The Quasi-Normative Approach to Housing Affordability: The Case of the Czech Republic

Martin Lux
Institute of Sociology, Academy of Sciences of the Czech Republic, Jilska 1, 11000 Prague 1, Czech Republic
martin.lux@soc.cas.cz

PLEASE, DO NOT QUOTE!
Article published in *Urban Studies* 44 (5-6): 1109-1124.
DOI: 10.1080/00420980701255981.

Abstract

The article attempts to contribute into the discussion on housing affordability and use of affordability measures for normative purposes. The author argues that social science does not have to resign on normativity in the affordability measurement under the condition that both housing allowances and rent regulation (social housing) are applied in the specific housing system. His approach is based on calculation of economic "quasi-norm" on rents in rent controlled (social) housing by looking at total public costs at different rent price levels. As this approach may have a significant meaning for some transitional countries, the Czech Republic is used as a case study. The extensive econometric simulations of public cost of alternative rent levels took into account not only the most relevant cost items but also the side effects of housing policy change – a change from supply to demand side subsidisation. The results show that there is a relatively large space for further increase in rents in the sector of the Czech rent-controlled housing and social science thus may recommend on rents and, via that, average affordability ratios.

Key words: housing affordability – housing economics – housing policy simulations

Introduction

During the 1980s “housing affordability” became a popular term of use among policy makers, and in the 1990s more and more housing researchers began to study this concept and the related methodology, often from a critical perspective (Bramley 1994, 1991; Hallet 1993; Hancock 1993; Stone 1990; Whitehead 1991; Hulchanski 1995; Hills et al. 1990; Freeman et al. 1997; Linneman and Melbolugbe 1992; Maclennan and Wiliams 1990). Hulchanski (1995) claims that there are six possible ways how to use the standard affordability measures: for description, analysis, the administration of subsidies, defining housing needs, predicting a person’s ability to pay a rent or mortgage, and selection criteria. While he considers the first three to be "quite valid" uses (Hulchanski 1995: 475), the latter three are not. The use of the rent-to-income ratio in administrating subsidies helps to target housing subsidies for lower income households, a clearly valid use. However, Hulchanski points out that “the decision as to where to draw the line, that is, what specific definition of eligibility is to be used for a subsidy programme, is a subjective judgement. It cannot be based on an objective scientific determination” (1995: 477). Many housing researchers agree with Hulchanski, and they make a distinction between actual affordability (what tenants pay) and normative affordability (what tenants should pay) (Hancock 1993; Oxley and Smith 1996). “There is much criticism of the use of affordability measures for these normative purposes.” (Freeman et al. 1997: 22).

For the transition countries in Central and Eastern Europe there may be significant consequences arising from the fact that the social sciences, and even economics, have rejected the notion of normative affordability. In several CEE post-communist countries the “first-generation” rent control system is still in place throughout a substantial part of the housing stock. Where this type of rent control exists there is a depreciation of real rents, huge gaps between market rents (estimated or actual) and controlled rents, and the hidden subsidy that arises from rent regulation is inefficiently targeted. Though the average rent-to-income ratio is low, social sciences cannot answer the question whether tenants “should” pay more because it would be a subjective judgment and as such it should be outside of the scientific discourse.

By abandoning normative housing affordability altogether we may be "throwing the baby out with the bathwater". I would propose taking a "quasi-normative approach" to determining housing affordability. To illustrate how this approach works I will use the Czech Republic as an example. The aim of this article is to show how to simulate economic "quasi-norms", described below, for determining rent settings and through them also for determining the rent-to-income ratio (affordability measure) for households living in rent-controlled housing – the quasi-norm that is closely linked to real housing, demographics, income and the cultural conditions of a given society.

Background and arguments

Between 1991 and 2001 the Czech Republic underwent substantial economic reform, but the housing sector was reserved as a kind of "shock absorber", to soften the dramatic impact of the transitional changes taking place in every other sphere of life (Hegedüs and Tosics 1998). Table 1 shows the tenure structure during this period and how it changed. Unlike many other Central and Eastern European countries the Czech government did not apply a "right-to-buy" policy on public housing. Consequently, the privatisation of public housing proceeded at slower rate and rental housing continued to be a significant form of tenure into the new century. However, the state also decided to maintain the "first-generation" rent control system for all running tenancies, including residential tenancies in private, restituted rental property, i.e. apartment buildings that had been nationalised under the communist regime and after 1989 were returned to the former owners or their descendants (about 10 % of total housing stock). In addition, no amendments were made to the provisions on tenancy relations in the Civil Code that were applied under the communist regime and they remain valid to date. These provisions allow for the continued application of rent controls even in the case of a new tenancy as long as that tenancy is acquired from a dwelling exchange or an "inheritance". Since 1994, the introduction of market rents is allowed only in the case where a dwelling has been fully vacated and has no tenant holder, or when a newly built dwelling is rented out.

The overwhelming majority of tenants (est. 80 % in 2003) therefore still live in the rent-controlled sector. Black-market practices (such as "selling" the tenure protection tied to a particular dwelling unit that ensures the right to regulated rent), which take advantage of the fact that the old provisions for protecting tenants are still in effect,

are widespread and commonplace, and are more or less accepted by the general public. The low turnover in rental housing has meant that newly formed households in search of affordable rental housing have been shut out of the market. Rent controls are not targeted to match household income, and roughly equal proportions of households from all income deciles occupy rent-controlled flats (Lux 2002). The average rent-to-income ratio is only about 7% in the rent-controlled sector (2003). Conversely, market rents (for vacated and new flats) are disproportionately high, providing landlords with high returns.[1] There is no scientific answer to the question of whether tenants in the rent-controlled sector "should" pay more; only a subjective judgment can be made in this regard and that as such has no place in scientific discourse. The Czech politicians have clearly taken advantage of that fact. Fearing the loss of voter support successive governments have consistently opted to postpone housing reform to a later date, which has thus far meant permanently deleting it from their agenda.

In advanced countries, the problems of housing affordability among lower income households are addressed with the use of supply- and demand-side subsidies. With regard to rental housing, supply-side subsidies are mostly the different kinds of subsidies that support social rental housing, while demand-side subsidies come in the form of housing allowances. Social housing in many ways resembles the rent-controlled housing in transitional countries. Given that there are these two means of providing support for households with low income, it would be possible to apply the "traditional" subjective normativity to just one of them, while the other is left open. Like other social benefits housing allowances are calculated so that they reflect the primary social norms of a particular welfare state. These means-tested benefits are intended to help those with insufficient income cover their housing costs, and the amount of this assistance is calculated on the basis of actual (or expected) housing costs, household income and sometimes also household structure. The norms of a particular society are explicitly expressed in the allowance equation, usually in the form of the "normative" cost burden rate or the "normative" maximum rent-to-income ratio.

[1] A good theoretical description of this type of situation is given in Maclennan (1982) and Fallis (1985).

If we assume that the subjective norms on affordability are indeed incorporated into the housing allowance, then we can determine the level of public support in the social housing (rent controlled housing) in the less subjective way. We need to find an appropriate scientific mean (paradigm) used to direct our analysis – and norms could thus become "quasi-norms". Public economics could serve as a useful tool if the economic analysis were to take into account the real social processes in the particular society.

In general economists tend to recommend that rents just be increased to match market levels or to the level where the economy's black market in rental housing disappears. Although there is certainly strong theoretical grounding for this view, it is nonetheless based on an ahistorical perception of reality. For example, in the current circumstances in the Czech Republic what would happen if rents were increased to market levels is that majority of tenants would begin to qualify for housing benefits, including middle-class households. The total public cost of such a reform would be astronomical, and it would take years for the market to absorb the shock, given its specificity. We may assume that better-off households would flee the rental sector and escape into home-ownership tenure, and rental housing would be residualised. The housing benefit would produce side effects, such as rent inflation, and the new costs arising from the onset of a "ghettoization" process may appear. Even from a purely economic point of view it would seem therefore that such shock is not a rational policy objective.

The percentage value of an increase or decrease in total real public (both state and municipal) housing expenditures incurred by the rent price change $PC_{t,t+1}$ in the rent-controlled (social) housing stock (relative public costs RPC_{t+1}) can be defined as:

$$RPC_{t+1} = \frac{PC_{t+1}}{PC_t} \tag{1}$$

The level of the average rent price in rent controlled housing leading to the lowest relative public costs can be defined as the alternative and more suitable economic quasi-norm for rents. The benefit system is supposed to provide effective help to those

who need it (there is no justification for additional public spending) and econometric cost-benefit analysis would take into account not only the most relevant public cost and benefit items but also the side effects of particular housing allowance and housing policy changes generally.[2] The quasi-norm for determining the average "optimal" rent could then be used to set a quasi-norm for determining the average rent-to-income ratio in the rent controlled housing sector.[3] Although in this article the use of the quasi-normative approach to housing affordability is limited to the Czech Republic, its applicability may be much wider, mainly for those developed countries with substantial social housing stock.

Scope of the Study

As stated in the introduction this approach assumes that the current model of housing allowance provides effective assistance to those who need it and in this way it incorporates the traditional affordability norms for determining the maximum housing cost burden for different types of households. While this may be viewed as a weakness of the approach, it is also its strength, as it suspends any subjective normative discussion on allowance eligibility criteria.

The majority of EU allowance models take into account real housing costs. If the cost-to-income ratio is higher than the agreed ceiling, the benefit covers the whole or part of the residual expenditures. The higher the real cost, the higher the benefit amount is. However, in the Czech Republic the amount of the housing allowance is calculated only in relation to household income, and it does not take real housing costs into account. The Czech model uses only the tariff costs. The amount of the allowance (*HA*) is calculated using the following equation:

$$HA = \text{household costs} - \frac{\text{household costs} * \text{net household income}}{\text{subsistence minimum} * 1.6}$$

[2] The change in policy towards housing allowances decreases the direct costs from social (rent-controlled) housing but increases the costs from the housing benefit and its administration, and it may have an impact on labour market incentives and social exclusion. All this should wherever possible be included into the calculation to determine the quasi-norm.

[3] Often the average itself has no practical significance, as there are different households with different incomes living in rent-controlled housing. However, if simulations are conducted on representative data sets this can produce a much more detailed set of quasi-norms for each social, professional or income group of households. In this article I use rough averages because my intention is only to describe the potentials of the quasi-normative approach.

Household costs are set at a fixed value and are uprated over time together with the subsistence minimum. They are approximately equal to the average housing expenditures in the current year. In fact, "household costs" are part of the subsistence minimum itself. The implicit taper is 0.1. If this allowance model is to be used in the simulations, both normative costs and part of the subsistence minimum (designated for housing expenditures) must be uprated proportionally to meet the simulated rent increase at each stage of the simulation, which adequately reflects the real uprating process and the logic of the current allowance model. In this way those who already receive the benefit (the lowest income households) will not be affected by a rent increase and will still pay out a similar proportion of their income on housing. The uprating will also increase the maximum income in the equation, and this will allow other needy households (including middle income households at the low end) to apply for a benefit.

To begin with simulations is also necessary to identify the main public cost items. As the aim is to measure the relative public costs (*RPC*), only those costs that change when rent prices change are selected: the revenue subsidy to municipal landlords (RS_t), public housing construction costs (HC_t), public housing benefit costs (HBC_t), Consumer Price Index costs (CPI_t) and costs via voids in municipal dwellings.[4] Costs via voids decrease the value of rental income of municipalities when computing revenue subsidies. Equation 2 (an elaborated version of equation 1) shows the expected correlation between the variable and rent price.

$$PC_t = RS_t^- + HC_t^- + HBC_t^+ + CPI_t^+ \qquad (2)$$

Costs via voids in municipal housing are included in an attempt to estimate the costs of residualisation, which are often overlooked. The higher rents are, the higher the proportion of occupants in rental dwellings that are from the lower income strata of society, which in turn has empirically verified effects on costs via voids in the residualised municipal housing stock. A higher vacancy rate in social housing is a well-known side affect of the policy that gives preference to demand-side subsidies

[4] Costs via voids reflect the loss of rental income in the case when rental housing became too residualised and vacant municipal dwellings will appear in the neighbourhood with the "bad address".

over supply-side subsidies, and this fact should not be ignored. The residualisation of rental housing also gives rise to the potential costs from rent arrears, but these are not included in the simulation because it has already been demonstrated elsewhere that rent arrears are not dependent on rent price if the amount of the benefit fully compensates for the increase in rent for benefit recipients (More et al. 2003: 88; *Housing Corporation* 1997: 12).

Many research studies in the UK have also analysed the impact of a rent increase on labour market incentives (Bradshaw and Millar 1991; Wilcox 1993a; Wilcox 1993b; Wilcox 1994; Ford and Wilcox 1994; Ford et al. 1995; Kearns et al. 1996; Kempson et al. 1997; Wilcox and Sutherland 1997; Bingley and Walker 1998; Ford et al. 1998; Pryce 1999 etc.). While it is not the aim of this article to summarise the findings of those studies, it is worth noting here that they all give consideration to the question of whether or not the housing benefit that has a relatively sharp taper ($t = 0.65$) leads to the poverty and unemployment trap. Though there are rational economic reasons why it may do so, analyses of empirical data have shown that this hypothesis does not necessarily apply to certain types of households, and even when it does the effect may be negligible. As indicated above, the taper of the Czech housing allowance model is much slighter ($t = 0.1$), and this, together with the findings from British research on housing, means that labour market implications can be excluded from the analysis.

In the simulated model the quasi-norm for determining rent price and the rent-to-income ratio is estimated on the basis of a single year, and therefore it is possible to assume that all other income and demographic variables during the simulated rent-increase stages remain constant. The simulation estimates the public costs of higher rents in the rent-controlled housing sector in 2002 (increases in rents by 10%).[5]

Data

The simulations presented in this analysis draw on several data sets. The main data source for the simulations was *The Family Budget Survey 2002*, as to date no

[5] As all models trying to answer the question "What would happen if?" even this approach has its own obvious limits. I was not able, for example, to simulate the impact of higher/lower rents and CPI increase on wider economy (house prices, GDP, consumption, unemployment), as profound macro-economic model would be needed for such a purpose.

representative house condition survey (or housing demand survey) has been conducted in the Czech Republic. *The Family Budget Surveys* (FBSs) are annual surveys conducted by the Czech Statistical Office, which are intended to observe the financial and in-kind flows in the management of a selected sample of households. The total FBS 2002 sample was 3710 households.

With the use of data that was collected in a survey conducted by the Institute of Sociology titled *Housing Attitudes 2001*, it was possible to test a logit model designed to calculate the probability of a household moving out of the rent-controlled housing sector. This quota survey gathered information on housing satisfaction and attitudes towards housing policy, and it monitored past and estimated future housing careers. The total survey sample was 3564 respondents and quotas were constructed to represent the national population.

The Household Social Condition Survey 2001, conducted by the Czech Statistical Office on a representative sample of 10599 Czech households, and the KISEB database of market rents, run by the Institute for Regional Information were used as the sources to estimate the hidden demand for rent-controlled housing. Market rent prices are collected into the KISEB database from advertisements published in leading regional newspapers. Data on transaction house prices from the Czech Statistical Office, derived from records on transfer tax, were used to estimate house prices in the simulation of behavioural reactions to rent changes (movements).

The methodology for estimating "behavioural" aspects of public cost simulations

Any increase in rents is logically connected with an outflow of better-off households from the rent-regulated sector. The reason for this is that the increasing housing costs are not compensated them by a benefit. The economic (rational) aspect of the tenure choice theory is based upon the decision of whether it is more advantageous for a given household to lease or purchase a dwelling. For this purpose, a household compares its net rent (rent after deducting a potential housing allowance) and the "user costs" of owner-occupied housing, and finally chooses the cheaper option. The standard calculation for user costs (*UN*) adjusted only according to the specifics of mortgage financing in the Czech Republic, which usually provides a maximum of 70% of an estimated price of real estate, is as follows:

$$UN_0 = [(1-t)*i + \delta + \alpha - g]*0.7P^e + [i_o + \delta + \alpha - g]*0.3P^e,$$

where t is the marginal tax rate of the member of a household with the highest income, i is the nominal mortgage credit interest rate, δ is the depreciation rate, α is the property tax rate, g the expected rate of price appreciation of a given property in the future (capital gain), i_0 is the opportunity cost to personal savings used to cover 30% of the property price, and P^e is the estimated property price.

For the purpose of the simulations, i was defined as the average interest rate on mortgage credits in 2002 (6.7%), adjusted according to the terms in the most advantageous programme in the Czech Republic, *TOP Bydlení*, which was offered by a major Czech bank in 2002 (part of the debt yields a reduced interest of 3.7 %), i_0 is the average interest rate on long-term government bonds in 2002 (4.5%), δ was 1%, t was set according to the income tax rates valid in 2002 (maximum of 32%), while α was excluded from the equation given its marginal significance. The expected price appreciation g was also excluded in the first step, as it is not entirely clear whether Czech households take price appreciation into account at all when they make decisions about moving. In post-communist countries like the Czech Republic, housing is generally perceived more as a simple consumption good, and far less as an investment. Moreover, there is no consensus on methodology used to estimate expected price appreciation. However, price appreciation can be a very important aspect of tenure choice, and therefore it is included in the sensitivity analysis of the model.

The price of dwelling P^e was estimated using a hedonic price regression model on data from the Ministry of Finance and the Czech Statistical Office. The dataset included transaction prices acquired from property transfer tax statements paid in 2002. The final model, presented in Appendix A, explained almost 64% of price variability (Adjusted R^2). The model indicated that the dwelling price changes with the dwelling area and the squared dwelling area, with the age of the dwelling, with the size of residence and with the regional dummy variables.

However, that the move to owner-occupied housing is rational from the economic point of view is not enough to lead people to really move. First, the purchase price of the new dwelling must be affordable, or, more precisely, mortgage loans must be accessible and the household must be able to meet the solvency criteria of the particular bank in order to receive a loan (credit constraints). Second, people must be the kind who are inclined to move – for example, older people are much less willing to move than young men, even if moving would save them money. There may be an infinite number of other factors, but generally these are the main obstacles to a person moving out of their current housing. Three conditions were therefore set in order to determine the probability that a household would be willing to move out of rent-controlled rental housing to owner-occupied housing:

- Movement to home-ownership is beneficial (user costs < net rent);
- The household meets the solvency criteria for receiving a mortgage credit;
- The move-stay logit model of moving probability is equal to 1.

The criteria applied by the leading mortgage lender in the Czech Republic were used in order to precisely define credit criteria. The relevant credit constraints had to be carefully determined for the simulation because mortgage loans are still unaffordable for large part of Czech households. Therefore, the household must have a net monthly income (after taxes and insurances) that is more than 1.5 times the subsistence minimum, plus the monthly repayment due (annuity) from the mortgage loan (based on the average interest rate and 20-year maturity), plus any other potential monthly repayment owed resulting from other household credits (leasing on cars, consumer credits, etc.). The simulation also included other criteria, which are perhaps not required by banks, but which reflect the real take up of mortgage credits in the Czech Republic, specifically:

- The age of the head of the household should be under 45. If the age is higher the loan maturity period is reduced from 20 years to the difference between 65 and the age of the household head;
- The monthly annuity payment from the mortgage loan must not exceed half of the total net household income (otherwise the household would face

affordability problems that in the Czech Republic are perceived as being too high).

The logit regression used to determine move-stay probability was run on a sub-sample taken from the *Housing Attitudes 2001* data, and the final model is presented in Annex B.[6] The sub-sample contained only respondents living in rent-controlled housing. In the analysis the Nagelkerke R^2 equalled 0.235 and almost 70% of predictions were correct. As expected the probability of moving was influenced mainly by the size of residence (the bigger the residence, the higher the probability of moving), the age of the respondent (the higher the age, the higher the probability of moving), the age of the dwelling (the older the dwelling the higher the probability of moving out) and the size of the dwelling in relation to the size of household (overcrowding increases the probability of moving).

Methodology for "non-behavioural" aspects of simulations

The first cost item monitored in the simulation was ***public expenditures on the housing allowance***, calculated as the percentage of households eligible for the housing allowance according to *FBS 2002* at a given simulated rent level, multiplied by the total number of households living in rental dwellings and the average simulated housing allowance for a given rent level. Logically, it was assumed that new households acquiring vacated rental dwellings at particular stage of rent simulations would have the same social and income composition as those that remained in regulated rental housing after an increase in rent – people with higher incomes would be less interested in renting and because better-off households from rent-controlled housing would move to the owner-occupied housing, the share of people dependent on housing benefits would grow quickly.

Second, the simulation took into account the ***revenue subsidy to municipalities,*** which amounts to the difference between the costs of management and maintenance and rental income for a given simulated rent level. Though there is no such subsidy in practice, the logic of its inclusion is obvious – its absence significantly contributes to

[6] The question used to estimate the probability of future movement was: "Would you please tell us what your desired housing would be like in which you would like to have your home and family?" The answers: current housing, other housing.

the deterioration of the housing stock and the poor efficiency of housing management. However, these distortions are very difficult to measure. In developed countries rent regulations are compensated by subsidies, because at some point somebody has to pay for the losses. According to findings from the Ministry for Regional Development, the annual cost rent in existing flats is determined as 2.8% of the dwelling market price. This rent includes only maintenance and management costs; capital costs are excluded because the municipalities received the housing stock through a no-charge transfer from state at the beginning of transition. The revenue subsidy for municipalities may also be negative - the additional rental income of municipalities above the level of costs could be thus perceived as public benefit.

Third, the simulation also includes ***the costs arising from the pension and social benefit uprating (CPI costs)***. The adjusted weight of the rent price in the consumer basket used for the purpose of uprating pensions and benefits is 2.344%. Therefore, a 10% rent increase in rent-regulated flats would result in a 0.2344% increase in the consumer price index (CPI). According to information from the Ministry of Labour and Social Affairs (and its research institute), a 10% rent increase could result in additional costs arising from the pension and social benefit adjustment that would amount to CZK 463 million. Although the State would probably not uprate pensions and benefits if the consumer prices went up "only" as a result of the 10% rent increase (normally it uprates benefits and pensions after more than 1% CPI growth), it was assumed in the simulation that total inflation including a price increase in other consumption items would lead to an uprating.

Fourth, as no reliable model for estimating the ***costs via voids of municipal landlords*** could be found from the performance data (there are almost no voids recorded in 2001), the simulations used the following assumption: today there are no voids, and empty flats will appear only when the number of vacated municipal flats at a particular stage of simulation exceeds the estimated additional (unsatisfied, hidden) demand for rent-controlled housing in a given region. The additional demand was calculated on the basis of a dataset from the *Household Social Condition Survey 2001* conducted by the Czech Statistical Office in 2001. The following households were included into the additional demand:

- Households living in one dwelling with one or more other households and which at the same time also stated in the survey that cohabitation with another household constituted a problem for them;
- Households sharing a dwelling with one or more households that also stated in the survey that they had too small a dwelling.

In order to correct the results they were weighted by the difference between usual market and regulated rent in the particular county or region. The higher the difference, the higher the additional demand for rent-regulated rental housing was. The prices for market rents were detected from the KISEB database of market rents.

Finally, the simulation calculated the ***subsidies for the construction of new public rental dwellings***. In order to calculate the cost of these subsidies, it was necessary to presume a certain *norm of need* for new public housing construction. The norm was defined as the number of dwellings capable of satisfying 10% of the estimated additional demand for rent-controlled housing in a given region. The higher the rents in the rent-controlled sector, the higher the tenant turnover and the lower the unsatisfied demand for this type of housing would be – this would consequently lead to lower public housing construction costs. Though there is no specific reason to set the norm at a level of 10% of additional demand, the impact that changing the norm to 20% or even 50% of additional demand has on quasi-norms on rents and affordability is negligible (see the sensitivity analysis in the final chapter).

The "cost" rent of new dwellings is defined as the total of all capital costs (mortgage credit repayments based on the assumption of 100% financing from commercial mortgage credits) and other management and maintenance costs calculated as 2% of the property value.[7] The difference between the collected rent, which equals the average regulated rent at a given stage in the simulation, and the "cost" rent would be covered by public funds – either in the form of a capital grant or a qualified loan. The costs to the public budgets arising from grants and qualified loans were expressed in the simulation in their net current values in order to clearly distinguish the costs of the

[7] If the construction of new municipal flats occurred only on a commercial basis, then according to our calculations the average "cost" rent in new municipal flats would reach approximately 9% of the property price.

grant from those of the qualified credit. A financial optimisation programme was developed which sought an optimal combination of a grant, qualified and commercial credit to cover capital costs of new public housing construction at a given rent level while ensuring the lowest possible total public costs (Annex C). In this way we get the estimate of public housing construction costs.

Conclusions and Discussion

Figure 1 shows the final shape of the relative public cost curve. It is clear that there is a relatively large amount of room for rent increases in Czech rent-controlled housing. The quasi-norm for determining rents should be at a level of 120% of current rent prices, because it is evident that any rent increase above the level of 120% of current rents would not result in public savings. Though, on average, such an increase in rents would not be sufficient to raise rent to market levels, according to the simulated public cost-benefit analysis, when particular income, demographic and other conditions valid in 2002 are taken into account a higher rent increase appears not to be a rational policy goal.

According to the results of the relative public cost analysis setting the optimum rent price at level 2.2 times the current price the quasi-norm for the average rent-to-income ratio in rent-controlled housing would be 15% of household income. This means that an average Czech household "should" pay about 15% of its total net income on rent, instead of paying the 7% of income that it pays on average now.

Figure 2 shows the change in each public cost item incurred by the rent price change. CPI costs and revenue subsidies to municipal landlords change linearly with rents while housing allowance costs, public housing construction costs and costs via voids are much more dependent on the behavioural aspects of the simulations – moving from rental to owner-occupied housing. The figure also shows the significance of the CPI costs that grow faster than housing allowance costs in the specific Czech environment.

Sensitivity analysis

The model was based on several assumptions, which, if they were to change, could change the results of the simulations, too. The following is the partial elasticity of

total public costs according to each cost item - a percentage change in total public costs incurred by a 1% change in a particular cost item:

$$E^{RS} = \frac{\Delta PC}{\Delta RS} = 0.1038\%,$$
$$E^{HC} = \frac{\Delta PC}{\Delta HC} = 0.8379\%,$$
$$E^{HBC} = \frac{\Delta PC}{\Delta HBC} = 0.0489\%,$$
$$E^{CVV} = \frac{\Delta PC}{\Delta CVV} = 0.0093\%,$$
$$E^{CPI} = \frac{\Delta PC}{\Delta CPI} = 0.4049\%.$$

It is evident that housing construction costs and CPI costs form the most important items in the total public costs summary. However, the real impact of particular cost items is far more important. As the public costs relationship with rent price is not always fully linear, we analyse the changes caused by a 10% rent increase (t = 1.1). The percentage changes in particular cost items and their weighted impact (elasticity is used as a weight) on relative public costs are:

$\Delta RS_{t=1.1} = -56.14\%$	$\Delta RS_{t=1.1} * E^{RS} = -5.83\%$
$\Delta HC_{t=1.1} = -8.35\%$	$\Delta HC_{t=1.1} * E^{HC} = -7.00\%$
$\Delta HBC_{t=1.1} = 17.19\%$	$\Delta HBC_{t=1.1} * E^{HBC} = 0.84\%$
$\Delta CVV_{t=1.1} = 114.64\%$	$\Delta CVV_{t=1.1} * E^{CVV} = 1.07\%$
CPI	$= 4.05\%$

The CPI weighted impact is calculated as a residual impact. The sum of weighted impacts is equal to a 7% total public cost decrease incurred by a 10% rent increase. Public housing construction costs have not only the highest elasticity but also the highest dynamic. Obviously revenue subsidies to municipal landlords and CPI costs also have high dynamic. Conversely, housing benefit costs have relatively low elasticity and the lowest dynamic. This is partly a result of the current household structure in rent-controlled housing (a significant proportion of households have very high incomes) but partially also due to the specific Czech housing allowance model. However, a change in the housing allowance uprating procedure or a change in the

whole benefit formula is outside the simulations of the quasi-normative approach, because it requires setting an alternative traditional norm based on the subjective judgments of policy makers.

Yet other model assumptions may be tested. As public housing construction costs showed the highest elasticity and the highest total dynamic, this particular cost item should be focused on. There may be a problem connected with the expected scale of needy housing construction. Simultaneously, municipalities may be able to solve part of the problem with empty flats by their demolition or sale. The movement from rental housing to owner-occupied housing may also be different, if tenants´ decisions take into account the future price appreciation. Following assumption changes were tested:

1. A change in the annual "need" norm, i.e. the demand, for public housing construction from 10% of the additional demand for rent-controlled housing to 30% and 50% of the additional demand for rent-controlled housing.
2. A decrease in the costs via voids in municipal housing to 50%.
3. The inclusion of the expected price appreciation into tenure choice. The expected price appreciation (g in equation on user costs calculation) was estimated separately for eight zones according to the past price increases. All Czech counties were divided into eight zones based on average annual price change (measured in KISEB database) during 1998 – 2002. Under the assumed price cycles the expected annual appreciation oscillated around 1.5% in the capital of Prague (Zone 1) and was close to zero in Zone 8, composed of counties with the lowest past price increases.

As it is clear from Figure 3, only the inclusion of the expected price appreciation into tenure choice simulations moved the "optimum" from a 120% rent increase to an 80% rent increase. However, in reality it is possible to assume that some people count on price appreciation and also perceive housing as an investment, while many others consider housing as a purely consumption good and do not see any benefit from future capital gains. Taking into account the fact that other important costs arising from the residualisation of public housing could not be included and the overall macroeconomic impact of inflation incurred by the rent increase could not be

measured, it is possible to conclude that the government reference point on rents (the quasi-norm for rents) should be "somewhere" between 80% and 120% of current rent prices, and similarly the reference point on affordability (the quasi-norm for rent-to-income ratio) should be "somewhere" between 13% and 15% average rent-to-income ratio. Though this conclusion may be perceived as a not very exact recommendation, it is better to admit the imperfection of simulation modelling than to be convinced about the infinite truth of mathematics.

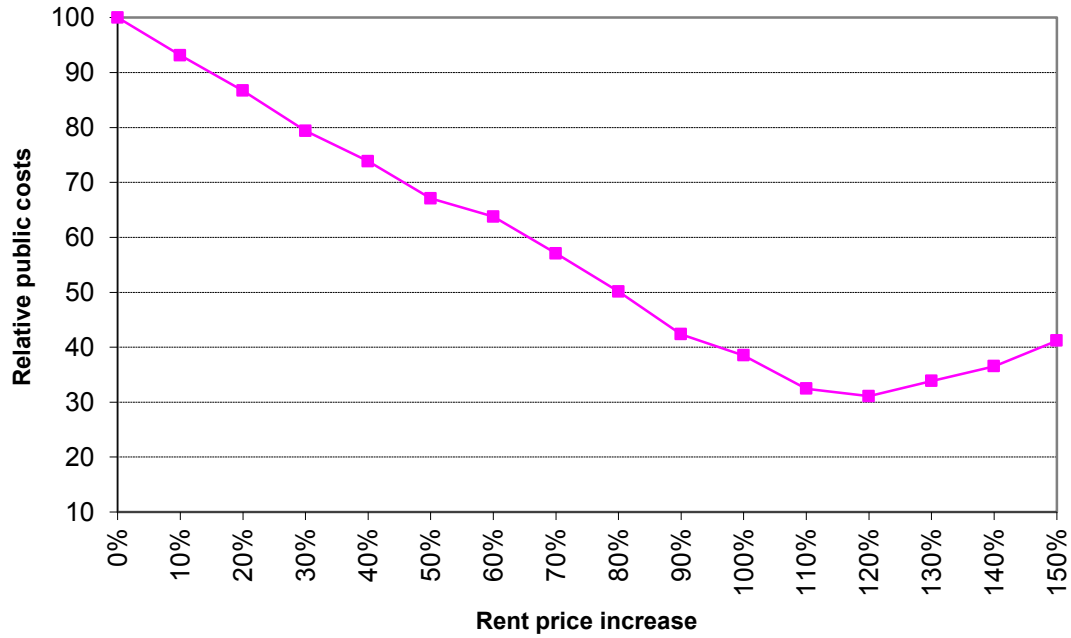
Public costs measurements should improve over time as the pressure on efficient public spending is growing. The simulation models would then be able to offer more precise estimates. However, even under the current circumstances this kind of analysis can reveal least whether or not there is space for rent reform or if rent levels are so close to the breaking point that a further rent increase in rent-controlled (and equally social) housing should not be risked.

Table 1: Tenure structure and its changes between 1991 and 2001 in the CR

	1991		2001	
	number	**in %**	**number**	**in %**
Own family house	1 367 027	36,9	1 371 684	35,8
Own flat	31 164	0,8	421 654	11,0
Rental housing	1 465 231	39,5	1 092 950	28,6
Cooperative housing	697 829	18,8	548 812	14,3
Tenants cooperative*)	-	-	103 216	2,7
Others	144 430	3,9	289 362	7,6
Permanently inhabited dwellings - total	**3 705 681**	**100,0**	**3 827 678**	**100,0**

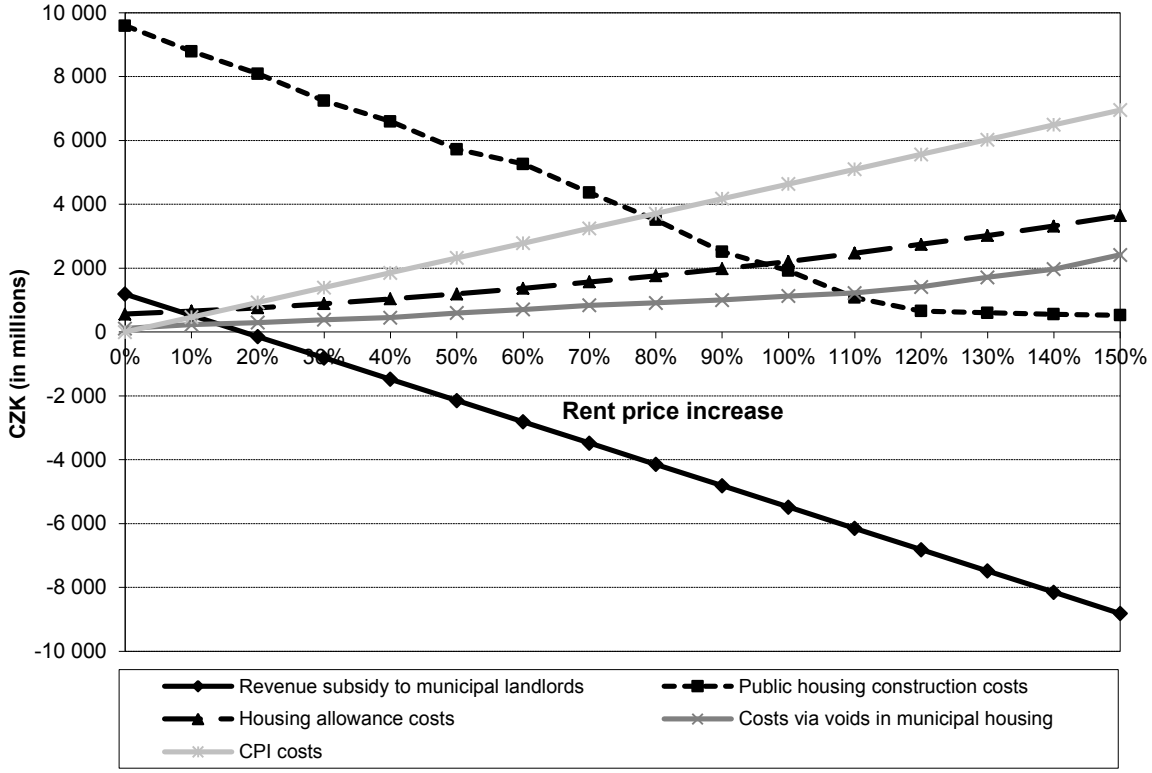
*) Tenants cooperatives are established for the purpose of apartment house privatization
Source*: SLDB 1991, SLDB 2001(census).*

Figure 1: Relative public costs and rents



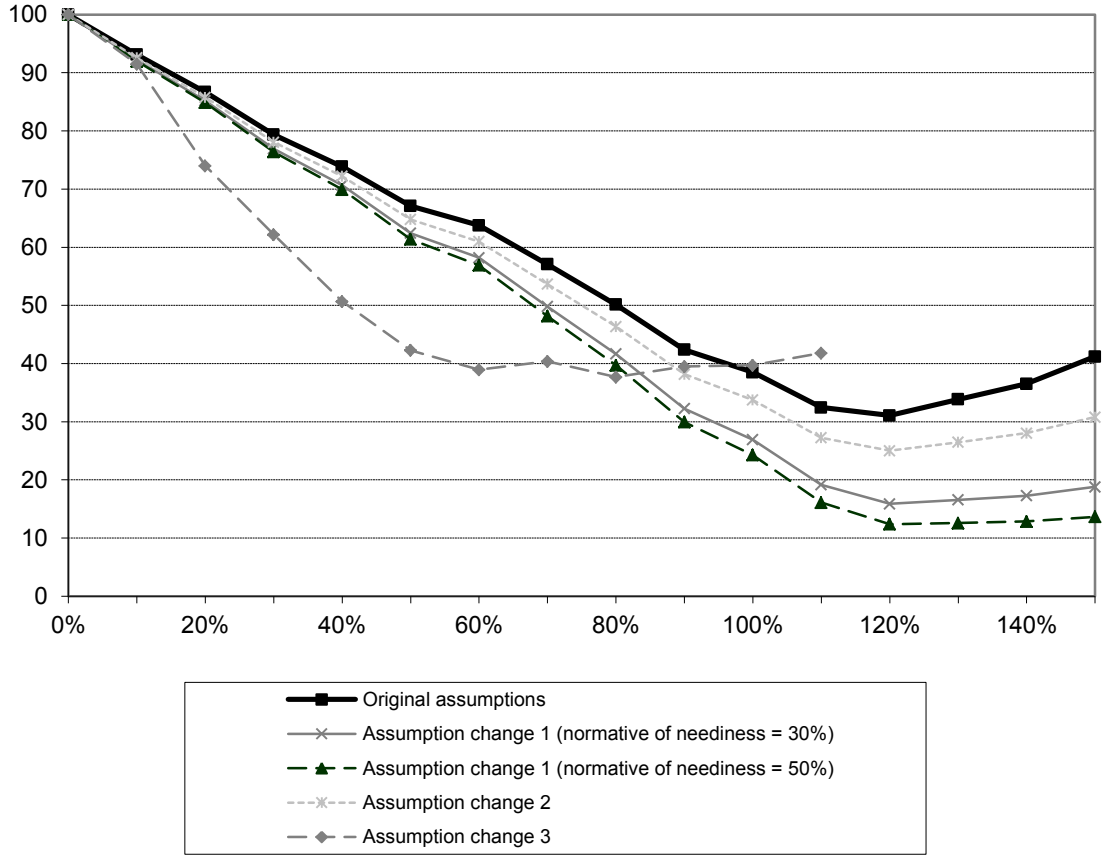
Source: Family Budget Survey 2002, own calculations

Figure 2: Separate public cost items and rents



Source: Family Budget Suvey 2002, own calculations

Figure 3: Relative public costs and rents – after changes in model assumptions



Source: Family Budget Suvey 2002, own calculations

Acknowledgements

The work on this article was supported by the Grant Agency of the Czech Republic, grant no. 403/06/0915 and the Marie Curie Fellowship no. MCFI-2001-00069.

References

Bingley, P. & Walker, I. (1998). *Rents and Work Incentives.* Unpublished Report for Department of the Environment, Transport and the Regions.

Bradshaw, J. & Millar, J. (1991). *Lone Parent Families in the UK.* Department of Social Security Research Report 6. London: HMSO.

Bramley, G. (1991). *Bridging the Affordability Gap in 1990.* The Association of District Councils.

Bramley, G. (1994). An Affordability Crisis in British Housing: Dimensions, Causes and Policy Impact, *Housing Studies* 9:103-124.

DiPasquale, D. & Wheaton, W.C. (1994). Housing market dynamics and the future of housing prices, *Journal of Urban Economics* 35: 1-27.

Ermisch, J., Findlay, J., Gibb, K. (1996). The price elasticity of housing demand in Britain: issues of sample selection, *Journal of Housing Economics* 5: 64-86.

Fallis, G. (1985). *Housing Economics.* Toronto:Butterworths.

Ford, J. & Wilcox, S. (1994). *Affordable Housing, Low Incomes and the Flexible Labour Market.* London: NFHA.

Ford, J., Burrows, R., Wilcox, S., Cole, I., Beatty, Ch. (1998). *Social Housing Rent Differentials and Processes of Social Exclusion. Research Report.* York: Centre for Housing Policy.

Ford, J., Kempson, E., England, J. (1995). *Into work? The Impact of Housing Costs and Benefit System on People's Decision to Work.* York: Centre for Housing Policy.

Freeman, A., Chaplin, R. and Whitehead, Ch. (1997). *Rental Affordability: A Review of International Literature.* Cambridge: University of Cambridge.

Ghekiere L. (1996). *Les Evolutions des Aides á la Personne en Europe.* Paris: Le Observatoire.

Gibb, K. & Mackay, D. (1999). *Citywide Interim Report. Social Housing Need and Demand Study.* Report for Glasgow municipality.

Gibb, K., Munro, M., Satsangi, M. (1999). *Housing Finance in the UK.* London: Macmillan.

Gibb, K. & Mackay, D. (2001). *The Demand for Housing in Scotland: New Estimates from the Scottish House Condition Survey.* Discussion Paper. Economic and Finance of Property and Housing Research Group. Glasgow: University of Glasgow.

Hallet, G. (ed.) (1993). *The New Housing Shortage: Housing Affordability in Europe and the USA.* London: Routledge.

Hancock, K.E. (1993). Can Pay? Won´t Pay?, *Urban Studies* 30: 127-145.

Hegedüs, J., Tosics, I. 1998. Rent reform – issues for the countries of Eastern Europe and the Newly Independent States, *Housing Studies* 13: 657 – 678.

Hendershott, P.H., Pryce, G., White, M. (2003). Household leverage and the deductibility of home mortgage interest: evidence from UK house purchasers, *Journal of Housing Research* 14: 49-82.

Hills, J. et al. (1990). Shifting Subsidy from Bricks and Mortar to People: Experiences in Britain and West Germany, *Housing Studies* 5: 147-167.

Holmans, A. & Whitehead, Ch. (1997). *Funding affordable social housing.* London: NHF.

Housing Corporation (1997). *Registered Social Landlords in 1996: Performance Indicators.* London: The Housing Corporation.

Housing Corporation (2001). *The Ready Reckoner. Rents, Benefits and Measures of Affordability.* London: the Housing Corporation.

Hsieh, B.M. (2002). *Housing Tenure Choice in Scotland: an Empirical Study of the 1996 Scottish House Condition Survey.* PHD thesis. Glasgow: Universtity of Glasgow.

Hulchanski, D. (1995). The Concept of Housing Affordability: Six Contemporary Uses of the Housing Expenditure-To-Income Ratio, *Housing Studies* 10: 471-492.

Kearns, A., Gibb, K., More, A., Keoghan, M., Pryce, G. (1996). *Community Ownership Rents: Greater Easterhouse in the Glasgow Context.* Report to the Greater Easterhouse Community Ownership Forum.

Kempson, E., White, M., Forth, J. (1997). *Rents and Work Incentives.* London: Policy Studies Institute.

Linneman, P. and Melbolugbe, I. (1992). Housing Affordability: Myth or Reality?, *Urban Studies* 29: 369-392.

Lowe S., Tsenkova S. (eds.) (2003). *Housing Change in East and Central Europe. Integration or Fragmentation?* London, New York: Ashgate.

Lux, M. (2000). *The Housing Policy Changes and Housing Expenditures in the Czech Republic.* Sociological Papers 1/2000. Prague: Institute of Sociology.

Lux, M. (ed.) (2001). *Social Housing in Europe 2000*. Prague: Institute of Sociology.

Lux, M. (ed.) (2002). *Bydlení – věc veřejná (Housing – Res Publica)*. Prague: SLON.

Lux, M. (ed.) (2003). *Housing Policy: an End or A New Beginning.* Budapest: Local Government Initiative.

Lux, M. (2004). *Quasi-Normative Approach to Housing Affordability.* Housing Research Group. Discussion Paper 1. University of Glasgow: Glasgow.

Lux, M., Sunega, P., Kostelecký, T., Čermák, D. (2003). *Standardy bydlení 2002/03 (Housing Standards 2002/03)*. Prague: Institute of Sociology.

Maclennan, D. 1982. *Housing Economics.* London, New York: Longman.

Maclennan, D. and Wiliams R. (1990). *Affordable Housing in Europe*. York: Joseph Rowntree Foundation.

More, A., Findlay, J., Gibb, K., Kasparova, D., Mills, C. (2003). *Determined Differences: Rent Structures in Scottish Social Housing.* Edinburgh: Scottish Executive Social Research.

More, A., Pawson, H., Scott, S. (2003). *Evaluation of English Housing Policy since 1975.* Draft paper for the Office of the Deputy Prime Minister.

Oxley, M. & Smith, J. (1996). *Housing Policy and Rented Housing in Europe*. London: Chapman and Hall.

Pryce, G. (1999). Work incentives and rent: evidence from Glasgow housing associations, *Netherlands Journal of Housing and Built Environment* 14: 343-362.

Stephens, M. & Goodlad, R. (1999). *Review of International Models of Housing Governance*. Edinburgh: Scottish Homes.

Walker, R. (1998). Regulatory and Organizational Issues in Market-led Social Housing: The Case of the Netherlands, *Regional Studies* 32: 79-84.

Wilcox, S. & Meen, G. (1995). *The cost of higher rents.* London: NFHA.

Wilcox, S. & Sutherland, H. (1997). *Housing Benefit, Affordability and Work Incentives.* London: NHF.

Wilcox, S. (1993a). *Housing Finance Review 1993/94.* York: JRF.

Wilcox, S. (1993b). *Housing Benefit and the Disincentive to Work.* Housing and Economic Recovery Briefing Paper 4. York: JRF.

Wilcox, S. (1994). „The costs of higher rents“ in Wilcox, S. (ed.) Housing Finance Review 1994/95. York: JRF,

Wilcox, S. (2002). *UK Housing Review 2002/03*. London: JRF.

ANNEX A

Hedonic price model (OLS model)

Variable	Beta
Constant	*13.170***
Area of dwelling (in m^2)	0.024**
Date of construction (up to 1946)	-0.645**
Date of construction (1946 – 1960)	-0.488**
Date of construction (1961 – 1970)	-0.363**
Date of construction (1971 – 1980)	-0.274**
Date of construction (1981 – 1990)	-0.211**
Date of construction (1990 - now)	ref.
Regional dummy 1	-0.580**
Regional dummy 2	-0.885**
Regional dummy 3	-0.771**
Regional dummy 4	-0.765**
Regional dummy 5	-1.457**
Regional dummy 6	-0.845**

Regional dummy 7	-0.662**
Regional dummy 8	-0.660**
Regional dummy 9	-0.720**
Regional dummy 10	-0.563**
Regional dummy 11	-0.784**
Regional dummy 12	-0.623**
Regional dummy 13	-1.156**
Regional dummy 14 (Prague)	ref.
Size of residence (up to 1,999 inhabitants)	-0.988**
Size of residence (2,000 – 9,999 inhabitants)	-0601**
Size of residence (10.000 – 49,999 inhabitants)	-0.423**
Size of residence (50,000 and more inhabitants)	ref.
Adjusted R^2	**0.64**
N	**4.325**

** significant on 0.01 level of significance; * significant on 0.05 level of significance

Note: Dependent variable is ln of transaction price.

Source: own computation, Czech Statistical Office – Ministry of Finance data.

ANNEX B

Move-stay decision (Logit Model)

Variable	Beta
Constant	*1.437**
Size of residence (up to 5,000 inhabitants)	-0.570*
Size of residence (5,000 – 100,000 inhabitants)	-0.172
Size of residence (more than 100,000 inhabitants)	0.087
Size of residence (Prague)	ref.
Date of construction (up to 1945)	1.020*
Date of construction (1946 – 1960)	0.629
Date of construction (1961 - 1980)	0.402
Date of construction (1981 – 1990)	0.773
Date of construction (1990 -)	ref.
Age of respondent	-0.049**
Number of persons per room	0.368*
Nagelkerke R^2	**0.235**

Predictions correct	**69.5% (cut-off 0.5)**
N	**742**

** significant on 0.01 level of significance; * significant on 0.05 level of significance

Note: dependent variable is a dummy variable with values 1 (move) and 0 (stay).

Source: own computation, Housing Attitudes 2001

ANNEX C: Optimisation Program on Public Housing Construction Costs

Program is looking for the minimum of the following equation:

$$MIN[(J_{Ki} \times \frac{i_{K\max}}{1-\frac{1}{(1+i_{K\max})^n}} - J_{Ki} * \frac{i_{Ki}}{1-\frac{1}{(1+i_{Ki})^n}}) * \frac{1-\frac{1}{(1+i)^n}}{i}]$$

where: i_{Kmax} – maximum interest rate on qualified loan (5% p.a.)

i – discount rate (5% p.a.)

n – loan maturity (25 years)

J_i – loan principal for region i

J_{Ki} – qualified loan principal for region i

i_{Ki} – optimised interest rate of a qualified loan for region i

under the following conditions:

$J_i \geq 0$

$J_{Ki} \geq 0$

$0{,}0000000001 \leq i_{Ki} \leq 0{,}05$

$Pi = J_i + J_{Ki}$

$$J_i \times \frac{i_T}{1-\frac{1}{(1+i_T)^n}} + J_{Ki} \times \frac{i_{Ki}}{1-\frac{1}{(1+i_{Ki})^n}} + OC_i \leq NR_i$$

where: P_i – cost price of an average new dwelling in region i;

i_T – market interest rate for mortgage loans in 2002 (6.7% p.a.);

OC_i – running costs (management and maintenance costs) - 2% of P_i;

NR – normative rent (equal to rent in rent-controlled sector at a particular stage of simulation).

If the equation does not have a solution even when $i_{ki} \approx 0$ and $J_i = 0$, then the principal of a qualified loan is gradually decreasing using following relation: $J_{Ki}(1-z)$, where $z = 0{,}0001$. A qualified loan is thus substituted by a grant. In each step of iteration the decrease in principal of a qualified loan is connected with the decrease of total construction costs till the moment when costs are lower or equal to normative rent (or when the full qualified loan is substituted by grant). Only if under such a condition the normative rent still does not cover the construction costs (subsidised by grant), the difference between costs and normative rent is supposed to be covered by regular revenue subsidies.