.5% using SL for remainder of life	FIFO	1.8%
Germany	48% ^e	10% for four years, 5% for next three years, 2.5% for remainder of life	30% using DB for four years, 10% using SL for remainder of life	LIFO	2.7%
Netherlands	35%	6.6%	23% using DB for three years, 12.5% using SL for remainder of life	LIFO	2.2%
UK	33%	4%	25% using DB	FIFO	2.5%
US	35%	2.6%	28.6% using DB for three years, 9.1% using SL for remainder of life	LIFO	2.1%
Czech	42%	1% for first year, 2% for remainder of life	14% using DB with extra FYA of 10%	FIFO	10.0%
Poland	40%	1%	20% using DB	LIFO	27.0%

^aThese are national tax rate on corporate income. Many countries have lower rates for small and medium-sized enterprises. Many countries also tax capital income at the state or provincial level; where information was available, an average of local taxes was included in the calculations of effective tax rates.

^bBuildings are generally depreciated by the straight-line method, except in the Netherlands and Poland where they use declining balance.

^cDB: declining balance; SL: straight-line; FYA: first-year allowance.

^dSource: *OECD Economic Outlook 1995*, except for Czech Republic and Poland which come from *The Economist's 'Emerging Markets Indicators'*, 9-15 September 1995.

^eGermany operates a split-rate system. The rates are 48 per cent for retained earnings and 32 per cent for distributions.

commonly used methods: LIFO (last in, first out) and FIFO (first in, first out). Under the FIFO system, all the end-of-period stock is assumed to be recently acquired and therefore is valued at today's prices, whereas under LIFO, it is assumed that the items held at the beginning of the period are still held. This means that under the FIFO system, *nominal* increases in the value of inventories are taxed, whereas under the LIFO system, they are not. All countries allow firms to use FIFO, while some countries also allow the option of using LIFO, as indicated in Table 1.

TABLE 2
Method of Integration and Treatment of Foreign-Source Income

	<i>Method of integration of personal and corporate taxes</i>	<i>Treatment of foreign-source income</i>	
		Dividends	Interest
France	Imputation	Exempt (95%)	Credit by source
Germany	Split-rate and imputation	Exempt	Credit by source
Netherlands	Classical	Exempt	Credit by source
UK	Imputation	Credit by source	Credit by source
US	Classical	World-wide credit	World-wide credit
Czech	Imputation	Credit by source	Credit by source
Poland	Classical	Credit by source	Credit by source

The generosity of capital allowances is influenced by inflation. If capital allowances are given on the historic, rather than replacement, cost of the asset, then the present value of allowances falls as inflation rises. Inflation also affects the present value of interest deductibility, making it higher in times of high inflation.

Table 2 describes how corporate taxes are integrated with the personal taxes of domestic shareholders, and gives the treatment of foreign-source income. The way in which personal and corporate taxes are integrated can have a significant impact on the relative incentives of companies to finance investment from retained earnings or new equity. There are basically three types of system in operation in these countries: (i) imputation, (ii) split-rate and (iii) classical. An imputation system is where some portion of corporate taxes can be offset against the individual's income tax liability. In a split-rate system, there are different statutory tax rates for distributions and retained earnings at the corporate level. In a classical system, distributions are taxed at the corporate level and then again at the individual level.

The treatment of foreign-source income determines the impact that the home country tax system will have on cross-border investment flows. Under an exemption system, foreign-source income is exempt from corporation tax in the home country. Where credit is given by source, a credit is given on an item-by-item basis for the tax paid on foreign-source income. This credit can be offset against the tax liability in the home country. An alternative to this is a world-wide credit, where credit is given on the total amount of tax paid on all foreign-source income.

III. EFFECTIVE TAX RATES

A standard measure for summarising the impact of the tax system on the return earned on capital is the cost of capital.⁶ The cost of capital is the rate of return a firm needs to earn *before* tax in order to make a required minimum return *after* tax. The cost of capital reflects the marginal effective tax rate in that it measures the impact of tax on a *marginal* investment.⁷ In the tables below, the marginal effective tax wedge (METW) is presented. This is the difference between the required real rates of return before and after tax. It can be thought of as the additional return needed to cover the cost of capital income taxes, and incorporates the statutory tax rate, the structure of the tax system and the definition of the base into one measure.

The figures in Table 3 are the METWs on a domestic investment. These are calculated for each type of asset and finance and then averaged. In the first three columns, the METWs for investment in the three different assets are averaged across types of finance. In the next three columns, the METWs for investment financed in the three different ways are averaged across assets. The overall average in the final column is averaged across all three types of finance and all three assets. It is assumed that the inflation rate is 3.5 per cent in all countries, which allows a comparison of the METWs abstracting from differences in actual inflation rates, and that the marginal investor is exempt from personal taxes.

There are some common patterns across countries. For example, investments financed by retained earnings are generally taxed at a higher rate than those financed by other forms of finance, and investment financed by debt is generally taxed at a lower rate. This is because, in all countries, interest payments are deductible from taxable income while there is no comparable relief for retained earnings. Overall, the METWs in the Czech Republic and Poland are higher than those in the other countries considered. This is due to a combination of their statutory tax rates being higher and their depreciation allowances being lower.

To identify the impact of each of these differences, in the final two panels of Table 3, the METWs for two policy experiments are shown for the Czech Republic and Poland. In the first, a statutory tax rate of 35 per cent is used which is more comparable to that in the other five countries, rather than the ones shown in Table 1. This lowers the METWs but not to the level of those of the other five

⁶ These tax data are largely taken from the Price Waterhouse 'Doing business in ...' guides. See OECD (1991), the Ruding Committee (1992), Devereux and Pearson (1995) and Chennells and Griffith (1996) for more detailed descriptions of EU and OECD tax systems. For some discussion of eastern European tax systems, see Mintz and Tsiopoulos (1991) and Heady, Rajah and Smith (1994).

⁷ The formula used here is the King-Fullerton one for the domestic cost of capital, $p = \frac{(1-A)}{(1-t)}(\rho + \delta + \pi) - \delta$

where A is the net present value of depreciation allowances, τ is the statutory tax rate, ρ is the discount rate, δ is the economic depreciation rate and π is the inflation rate. The economic depreciation rates used are 3.6 per cent for buildings, 12.25 per cent for plant and machinery and 0 per cent for inventories.

TABLE 3
Domestic Marginal Effective Tax Wedges
 (no personal taxes, inflation consultant)

	<i>Percentage points</i>						
	<i>Buildings</i>	<i>Plant and machinery</i>	<i>Inventory</i>	<i>Retained earnings</i>	<i>New equity</i>	<i>Debt</i>	<i>Average</i>
France	1.2	-0.5	3.5	3.7	-4.0	-2.2	0.8
Germany	2.4	0.5	4.5	7.0	-3.1	-4.6	1.9
Netherlands	1.8	0.4	2.3	4.0	-0.7	-2.5	1.2
UK	2.0	0.6	3.9	4.2	0.5	-1.8	1.7
US	4.4	0.9	3.8	5.4	5.4	-2.9	2.5
Czech	5.0	2.4	6.3	7.1	7.1	-1.9	4.0
Poland	5.3	2.2	3.5	6.2	6.2	-2.0	3.4

Policy experiment: Statutory tax rate of 35 per cent

Czech	3.7	1.7	4.7	5.3	5.3	-1.5	2.9
Poland	4.3	1.7	2.9	5.0	5.0	-1.7	2.7

Policy experiment: Depreciation rates for buildings of 5% SL and for plant and machinery of 30% DB for three years switching to 10% SL for the remainder of the assets' life

Czech	3.0	0.7	6.3	5.5	5.5	-2.8	2.6
Poland	3.4	0.6	3.5	4.7	4.7	-3.0	2.0

Note: The METW is the difference between the post-tax and pre-tax required real rates of return. The post-tax required real rate of return is assumed to be 10 per cent, so an METW of 1.2 implies a pre-tax required real rate of return (i.e. a cost of capital) of 11.2 per cent.

Weights (source: OECD, 1991):

Assets: buildings 28%; plant and machinery 50%; inventories 22%.

Types of finance: retained earnings 55%; new equity 10%; debt 35%.

countries. In the second policy experiment, the original statutory tax rates from Table 1 are used, but the depreciation rates are set higher to make them more comparable to those in the other five countries. This brings the METWs down further and almost in line with those of the other five countries. This suggests that it is the lower depreciation allowances, rather than the higher statutory tax rates, that have the greater impact in raising the METWs above those in the other countries.

As was noted above, an important consideration in analysing effective tax rates is the interaction of economic variables, particularly inflation, with the tax

TABLE 4
Domestic Marginal Effective Tax Wedges
 (no personal taxes, country-specific inflation)

	<i>Buildings</i>	<i>Plant and machinery</i>	<i>Inventory</i>	<i>Retained earnings</i>	<i>New equity</i>	<i>Debt</i>	<i>Average</i>
France	1.3	-0.4	3.1	3.3	-3.4	-1.9	0.8
Germany	2.4	0.5	4.9	6.8	-2.7	-4.2	2.0
Netherlands	1.9	0.5	2.6	3.8	-0.4	-2.1	1.3
UK	2.0	0.7	3.6	4.0	0.6	-1.6	1.7
US	4.4	0.8	4.1	5.2	5.2	-2.3	2.6
Czech	4.1	2.6	9.0	8.9	8.9	-3.8	4.4
Poland	1.6	1.7	-0.6	7.9	7.9	-11.3	1.2

Policy experiment: Indexed for inflation, LIFO in Czech

Czech	2.8	-0.1	2.4	5.9	5.9	-7.3	1.3
Poland	1.4	-2.1	-0.6	5.7	5.7	-12.9	-0.8

Weights: As Table 3

system. In Table 4, the actual inflation rates shown in Table 1 are used for each country. This table highlights the effect that differences in economic conditions can have on METWs. Generally, the METW is higher on inventories in countries that use FIFO valuations than in countries that use LIFO. It is lower on debt in countries with high inflation than in countries with low inflation. The METW is also lower on debt in countries with high statutory tax rates than in countries with low statutory tax rates, since high rates increase the present value of interest deductibility. The effects of inflation can be somewhat mitigated by indexation. This is shown in the policy experiment in the lower panel of Table 4. Indexing capital allowances for inflation and using LIFO for inventory valuation in the Czech Republic brings the METWs down significantly.

In a closed economy, the cost of capital gives an indication of the impact the tax system has on the incentive to invest. In an open economy, the impact of tax is more complicated and depends, among other things, on the extent to which capital can move freely between countries. The cost of capital is not, however, informative about the impact of tax on investment projects that earn economic rent — that is, projects that have a rate of return that is higher than the minimum required rate of return. The average effective tax rate (AETR) is the relevant measure in this case.

The AETR presented here is calculated using a similar methodology to that used to calculate the cost of capital;⁸ however, rather than being based on a rate of return, it is the proportion of economic rent that is taken in tax. To calculate the figures here, a pre-tax economic rent of 30 per cent has been assumed. As economic rent tends towards zero, the AETR will tend to infinity (if any taxes are paid), and as economic rent rises, the AETR will tend towards the statutory tax rate.

Table 5 shows the METWs and AETRs for international investment from one country into another. These are weighted averages of the METWs for the three types of finance and three assets. As in Table 3, inflation is held constant at 3.5 per cent across countries, focusing on differences in the tax systems. Note that the diagonals in the first panel are the domestic METWs as shown in the final column of Table 3.

There are two ways to think about the results in Table 5. The first is to consider an entrepreneur in the Czech Republic or Poland who wants to raise finance for an investment project. What are the incentives for the entrepreneur to raise finance on the local market relative to raising it through a foreign multinational? The last two columns show the METW and AETR on inward investment into the Czech Republic and Poland. The tax burden on foreign inward investment from all countries is higher than on domestic investment (indicated in bold). This is true not only for the Czech Republic and Poland but for most other countries as well. The AETRs are also higher for foreign inward investment than for domestic investment. These results indicate that both tax systems favour domestically financed investment over foreign investment.

A second way of analysing these figures is to consider a foreign multinational deciding where to locate a new factory. Comparing the figures across the rows gives an indication of the impact the tax system has on the relative incentives for where to locate the factory. Again, the METWs and AETRs on domestic investment are generally lower than those on international investment, and those

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$$AETR = \frac{R^{NT} - R^T}{R^{NT}}$$

where R is the present value of economic rent, superscript NT indicates in the absence of tax and superscript T indicates in the presence of tax. Rent is equal to value minus costs (where costs in the absence of tax are unity), so for a domestic investment

$$R^{NT} = \frac{(p + \delta)(1 + \pi)}{(1 + \rho^{NT}) - (1 - \delta)(1 + \pi)} - 1$$

and

$$R^T = (1 - \tau) \frac{(p + \delta)(1 + \pi)}{(1 + \rho^T) - (1 - \delta)(1 + \pi)} - (1 - A)$$

.See Griffith (1996) for details.

TABLE 5
International METW's and AETRs
 (no personal taxes, inflation constant, fixed exchange rate)

<i>Capital exporter</i>	Capital importer						
	<i>France</i>	<i>Germany</i>	<i>Netherlands</i>	<i>UK</i>	<i>US</i>	<i>Czech</i>	<i>Poland</i>
METWs (percentage points)							
France	0.8	1.2	2.3	2.3	3.1	4.0	3.5
Germany	2.6	1.9	2.7	3.1	3.4	4.9	4.3
Netherlands	2.3	1.6	1.2	2.8	3.2	4.7	4.1
UK	2.1	1.5	2.2	1.7	2.9	4.4	3.8
US	2.5	2.2	2.6	3.0	2.5	5.0	4.4
Czech	—	—	—	—	—	4.0	—
Poland	—	—	—	—	—	—	3.4
AETRs (pre-tax economic rent=30%)							
France	32%	37%	57%	59%	70%	87%	73%
Germany	49%	36%	45%	55%	62%	88%	72%
Netherlands	66%	49%	38%	71%	77%	101%	87%
UK	62%	47%	59%	51%	74%	98%	84%
US	64%	55%	61%	70%	56%	102%	87%
Czech	—	—	—	—	—	83%	—
Poland	—	—	—	—	—	—	69%

Weights (source: OECD, 1991)

Parent finance: retained earnings 55%; new equity 10%; debt 35%.

Subsidiary finance: 33% each.

Parent finance weights used for domestic investment.

Assets: buildings 28%; plant and machinery 50%; inventories 22%.

into the Czech Republic and Poland are higher than those into the other countries.

In Table 6, the same two policy experiments that were simulated in Table 3 are presented for the international METWs and AETRs. The first experiment sets the statutory tax rates in the Czech Republic and Poland to 35 per cent. As was the case for domestic investment, this reduces both the METWs and AETRs for investment into the Czech Republic and Poland but does not reduce them to the level of those in the other countries. The second experiment instead gives more generous depreciation allowances. This reduces both the METWs and

TABLE 6

Policy Experiments

(no personal taxes, inflation constant, fixed exchange rate)

<i>Capital importer:</i> <i>Capital exporter</i>	Statutory tax rate of 35%		Depreciation rates for buildings of 5% SL and for plant machinery of 30% DB for three years switching to 10% SL for the remainder of the assets's life	
	<i>Czech</i>	<i>Poland</i>	<i>Czech</i>	<i>Poland</i>
METWs (percentage points)				
France	3.1	2.9	2.6	2.1
Germany	4.0	3.7	3.5	3.0
Netherlands	3.7	3.5	3.3	2.8
UK	3.4	3.2	3.0	2.5
US	3.0	3.6	3.5	3.0
Czech	2.9	—	2.6	—
Poland	—	2.7	—	2.0
AETRs (pre-tax economic rent=30%)				
France	72%	66%	70%	56%
Germany	68%	60%	70%	55%
Netherlands	84%	77%	84%	70%
UK	81%	73%	80%	67%
US	83%	75%	84%	70%
Czech	69%	—	66%	—
Poland	—	61%	—	52%

Weights: As Table 5.

AETRs further; in this case, Poland has METWs and AETRs close to those in the other countries.

IV. SUMMARY

As was discussed in the Introduction, optimal tax theory does not give very clear guidance for tax policy in eastern European countries. On the one hand, simple theoretical models suggest the need for low, or zero, taxes on capital inflows. However, it is possible that governments may be able to raise revenue from location-specific rents and through some redistribution of tax revenue (where the capital exporter operates a credit system) without seriously affecting incentives for investment.

Tax rates on capital income are currently higher in the Czech Republic and Poland than in the other countries considered. Inflation exacerbates these differences, not because of the structure of the tax system but simply because it is higher in the Czech Republic and particularly Poland than in the other countries. Indexation of capital allowances and inventories would considerably reduce the problems arising from higher inflation. Further, relatively small changes in both statutory tax rates and the tax base bring the METWs and AETRs more in line with those in these other countries.

A caveat to this note is that the discussion presented in this paper has not considered the need for governments to raise revenue. Other options to raise revenue may be limited for administrative or other reasons, and immobile factors may be difficult to tax. The analysis also has not considered how firms respond to these differences in after-tax rates of return. Both of these considerations could alter the policy conclusions significantly. However, it seems unlikely that the best policy for the Czech Republic and Poland is to set marginal and average taxes higher than other (east or west) European countries.

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