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# (Post-)Materialist Attitudes and the Mix of Capital and Labour Taxation

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# (Post-)Materialist Attitudes and the Mix of Capital and Labour Taxation

## Abstract

Social values shape policy outcomes. We examine the role of postmaterialism, a widely used concept in the social sciences, for the mix of capital and labour taxation chosen by a society. Following political scientist Inglehart, we define the degree of postmaterialism as the relative importance which individuals or a society as a whole ascribe to non-material values over material things. We incorporate this notion into a simple tax model for a small open economy. We show that a greater emphasis on immaterial values will lower the ratio of capital to labour taxes. Subsequently, we test our theoretical results empirically, using a panel data set comprising 17 OECD countries over the period 1981-2000. Proxies for the degree of postmaterialism are developed from the World Values Surveys. Their impact on the tax mix is highly significant and goes into the theoretically predicted direction.

JEL Code: Z13, E62, H20.

Keywords: culture economics, social values, postmaterialism, taxation.

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# 1 Introduction

Among political and social scientists, it is widely held that a deep change in value orientations has taken place throughout advanced industrial societies over the past decades. In seminal contributions, Ronald Inglehart and others argue that people nowadays put lesser emphasis on material goods (such as consumption, wealth, and income) but give more priority to immaterial goods, such as esteem, self-expression, freedom of choice and other intangible aspects of the quality of life (Davenport and Davis, 1999; Hellevik, 1993; Inglehart, 1971, 1997, 1999; Inglehart and Welzel, 2005; Moors and Vermunt, 2007; Duch and Taylor, 1993).

The so-called “value change hypothesis” is largely supported by empirical evidence derived from the *World Values Surveys*, the largest investigation on attitudes, values, and beliefs around the world. In these surveys, a rising share of respondents say that less emphasis on material possessions would be a desirable change in our way of life; a growing number of people consider tolerance and respect to be more valuable qualities to teach a child than “hard work” or “saving money”; respondents increasingly think that, when seeking a job, a feeling of accomplishment and working with people one likes is more important than good pay; people to a greater extent emphasize the importance of leisure and time spent with friends; people are increasingly interested in arts, music, entertainment and culture; and respondents are more inclined to say that the protection of the environment is as important as economic growth (see Inglehart, 1997; Inglehart and Welzel, 2005).

The change in basic values, thus, involves that people shift priorities from materialist issues to “postmaterialist” or quality-of-life goals, as Inglehart and others call the objectives ranked higher in Maslow’s hierarchy. Occurring on a large scale, this trend can be expected to impact also on political decisions, processes, and policy choices. Indeed, political scientists argue that the tendency towards postmaterialism helped to promote democracy and good governance (see, e.g., Inglehart and Welzel, 2005) and fostered the emergence of social movements with concerns about civil rights, the environment, globalization or the “Americanization of culture” (Inglehart, 1997; della Porta and Diani, 1999). In this paper we argue that the rise of postmaterialism may also affect tax policies. Inglehart (1971) defines postmaterialism as the relative importance people ascribe to immaterial values relative to material goods. Put simpler, it is the degree of how little people are impressed by money. As taxation is foremost associated with a smaller purse, it seems reasonable to suppose that the people’s attitude towards money also has an effect on how strongly governments can tax them or how elastically they try to escape from the grabbing hands of government. Changes in the perception of the burden imposed by taxes and in the responsiveness to taxation will then translate into changes of the optimal tax mix in a society. Taxation will shift to those items that are complementary with material values.

This is the vantage point of our paper. Specifically, we ask whether a society’s (non-)materialistic

attitude may affect its mix of capital and labour taxation. This exercise seems especially worthwhile as the shift in the fiscal importance and in the tax burden from taxes on capital to taxes on labour has been one of the most pronounced (and most hotly debated) trends in the structure of taxation over the past decades. A standard explanation for this trend are the pressures of “globalization”, i.e., a higher mobility – and, thus, a higher tax sensitivity, of capital (see below). In this paper, we complement this explanation by arguing that the reduced relative tax burden on capital may also be driven by changes in the values held in the populations.

In a first step, we propose a simple model of capital and labour taxation for open economies with mobile capital and immobile, but elastically supplied labour (Nash tax competition). We incorporate the notion of postmaterialism via a preference parameter. This parametric approach comes at the cost of some loss of generality, but allows for a reduced-form solution for the equilibrium mix of capital and labour taxes.

As a testable hypothesis we derive that a higher degree of postmaterialism will lower the ratio of capital to labour taxes. The intuition behind this result is the following. Both capital and labour are elastic tax bases: capital can move abroad and labour, though internationally immobile, avoids taxation by fleeing into leisure. If people place lower relative emphasis on material aspects, they are less sensitive to their labour income being taxed. The wage tax elasticity of their labour supply decreases with postmaterialism. In turn, this implies that governments increase the relative tax burden on labour.

In a second step, we empirically test our theoretical results using a panel data set comprising 18 OECD countries over the period covering 1981 to 2001. We employ a modified version of the so-called *Inglehart Four Items Index* but also develop two other proxies for postmaterialist attitudes from the *World Values Surveys*. Controlling for country-specific and time fixed effects, these proxies, a measure of capital mobility, and a set of control variables are used as regressors for explaining the ratio of the effective marginal tax rate on capital (EMTR) to the tax wedge on labour. The estimates for the postmaterialism parameter exhibit the predicted signs and are highly significant in all regressions, indicating a substantial impact of non-material values on tax design.

Our research adds to a recent trend in the literature with focus on the complementarity between norms, values, and beliefs, and tax policies. E.g., Alesina and Angeletos (2005) trace back differences in the volume of redistributive taxation between Western Europe and the United States to different perceptions about how fair market outcomes are. Hodler (2008) points out that different attitudes towards leisure (in our terminology, varying degrees of postmaterialism) are responsible for the variation in the size of welfare states and, by and large, in the overall tax burden. Franzen (2003) and others report evidence that appreciation for eco-taxes is greater in postmaterialist than in materialist countries. It remains unclear, however, whether this reflects “merely” an increased concern for the environment or a generally reduced price sensitivity. None

of the studies so far attempts to relate values and norms to the composition of the tax burden or to the tax mix. This is our focus.

Traditionally, the (relative) reliance on capital taxation is explained by the degree of capital market integration. It is reckoned that more open economies face a greater danger of capital flight. They, thus, have stronger incentives to shift the tax burden to immobile factors – which is mainly labour, but also consumption (see Wilson, 1999, for a survey). By and large, this argument seems well in line with the experience from the last two decades, a period that was characterized by both deeper economic integration and a decline in the ratio of capital to labour taxes (see Haufler et al., 2008). Many of the empirical papers do, however, fail to find a robust negative link between capital mobility and the relative tax burden on capital and labour.<sup>1</sup> Thus, it appears natural to search for further factors that drive the mix of capital and labour taxation. This paper suggests that postmaterialist attitudes in the population are a potential candidate – and substantiates this claim theoretically and empirically.

This paper proceeds as follows: Section 2 sets out the model and derives predictions on optimal tax structures. Section 3 tests these hypotheses empirically. Section 4 concludes.

## 2 The model

### 2.1 Framework

We incorporate postmaterialism into a standard tax model for open economies. We borrow the main components of the modelling framework from Bucovetsky and Wilson (1991), Persson and Tabellini (1992, 2002), and Haufler et al. (2008). These studies explain the relative reliance on capital taxation by economic factors; we will put the spotlight on the role values might play.

We consider an integrated economic area with two small open economies that are identical in every respect. In particular, they face the same exogenously given gross return on capital. Capital is assumed to be imperfectly mobile and taxed at source. The populations in both countries are identical in structure and tastes; individuals are internationally immobile. For convenience, we refer to one of the two countries as the “home” and to the other as the “foreign” country. If necessary, we shall correspondingly index country variables with subscripts  $h$  and  $f$ , respectively. Without loss of generality we introduce model features from the home country’s point of view.

Each country is inhabited by capitalists and workers. Within each class, individuals are identical. Workers are assumed to outnumber capitalists. Governments, driven by (re-)election concerns, choose policies (i.e., the capital-labour tax mix) as to maximize the utility of workers.

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<sup>1</sup>Haufler et al. (2008) survey the empirical literature on the relationship between the openness of an economy and its tax mix.

Capitalists receive income from capital (which may include income from abroad). Workers receive only wage income. Workers have convex and monotone preferences over consumption  $c$ , leisure – negatively represented by working hours  $\ell$  –, and a publicly provided good  $g$  that is financed by domestic taxes on capital and labour.

We will interpret leisure as to reflect non-materialist goods and, thus, assume that (post-) materialist attitudes are incorporated in the preferences over leisure. This assumption can be motivated by phenomena cited as evidence for the so-called “value change hypothesis”. Inglehart and Welzel (2005), together with others, assert that people turn their minds away from consumer goods towards arts, music and culture or, in short, towards a “better quality of life”. As many of these quality activities are genuine leisure time activities, it seems quite natural to suppose that postmaterialist societies tend to have higher levels of leisure or, equivalently, lower volumes of work. Seen from that angle, postmaterialism may be linked to the observation that Western European countries (which count as highly postmaterialist) experienced a sharp fall in average working hours over the last decades (see Alesina et al., 2005).<sup>2</sup>

Specifically, the utility of workers is assumed to be quasi-linear and given by

$$U(c, \ell, g) = c - \frac{1}{1 + \gamma} \cdot \ell^{1+\gamma} + \delta \cdot g \quad (1)$$

with  $\delta > 1, \gamma > 0$ . The marginal utilities from private and public consumption are constant, with the latter being larger than the former ( $\delta > 1$ ). This assumption ensures that workers wish to have some positive amount of the public good even if it has to be financed by distortionary taxes.<sup>3</sup>

In (1), the parameter  $\gamma$  will be interpreted as the degree of postmaterialism. Two arguments support this interpretation: First, the higher  $\gamma$ , the larger the willingness to pay (measured in terms of material consumption) for an increase in leisure. The relative weight that people give to non-material over materialist consumption is, however, the genuine definition of postmaterialism according to Inglehart (1997). A higher  $\gamma$  implies a shift away from consumption due to a higher marginal disutility from work. In this respect, postmaterialism is related to “laziness” in Alesina and Angeletos (2005) or Hodler (2008).

Second,  $1/\gamma$  equals the elasticity of labour supply with respect to net wages (also see below). Higher values of  $\gamma$  reflect a reduced sensitivity of individuals to material incentives (or changes in their budgets). This is in line with Inglehart’s (1990, pp. 176f) observation that post-materialists are lesser motivated by income than materialists and that they earn less for the same amount

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<sup>2</sup>This unrealistically rules out that nonmaterialist goals (such as self-expression or self-actualization) can be achieved during work time. However, as mentioned above, leisure seems to play a more important role for satisfying non-materialist needs.

<sup>3</sup>While not innocent, the assumption of separable utility is the simplest way to generate the results we are aiming at.

of labour and at comparable levels of education (“economic underachievement”).<sup>4</sup>

To summarize, a higher  $\gamma$  translates, first and *ceteris paribus*, into an absolute reduction in labour supply and, second, into a larger indolence of individuals with respect to monetary rewards. Both aspects are included in the sociological concept of postmaterialism.

We assume that  $\gamma$  and changes to it are exogenous. Empirically, postmaterialist attitudes are highly and positively correlated with economic well-being. However, as Inglehart (1990) shows, changes in postmaterialist attitudes occur at a much slower pace than changes in economic conditions. Postmaterialism is a cultural value embedded in society; since changes in  $\gamma$  should therefore reflect changes in attitudes over and above those triggered by economic factors, we treat it as exogenous.

Workers’ consumption  $c$  equals their after-tax income  $(w - \tau) \cdot \ell$ , where  $w$  and  $\tau$  denote the real gross wage and the wage tax, respectively. Using this when maximizing (1) with respect to  $c$  and  $\ell$ , taking wages, taxes and the amount of the publicly provided good as given, optimal labour supply  $L$  amounts to

$$L(w - \tau; \gamma) = (w - \tau)^{\frac{1}{\gamma}}. \quad (2)$$

As mentioned earlier, the elasticity of labour supply with respect to the wage tax rate equals

$$\eta_{L,\tau} := \frac{\partial L}{\partial \tau} \frac{\tau}{L} = -\frac{1}{\gamma} \frac{\tau}{w - \tau} < 0. \quad (3)$$

Eqs. (2) and (3) formally justify why  $\gamma$  is a meaningful proxy for postmaterialism: First, the higher  $\gamma$ , the higher the consumption of “non-materialist” leisure. Second, the higher  $\gamma$ , the more difficult are people to motivate via monetary incentives. Equivalently, less materialist people are less easily deterred by monetary disincentives like wage taxes – an observation that will drive optimal tax policies.

Domestic and foreign capitalists each own a fixed stock  $\bar{K}$  of capital, which they can allocate between their home and the foreign country. Given that both economies are small, capitalists have to receive the real rate  $r$  of return on worldwide markets, gross of taxes, independently of where they invest.

We denote by  $k_{ij}$  (with  $i = f, h$ ) the amount of capital originating from country  $i$  that is invested in country  $j$ . Investing abroad is associated with mobility costs (with increasing marginal costs). These costs contain all extra costs that foreign investment entails over domestic investment, e.g., when gathering information about legal issues, tax planning, purely tax-driven misallocations of factors. We follow Haufler et al. (2008) by assuming mobility costs  $M$  to be a quadratic function in the amount of capital invested abroad. For an investor from  $h$ , they amount to  $M_h = \frac{1}{2\beta} \cdot k_{hf}^2$ .

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<sup>4</sup>Uhlaner and Thurik (2007) empirically show that the more postmaterialist a culture, the lower the rate of entrepreneurial activities. As they argue that entrepreneurship is associated with (the hope of) making a lot of money, this corroborates the view that postmaterialists respond less elastically to monetary incentives.



The cost parameter  $\beta$  is common to both countries; it serves as a proxy for the degree of capital market integration between the two countries.

After-tax income of capital owners from  $h$  amounts to

$$(r - t_h) \cdot k_{hh} + (r - t_f) \cdot k_{hf} - \frac{1}{2\beta} \cdot k_{hf}^2 = (r - t_h) \cdot \bar{K} + k_{hf}(t_h - t_f) - \frac{1}{2\beta} \cdot k_{hf}^2, \quad (4)$$

where  $t_h$  and  $t_f$  denote the rates of the source tax on capital in country  $h$  and  $f$ , respectively. We assume that capitalists are just interested in maximizing their after tax income. They, thus, remain unaffected by postmaterialist tendencies. At first sight, this seems to contradict Inglehart's findings that rising postmaterialism can be observed throughout all classes and strata of society. Yet, this assumption can be justified on several grounds: In practise, the allocation of capital across countries is decided by professionals who, by virtue of their job as bankers or managers, have to aim at maximizing after tax profits, irrespective of what their personal attitudes towards material goods might be. Moreover, one might also view capital owners as non-working *rentiers* who live on their wealth. For such leisure-class people, increased tendencies towards postmaterialism would not make a behavioural difference.<sup>5</sup>

Maximizing (4), the domestic capitalist's optimal amount of foreign investment is given by

$$k_{hf} = \beta \cdot (t_h - t_f) =: K_{hf}(t_h - t_f, \beta). \quad (5)$$

Combined with labour input, capital produces economic output. In a general equilibrium of a competitive economy, remunerations of factors will depend on the amounts of factors employed. Assuming that factors of production are complements, a higher capital stock would increase the marginal productivity of labour and, thus, lift gross wages. Short-cutting that investment decisions impact on gross wages of workers, we follow Haufler et al. (2008) and assume that gross wages vary proportionally with the total amount of capital invested at home:

$$w_h = \alpha \cdot (\bar{K} - K_{hf}(t_h - t_f, \beta) + K_{fh}(t_f - t_h, \beta)) =: w_h(t_h - t_f, \beta) \quad (6)$$

with  $0 < \alpha < 1$ . Note that  $\alpha$  being positive precludes that workers wish to expropriate capitalists entirely when it comes to generate positive tax revenues.

Now, let us turn to the government sector. The government uses tax revenues to provide a public good. As only source-based taxes are available, the home government's budget constraint

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<sup>5</sup>There is a more fundamental objection against the assumption of postmaterialist capitalists in our model. In a more complete and dynamic framework, capital income would be derived from savings, i.e., from income that is not consumed at the moment of its generation. However, we did not find any evidence that postmaterialism appears to be related to the postponement of consumption or the intertemporal (re-)allocation of (some given) wealth. Rather, postmaterialism involves incentives to the generation of income in the first place. Accordingly, a more complete modelling of postmaterialist attitudes ought not to include "inefficient" investment strategies (in the sense that maximizing (4) is questioned). Rather, the generation of  $\bar{K}$  should be modelled. However, such intertemporal problems are beyond the scope of this paper.

is given by

$$g_h = \tau_h \cdot L(w_h(t_h - t_f, \beta) - \tau_h) + t_h \cdot (\bar{K} - K_{hf} + K_{fh}) =: G(\tau_h, t_h, t_f; \beta, \gamma). \quad (7)$$

The foreign country is identical to the home country in every respect. By symmetry, we get

$$K_{fh}(t_f - t_h, \beta) = -K_{hf}(t_h - t_f, \beta), \quad (8)$$

$$\frac{\partial K_{fh}}{\partial t_h} = -\frac{\partial K_{hf}}{\partial t_f} = \beta. \quad (9)$$

From (8) and (9), the elasticity of the home country's capital tax base with respect to the own capital tax rate  $t_h$  equals:

$$\varepsilon_{K_h, t_h} = \frac{\partial(\bar{K} - K_{hf} + K_{fh})}{\partial t_h} \cdot \frac{t_h}{\bar{K} - K_{hf} + K_{fh}} = -\frac{2\beta t_h}{\bar{K} - K_{hf} + K_{fh}}. \quad (10)$$

## 2.2 The tax mix in an equilibrium

Both governments are only interested in getting majority support for their politics. They are unwilling or unable to coordinate on policy decisions with their neighbour. Since workers outnumber capitalists by assumption, governments choose a mix of capital and labour taxes as to maximize utility of workers, thereby taking the foreign tax policy as given. The indirect utility of the home workers is derived by substituting (2), (6), and (7) into (1):

$$\begin{aligned} V_h = V(\tau_h, t_h; t_f, \beta, \gamma) &= (w_h(t_h - t_f, \beta) - \tau_h) \cdot L(w_h(t_h - t_f, \beta) - \tau_h) \\ &\quad - \frac{1}{1 + \gamma} \cdot L(w_h(t_h - t_f, \beta) - \tau_h)^{1+\gamma} + \delta \cdot G_h(\tau_h, t_h, t_f; \beta, \gamma). \end{aligned} \quad (11)$$

The FOCs for the home government's maximization problem are given by the following equations, where we use general functional forms, exploit the Envelope Theorem and suppress parameters for reasons of tractability:

$$t_h : \quad \frac{\partial V_h}{\partial t_h} = \frac{\partial w}{\partial t_h} \cdot L + \delta \left[ \bar{K} - K_{hf} + K_{fh} + t_h \cdot \frac{\partial(K_{fh} - K_{hf})}{\partial t_h} + \tau_h \cdot \frac{\partial L}{\partial w} \frac{\partial w_h}{\partial t_h} \right] = 0 \quad (12)$$

$$\tau_h : \quad \frac{\partial V_h}{\partial \tau_h} = -L + \delta \left[ L + \tau_h \frac{\partial L}{\partial \tau_h} \right] = 0. \quad (13)$$

In a symmetric Nash equilibrium, the domestic and the foreign capital tax rates will be equal ( $t_h = t_f$ ). Consequently, no cross-border capital flows occur ( $K_{hf} = K_{fh} = 0$ ) and equilibrium capital stocks equal initial endowments. Therefore, the equilibrium gross wage in both countries is given by  $w = \alpha \cdot \bar{K}$ . We shall henceforth abandon with country indexes.

To arrive at an explicit solution for the government's choice of  $\tau$ , observe that (13) yields the Atkinson-Stern rule,

$$\delta = \frac{1}{1 + \eta_{L, \tau}}.$$

The willingness-to-pay for public consumption (on the LHS) must equal the marginal costs of public funds through labour taxes (RHS).

Substituting for  $\eta_{L,\tau}$  and using  $w = \alpha\bar{K}$ , we obtain the equilibrium tax rate on labour as

$$\tau^* = \frac{\bar{c}\gamma}{1 + \bar{c}\gamma} \alpha\bar{K}, \quad (14)$$

where we set  $\bar{c} := 1 - 1/\delta$ . The wage tax is always positive since we assumed  $\alpha > 0$  and  $\delta > 1$ . If wages were independent of the amount of domestic capital, workers would wish to exclusively rely on capital taxes, leaving wage income untaxed. Thus, a positive value of  $\alpha$  (generally: a positive relation between capital and labour productivity) opens the door for taxing both capital and labour. Similarly, the assumption  $\delta > 1$  triggers positive levels of taxation as it implies that the economy is willing to finance the public good via distortionary taxes.

The impact of the postmaterialism parameter  $\gamma$  on labour taxation can be seen directly from (14): A stronger degree of postmaterialism will unambiguously lead to a higher wage tax ( $\partial\tau^*/\partial\gamma > 0$ ). Intuitively, as workers respond less sensitively to their labour income being taxed away, the marginal opportunity costs of wage taxation become lower, too.

Using (2) and substituting for  $w$  and  $\tau$  by using (14)) and  $w = \alpha\bar{K}$ , labour supply in the equilibrium turns out to be

$$L^* = \left[ \frac{\alpha\bar{K}}{1 + \bar{c}\gamma} \right]^{1/\gamma}. \quad (15)$$

Note that the effect of a greater postmaterialism on equilibrium labour supply is unambiguously negative. For any given tax rate, a higher  $\gamma$  makes workers prone to consume more of (non-material) leisure such that labour supply decreases. This effect is amplified by the effects of postmaterialism on wage taxes. Due to increasing sensitivity of workers with respect to taxation, tax rates rise and net wages decrease. Thus, the direct effect and the indirect effect of postmaterialism via taxing wages work in the same direction.

For the equilibrium tax rate on capital, combine (12) and (13) to obtain

$$\frac{K}{L} \cdot [1 + \epsilon_{K,t}] = -\frac{\partial w}{\partial t}.$$

Conditions (6), (15), and (10) together give the reduced-form solution for capital taxes:

$$\begin{aligned} t^* &= \frac{\bar{K}}{2\beta} - \alpha \cdot L^* \\ &= \frac{\bar{K}}{2\beta} - \alpha \cdot \left[ \frac{\alpha\bar{K}}{1 + \bar{c}\gamma} \right]^{1/\gamma}. \end{aligned} \quad (16)$$

The optimal tax rate is, thus, driven by two concerns (also see Hauffer et al., 2008): First, capital taxes contribute to financing the public good, which *ceteris paribus* calls for a strictly positive tax rate (see the first term on the RHS of (16)). By contrast, and represented by the

second term, capital taxation also has the negative effect of reducing wages. Thus, workers have, for given levels of labour supply, an incentive to subsidize capital. We henceforth assume that capital is taxed at a positive rate, presupposing that the first effect outweighs the second.

Since capital mobility, represented by  $\beta$ , does not affect equilibrium wages (capital flight is only perceived by governments), capital taxation unambiguously decreases the more mobile is capital. This is a standard effect in open economies.

More interestingly, a higher degree of postmaterialism reduces also the tax burden on capital. This can be explained as follows. With labour supply decreasing due to a rise in postmaterialism, the adverse effects of capital taxation on labour income are reduced.<sup>6</sup> Thus, the incentives to subsidize capital (and, thus, to boost workers' wages) declines with stronger postmaterialist attitudes.

### 2.3 The effects of postmaterialism

Let us turn to the ratio of capital to labour taxes,  $t^*/\tau^*$ : First, deeper capital market integration drives down this ratio (since  $\tau^*$  does not depend on  $\beta$  and  $\frac{\partial t^*}{\partial \beta} < 0$ ). As expected, higher capital mobility reduces the governments' relative reliance on capital taxation. Second, and more interestingly, the effect of a rise of postmaterialism on the tax ratio is unclear since both capital and wage taxes increase with  $\gamma$ . Hence, the effect of postmaterialism on the tax mix is ambiguous.

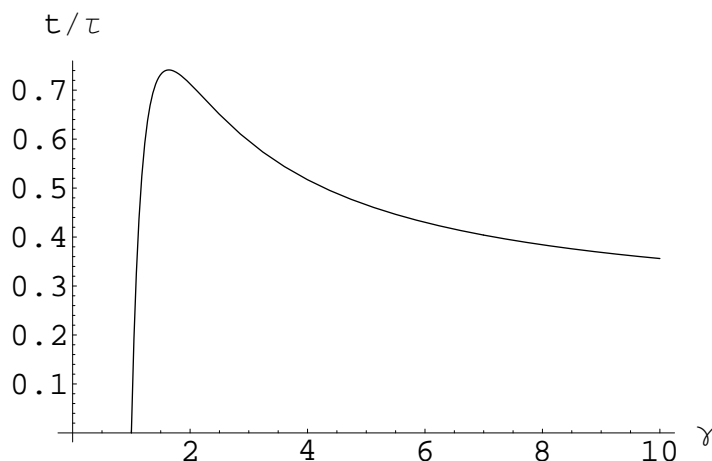


Figure 1: Postmaterialism and the ratio of capital to labour taxes

Figure 1 illustrates the relationship between the degree of postmaterialism  $\gamma$  and the tax ratio  $t^*/\tau^*$ . Parameters in this plot are chosen such that both the capital and the labour tax rate are positive and, in line with reality, the tax rate on labour exceeds that on capital (i.e.,  $t^*/\tau^* < 1$ ).<sup>7</sup>

<sup>6</sup>The income loss from capital taxation, represented by  $\frac{\partial w}{\partial K} \frac{\partial K}{\partial t} L$  in (15), decreases in  $L$ .

<sup>7</sup>We choose  $\bar{K} = 100$ ,  $\alpha = 0.3$ ,  $\beta = 2$  and  $\bar{c} = 0.2$ . According to Sørensen (2000), the average effective tax rate

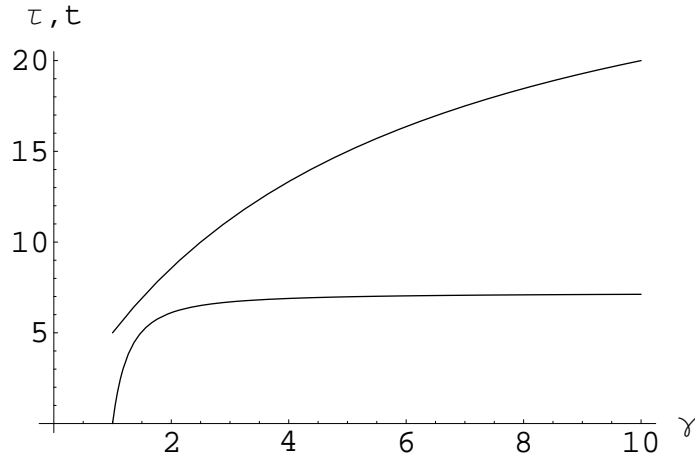


Figure 2: Postmaterialism and the capital and labour tax rate

From Figure 1, the relationship between the tax ratio and postmaterialism is non-monotonic. Starting at moderate levels of postmaterialism, the tax ratio increases with the degree of postmaterialism; here, the potential of postmaterialism to reduce labour supply outweighs the positive effect via reducing the tax sensitivity of labour supply. At higher levels of postmaterialism, the effects change and the tax-ratio starts to decline. This result is also apparent from Figure 1: the slope of  $t(\gamma)$  is higher (lower) than the slope of  $\tau(\gamma)$  for low (high) levels of postmaterialism.

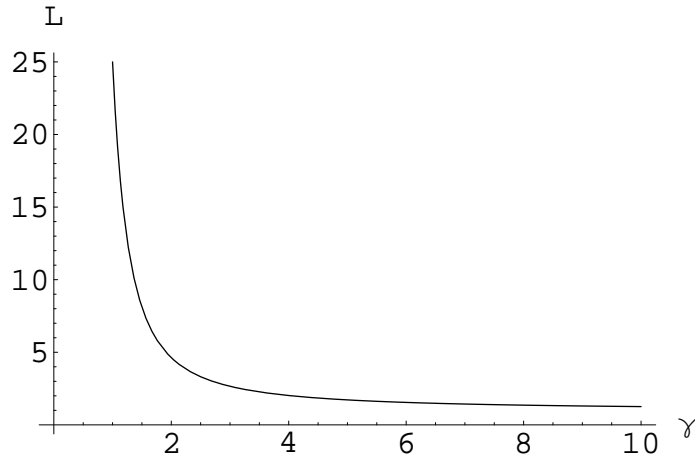


Figure 3: Postmaterialism and labour supply

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on labor income was higher than the effective tax rate on capital income in Nordic countries and in Continental Europe, while the effective tax rate on capital income was higher in Anglosaxon countries. The time periods covered were 1981 to 1985 and 1991 to 1995. The European Commission (2006, pp. 46ff) reports an implicit tax rate on labor income of 35.6 percent (unweighted EU average, 2003) while the implicit marginal tax rate on capital is only 25.6 percent (the average tax rate on capital and business *income* is even lower at 17.7 percent). Only in few countries (e.g., United Kingdom and Portugal) or for limited periods of time (e.g., Denmark in 2004) has capital on the margin been taxed more heavily than labor.

The non-monotonic relationship between postmaterialism and the tax ratio can be explained by the response of labour supply towards changes in postmaterialism. Figure 3 shows that labour supply is converging to a fixed, positive level. Intuitively, even the most ardent postmaterialist needs a certain amount of labour income to survive (formally, the constant marginal utility of private consumption will eventually exceed the marginal utility from leisure). Close to this minimum level, further increases in the degree of postmaterialism have negligible effects on labour supply and, consequently, on capital taxation. Thus, above a certain degree of postmaterialism, the sensitivity effect of postmaterialism dominates and accordingly, the ratio of capital to labour taxes is decreasing in postmaterialism.

Observe that – with our specification – postmaterialism does not exert much impact on government expenditures (i.e., on the level of the publicly provided good). Using (14), (15), and (16), the size of the government budget in the equilibrium can be calculated as<sup>8</sup>

$$G^* = \frac{\alpha \bar{K}^2}{2\beta} - \left( \frac{\alpha \bar{K}}{1 + \bar{c}\gamma} \right)^{1+1/\gamma}. \quad (17)$$

Only the second term in this expression varies (positively) with the postmaterialism parameter  $\gamma$ . At low levels of postmaterialism, an increase in  $\gamma$  leads to a considerable increase in public good supply. However, in the range where increased postmaterialism triggers a decline in the capital-labour tax ratio, the variation of  $G^*$  in  $\gamma$  is only very mild and convergence towards the constant  $\alpha \bar{K}^2 / (2\beta)$  is fast. Figure 4 visualizes this.

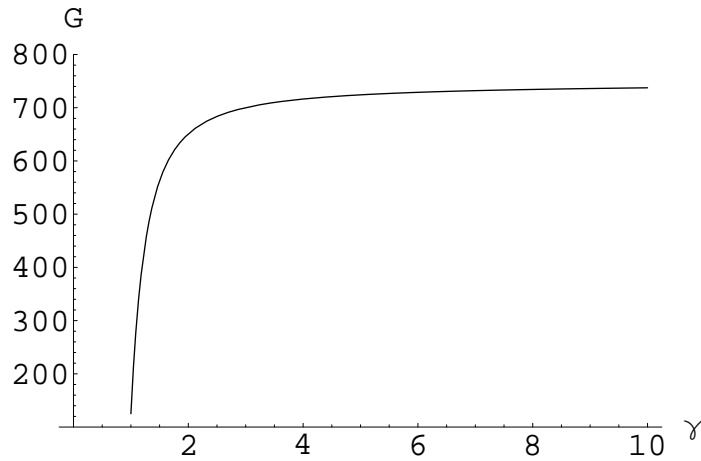


Figure 4: Postmaterialism and government expenditures

Higher degrees of postmaterialism do not translate into substantial changes in the demand for government-provided goods.<sup>9</sup> It only affects the tax mix that finances government expenditures.

<sup>8</sup>For consistency, we also checked whether equilibrium tax rates are such that the economy is in the upward-sloped part of its Laffer curve. This is the case.

<sup>9</sup>As mentioned in the introduction, postmaterialism can manifest itself in a higher demand for cultural activi-

### 3 Empirical analysis

In this section we test our model empirically. Our main hypothesis is that, for a sufficiently high degree of postmaterialism, both a greater capital mobility and a higher tendency towards postmaterialist values encourage governments to lower the tax ratio of capital to labour taxes. Our analysis focusses on OECD countries, i.e., on countries which are characterized (according to Inglehart and his adherents) by high levels of postmaterialism. Therefore, we are confident that the collected data come from countries positioned on the downward-sloped part of the tax ratio curve in Figure 1. We consider the period from 1981 to 2000 which was characterized by a rise of postmaterialism (see Inglehart and Welzel, 2005), a deepening in capital market integration and a decrease in the relative reliance on capital taxation (see Haufler et al., 2008, and the references therein).

Our approach is in line with some other recent empirical work on the association between closer capital market integration with lower (relative) tax burdens on capital (Bretschger and Hettich, 2002; Haufler et al., 2008; Slemrod, 2004; Schwarz, 2007; Winner, 2005). We go beyond these studies by adding several proxies for postmaterialism as explanatory variables, i.e., by taking explicitly into account social values. Before presenting regression results, we discuss the data; summary information is provided in Appendix 1.

#### 3.1 Proxies for postmaterialism

To operationalize the concept of postmaterialism we use data from the World Values Surveys (WVS), the largest worldwide investigation of attitudes, values, and beliefs. The WVS studies were carried out in four waves of national surveys: 1981-1982, 1990-1991, 1995-1997, and 1999-2001. In each wave, respondents were confronted with more than 200 questions meant to detect their socio-cultural, moral, religious, and political attitudes. Several of these questions shed light on the valuation of non-material over material values. Using and aggregating items that were asked in each of the four waves we construct a total of three proxies for a nation's tendency towards postmaterialist goals:

**Adjusted Inglehart index.** Our first proxy is based on the so-called Inglehart index, which is meanwhile included in the world values database as a ready-made variable (Inglehart 1997, 1999). The Inglehart index rests on the relative importance respondents ascribe to the following four items: (1) maintaining order in the nation; (2) give people more to say; (3) fighting rising prices; and (4) protecting the freedom of speech. Items (1) and (3) are considered to reflect ties. To the extent that cultural goods are provided by governments, this would imply a larger government sector. In the model, this could be captured by a change in the preference for the government-provided good, i.e., in  $\delta$  (and, thus,  $\bar{c}$ ). However, this would require an interpretation of  $g$  as a “non-materialist” good. We refrain from this, allowing that  $g$  may also be quite mundane.

materialist attitudes while items (2) and (4) express postmaterialist values. Respondents were asked to indicate which two of these items they consider to be most important. Then a score of “1” is assigned to the respondent if both choices are materialist, a score of “2” if exactly one choice is postmaterialist, and a score of “3” for two postmaterialist choices. A nation’s degree of postmaterialism is then measured by the mean over all scores of the national respondents on this scale. A major problem with the original Inglehart index is its potential downward bias in periods of high inflation (then respondents will probably put the fight against rising prices higher on the political agenda more often and for reasons other than being materialist; see Hansen and Tol, 2003). To correct for this bias, we use a procedure applied by Bretschger and Hettich (2002) in a different context: We perform a pooled regression with the original Inglehart index as an endogenous variable and the inflation rate as an exogenous variable at the country level and take the residuals from this regression as a proxy for postmaterialism. We refer to this indicator as the *adjusted Inglehart index*.

**Education qualities.** Going beyond the political sphere, our second proxy for postmaterialism is developed from the following question about values in child education: “Here’s a list of qualities that children can be encouraged at home. Which, if any, do you consider to be especially important?” The items respondents can choose from include the qualities “thrift saving money and things”, “hard work”, “independence”, and “tolerance and respect”. We code each quality with “1” if chosen and with “0” if not. For each individual we subtract the codes of the first two qualities, which we think to be preferred by materialists, from the other two qualities, which may be more attractive for postmaterialists. This locates each individual on a scale from  $-2$  to  $+2$  with higher values signifying a higher preference for immaterial goods. On the aggregate level, we calculate a nation’s arithmetic mean on this scale and denote this variable by *education qualities*.

**Future changes.** As a more direct indicator for postmaterialism, we consider the following question from the WVS: “I’m going to read out a list of various changes in our way of life that might take place in the near future. Please tell me for each one, if it were to happen, whether you think it would be a good thing, a bad thing or you don’t mind.” Among the scenarios to be evaluated is “Less emphasis on money and material possessions”. For each country, we calculate the percentage of respondents who answered “good thing” and refer to this postmaterialism proxy as *future changes*.

These three indexes are hoped to capture important aspects of the multi-faceted concept of postmaterialism. We expect each of them to be negatively correlated to the relative reliance on capital taxation, the dependent variable to be discussed now.



## 3.2 Tax measures

To measure tax burdens on both capital and labour, many studies employ revenue-based measures, derived from national account statistics. These measures can be easily obtained for a large number of countries but have several important drawbacks (see Devereux et al., 2002, and Klemm and Griffith, 2004). When tax ratios are calculated as tax revenues over GDP, both numerator and denominator are driven by factors out of government control (say, business cycles, the profitability of the corporate sector, historical events etc). This limits their reliability for reflecting government tax setting behaviour. A related problem occurs with the implicit tax rates due to Mendoza et al. (1994) that divide tax revenues earned from one factor by its pre-tax income. These tax rates are not linear in the “real” tax burden supposed to be approximated.<sup>10</sup> As a consequence, a country with high tax burden might be misleadingly identified as a low tax country.

In contrast to revenue-based ratios, measures based on tax laws give more direct information on how governments react to changing environments. Thus, they appear more useful in our context. For capital taxes, we use the *effective marginal tax rate (EMTR)*, provided by Devereux et al. (2002). The EMTR measures the impact of tax policy on marginal investments via its impact on capital costs<sup>11</sup> and allows inferences on how tax policy affects the size of the capital stock. This comes close to the capital tax rate of our theoretical model.<sup>12</sup> A drawback of the EMTRs is their sensitivity to underlying assumptions (financing sources etc.) and their disregard of enforcement issues.<sup>13</sup>

To measure the tax burden on wages, we employ the tax wedge on labour income as provided by OECD (2006). This tax wedge reflects the tax rate faced by a worker in the manufacturing sector earning average income; it includes social security contributions and payroll taxes. The tax wedge is based solely on tax laws; yet it is not a marginal tax rate, which would better capture government-induced distortions of the labour-leisure decisions.

In the regressions to follow, we use the ratio between the EMTR and the tax wedge as the independent variable.

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<sup>10</sup>Let  $t$  and  $y$  denote the “real” tax rate and the pre-tax income, respectively. Suppose  $y$  is decreasing in  $t$ . When there are tax exemptions, denoted by  $E$ , the Mendoza-tax rate ( $M$ ) is given by  $M = t(1 - \frac{E}{y(t)})$ .  $M$  first increases, and then decreases in  $t$  for  $E > 0$ . Only without exemptions, i.e.  $E = 0$ , we have  $M = t$ .

<sup>11</sup>We use the base case from Devereux et al. (2002) which applies to an (hypothetical) investment in plant and machinery, financed by equity.

<sup>12</sup>We do not use the statutory corporate tax rate and the effective average tax rate (EATR). As argued in Devereux et al. (2004), the former is relevant for profit shifting, the latter for locational decisions of multinational enterprises. Both aspects are not in our focus. However, as shown in Appendix 2, the statistical results are qualitatively the same when EATRs or statutory rates are used.

<sup>13</sup>See Stewart and Webb (2006) for further criticism of EMTRs.

### 3.3 Capital mobility and other controls

We follow previous studies by assuming that capital mobility is positively related to the overall openness of an economy. We employ the composite openness measure provided by Dreher (2006); this measure takes into account different aspects of economic integration, such as trade and FDI flows, portfolio investments, but also restrictions on current and capital account. Dreher's index (referred to below as *economicglob*) measuring a country's openness is scaled such that higher values indicate higher levels of economic integration. A potential drawback of this measure in our context is its broadness. E.g., it includes trade flows which might not be associated with cross-border capital movements. A more direct proxy for capital mobility would be the so called Quinn 0-4 index. However, this qualitative index does not show enough variation to be useful in fixed-effects regressions (see e.g. Hauffer et al., 2008, or Bretschger and Hettich, 2002). In line with the model presented above, we expect to find a negative correlation between *economicglob* and the ratio between the EMTR on capital and the tax wedge on labour.

Clearly, the variables identified as crucial for the tax structure in our simple model (i.e., the degree of postmaterialism and capital market integration), are not the only factors driving the tax setting behaviour of real-world governments. Therefore, we control for a variety of other factors. To capture an economy's relative market size, we employ a country's GDP relative to the GDP of USA (*size*). Such a variable might be relevant as Bucovetsky (1991) and Wilson (1991) show that smaller countries face a lower (per capita) capital elasticity, thus having incentives to tax capital at lower levels. We therefore expect to find a positive relationship between *size* and the ratio of capital to labour taxes. To control for governments' ideologies, we use an index provided by Potrafke (2008). This partisan index, which is scaled such that higher values indicate a stronger position of left-wing over right-wing parties in government and parliament, will be referred to as *ideology*. As left-wing parties are inclined to rely more heavily on capital taxation, we expect to find a positive correlation between *ideology* and the ratio of EMTR to the tax wedge on labour. To account for budgetary pressures, we include the budget saldo normalized by GDP (*budget saldo*). To control for demographic effects on the government budget, we include the percentage of the total population between 15 and 64 years (*pop15to64*). To capture fluctuations in the business cycle, a country's unemployment rate (*unemp*) and its growth rate of real GDP (*growth*), measured at PPP, are included. As argued by Krogstrup (2004), governments might utilize the capital tax rate as an instrument of employment policy. Against this background, it could be held that *unemp* negatively impacts on the ratio of the EMTR to the tax wedge on labour.

### 3.4 Method and results

We construct a panel data set for 17 countries, covering the period from 1981 to 2000.<sup>14</sup> As the WVS studies were carried out in four waves only (1981-1982, 1990-1991, 1995-1998, and 2000-2002), we obtain at maximum four observations for the national postmaterialism indexes during the period under study. To generate yearly values, we linearly interpolate between two waves for each country. This imputation, though rough, allows for unobserved time-invariant heterogeneity between countries, that we otherwise cannot control for. However, our data set is still “unbalanced” since not all countries participated in every wave. If, say, a country did not participate in the first wave but in each of the subsequent ones, then the time series for this country starts with the date at which the second wave was conducted. For these reasons, we come up with a maximum number of 265 observations for the postmaterialism measures derived from the WVS.

The statistical model we estimate is:

$$\left( \frac{EMTR}{\text{tax wedge on labour}} \right)_{it} = X_{it}\beta + a_i + b_t + u_{it}.$$

Here, the  $X_{it}$  are the explanatory variables in country  $i$  at time  $t$  and  $u_{it}$  is a possible heteroscedastic and serially correlated error. Variables  $a_i$  absorb all unobserved effects that differ among countries but are constant over time, whereas variables  $b_t$  represents unobserved factors that are identical for all countries but change over time.<sup>15</sup> To ensure conservative statistical inferences, results are presented by using heteroscedasticity and autocorrelation robust standard errors following the approach developed by Newey and West (1987).<sup>16</sup>

The main regression results are shown in Table 1. The basic specification is presented in column (1). It does not include postmaterialism indexes and regresses the ratio between the EMTR and the tax wedge on labour on the openness measure, *economicglob*, controlling for various the other factors described earlier. The relationship between *economicglob* and the tax ratio is negative and highly statistically significant. While result is in full accordance with the theoretical prediction that a higher capital market integration is associated with a lower relative tax burden on capital, we should stress that many previous empirical studies fail to produce that observation. The reason why we obtain the expected sign may be due to the circumstance that we use a tax ratio as a dependent variable and not the capital tax rate on its own.<sup>17</sup> However, the coefficient of the market size variable, *size*, is negative at a weakly statistically significant level. This seemingly contradicts the theoretical prediction that larger countries more heavily rely on

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<sup>14</sup>The countries included are Austria, Belgium, Canada, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and the USA.

<sup>15</sup>To control for fixed effects, we include year and time dummies in our regressions below.

<sup>16</sup>To obtain HAC-consistent standard errors, we use the Newey-West covariance matrix with lag one. However, our inferences remain unchanged when using two or more lags.

<sup>17</sup>Schwarz (2007) arrives at a similar conclusion.

Table 1: Regression results

	(1)	(2)	(3)	(4)
<i>economicglob</i>	-0.31*** (0.08)	-0.28** (0.12)	-0.31*** (0.12)	-0.23** (0.11)
<i>size</i>	-0.60* (0.32)	-0.24 (0.40)	-0.02 (0.38)	-0.38 (0.39)
<i>ideology</i>	0.004 (0.01)	0.004 (0.01)	0.01 (0.01)	0.01 (0.02)
<i>budget saldo</i>	0.01** (0.01)	0.01* (0.01)	0.01 (0.01)	0.01 (0.01)
<i>pop15to64</i>	0.002** (0.001)	0.002** (0.001)	0.002** (0.001)	0.002** (0.001)
<i>growth</i>	0.006 (0.01)	0.003 (0.01)	0.002 (0.01)	 (0.004)
<i>unemp</i>	-0.03*** (0.01)	-0.03*** (0.01)	-0.02*** (0.01)	-0.03*** (0.01)
<i>adj. Inglehart index</i>		-0.60** (0.24)		
<i>future changes</i>			-1.01* (0.64)	
<i>education qualities</i>				-0.45*** (0.15)
observations	311	256	265	265
$R^2$	0.88	0.92	0.92	0.92

HAC-robust standard errors with a lag-length of one in parentheses.

Stars indicate levels of significance (\*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ .)

All regressions include country-fixed and time-fixed effects. Dummies are not reported.

capital taxes. This “wrong” sign will survive in (almost) all specifications, but will eventually become statistically insignificant. Among the other explanatory variables, (only) the coefficients of *budget saldo*, *pop15to64*, and *unemp* turn out to be statistically significant in the expected directions.

Columns (2) to (4) in Table 1 extend the basic specification by separately adding our various postmaterialism indexes. Recalling that these indexes are scaled such that higher values denote a higher tendency towards postmaterialism, all coefficients show the “correct” negative sign. Moreover, all coefficients are statistically significant ranging from a ten percent to a five percent level. Thus, our cultural variables turn quite successfully explain the ratio of EMTR to tax wedge on labour.

As mentioned above, the effect of *size* becomes statistically insignificant after including postmaterialism measures. This might be due to fact that our market size variable is strongly positively correlated with the postmaterialism proxies:<sup>18</sup> When omitting postmaterialism indexes from the regression, the effects postmaterialism effect may be hidden in the market power proxy. After all, *size* (= national GDP, relative to US-GDP) also captures wealth effects, and the high correlation between *size* and the degree of postmaterialism conforms with Inglehart (1990)’s prediction that richer countries exhibit stronger tendencies towards postmaterialism.

### 3.5 Extensions and robustness

Appendix 2 reports some further robustness checks. Specifically, our results do not change when we use the ratio between the EATR (rather than the EMTR) on capital to the tax wedge on labour as the dependent variable. We still obtain a (statistically significant) negative relationship between postmaterialism and tax structure (see column (1) in Table 3). However, when using the ratio between the nominal corporate income tax rate and the tax wedge on labour, the (still negative) relationship becomes insignificant in some regressions (see column (2) in Table 3).

Postmaterialism remains statistically significant for the tax mix after controlling for per-capita GDP (see column (3) in Table 3). This indicates that cultural attitudes indeed exert a genuine influence on the tax mix that is not driven by changes in economic circumstances.

Recall that we control for country-fixed effects in all regressions. This makes variables that change only slightly over time – which is often said of attitudes and beliefs – difficult to become significant. Moreover, standard errors are estimated in a HAC-robust way which likewise depresses significance. When estimating without autocorrelation-robust standard errors, parameter estimates for the postmaterialism proxies become statistically significant at the one-percent level (see , column (4) in Table 3). The robustness of our regression results is further supported by the fact that all coefficients that are significant in our basic regressions maintain their signs and (in almost every case) their significance when postmaterialism proxies are added.

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<sup>18</sup>E.g., the correlation between *size* and the *adjusted Inglehart index* is +0.35.

## 4 Conclusion and Discussion

Cultural values shape policy outcomes. Starting from that premise, we investigated the impact of a growing tendency towards postmaterialism on tax policies. Specifically, we analyzed how the relative importance which society ascribes to non-consumptive values affects its choice of tax structure, i.e., the mix of capital and labour taxation.

Postmaterialism means that individuals place higher priority on non-material goods in their preferences. This includes both a reduced preference weight on goods other than (materialist) consumption and a weaker responsiveness to (dis-)incentives to make money. Understood in that way, a higher and substantial degree of postmaterialism goes along with a lower [higher] relative tax burden on capital [labour]. People who are less interested in material possessions are also less sensitive to higher labour taxation. Since postmaterialists put relatively lower priority on consumption, their avoidance of taxation by fleeing into leisure is low as well.

Thus, a higher degree of postmaterialism has a similar effect on the tax mix as a higher degree of capital mobility, though through an entirely different channel. Changes in attitudes may, thus, complement the standard “globalization argument” for the observed decline in the relative importance of capital taxes.

Our model has clear predictive power: The rise of postmaterialist values in advanced economies triggered, on its own, reductions in the relative reliance on capital taxation. Testing the predicted negative link between postmaterialism and the relative reliance on capital taxation proved fully successful: All estimates for postmaterialism parameters show the predicted sign at high levels of statistical significance.

Several critical points – which then open avenues for future research – have to be stressed, though. Foremost, our modelling of postmaterialism is open to dispute. We limited the effects of postmaterialism to labour supply. Arguably, postmaterialism in a more complete, intertemporal framework should be modelled as to also affect the allocation of capital.

Furthermore, the simple link we assumed between postmaterialism and the elasticity of labour supply has only superficially been established empirically so far. In spite of the widespread discussion of postmaterialism (starting in the 1970s) empirical studies on the behavioural consequences of changes in attitudes towards material values are remarkably scarce. Still, we believe that our way of modelling captures, in a manageable way, important features of the complex phenomenon of dampened materialism. Moreover, our modelling of postmaterialist preferences gives rise to hypotheses that themselves turn out to have empirical content and support. If our empirical findings are not mere statistical artefacts but rest on some underlying causality, then our model might be one candidate for an explanation.

Theoretically, the relationship between postmaterialism and the capital-labour tax ratio is not monotonic, but hump-shaped. At low levels, lesser importance attached to material goods

leads to a higher, rather than to a smaller, reliance on capital taxes. For the empirical part we excluded this feature, arguing that the countries in our sample are, by common standards, highly postmaterialist. Non-availability of data at present forbids to extend our empirical analysis also to (still) more materialist countries. Closing this gap is on our agenda for future research. Finally, we represent the [increased] importance of postmaterialist values by [the exogenous change of] an exogenous parameter. There is some evidence (also manifest in the selection of countries for the empirical analysis) that postmaterialism is an attitude dominantly found in richer economies – and, thus, is at least partly endogenous. Allowing for endogenous value formation is a further challenge – both from a theoretical and an empirical perspective.

## Appendix 1: Data sources and methods

Table 2: Data sources and methods

Variable	Source	Definition
EMTR	IFS data	Effective marginal tax rate for a (hypothetical) investment. Base case (investment in plant and machinery, financed by equity). For further details, see Devereux et al. (2002).
EATR	IFS data	Effective average tax rate for an project with an expected rate of economic profit of 10 percent. Base Case. For further details, see Devereux et al. (2002).
nominal	IFS data	Statutory corporate income tax rate, including local taxes and surcharges.
tax wedge	OECD Taxing Wages	Average tax wedge of a single, manufacturing worker with average income, including social security contributions and payroll taxes. Before 1993, it is reported biannually, and we interpolate linearly.
<i>economicglob</i>	KOF data	Openness measure taking into account different aspects of economic integration. For further details, see Dreher (2006).
<i>gdp</i>	AMECO	Gross domestic product at current market prices (billion US-\$, PPP)
<i>size</i>	AMECO, own calculation	GDP of country divided by GDP of USA
<i>budget saldo</i>	OECD	Budget saldo, in percent of GDP
<i>ideology</i>	Potrafke (2008)	Partisan index, where higher values indicate a stronger position of left wing over right wing parties. For further details, see Potrafke (2008).
<i>pop15to64</i>	AMECO	Percentage of the total population between 15 and 64 years
<i>growth</i>	AMECO	Growth rate of real GDP, measured at PPP
<i>unemp</i>	OECD	Unemployment rate
<i>per capita GDP</i>	AMECO	GDP divided by total population
<i>inflation</i>	AMECO, OECD	Inflation rate
<i>adj. Inglehart index</i>	WVS, own calculation	Proxy for a country's tendency towards post-materialism. For a detailed description, see Section 3.1.
<i>future changes</i>	WVS, own calculation	Postmaterialism proxy. For a detailed description, see Section 3.1.
<i>education qualities</i>	WVS, own calculation	Postmaterialism proxy. For a detailed description, see Section 3.1.

IFS data available from <http://www.ifs.org.uk>.

All OECD data are available from <http://new.sourceoecd.org>.

AMECO data are available from <http://ec.europa.eu>.

KOF data are available from <http://globalization.kof.ethz.ch>.

WVS data are available from <http://www.worldvaluessurvey.org>.



## Appendix 2: Additional Regressions

Table 3: Additional regression results

	(1)	(2)	(3)	(4)
Dep. variable	EATR/tax	Nominal/tax	EMTR/tax	EMTR/tax
	wedge	wedge	wedge	wedge
<i>economicglob</i>	-0.18** (0.08)	-0.18** (0.12)	-0.26** (0.11)	-0.27*** (0.08)
<i>size</i>	0.36 (0.27)	1.1*** (0.33)	0.28 (0.52)	-0.23 (0.34)
<i>ideology</i>	0.005 (0.01)	0.002 (0.01)	0.01 (0.01)	0.005 (0.01)
<i>budget saldo</i>	0.01** (0.004)	0.02*** (0.004)	0.01 (0.01)	0.01** (0.004)
<i>pop15to64</i>	0.002** (0.001)	0.002** (0.001)	0.002 (0.001)	0.002* (0.001)
<i>growth</i>	0.0004 (0.003)	0.002 (0.005)	0.004 (0.005)	0.003 (0.005)
<i>unemp</i>	-0.01*** (0.01)	0.002 (0.002)	-0.01*** (0.01)	-0.03*** (0.01)
<i>adj. Inglehart</i>	-0.37** (0.18)	-0.25† (0.17)	-0.51** (0.24)	-0.60*** (0.17)
<i>per capita GDP</i>			-4.18* (2.28)	
observations	256	256	256	265
$R^2$	0.96	0.95	0.92	0.92

HAC-robust standard errors (except of specification 4) with a lag-length of one in parentheses.

Stars indicate levels of significance (†  $p < .15$ , \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ .)

All regressions include country-fixed and time-fixed effects. Dummies are not reported.

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