THE DYNAMIC PUBLIC SECTOR COMPARATOR

V Beran, J Frková, E Hromada, F Lehovec
Czech Technical University in Prague, Czech Republic
eduard.hromada@fsv.cvut.cz

ABSTRACT

The Dynamic Public Sector Comparator represents a modified method for the calculation of the Public Sector Comparator (PSC), which is usually constructed to present a full cost pricing at an early stage in the procurement process of Public Private Partnership (PPP/PFI) projects. It is an instrument which gives insight into the possible added value of a PPP/PFI procurement by comparing the PPP/PFI procurement option with the public approach. This contribution deals with a description of this innovative assessment method - the Dynamic Public Sector Comparator and explains its application during the initial assessment and pre-market stages.

1 THE DYNAMIC PUBLIC SECTOR COMPARATOR – A METHOD FOR EVALUATION OF PPP/PFI PROJECTS

The Public Sector Comparator (PSC) is an evaluation tool, which provides to the public sector complex information about the progress of total costs, incomes and risks during the life cycle of a PPP project [4]. The Public Sector Comparator represents a so–called Reference project which means that it compares value-for-money (value achieved for capital employed) delivered by a PPP project with the most effective form of service procurement in the public sector. The value of the Public Sector Comparator represents the hypothetical total costs of the effective organization of the public sector that are necessary for the procurement of an identical service during the scheduled time of a PPP project.

The Public Sector Comparator is based on a hypothetical project contract, in which the public sector executes all project functions (design, building, operation, etc.) on the basis of real costs expended on comparable projects. It should include the value of all risks and assets that are used within the scope of public procurement.

The Public Sector Comparator is prepared in advance of call for tenders. Its results serve in the public sector as a measure for comparison with submitted bids for the solution of investment requirements directed to PPP projects and for selection of the most suitable partner from the private sector.

The Public Sector Comparator is an important tool for public sector decision making regarding the applicability of Public Private Partnership (PPP). The PPP mode should be used only in connection with projects in which, by the application of principles of Public Private Partnership, there will be achieved a higher total economic contribution in the context of a project life cycle than in the case of a traditional mode of public procurement.

2 THE STRUCTURE OF THE PUBLIC SECTOR COMPARATOR

There are different conceptions of the meaning and structure of the Public Sector Comparator in the world-wide literature that is engaged in questions of Public Private Partnership. Each state defines this financial and evaluation tool in its unique way. In terms of the complex analysis examining this problem it was determined that the Public Sector Comparator should be structured in the following way :

- Raw PSC.
- Competitive Neutrality.
- Transferable Risk.
- Retained Risk.

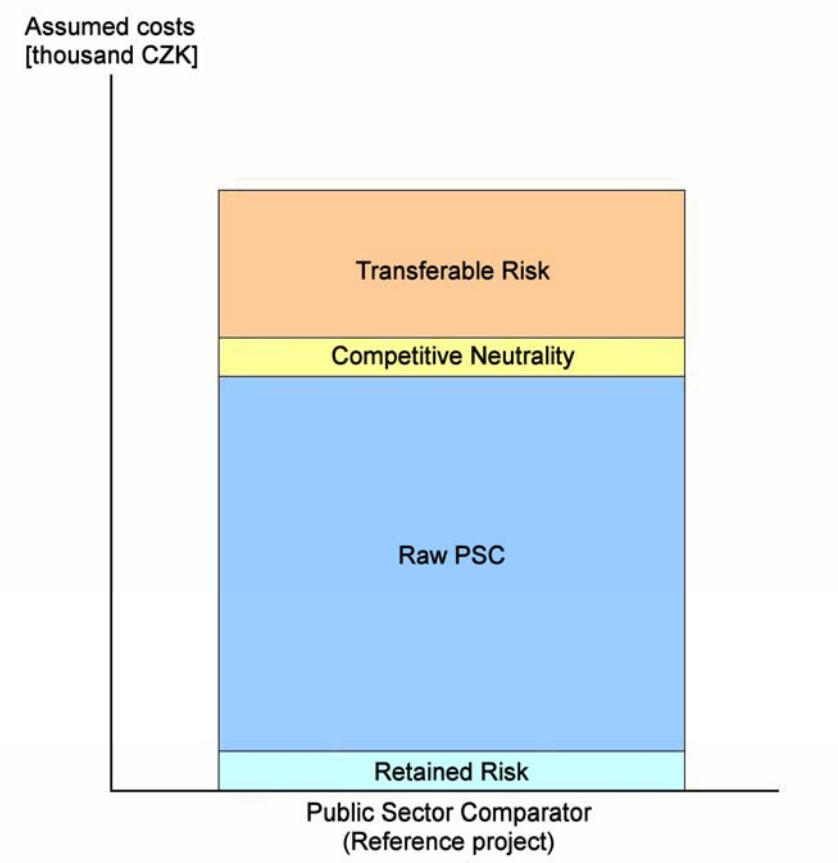

Figure 1 - Recommended structure of the Public Sector Comparator [5].

2.1 Raw PSC

Raw PSC represents the most considerable component of the Public Sector Comparator. It includes all direct and indirect investment and operating costs (converted to present values) related to the preparation, construction and operation of a public service. It should not include the evaluation of risks.

2.2 Competitive Neutrality

Competitive Neutrality is a specific component of the Public Sector Comparator that potential partners from the private sector in their bids don't usually calculate. Its importance consists in the elimination of competitive advantages and disadvantages in the public sector. In the event of the realization of a project under the direction of the public

sector, it would obtain by virtue of its status specific competitive benefits that are unavailable to the private sector.

A typical competitive advantage for the public sector is in the taxation area. Payers of land tax are only private subjects, while lands in the ownership of the state are exempt from this tax. On the other side the position of the state also carries specific competitive disadvantages. The public sector has to make decisions in accordance with legislative rules relevant to public procurement. There are also stricter demands on the public sector regarding the giving of due notice about its activities.

2.3 Transferable Risk

The Public Sector Comparator divides risks between the private and public partner according to presumptions about their abilities to effectively control each particular risk. Transferable risk represents the value of those risks that should be carried by the public sector, but there is the possibility to effectively allocate them to the private sector.

2.4 Retained Risk

Retained risk represents the value of those risks that will be allocated to the domain of the public sector.

3 THE UTILIZATION OF THE PUBLIC SECTOR COMPARATOR IN THE PROCESS OF PUBLIC PROCUREMENT

The Public Sector Comparator has a unique position in the process of public procurement in a PPP project. Figure 2 illustrates an example of utilization of the Public Sector Comparator in the process of bid evaluation. The first column represents the present value of total life cycle costs in a Reference project (the value of the Public Sector Comparator). The next columns represent bids of partners from the private sector. Bid No. 2 represents, from sight of the quantitative evaluation, the selected bid by reason of it achieving the highest „value for money".

In the event of an absence of bids with a lower present value of required payments on the part of public sector than is the value of the Public Sector Comparator, the public tenderer should consider carefully, with reference to the qualitative aspects of the submitted bids, giving priority to the conventional means of project realization under direction of the public sector.

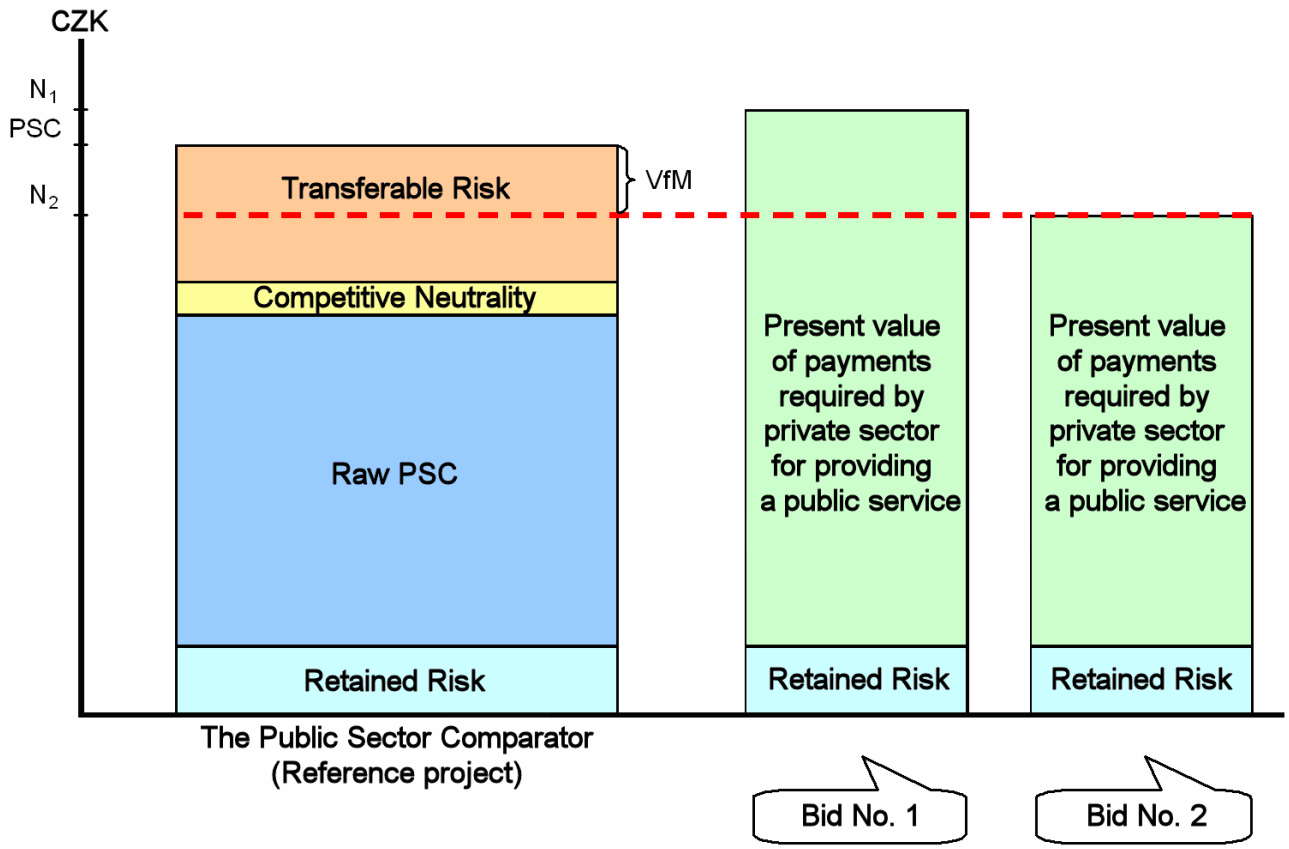

Figure 2 - Evaluation of submitted bids using the Public Sector Comparator.

Key:

VfM … Value for Money represents in quantitative form the discrepancy between the present value of the life cycle costs of a Reference project and the present value of the payments required by the private sector for providing a public service,

PSC … The Public Sector Comparator,

N_1 … Present value of payments on the part of the public sector required by partner No. 1 from the private sector for providing a public service,

N_2 … Present value of payments on the part of the public sector required by partner No. 2 from the private sector for providing a public service.

4 UTILIZATION OF THE DYNAMIC PUBLIC SECTOR COMPARATOR

At the present time in calculating the Public Sector Comparator methods are used that ignore one fact, namely that its particular components cannot be defined with a comparable reliability. Consultation and advisory companies, which usually prepare the Public Sector Comparator for the public sector, have the experience and necessary know - how for its calculation. However the total range of their abilities cannot be distributed absolutely equally across all required branches. The contents of particular components of the Public Sector Comparator already leads its compiler to the necessity on some items (e.g. costs connected with the purchase of a plot of land and existing objects, non-building work, groundwork, etc.) of defining them with a higher rate of uncertainty.

Present methods of calculation of the Public Sector Comparator are based on the formulation of an economic model of a PPP project with a simplification of the objective reality. This fact leads to problems linked to the interpretation of achieved results. The next weak point of present methods is the rather static means of calculating the Public Sector Comparator. There are accepted for the basis of a solution in an economic model of PPP project once-and-for-all decisions in a predetermined time frame. However it is necessary to record the dynamic of a surveyed process [1].

From these aspects of knowledge there results the finding that the present methods of calculating the Public Sector Comparator are unsuitable. It is necessary to respect the fact, within the scope of determining the values of particular items of the Public Sector Comparator, that its input parameters represent only point estimates that will be nearly always at variance with really achieved values. It is therefore necessary to record information about the accuracy of each realized estimation, which will be consequently utilized in the calculation of the final value of the Dynamic Public Sector Comparator [3].

The Dynamic Public Sector Comparator represents a significant qualitative and quantitative innovation in the method of calculating the Public Sector Comparator. The Dynamic Public Sector Comparator is based on a parametrization of input data by means of determinate characteristics of mathematical/statistical methods. For that reason input data are defined in extended format. Every item of the Dynamic Public Sector Comparator is defined by a specific probability distribution function and confidence interval [2].

In order to assure the usability of the method of the Dynamic Public Sector Comparator for those who do not have good knowledge of mathematical statistics, the process of data entry was sufficiently simplified. The model requires a discreet probability distribution for every item of the Dynamic Public Sector Comparator (Table 1).

Table 1 - Example of table of input parameters for items of the Dynamic Public Sector Comparator.

Item of the Dynamic Public Sector Comparator: ***Costs connected with purchase of piece of land and existing objects***	
Value (thousand CZK)	**Probability**
10 000	0,15
12 000	0,20
14 000	0,30
16 000	0,25
18 000	0,10
Checksum	**1,00**

On the basis of the input parameters the model of the Dynamic Public Sector Comparator calculates for every item a continuous probability function that reliably reflects the input parameters of a discreet probability distribution (see Figure 3). These assigned functions are the basis for simulation of input data for a prepared PPP/PFI project. The users of the model of the Dynamic Public Sector Comparator are not thus obliged to search for the proper continuous probability distributions of the input parameters.

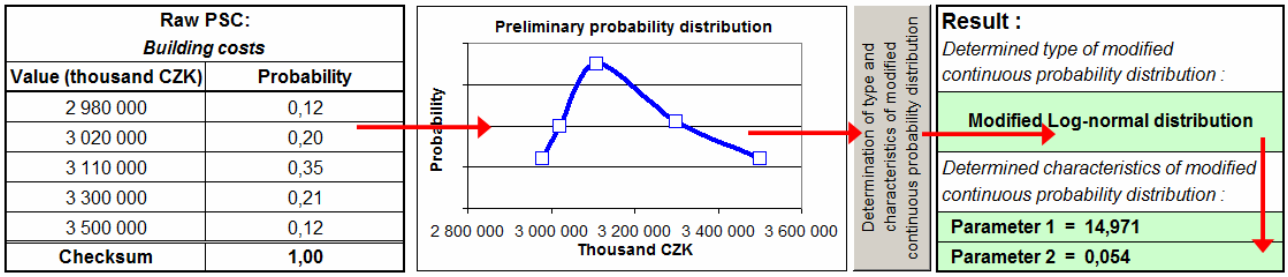

Figure 3 - Procedure for determining the type and characteristics of the modified continuous probability distribution of an identified item of Raw PSC.

Within the scope of seeking particular types of continuous probability distributions there was found to be a just number of continuous probability distributions applicable to the definition of input parameters of the Dynamic Public Sector Comparator. Input parameters are generally determined by set of common properties depending on some physical and economic regularities. For that reason it is acceptable in the model of the Dynamic Public Sector Comparator to apply only a qualified set of continuous probability distributions that includes: Normal distribution, Log-normal distribution, Modified log-normal distribution and Uniform distribution.

The model carries out simulations of cost distribution probability occurrences for particular input parameters after completing the definition of input parameters. The results of the simulations represent input parameters for the calculation of the Dynamic Public Sector Comparator. The program algorithm carries out simulations of particular scenarios of progress for the value of the Dynamic Public Sector Comparator. The number of executed simulations depends on the reliability requirements of the analysis results. It is recommended to carry out at least 1000 simulations. The results of the simulations are continuously recorded and serve as a basis for statistical evaluation. The recorded simulation results are sequentially analyzed utilizing mathematic-statistical methods.

It is possible to statistically analyze the simulation results with the help of the graph of frequency distribution of values of the Dynamic Public Sector Comparator. The final value of the Dynamic Public Sector Comparator that will be used by the public sector in the process of public procurement of a PPP project, is the value of the Dynamic Public Sector Comparator at the maximum frequency of simulation results mentioned in the graph of frequency distribution of values of the Dynamic Public Sector Comparator.

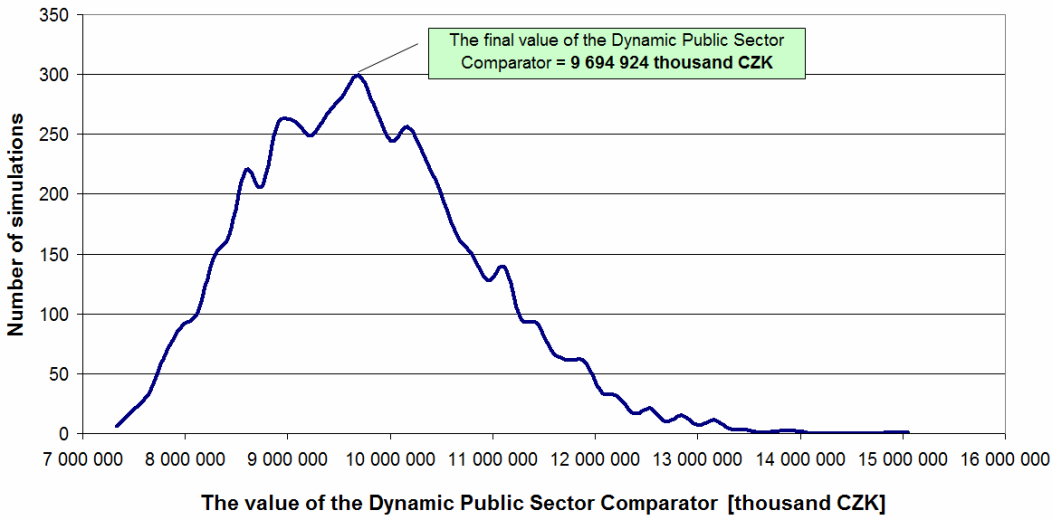

Figure 4 - Example of the graph of the frequency distribution of values of the Dynamic Public Sector Comparator.

Important information for the public sector is also the final values of particular components of the Dynamic Public Sector Comparator (Raw PSC, Competitive Neutrality, Transferable Risk and Retained Risk). For their determination it is necessary initially to calculate the frequency occurrences of these values in particular simulations. The following four figures represent examples of the graphs of frequency distribution of values of the particular components of the Dynamic Public Sector Comparator. However these graphs represent only preliminary final values that it is necessary to mathematically modify.

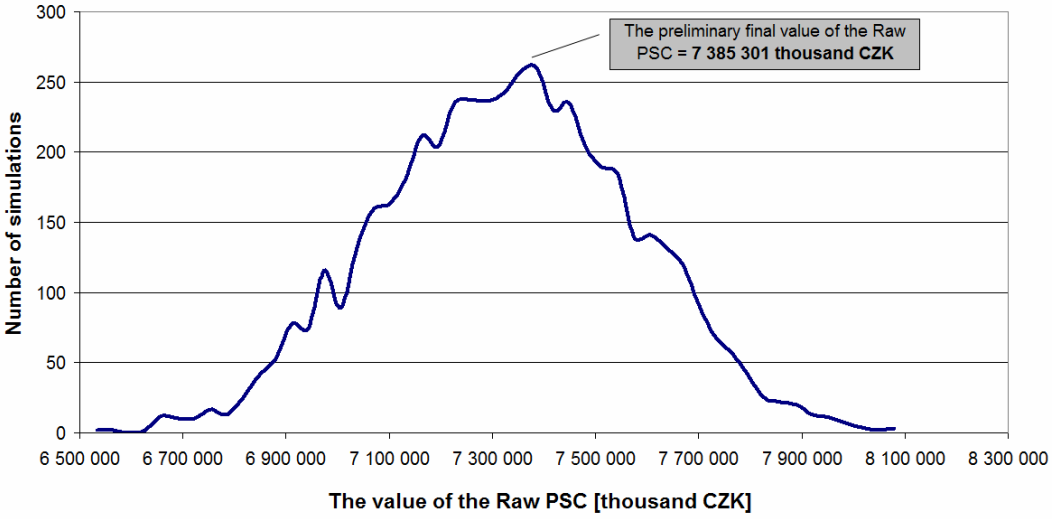

Figure 5 - Example of the graph of frequency distribution of values of the Raw PSC.

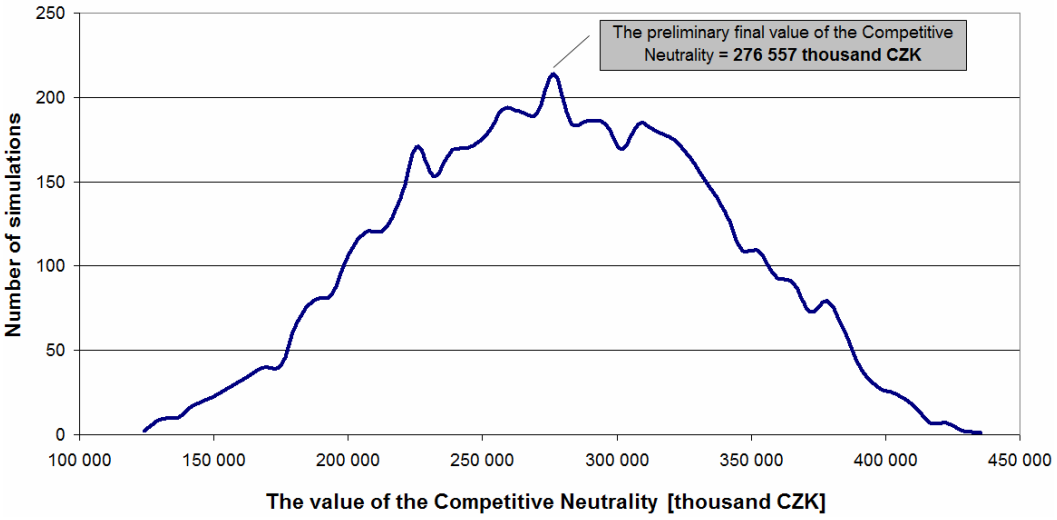

Figure 6 - Example of the graph of frequency distribution of values of Competitive Neutrality.

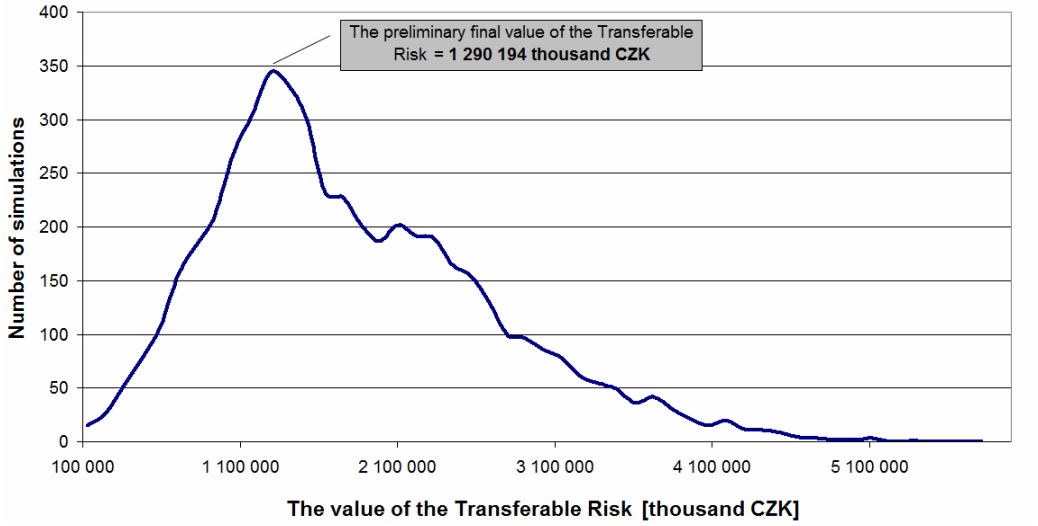

Figure 7 - Example of the graph of frequency distribution of values of the Transferable Risk.

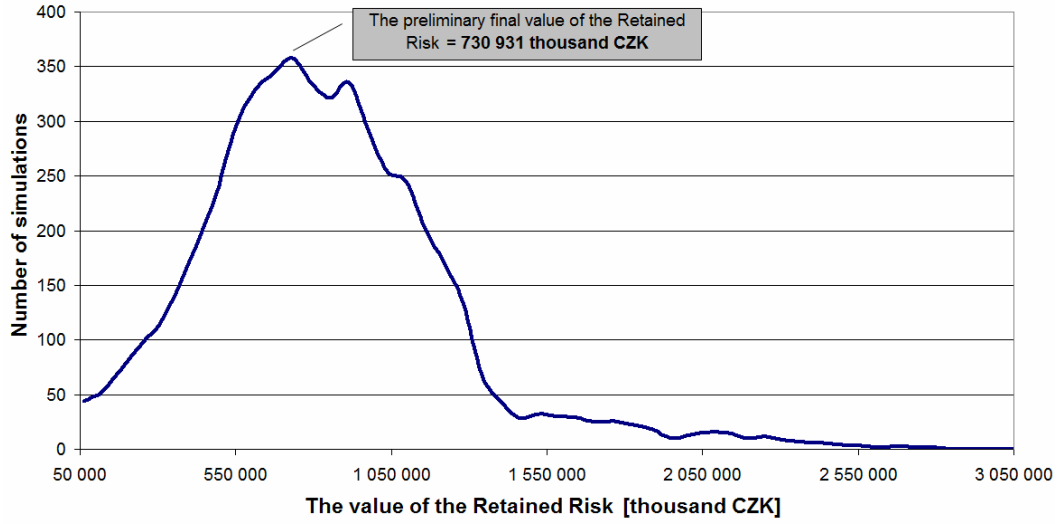

Figure 8 - Example of the graph of frequency distribution of values of the Retained Risk.

In the mentioned case the sum of the preliminary final values of the particular components of the Dynamic Public Sector Comparator is not equal to the final value of the Dynamic Public Sector Comparator. This equation would occur only in the event of the realization of an infinite number of simulations. It is therefore necessary to carry out a modification of the preliminary final values of the particular components of the Dynamic Public Sector Comparator in a way that is shown in the following table.

Table 2 - The calculation of the final values of the particular components of the Dynamic Public Sector Comparator.

The component of the Dynamic Public Sector Comparator	The preliminary final value *	%	The final value
Raw PSC	7 385 301	76,27%	**7 394 408**
Competitive Neutrality	276 557	2,86%	**276 898**
Transferable Risk	1 290 194	13,32%	**1 291 785**
Retained Risk	730 931	7,55%	**731 833**
Total	**9 682 983**	**100%**	**9 694 924****

Key:

* The preliminary final values are taken over from examples of the graphs of frequency distribution of values of the particular components of the Dynamic Public Sector Comparator (Figure 5 till Figure 8).

** The final value of the Dynamic Public Sector Comparator is taken over from Figure 4.

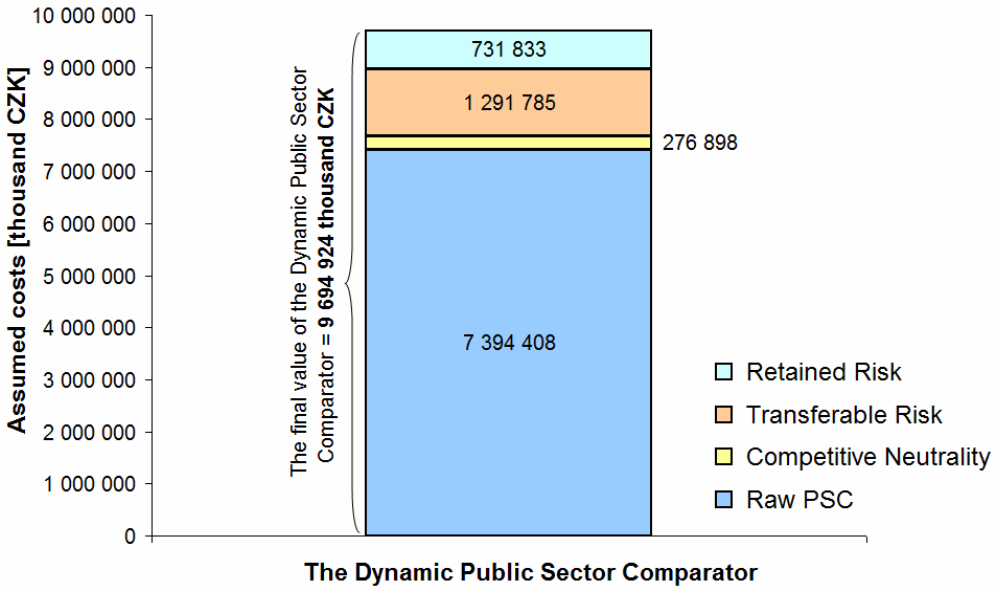

Figure 9 - Example of the graph for the assessment of the simulation results of the Dynamic Public Sector Comparator.

5 INDIRECT BENEFITS OF TRANSPORT INFRASTRUCTURE FOR THE ECONOMIC DEVELOPMENT OF A REGION

5.1 The Preparation of PPP Projects

The general benefit of utilization of Public Private Partnership (PPP) is in a speeding up in the realization of important sections of land-surface communications in the Czech Republic that are not financially ensured by the state in a close time-frame.

It is necessary to determine which benefits will be lost by society for every year in consequence of delay in the utilization of planned communications. The problems of expeditious modernization of land-surface communications are very real at the present time. There is discussion and preparation of the utilization of the PPP model within the scope of realization of selected roads and highways. There is presumed the utilization of licensed projects in 9 segments of land-surface communications concerning a total distance of 280 km on the territory of the Czech Republic. A pilot road PPP project, which was passed by the government in August 2005, is concerned with a section of highway D 3: Tábor – Soběslav – Bošilec and is designated to extend for a distance of 30 km involving total investment costs circa. 370 mil. Euro.

5.2 Economic Benefits of Transport

In general, 2 categories of benefits may be distinguished:

- benefits of transport infrastructure – accounting for a direct benefit,
- benefits of transport performances (processes) – accounting for an indirect benefit.

5.2.1 Benefits of Transport Infrastructure

The benefit of transport infrastructure consists in improving transport conditions and thus economizing resources. The principal effects include lower operating costs for the means of transport, lower time losses and lower accident costs and environmental expenses. The assessment is based on cost economies comparing transport costs for the case with and without the implementation of the respective investments. The difference reached represents the benefits of the improved transportation route within transport infrastructure.

The procedures of benefit assessment have been traditionally applied in transportation planning in analyzing the cost-efficiency of infrastructure projects (the cost and benefit analysis, the efficiency analysis). The costs and benefits for the service life time of the designed structure are added up, and discounted at the day of investment implementation. A benefit/cost ratio greater than 1 shows that the designed structure is profitable for the whole society.

Economic calculations of the dependency of the economic growth on transport infrastructure are regarded as a significant new step in the assessment of investments into infrastructure.

5.2.2 Benefits of Transport Performances

When talking about the benefits of transport, we namely refer to enhanced transport performances (both in passenger and freight transport) which are manifested through the

benefits in the national economy arising due to mobility in terms of possibilities of overcoming distances, affecting the distribution of labour and the productivity of the population and the economy.

Each state is interested in a harmonious and well-balanced development of its entire territory, in reducing the differences between the level of individual regions and in supporting their economic and social development. A lower efficiency of some regions may be caused by their remote position and low-quality transport accessibility. These effects result in an insufficient exploitation of the territory as a production factor, and, on top of that, call for increased assistance from public resources in the form of social services and allowances allocated into the region (e.g. higher expenses spent on unemployment benefits).

In terms of economic efficiency, the essential presumption is that public investments spent in the supported region result in the greatest possible effect in the form of private investments. Analogically, in creating new job opportunities, the effect on the existing job offer and on new related additional secondary jobs is monitored. In both cases, we talk about the so-called multiplication effect, which implies that the effect of the initial impulse (investment) in an economic environment is multiplied.

5.3 Solution Methods and Procedures

Due to the extreme demands and scope involved in the preparation of road infrastructure projects, the solution below is focused on the benefits of road transport. The results of previous partial studies allowed us to express the dependency of the economic potential of the respective districts of the Czech Republic on the quality and capacity of transport routes, the positive effects on safety on new roads, and to determine the unfavourable effects on the population living in the vicinity of existing roads congested with traffic.

With regards to these aspects, the benefits of new infrastructure projects for the socioeconomic development of a territory may be expressed in two categories:

- Direct benefits (mainly for transport route users) including, above all partial benefits due to:
  - time economies,
  - energy (fuel) economies,
  - reduced vehicle wear,
  - reduced accident rate.

- Indirect benefits (mainly for the population of the affected territory) including, above all partial benefits due to:
  - greater numbers of job opportunities,
  - improved environmental conditions (noise, emissions) for the population along existing congested roads,
  - evaluation of ecological effects on the territory,
  - growth in the value of the territory due to creation of commercial and industrial zones,
  - enhanced economic potential of municipalities due to better transport accessibility,
  - improved territorial accessibility for tourist trade and relaxation of the population,
  - revival of building activity during the construction of the transport route and its successive maintenance,

- setting limits for sustainable territorial development [6].

Complex (overall) benefits of transport infrastructure projects may be expressed by the following relation:

$$U_{total} = \sum_{i=1}^{n} U_{dir.} + \sum_{j=n+1}^{m} U_{indir.}$$

where $U_{dir.}$ equals direct benefits of monitored factors, direct benefits assessment $i=1,\ldots,n$

$U_{indir.}$ equals indirect benefits of monitored factors, indirect benefits assessment, $j=n+1,\ldots,m$.

In order to express direct benefits, the economic (cost-benefit analysis) project assessment is used in comparison with a zero alternative (application of the HDM – 4 assessment model).

This allows monetary expression within standard categories, i.e.:
- overall net economic benefit discounted at the end of the monitored period (NPV),
- setting the internal return rate (IRR),
- expression of the ratio of the present net value to costs (cost return, BCR).

In order to determine indirect benefits, we need to specify the territory which may be presumed to be affected by the construction of a high-capacity road. Here, an appropriate technique seems to be its subdivision into individual exits of the future road with hinterlands delimited by their accessibility within 15 minutes of travel by motor vehicle.

The territory of each exit is assessed with a view to the differences in the monitored beneficial factors generated by the route in relation to the respective catchment area. The assessment of the difference (growth or decline) between the situation without construction and the new situation (after the construction is completed) is carried out in a time perspective of twenty years, split into five-year intervals.

The 4 principal assessment factors describing differential consequences of the unaffected and new situation selected for the conditions of the Czech Republic are as follows:
- increase in the number of job opportunities,
- the effect of mobility on economic growth,
- increase in the value of the territory,
- environmental effects on the territory and population.

The principles designed for use in the complex assessment of projects of integrated transit routes of transport structures may be applied in determining their urgency within the implementation time prospective. They allow extended evaluation of alternative solutions not only in terms of the economic expression of direct benefits, but the inclusion of indirect benefits may principally affect the priorities for implementation [7].

6 CONCLUSION

With the method of the Dynamic Public Sector Comparator it is possible to get a more accurate calculation of full cost pricing in PPP/PFI projects. It can act as a key management and evaluation tool during the procurement process and can provide a more reliable means of demonstrating value for money. The method of the Dynamic Public Sector Comparator provides full economic analysis of a prepared PPP/PFI project including extended financial, risk and sensitivity analysis and gives a solid idea of the total project costs over the PPP/PFI project life cycle.

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