The Political Economics of Redistribution and "Pro-Growth" Spending

(A short overview and some discussion for the Czech Republic)

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The standard theory of long-run growth has been seeking for *normative* recommendations to the policymakers on how to improve long-run prospects of the economy. This is true both of the neo-classical models, and the "new growth theory". The former line of models can be applied to studying optimal tax policies, pension insurance schemes and so on. The later kind of models is typically used to derive optimal patent protection rules, educational and primary research public spending, applied research and development (R&D) subsidy schemes etc. In giving these recommendations, it is often implicitly assumed that there exist benevolent politicians whose true desire is to maximize the utility of a representative economic agent, and who are thus ready to listen to the first-best advises of the economic theory.[2]

The real-life policies, however, are often far from optimal. To understand this, we need to provide a *positive* analysis of the actual policy-making process. The economists started to explore these issues systematically thanks to the public choice theory in the second half of the 20th century.[3] During the 1980-90s, the analysis has become more formalized thanks to the "new political economics". The strategy is to define a clear decision-function of the politicians and seek for their optimum choices subject to the constraints stemming from a rational economic and electoral behaviour of the economic agents.

The Czech economic community was long isolated from the rest of the world, and the new political economics thus have had little impact on its thinking so far. The aim of this paper is to partly make up for this deficit. I survey the basic approaches of the new political economics, putting the main emphasis on illustrating the basic tools rather than providing a comprehensive survey of literature.[4] I focus on the government's dilemma between financing productive pro-growth projects and running re-distributive social policies. In sections I and II, a simple one-period model of public finance is presented in a median-voter and a "swing-voter" setting, respectively. Section III focuses on the dynamic inconsistency problem in taxation.

In section IV, I discuss how the previous theoretical findings correspond to the current state of public finance in the Czech Republic. I stress that the public

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[1] This paper expresses my own opinions and may not correspond to the official views of these two institutions. I am grateful to V. Bezděk from the CNB for providing me with the data (including forecasts for 2000 and 2001) on the current fiscal developments of the Czech Republic.

[2] A partial exception is, for example, Lucas (1990) who is not seeking for the first-best tax policy in his paper, but rather for a second or third-best policy, claiming that the first-best (i.e. lump-sum taxation) is not implementable in practice due to political constraints. Nevertheless, he just takes these political constraints as given without deriving them endogenously within his model.

[3] The most distinguished proponent of this economic school is the Nobel-Prize winner J.M. Buchanan. See e.g Buchanan (1960) or Buchanan and Tullock (1962).

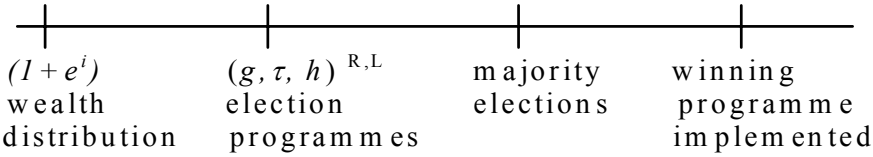
[4] For a more comprehensive survey see e.g. Persson and Tabellini (1998a,b).

budgets are caught in a structural and political "trap". On the one hand, there is a desire to finance pro-growth public projects that would facilitate real convergence to the EU, but on the other hand the demographic trends, increasing inequality and unemployment (plus left-wing ideological bias of the current government) push on higher re-distributive spending. This leads to increasing structural budget deficits that may eventually threaten the macroeconomic stability of the Czech Republic. Section V summarizes and concludes.

I. One-Period Median-Voter Model

I will use the simplest possible model of a one-period economy, the time structure of which is illustrated in Figure 1.[5]

Figure 1: The Electoral Process (one-period model)



At the beginning of period, the nature endowns each individual *i* with an amount of effective time $(1+e^i)$, which will be the only source of inequality among people in this model. We will assume that e^i has a continuous distribution function $F(e^i)$ with

$$e^i \sim F(e^i); \quad E(e^i) = 0; \quad e^m < 0 \qquad (1),$$

where *E* denotes mathematical expectations and e^m is the median of the distribution. The median is assumed to be below the mean (i.e. smaller than zero), and the distribution is thus skewed to the right, which correspond to the empirical observations on the distribution of wealth in democratic (and other) societies. The absolute value of e^m can be interpreted as a condensed measure of the social (ex-ante) inequality (see e.g. Persson, Tabellini, 1998a,b).

The second and third steps in the model are an election campaign of the political parties and the subsequent polls. In line with the mainstream new political economics, I will assume that the elections have a majority form with only two competing parties *R* and *L*. The party that receives more than 50 % of votes wins the office. The election programme of each party contains a proposed per capita level *(g)* of the public productive (or pro-growth) spending.[6,7] At the

[5] The model is a modification of the „textbook" models presented in Persson, Tabellini (1998a,b). For more general models, see e.g. Meltzer and Richard (1981) or Roberts (1977).

[6] Among productive spending I consider R&D programmes, education, infrastructure investment etc., or in general all the public purchases that do not substitute for private consumption but are instead aimed at improving the aggregate production function of the economy. In this static one-period setting it is probably not correct to speak about pro-growth spending, as there is no economic growth in the proper sense of this word, and the public spending has a direct instantaneous effect on the GDP. It would not be conceptually difficult, however, to extend the model to a multi-period setting and allow for GDP growth and lags in the effects of public spending.

same time, each party proposes how to finance its spending through a combination of a lump-sum tax *(h)* and a wage tax with a linear tax rate *(τ)*. The lump-sum tax can be negative, of course, being equivalent to lump-sum transfers. Both the two parties must obey the public budget constraint that has a form

$$\tau L(\tau;g) + h = g \qquad (2),$$

where $L(\tau;g)$ is the average per-capita labour supply-function (to be defined below – see equation 7). The parties are purely office-seeking, which means that their sole aim is to design their election programmes in such a way as to maximize their probability of winning the office.[8]

At the end of period, the winning political party implements its programme. At this stage of the paper, I will assume that the parties are able to credibly commit to their election promises (or that they have no own policy preferences that would motivate them to deviate from their proposals). I will relax this assumption in section III when discussing the dynamic inconsistency issue.

The individuals' aim is to maximize their utility by choosing the optimal level of consumption and leisure, given their individual budget constraint. Formally, the individual *i* solves the following problem

$$\begin{aligned} &\underset{c,x}{Max}\, U^i = c^i + V(x^i) \\ &s.t. \quad c^i = (1-\tau)l^i - h \\ &\qquad x^i + l^i = (1+e^i)\Phi(g) \end{aligned} \qquad (3),$$

where c^i denotes consumption, x^i leisure and l^i the time spent working for a gross wage normalized to 1. Following Persson and Tabellini (1998a,b), I assume risk neutrality of the agents in consumption.[9] The utility of leisure $V(x)$ is an increasing and concave function. As we can see, the public productive spending is assumed to affect the production-function of the economy by multiplying the individuals' stock of effective time. I assume

$$\Phi(0) = 1; \quad \Phi_g(g) > 0; \quad \Phi_{gg}(g) < 0 \qquad (4),$$

i.e. that the function $\Phi(g)$ is increasing and concave.

We can rewrite the optimization problem (3) as

$$\underset{l}{Max}\, U^i = (1-\tau)l^i - h + V\left((1+e^i)\Phi(g) - l^i\right) \qquad (5).$$

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[7] In Čihák and Holub (2000), for example, we illustrate how public provision of consumption goods and services could be easily included in the model (in a special setting in which there is no political conflict over the level of public consumption). In this paper, however, I ignore this additional dimension of public finance for simplicity.

[8] As opposed to the „citizen-candidate" models (see e.g. Osborne, Slivinski, 1996; Persson, Tabellini, 1998a,b).

[9] This assumption greatly simplifies the algebra as it eliminates the income effects on the marginal utility of consumption, and in the optimum thus also the income effects on the labour supply (see below).

The individual's optimum can be found by differentiating this utility function with respect to l^i and setting the derivative equal to zero. The resulting first-order condition for the labour supply is

$$V_x\left((1+e^i)\Phi(g)-l^i\right)=(1-\tau) \qquad (6),$$

where $V_x(...)$ is the derivative of $V(...)$ with respect to labour[10]. Equation (6) says that in an optimum the marginal utility of leisure must be equal to the utility of consumption the individual can gain by increasing his/her labour supply by one marginal unit (and thus earning an additional net wage of $1-\tau$) [11].

From equation (5) we can derive the individual's labour-supply function

$$l^i\left(e^i,\tau\right)=e^i\Phi(g)+L(\tau;g), \quad L(\tau;g)\equiv\Phi(g)-V_x^{-1}(1-\tau) \qquad (7),$$

where $V_x^{-1}(...)$ denotes an inverse function to $V_x(...)$. The individual's supply of effective labour can thus be divided into a common component $L(\tau;g)$ and an idiosyncratic component $e^i\Phi(g)$. This is enabled by the assumed risk-neutrality of the economic agents, which eliminates the income effects on marginal utility of leisure in the optimum. Given the zero mean of e^i, $L(\tau;g)$ also represents the average per-capita effective labour-supply, and thus enters the government's budget constraint (2). $L(\tau;g)$ is decreasing in the wage-tax rate τ, which follows from the assumed concave shape of $V(x)$. On the other hand, it is increasing in the public productive spending g, which results directly from the fact that $\Phi(g)$ is increasing.

By substituting from the labour-supply function (7) back into the right-hand side of (5), we get an indirect utility function

$$W^i\left(e^i,g,\tau\right)=(1-\tau)e^i\Phi(g)+L(\tau;g)-g+V\left(V_x^{-1}(1-\tau)\right) \qquad (8),$$

which is increasing in e^i, and further depends (in a non-monotonic way) on the level of public productive spending g and on the wage-tax rate τ.

If the parties R and L propose election programmes given by $(g^R;\tau^R)$ and $(g^L;\tau^L)$, respectively, the simplest-possible voting behaviour of the individual i follows[12]:

$$\begin{aligned} &W^i\left(e^i,g^R,\tau^R\right)>W^i\left(e^i,g^L,\tau^L\right) &&\Rightarrow \text{vote for R}\\ &W^i\left(e^i,g^R,\tau^R\right)<W^i\left(e^i,g^L,\tau^L\right) &&\Rightarrow \text{vote for L}\\ &W^i\left(e^i,g^R,\tau^R\right)=W^i\left(e^i,g^L,\tau^L\right) &&\Rightarrow \text{randomize with probability } 1/2 \end{aligned} \qquad (9).$$

If a party wants to please voter i as much as it can, it must propose policies that fulfil two first-order conditions that can be found by differentiating the indirect utility function (8) with respect to g and τ and setting these partial

[10] I keep the same notation throughout the whole paper.
[11] Recall that the marginal utility of consumption is constant at 1 due to the risk neutrality of individuals.
[12] The proposed levels of lump-sum tax or transfer follow directly from the government's budget constraint.

derivatives equal to zero.[13] After some rearranging, these two conditions are (super-scripts *i* denote policies optimal for agent *i*):

$$\Phi_g\left(g^i\right)=\frac{1}{1+\left(1-\tau^i\right)e^i} \qquad (10),$$

$$\tau^i=\frac{e^i\Phi\left(g^i\right)}{L_\tau\left(\tau^i\right)} \qquad (11).$$

From equation (10), we can see that the optimal level of public productive spending is increasing in the individuals type e^i. Equation (11), on the other hand, shows that the individual's optimal level of wage-tax rate is falling with his type e^i.[14] Very productive agents thus want a high level of public investments and low degree of redistribution through income taxes, and vice versa.

What policies would be recommended in this setting by the standard supply-side economics in a representative (or mean) agent model? For the mean agent, e^i is equal to zero, which gives the optimal policies

$$\Phi_g(g)=1 \qquad (12),$$

$$\tau=0 \qquad (13).$$

The level of productive investment thus is exactly as high so as to make its marginal benefit (i.e. marginal productivity gain) equal to its marginal cost of foregone private consumption, which is one here. The wage-tax is equal to zero and all the public investment is financed through non-distortionary lump-sum taxes.

This first-best policy, however, does not correspond to the outcome of the political process. In equilibrium of this simple model, the policy proposals of the two parties are not suited to the average (mean) individual, but to the median voter.[15] The equilibrium outcome is thus characterized by

$$\Phi_g\left(g^*\right)=\frac{1}{1+\left(1-\tau^*\right)e^m}>1 \qquad (14),$$

$$\tau^*=\frac{e^m\Phi\left(g^*\right)}{L_\tau\left(\tau^*\right)}>0 \qquad (15).$$

This means that in equilibrium, there is a sub-optimal level of public pro-growth spending, and there exists redistribution through income taxes. This stems from the fact that the median voter's wealth is below the average, i.e. from the

[13] I implicitly assume here that all the relevant functions in the model are well-behaved so that the second-order conditions be fulfilled. This requires, inter alia, that the labour supply function is concave, or at least not „too convex".

[14] Recall that $L_\tau(...)$ is negative. Due to this fact, individuals with a positive endownment e^i in fact desire a negative wage-tax rate, being equivalent to production subsidies.

[15] The median-voter theorem can be applied here despite the multi-dimensional policy programmes due to the fact that the indirect utility function is linear in the individual's type e^i, which means that the so-called „single-crossing condition" is satisfied. See Coughlin and Hinich (1984) for the necessary and sufficient conditions for single-peakedness.

inequality in wealth and income distribution in the society. If the degree of inequality is large, the lump-sum taxes may even become lump-sum transfers, and the income taxes then need to be high enough not only to cover the cost of public investments, but also to cover these transfers. At the same time, though, the distortionary effects of wage taxes (here measured by the elasticity of labour supply with respect to the tax rate) cannot be ignored completely by the politicians, as the denominator in (15) shows.

To sum up, the greater the degree of social inequality (and the less responsive people are to taxation), the more it pays off to the policy-makers to levy distortionary income taxes, and spend on social policies rather than on productive investment that would enhance the production possibilities of the economy. This is a standard mechanism in the new political economics that explains the observed negative impacts of inequality on the economic growth.[16]

II. One-Period Swing-Voter Model

The election competition that we modelled in the previous section is very simplified in that it treats the voters as fully rational, neglects all other policy issues that are not directly discussed within the model etc. In reality, however, the elections are not only about choosing a desired fiscal policy. Instead, they concern many other aspects, which I will summarize under the term "popularity" here. This popularity may stem from purely "irrational" preferences of the individuals for the political parties or their representatives (such as personal sympathy etc.), or from non-modelled policy issues (political, social, cultural, religious etc.) that do not have direct (or at least first-order) fiscal consequences. In this section, I allow for such additional factor in a very simplified (in fact mechanical) way, modifying the model from the basic medium-voter setting to a probabilistic voting (or "swing-voter") setting. [17]

There will be only two changes compared to the model of section I. First, I will cease to assume a continuous distribution function of endownments given by (1). Instead, I will assume that each individual i belong to a homogenous social group j, the members of which all have the same endownment of effective time e^j. There will be a total J of these groups, the weight of each group in population being λ^j. The following is an analogue to the assumptions from (1):

$$\sum_{j=1}^{J} \lambda^j e^j = 0; \quad e^m < 0 \qquad (16),$$

where m denotes the median group (i.e. group that includes the median voter).

[16] See e.g. Persson and Tabellini (1994) for some empirical findings on the relationship between inequality and growth. Alesina and Perotti (1993) provide an alternative view of why income inequality reduces the economic growth. According to their cross-country estimates, income inequality increases political instability, which in turn reduces investment and lowers GDP growth (in line with the empirical findings of Barro, 1991). The traditional political economic view was also disputed by Saint-Paul, et al. (1996) and others.

[17] For probabilistic voting, see e.g. Coughlin and Nitzan (1981), Lindbeck and Weibull (1993), or the surveys in Persson and Tabellini (1998).

Second, I will abandon the assumption of a deterministic voting defined by (9) in favour of a probabilistic voting behaviour. In particular, I will assume that there is a popularity "shock" $\delta + \psi^{ij}$ working in favour of party R. The term δ is a population-wide shock, while ψ^{ij} is an idiosyncratic shock for voter i coming from group j. The population-wide preference shock has a uniform distribution function $D(\delta)$ on the interval

$$\delta \in \left[-\frac{1}{2\Delta}; \frac{1}{2\Delta} \right] \qquad (17),$$

while the idiosyncratic popularity shock has a uniform distribution function $S(\psi^{ij})$ on the interval

$$\psi^{ij} \in \left[-\frac{1}{2\Psi^j}; \frac{1}{2\Psi^j} \right] \qquad (18),$$

where Ψ^j may (or may not) differ among groups. The two kinds of popularity shocks, the realizations of which are not known to the political parties at the time of elections, are assumed to be mutually independent. The voting behaviour can be summarized as follows:

$$\begin{aligned} W^{ij}(e^j, g^R, \tau^R) + \delta + \psi^{ij} > W^{ij}(e^j, g^L, \tau^L) &\Rightarrow \text{vote for R} \\ W^{ij}(e^j, g^R, \tau^R) + \delta + \psi^{ij} < W^{ij}(e^j, g^L, \tau^L) &\Rightarrow \text{vote for L} \\ W^{ij}(e^j, g^R, \tau^R) + \delta + \psi^{ij} = W^{ij}(e^j, g^L, \tau^L) &\Rightarrow \text{randomize w.p. } 1/2 \end{aligned} \qquad (19).$$

We can find a critical level of the idiosyncratic popularity shock (denoted ψ^j) which makes an individual from group j indifferent between voting for R and L as

$$\psi^j = W^{ij}(e^j, g^L, \tau^L) - W^{ij}(e^j, g^R, \tau^R) - \delta \qquad (20).$$

All the people from group j with a personal popularity shock below σ^j vote for party L, and vice versa. The probability of an individual from group j voting for party L, given the two proposed political programmes and the population-wide popularity shock δ thus equals:

$$S(\psi^j) = \Psi^j \left[W^{ij}(e^j, g^L, \tau^L) - W^{ij}(e^j, g^R, \tau^R) - \delta \right] + \frac{1}{2} \qquad (21).$$

The overall probability of party L winning the elections (i.e. getting more than 1/2 of the votes) is thus given by:

$$P^L = \operatorname*{Prob}_{\delta} \left[\sum_{j=1}^{J} \lambda^j S(\psi^j) \geq \frac{1}{2} \right] = \Delta \sum_{j=1}^{J} \left(\lambda^j \Psi^j \left[W^{ij}(e^j, g^L, \tau^L) - W^{ij}(e^j, g^R, \tau^R) \right] \right) + \frac{1}{2} \qquad (22).$$

The first-order condition for the optimal policy proposal of party L, which maximizes its chances to be elected, is then found by differentiating the above

expression with respect to the policy variables $(g^L;\tau^L)$, and setting the partial derivatives both equal to zero. We get

$$\Delta\sum_{j=1}^{J}\left(\lambda^j\Psi^j W_g^i\left(e^j,g^L,\tau^L\right)\right)=0 \qquad (23),$$

$$\Delta\sum_{j=1}^{J}\left(\lambda^j\Psi^j W_\tau^i\left(e^j,g^L,\tau^L\right)\right)=0 \qquad (24).$$

In other words, a weighted sum of the partial derivatives of the indirect utility functions must equal to zero, the weight of each group corresponding to the product of λ^j (the group's share in population) and Ψ^j (the factor inversely related to the variability of preference shocks in group j). Using (8), this yields

$$\Phi_g\left(g^*\right)=\frac{1}{1+\left(1-\tau^*\right)\left(1/\overline{\Psi}\right)\sum_{j=1}^{J}\left(\lambda^j\Psi^j e^j\right)};\quad \overline{\Psi}\equiv\sum_{j=1}^{J}\left(\lambda^j\Psi^j\right) \qquad (25),$$

$$\tau^*=\frac{\Phi\left(g^i\right)\left(1/\overline{\Psi}\right)\sum_{j=1}^{J}\left(\lambda^j\Psi^j e^j\right)}{L_\tau\left(\tau^*\right)} \qquad (26).$$

The same logic applies to party R's choice of policy proposal. The equations (25) and (26) thus define a political equilibrium of the model in which both parties propose the same programme and win office with a probability of 1/2.

An interesting situation emerges when Ψ^j is the same for all groups (i.e. when $\Psi^j=\overline{\Psi}$ for all j). The equations (25) and (26) then reduce to (12) and (13), which means that the representative-agent first-best policy is implemented (unlike in the median-voter equilibrium).[18]

In this particular model, there is no endogenous reason why the variability of popularity shocks should differ among groups. I believe, though, that it is reasonable to assume that the poorer groups have relatively lower variability of these shocks (i.e. a higher Ψ^j) than the richer ones. What is the reason? In this model, I assumed a constant marginal utility of consumption as a simplifying device. In reality, however, it is reasonable to think that the marginal utility of consumption is decreasing. This means, that the relative (i.e. in ratio to the "true" marginal utility of consumption) importance of non-modelled policy aspects should be greater for the richer groups than for poorer people. This can be modelled here in a mechanical way by assuming that $1/\Psi^j$ is increasing in e^j, and Ψ^j is thus decreasing in e^j.[19]

[18] For this result, see e.g. Persson, Tabellini (1998a,b). Coughlin and Nitzan (1981) have proved that the political equilibrium in a probabilistic model is always a Nash social welfare maximum. The first-best representative-agent policy is a special case of the Nash social welfare maximum.

[19] Of course, a preferred strategy would be to model the increasing relative importance of popularity factors for richer groups in an endogenous way by leaving the assumption of a constant marginal utility of consumption. Holub (2000) is an example of a paper in which the marginal utility differs among groups and different

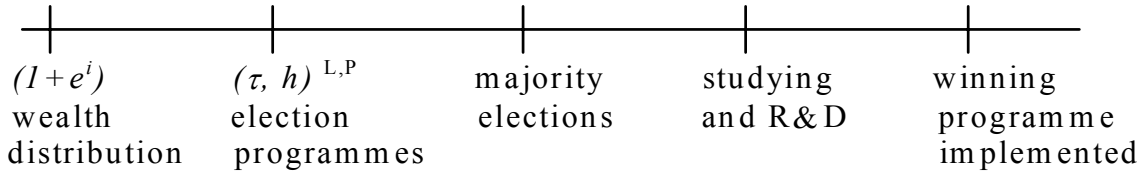
What is the result of such an assumption? If the poorer groups care much more about the fiscal programmes than about other policy aspects, they are relatively "easy-to-buy". They thus constitute a group of "swing-voters", for the votes of which it becomes attractive to compete. As a result, the weight of these groups in the equilibrium policy proposal is higher than their relative share in population, which is shown in equations (25), (26). This leads to an outcome that is qualitatively the same as in the previous simple median-voter model: there is a sub-optimal level of public pro-growth spending (i.e. its marginal product is greater than one), and there exists redistribution through income taxes (i.e. the wage tax is positive). Of course, there is no reason why the results should be the same as in the median-voter model quantitatively, too.[20]

III. Dynamic (In)consistency and Moral Hazard

In the previous two sections, I discussed how the government's redistribution goals may lead to a sub-optimal level of *public* productive, pro-growth spending. In this section, I want to show how the redistribution policies may reduce the motivation of *private* agents to invest into their own education and R&D programmes, and how these disincentives may be further strengthened by the dynamic inconsistency problem and moral hazard.

The modelling strategy will be very simple. From the simple median-voter model of Section I, I will assume away the public productive spending. On the other hand, I will add another period into the model that will precede the original one. During this first period, which I will call "studying and R&D" phase, the individual's decision-making will be for simplicity limited to choosing a level of investment into human capital, with no physical production and consumption taking place. The human capital will then increase their production capacities in the second period. The timing of the model will initially be assumed as in figure 2. The elections will take place before the "studying and R&D" phase, and the political parties will be able to credibly commit to their policies that will be implemented in the production and consumption phase. As a result, there will be no dynamic inconsistency problem in this initial example.

Figure 2: The Electoral Process (without dynamic inconsistency)



propensities „to swing" (see below) thus emerge endogenously. This paper applies a swing-voter model to studying the political sources of the inflationary bias in monetary policy.

[20] If the richer groups, though, can more easily organize and lobby for their interests, they can increase their weight in the electoral outcome. Interesting papers that develop political economy models with lobbying include Grossmann and Helpmann (1996) or Baron (1989). For a survey of see Persson, Tabellini (1998a,b).

The optimization problem of each individual will now be

$$\begin{aligned} &\underset{c,x_1,x_2}{Max} U^i = \beta c_2^i + V\left(x_1^i\right) + \beta V\left(x_2^i\right) \\ &s.t. \quad c_2^i = (1-\tau)\left(l_2^i + \theta s_1^i\right) - h \\ &\qquad x_1^i + s_1^i = 1 + e^i \\ &\qquad x_2^i + l_2^i = 1 + e^i \end{aligned} \qquad (27),$$

where β is the subjective discount factor, θ is a constant productivity of human-capital investment, *s* is the time spent studying and researching in the first period and the sub-indeces *1* and *2* denote the two periods.

The above problem can be re-written as

$$\underset{s,l}{Max} U^i = \beta\left[(1-\tau)\left(l_2^i + \theta s_1^i\right) - h\right] + V\left(1 + e^i - s_1^i\right) + \beta V\left(1 + e^i - l_2^i\right) \qquad (28).$$

The first-order conditions of (28) are

$$V_x\left(1 + e^i - s_1^i\right) = \beta\theta(1-\tau) \qquad (29),$$

$$V_x\left(1 + e^i - l_2^i\right) = (1-\tau) \qquad (30),$$

which leads to a "studying-function" and labour-supply function given by

$$s_1^i = e^i + S(\tau); \quad S(\tau) \equiv 1 - V_x^{-1}(\beta\theta(1-\tau)) \qquad (31),$$

$$l_2^i = e^i + L(\tau); \quad L(\tau) \equiv 1 - V_x^{-1}(1-\tau) \qquad (32).$$

As we can see, both these functions are increasing in the individual's endownment e^i and decreasing in the wage-tax rate τ.

The government's budget constraint is

$$\tau\left[L(\tau) + \theta S(\tau)\right] + h = 0 \qquad (33),$$

which means that all the resources that the government collects from the wage-tax must be distributed to citizens through lump-sum transfers.

The equations (28), (31), (32) and (33) together yield the indirect utility function

$$W^i\left(e^i, \tau\right) = \beta(1+\theta)(1-\tau)e^i + \beta\left[L(\tau) + \theta S(\tau)\right] + V\left(V_x^{-1}(\beta\theta[1-\tau])\right) + V\left(V_x^{-1}(1-\tau)\right) \qquad (34).$$

We can find the optimal policy proposal for the individual *i* by differentiating (34) with respect to τ and setting this derivative equal to zero. We get

$$\tau^i = \frac{(1+\theta)e^i}{L_\tau\left(\tau^i\right) + \theta S_\tau\left(\tau^i\right)} \qquad (35).$$

As in sections I, the first-best policy suited to the representative (i.e. mean) agent would be a zero wage tax. As before, though, this is not the political equilibrium. If the voting behaviour follows (9), the equilibrium policy proposals are suited to the medium voter, which implies

$$\tau^* = \frac{(1+\theta)e^m}{L_\tau(\tau^*) + \theta S_\tau(\tau^*)} > 0 \qquad (36),$$

i.e. a positive wage-tax rate and redistribution through lump-sum transfers. As a result, both the accumulation of human capital and the labour supply are sub-optimal in the political equilibrium, reducing the GDP level and growth. Again, the redistribution (and its negative effects) is the stronger the greater the degree of social inequality. It is constrained, though, by the elasticity of "studying-function" and labour-supply function with respect to the wage-tax rate.

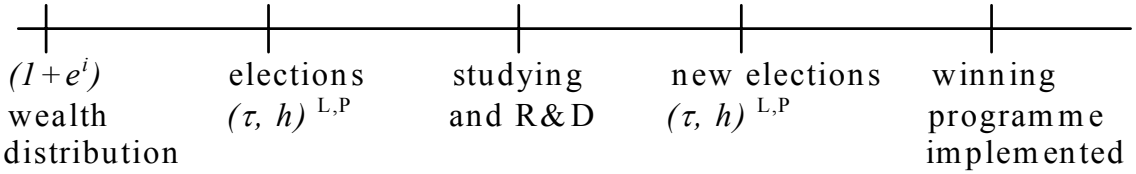
Finally, note that in a special case when $\beta\theta=1$ (or when the studying and labour-supply functions are linear) the equation (35) reduces to

$$\tau^* = \frac{e^m}{L_\tau(\tau^*)} = \frac{e^m}{S_\tau(\tau^*)} > 0 \qquad (37),$$

which is an exact analogue to (15).

The mechanism through which the inequality and government's redistribution policies are harmful to growth, which I have described so far in this section, is essentially the same as in the basic one-period model above. The only difference consists in the fact that it does not work via reducing the public productive spending, but instead via an adverse effect on private accumulation of knowledge. Now I will add another dimension, introducing the credibility and dynamic inconsistency problem.[21] I will assume that there is another election after the time has been invested into accumulation of human capital but before its contribution to future consumption is able to materialize (see Figure 3). As a result, the government may have an incentive to deviate from its earlier promises if the political equilibrium changes.[22]

Figure 3: The Electoral Process (with dynamic inconsistency)



At the time of the second elections, the investment into human capital already represents sunk costs that cannot influence the decision making of individuals. We will thus assume that the time an individual *i* spent studying is a constant s^i and the average studying time in the economy is another constant *S*.

The government's budget constraint thus now is

[21] The dynamic inconsistency problem in taxation was demonstrated in Kydlan and Prescott (1977), a seminal paper that gave rise to an extensive research of the dynamic inconsistency both in fiscal and monetary policies.

[22] Another line of the new political economy models are the so-called „citizen candidate" models. In these models, the politician has an incentive to ex-post deviate from the ex-ante promises due to his/her own preferences over policies, and not due to new elections. These models give some interesting results in addition to those presented here, such as the possibility of strategic delegation of power to a right-wing candidate etc.

$$\tau\left[L(\tau)+\theta S\right]+h=0 \qquad (38),$$

and the indirect utility function takes the form

$$W^{i}\left(e^{i},\tau\right)=(1-\tau)e^{i}+L(\tau)+(1-\tau)\theta s^{i}+\tau\theta S+V\left(V_{x}^{-1}(1-\tau)\right) \qquad (39).$$

Differentiating this with respect to τ and setting the derivative to zero, we get

$$\tau^{i}=\frac{e^{i}+\theta\left(s^{i}-S\right)}{L_{\tau}\left(\tau^{i}\right)} \qquad (40).$$

This shows, that in setting the ex-post (i.e. after the investment decisions have been made) policies, the parties do not take into account just the inherited inequality in wealth e^i, but also the acquired differences in accumulated human capital. Moreover, the supply of human capital becomes inelastic in the second elections, which reducers the constraints on redistribution policies. As a result, the equilibrium taxation is higher than if the political parties were able to commit to the ex-ante equilibrium defined by (37).

If people form they expectations rationally, they anticipate this outcome, and thus invest little into the human capital in the first period, which harms the productivity in the second period (in addition to the harms caused by the ex-ante equilibrium redistribution policies). Using equation (31), we can find that the medium-voter rational-expectations equilibrium is defined by

$$\tau^{*}=\frac{(1+\theta)e^{m}}{L_{\tau}\left(\tau^{*}\right)};\quad S=S\left(\tau^{*}\right);\quad s^{i}=e^{i}+S \qquad (41).$$

For the special case in which $\beta\theta=1$ (or the studying and labour supply functions are linear) the equilibrium tax rate with the dynamic inconsistency problem is exactly $(1+\theta)$-times (i.e. more than 2-times) greater than without the time inconsistency problem.

This dynamic inconsistency model can be easily developed for the swing-voter setting, too. Combining (24) with (34), we can derive the ex-ante equilibrium policy as

$$\tau^{*}=\frac{\left(1/\overline{\Psi}\right)\sum_{j=1}^{J}\left(\lambda^{j}\Psi^{j}(1+\theta)e^{j}\right)}{L_{\tau}\left(\tau^{*}\right)+\theta S_{\tau}\left(\tau^{*}\right)} \qquad (42),$$

which is an analogue to (26) combined with (35). As in the swing-voter model of section II, redistribution through income taxes takes place only if Ψ^j is greater (or equivalently the volatility of popularity shocks is smaller) for poorer groups.

The ex-post equilibrium policy is given by

$$\tau^{*}=\frac{\left(1/\overline{\Psi}\right)\sum_{j=1}^{J}\left(\lambda^{j}\Psi^{j}\left[e^{j}-\theta\left(S-s^{j}\right)\right]\right)}{L_{\tau}\left(\tau^{*}\right)} \qquad (43).$$

If the groups of people cannot co-ordinate their actions, and each individual thus must treat the resulting equilibrium tax rate as exogenous, the rational expectations equilibrium is then

$$\tau^* = \frac{(1/\overline{\Psi})\sum_{j=1}^{J}\left(\lambda^j \Psi^j (1+\theta) e^j\right)}{L_\tau(\tau^*)}; \quad S = S(\tau^*); \quad s^j = e^j + S \qquad (44),$$

i.e. it is a combined analogue to (26) and (41). As in section II, there is income redistribution in the equilibrium only if Ψ^j is decreasing in wealth. But if this condition holds, the wage tax is increased by the dynamic inconsistency problem in this swing-voter model in the same way as in its median-voter version.

Moreover, if the groups (or at least some of them) are able to co-ordinate their human capital investment in the first period, it could lead to moral hazard. People should rationally realize that through their choice of the investment they are able to influence the eventual equilibrium policy in line with (43). In particular, the equation (43) could be re-written as

$$\tau^* = \frac{\theta(1/\overline{\Psi})\sum_{j=1}^{J}\left[\lambda^j\left(\Psi^j - \overline{\Psi}\right)s^j\right] + (1/\overline{\Psi})\sum_{j=1}^{J}\left(\lambda^j \Psi^j e^j\right)}{L_\tau(\tau^*)} = \tau(\vec{s}) \qquad (45).$$

As we can see, a group i with $\Psi^i > \overline{\Psi}$ (which I assume to be the poorer groups) can increase the equilibrium tax rate by investing less into human capital, and vice versa.[23] The impact is the higher, the farther a group is from the average (i.e. the greater the difference between Ψ^i and $\overline{\Psi}$).

The first-order condition (29) then modifies to

$$V_x\left(1 + e^i - s_1^i\right) = \beta\theta(1-\tau(\vec{s})) + \beta\theta\tau(\vec{s})\lambda^i - \beta\tau_{s_1^i}(\vec{s})\left[e^i - \tau(\vec{s})L_\tau(\tau(\vec{s})) + \theta\left(s^i - S\right)\right] \qquad (46).$$

The second term on the right-hand side is due to the fact that an organized group internalizes a part of higher taxes, which returns to it through higher lump-sum transfers. This factor motivates all organized groups to invest more than they otherwise would if they simply followed equation (29). The last term on the right-hand side of (46) captures the impact of strategic considerations. We can (loosely) say that this terms reduces the marginal utility of leisure (an thus increases its amount) in an equilibrium both for the richest and the poorest groups, and may increase it only for the groups close to the middle of political spectrum. In other words, the poor groups may face a morale hazard, as they know that by investing less into their human capital they can increase the equilibrium level of redistribution and thus their overall utility. The rich groups do exactly the same, but for exactly the opposite reason: they invest less into human capital, as they know that this reduces the equilibrium redistribution that

[23] This is exactly true only if the labour-supply function is linear. If it is concave, the tax rate may be decreasing in s^i even for some groups with $\Psi^i > \overline{\Psi}$. Conversely, if the labour-supply function is convex, the tax rate may be increasing in s^i even for some groups with $\Psi^i < \overline{\Psi}$.

they dislike. Overall, though, it is difficult to say whether the organization of groups has a positive or negative effect on the accumulation of human capital.

IV. Czech Fiscal Policy

So far, I have discussed the new political economics on purely theoretical grounds. In this section, I would like to discuss in an informal way, whether the above findings have any empirical relevance for the Czech Republic. In particular, I will try to show how the trade-off between redistribution programmes and pro-growth spending, that lies at the heart of the theoretical models I have just described, is (or is not) being solved in the Czech reality.

In its election programme and the subsequent government's policy statement, the current social-democratic government has emphasized "pro-growth" projects as a high fiscal priority.[24] Among its major goals the government cited: "the idea of a learning society (which) draws on the presumption that the qualifications of people are currently becoming a basic production factor. Only a society which is capable of making an investment into the lifelong education of its citizens, and in this respect into the development of their skills, will be able to achieve long-term success in international competition. …. Social spending, investment into human capital or into the development of the human potential is considered by the Government to be the most effective form of Government investment. It intends to reflect this form, especially investment into education, in its budget priorities and transform our society gradually into a knowledge society." As a result, the government promised to increase educational spending to 6 % of GDP by 2002 (compared to 4.5 % in 1997). It is difficult to illustrate the actual rise in educational spending on hard data, as its increase in 1999 was not strong enough to reverse the decline of 1997-98, and there are no reliable estimates for 2000 and 2001 for the public sector as a whole. Nevertheless, the education has been one of the key priorities of the state budget draft for 2001, the proposed outlays of the ministry of education rising by more than 13 % year-on-year.

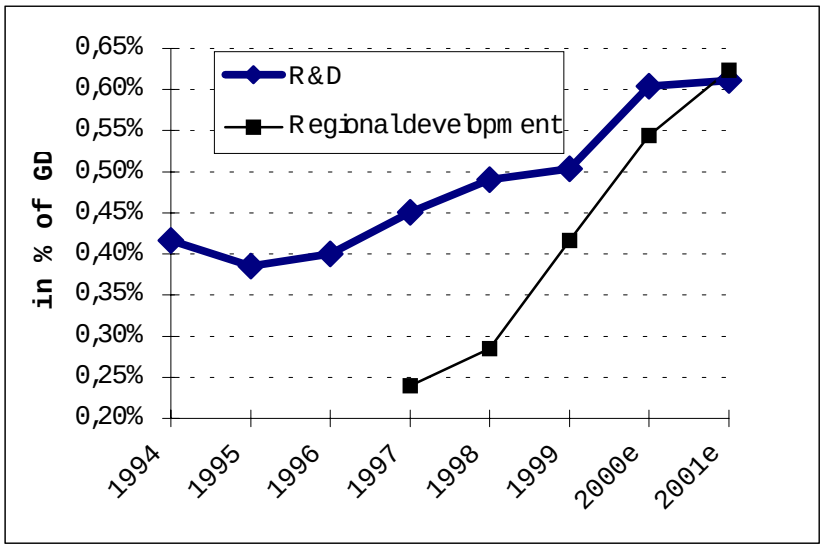
In its election programme, the social democrats also promised to at least double the financing of R&D. Another fiscal priorities have been the industrial, pro-export and FDI-supporting policies aimed at improving the supply-side of the economy and solving regional development and employment problems.[25] The following chart shows the ratio of public R&D and regional-development spending since 1994, including the projections for 2000 and 2001. As we can

[24] See http://www.vlada.cz/1250/eng/vlada/vlada_progrprohl.htm for a full text of the policy statement.

[25] Among the pro-growth spending, the government usually counts its housing policy, too. I agree that a functioning housing market can help to improve the supply-side of the Czech economy by increasing labour mobility. I do not, however, include housing spending among pro-growth project here, as much of the housing policy is necessitated by the market imperfections associated with rent controls that are motivated primarily by social policy goals. The pro-growth housing spending is thus just a (weak) compensation of the anti-growth impacts of redistribution policies in the housing area.

see, there has indeed been an increase in the importance of this spending since the current government took over office.

Figure 4: Public R&D and Regional-Development Spending



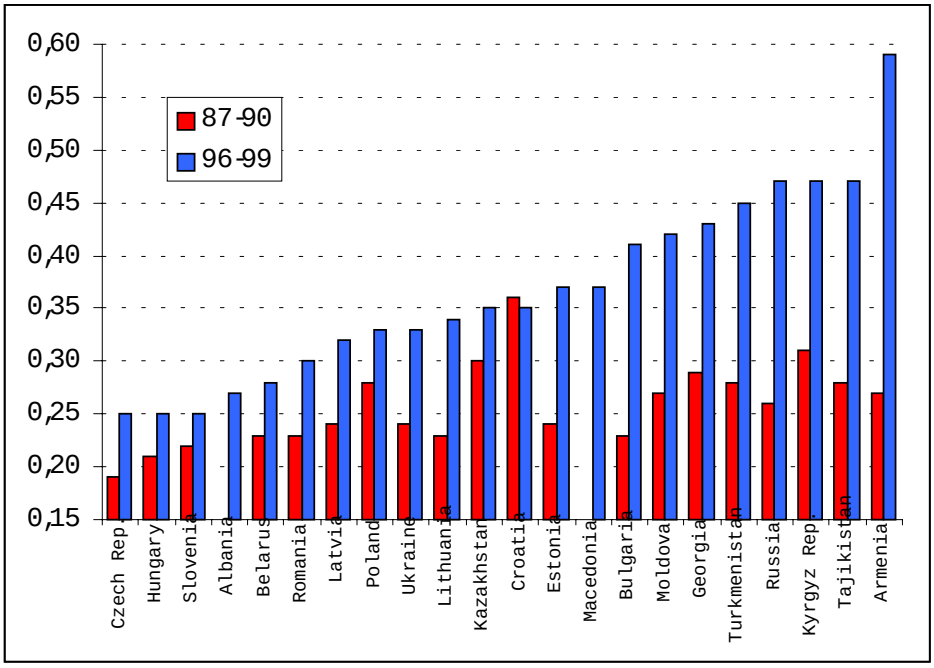
Source: Ministry of Finance, Czech National Bank

In the new political economics models I have discussed so far, an increase in pro-growth spending is plausible and politically sustainable only if: (i) the productivity of such spending goes up; (ii) the political desire for income redistribution goes down. It would be purely speculative to discuss the former possibility, so I will concentrate on the later one. My major claim is that the desire to run redistribution policies has not gone down in recent years. In fact, the opposite might be true.

The income inequality, which motivates social redistribution in the new political economics models, has increased in the Czech Republic since the late 1980s. As reported by Jones and Revenga, et al. (2000), for example, the Gini coefficient has increased from 0.19 in 1987-90 to 0.25 in 1996-99 in the Czech Republic (see Figure 5).[26] It is true that this increase is relatively modest compared to other transition economies, and that in absolute terms, the Czech income inequality is still quite low compared even to the advanced market economies. Nevertheless, even in such a situation the increase in inequality may be politically sensitive as people tend to compare their relative situation not with other countries but rather with their past experience.

[26] Večerník and Matějů, et al. (1998) reported an increase of the Gini-coefficient for gross wages from 13.2 % in 1988 to 18.7 % in 1996.

Figure 5: Gini-Coefficient during Transition



Source: Jones and Revenga, et al. (2000)

Another factor that speaks in favour of an increased social redistribution rather than the other way round has been a rise in unemployment. While four years ago, the registered unemployment rate still did not exceed 4 %, it climbed almost to 10 % in early-2000. It is true that a large part of this increase may have been cyclical, and the recent declines in seasonally-adjusted unemployment rate indicate that the unemployment will probably start falling down again, with the economic recovery underway. In this paper, I focus on the long-run, structural part of the public budgets rather than on short-run cyclical movements (see the discussion of the structural budget deficits below). Therefore, we should not take into account the temporary cyclical increase in unemployment benefits and other social contributions. It is true, though, that some part of the increase in unemployment may have structural reasons, too, as it is associated with an accelerated restructuring of large firms in the traditional industrial sectors. This increase in structural unemployment, in turn, represents a source of political motivation for higher equilibrium spending on redistribution policies.[27]

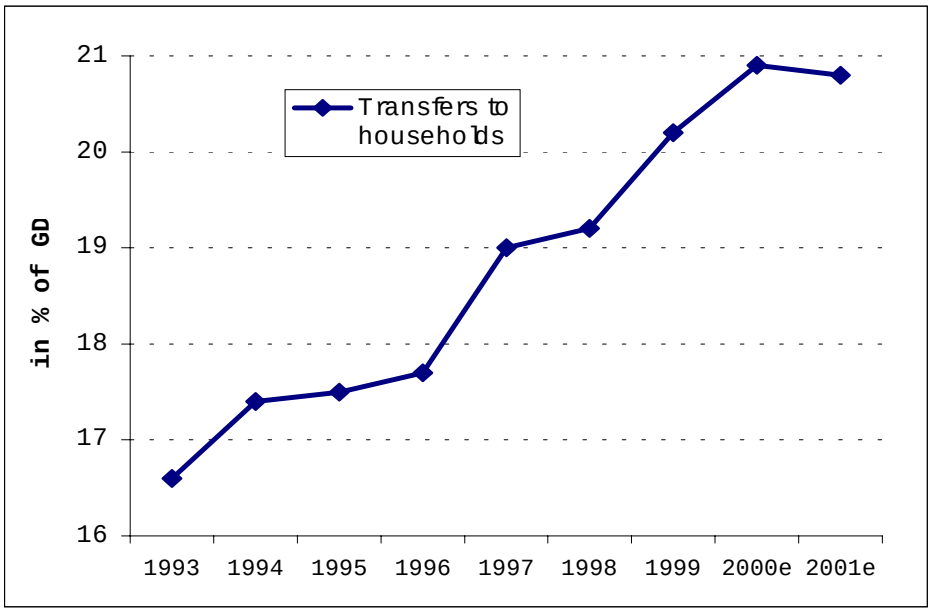
And finally, the Czech Republic faces the standard population-ageing problem. [28] As Persson and Tabellini (1998b) show, a population ageing reduces the level of pensions in a median-voter equilibrium, but at the same time has an ambiguous effect on the total volume of redistribution in the economy, as it can both decrease or increase the equilibrium rate of pension system contributions.

[27] It should be also noted, that the current unemployment rate is already lowered by the government's active employment policies, the impacts of which the experts estimate at almost 1 % point in 2000.

[28] Kreidl (1998), for example, discusses the demographic trends in the Czech Republic and their implications for the pension system. It should be noted that besides the unfavourable demographic trends, the situation of Czech pension system has been worsened by a generous early-retirement scheme during the last years, too.

In the Czech Republic, the latter seems to have been the case so far. Very little has been done to reduce the role of pay-as-you-go pensions in the social security system: even though the ageing has been partly fought by lengthening the working age of people, there is a clear long-run tendency of the pension system to run into a deficit.[29] As a partial solution, there are proposals to increase the pension contributions of self-employed people.[30]

Figure 7: Public Transfers to Households



Source: Ministry of Finance

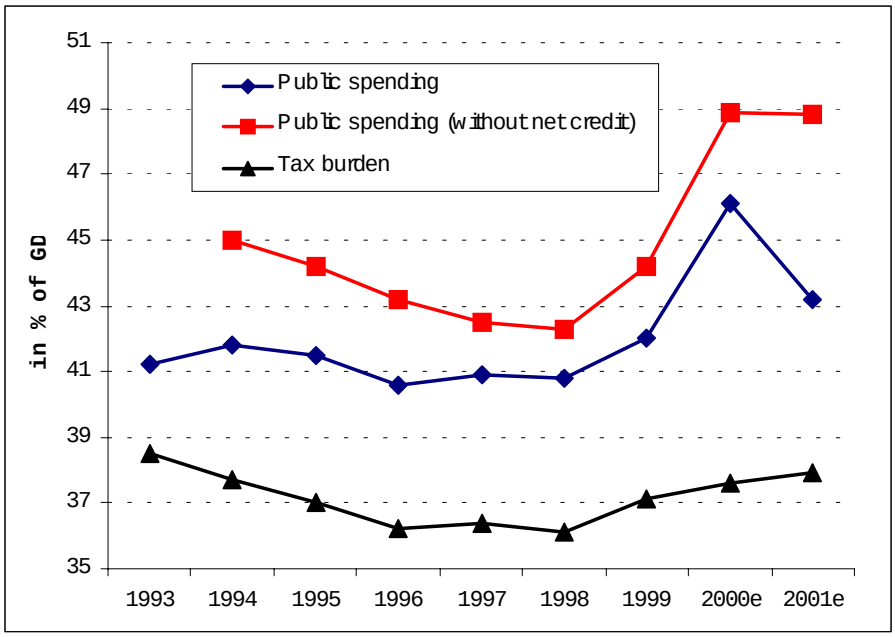
To sum up, the desire to increase public pro-growth spending has not been accompanied by a reduction in social security payments. In fact, the opposite has been true, which is clearly demonstrated in Figure 7 that shows an increasing ratio of public transfers to households since 1993. The trade-off between the public investment and redistribution, that forms a core of the new political economics models, thus seems not to work in the Czech reality.

What are the consequences? First, we have observed an increase in the ratio of public spending to the GDP during the last two years (see Figure 8). Even though this has been to a large extent caused also by the government's cost of cleansing the banking system, which is a one-off transition operation, the social security spending and pro-growth projects undoubtedly contributed to this, too.

[29] In October 2000, the „pension account" already reached a deficit of CZK 18.7 bn., or more than 1 % of the projected full-year GDP (as compared to a deficit of CZK 16.2 bn. originally planned for the whole of 2000).

[30] These proposals have recently received support from abroad, too – see the IMF Czech Republic-October2000 Staff Visit Concluding Statement (http://www.cnb.cz/_mvztahy/pdf/imf_concluding_statement_oct_2000.pdf).

Figure 8: Public Spending and Tax Revenues

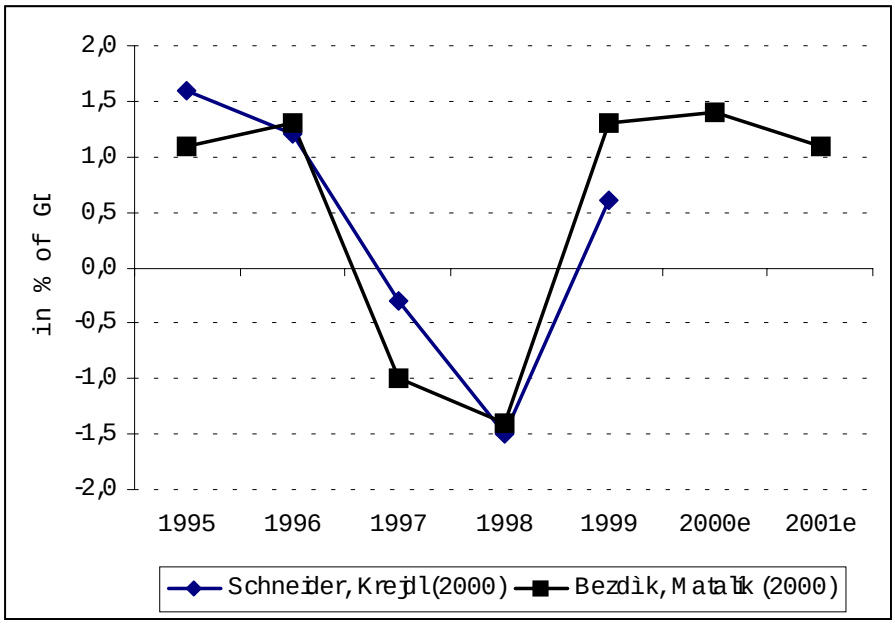


Source: Ministry of Finance, Czech National Bank

Second, the increased spending has been partly covered by a rising ratio of collected taxes to the GDP (see Figure 8). And last, and perhaps most importantly, there has been a clear tendency of the public budgets to run into unsustainable structural deficits (even after an adjustment for subsidies to transition institutions and an exclusion of privatization revenues). For example Schneider and Krejdl (2000) have shown that the structural deficit of public budgets adjusted for net borrowing has started to increase again in 1999 after the restrictions of 1997-98. Moreover, Bezděk and Matalík (2000) have demonstrated on the structural budget deficit (adjusted for privatization revenues and subsidies to the transition institutions) continues to grow in 2000, as well, and nothing is likely to improve in 2001 either. Figure 9 reproduces the estimated year-on-year changes in the structural budget deficits both from Schneider and Krejdl (2000; for an assumed constant GDP growth trend) and from Bezděk and Matalík (2000) since 1995. It also includes a rough estimate for 2001 drawing on the state budget draft for that year.[31] As we can see, the overall picture is indeed very unfavourable.

[31] This estimate is based on the computations by V.Bezděk from the CNB who kindly provided me with his figures, and is also in line with the IMF Czech Republic-October2000 Staff Visit Concluding Statement.

Figure 9: Year-on-year Changes in Structural Public Budgets' Deficit



Source: Schneider, Krejdl (2000); Bezděk, Matalík (2000)

This shows that the simultaneous increase in social security and pro-growth spending has been achieved only thanks to the fact that the government can – unlike governments in the basic one-period model of the new political economics – violate the budget constraint temporarily. This may in fact be a rational policy response to the cyclical developments. But apart form the years 1999 and 2000, the fiscal policy has been strongly pro-cyclical in the Czech Republic (see Bezděk, Matalík, 2000). This means that the gloomy outlook for the Czech public finance can hardly be justified by stabilization policy goals. In fact, the fiscal developments represent a significant risk factor for future macroeconomic stability of the Czech Republic, which has been already stressed by the Czech National Bank[32], the IMF[33] and the EU[34].

We can thus conclude that the current fiscal developments are unsustainable in the long-run. For the future, it is clear that the government's budget constraints will eventually need to be enforced by the financial markets. If the pro-growth spending is thus to be raised on permanent grounds, it would either require higher taxation in the future, or a shift away from the current high level of income redistribution through a generous social security system. The former possibility may be dangerous, as an expectation of higher taxation in the future may further aggravate the dynamic inconsistency problem that is inherently present in fiscal policy (see section III). Therefore, if the government wants to increase taxes, it should rather do it now, without giving non-credible

[32] See the minutes of the CNB's board meeting of 5 October 2000 and 26 October 2000, available at the CNB's web page (http://www.cnb.cz/en/index.html).
[33] See the IMF Czech Republic-October2000 Staff Visit Concluding Statement.
[34] See the 2000 Regular Report of the EU Commission on the Czech Republic's Progress towards Accession, available at http://www.vlada.cz/1250/vrk/vybory/vvei/vvei.htm.

promises to the savers and investors. The latter possibility, on the other hand, would be more desirable in terms of the economic efficiency. It might prove to be difficult, though, to implement as a political equilibrium in a situation of rising social inequality, growing structural unemployment and ageing population (unless the government finds a way to do the same redistribution at lower cost).

V. Discussion and Conclusions

In this paper, I illustrated how the new political economics analyze the policy-making process to explain why the actual policies do often differ from the first-best policy recommendations of the economic theory. I stressed the trade-off between income redistribution and pro-growth spending, both public and private. I showed how the political competition for votes can shift the equilibrium fiscal policies away from productive investment to social security spending, which is not efficient in the theoretical, representative agent point of view. I further showed how the disincentives caused by distortionary taxes can be further aggravated by the dynamic inconsistency problem and moral hazard.

In the empirical section, I demonstrated that the Czech fiscal developments seemingly deviate from the theoretical trade-off between productive spending and income redistribution, but I also stressed that these trends are unsustainable in the longer-run. I leave it as a possible challenge for further research to explain why such developments are plausible. In fact, there exists a rich body of the new political economy literature that shows why budget deficits may constitute an equilibrium political outcome (for a summary see Persson, Tabellini, 1998b). It requires to leave the simple one-period model setting in favour of a multi-period setting that allows government to decide on the distribution of the tax burden over time, introduces strategic considerations of the debt-repayment etc. It might also be useful to leave the perfect-competition setting in the political market and introduce some imperfections such as asymmetric information, rent-seeking and so on. One might indeed argue that the political competition in the Czech Republic is (due to its "child diseases" and cartellization) not efficient enough to impose hard budget constraints on the politicians.

Sooner or later, though, these budget constraints will be enforced, and the current trends will thus have to be reverted either by higher taxes or lower social security spending. While the former possibility is harmful to the GDP growth as it would increase the distortionary disincentives in the economy, the latter option might be difficult to implement as a political equilibrium (given the political constraints discussed by the new political economics). The fiscal sphere thus constitutes a nightmare for future policy-makers in the Czech Republic.

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