SAFETY SCIENCE Monitor

ISSUE 1 2005

Article 4

VOL 9

COST CALCULATING TOOL

P. R. HARPER
Faculty of Mathematical Studies, University of Southampton

OVERVIEW

A cost calculating tool for AUVA has been designed and built using MS-Access database and Visual Basic coding. The tool has been designed to calculate future costs to AUVA, the Economy and the Employer. Inflation and discounting rates have been included and the user may calculate costs over a specified period (e.g. a year, range of years) or the lifetime costs for the cohort of people. Complex rules have been included to calculate each of the costs. The AUVA categories are shown in Table 1.

Table 1: AUVA cost categories

Pensions	Renten
Allowances	Beihilfen
Funeral costs	Bestattungskostenbeitrag
Hospitalisation costs	Unfallheilbehandlung
Cost for prostheses	Körperersatzstücke u. a. Hilfsmittel
Rehabilitation costs	Rehabilitation
Prevention and first aid	Unfallverhütung, Prävention und Erste Hilfe
Transportation costs	Fahrtspesen und Transportkosten
Special doctors	Vertrauensärztlicher Dienst und sonst. Betreuung
Payment fee	Auszahlungsgebühren
Administration	Verwaltungs- und Verrechnungsaufwand
Deduction	Abschreibungen
Other costs	Sonstige und a.o.Aufwendungen
Allocation to reserves	Zuweisung an Rücklagen

Data Sources

Data was provided on all claims processed during 2000 and 2001. In total 123,387 records were in the database and 66 fields were created to capture information on each cases, including VNR, MDE, Beza, Unfdat, Gebdat, Alter, Tod etc. Getting the data into the correct format in one complete table was a complicated process and involved merging a number of different data sources together based on unique identifiers such as VNR and Unfdat. The list of the fields is shown in Table 2.

Table 2: Fields used in MS-Access

Original Fields:	Bezbetr
Rbetrag	Stellg
RSumme	Dgktnr
KZ	Dnanz
MDE	Kbeg
Prostheses Costs 2000	Kend
Prostheses Costs 2001	Kstdauer
Prostheses Costs Other	Branche
Rehabilitation Costs 2000	Berufsg
Rehabilitation Costs 2001	GebR
HZ	SexR
Beza	AlterR
Year of Accident	Life Expectancy
VNR	Unfnr
Versart	**Calculated Fields (costs):**
BFA	Pensions
Unftag	Allowances
Unfdat	Funeral
Gebdat	Hospital
Tod	Prostheses
Alter	Rehabilitation
Sex	Prevention
Staats	Transport
Wochtag	Doctors
Uhrzeit	Payment
Schadart	Administration
Taet	Deduction
VA1	Others
KR1	Reserves
KS1	Employer
Salary	Economy
Behart	Individual
Spital	Injury
Urs	Sick pay

Using this data and the rules governing the costs calculations of each category (within AUVA, Economy, and Employer classes), a cost calculating tool was designed and built within MS-Access linking to the data source. It has been designed for ease of use and allows maximum flexibility, for example in permitting changes to default parameter values. The tool is described in the following sections.

System Description

Main Form

The main form provides access to changing parameter values, running the model, obtaining and exporting results. One central form controls use of the system, as shown in Figure 1.

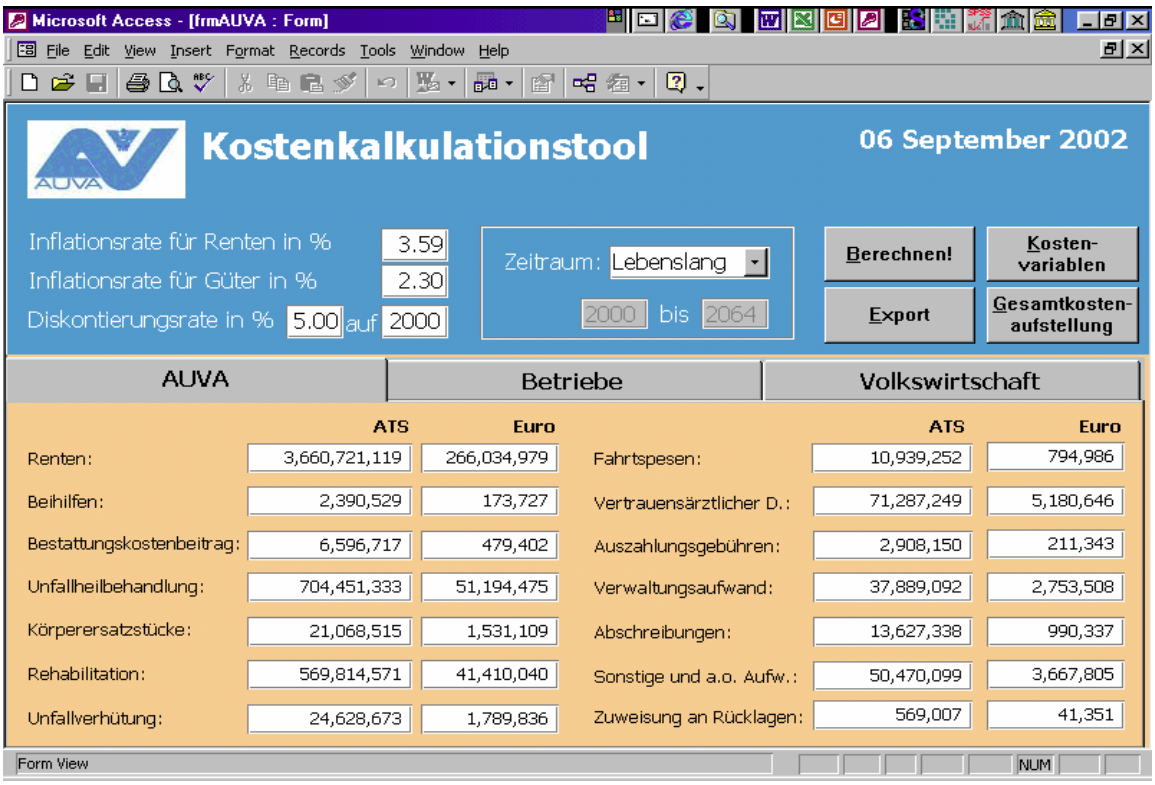

Figure 1: Cost calculation tool main form

Parameters

The user inputs inflation rates (for both pensions and costs) and discount rate (discounted to a user defined year). To perform costs calculations, the user should select the required time period. This may be:

- A single year e.g. 2010
- Between years e.g. 2000-2005
- Lifetime costs 2000

Thus it is possible to select any combination of years (Figure 2).

Figure 2: Selecting a time period for cost calculations

Cost Variables

A number of variables are used in the rules used to calculate costs for each category. For example, the costs per visit to hospital or the age the average that a man/woman receives their pension. Since these variables might change in the future, these have been designed so that the user may change them. The list of default costs is shown in Figure 3.

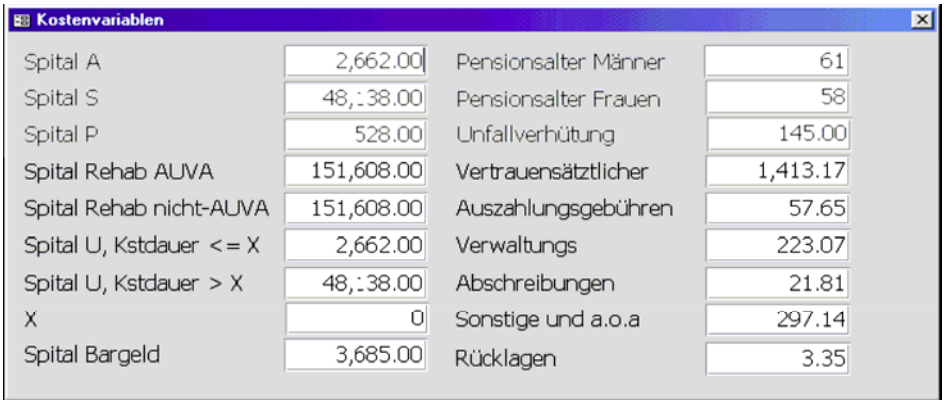

Figure 3: Costs variables form

Running the Model

This button runs the model for the user selected time period, inflation rates, discount rate and cost variables.

Costs

Once the model has finished running (it might take a few minutes depending on the speed of the PC), the new costs are displayed on the main form for each category and each class:

- AUVA
- Company
- Society

Costs are shown in both ATS and Euro.

Report Summary

This button allows the user to view a report summary, which may be printed. This shows a breakdown of all costs by each category (Figure 4).

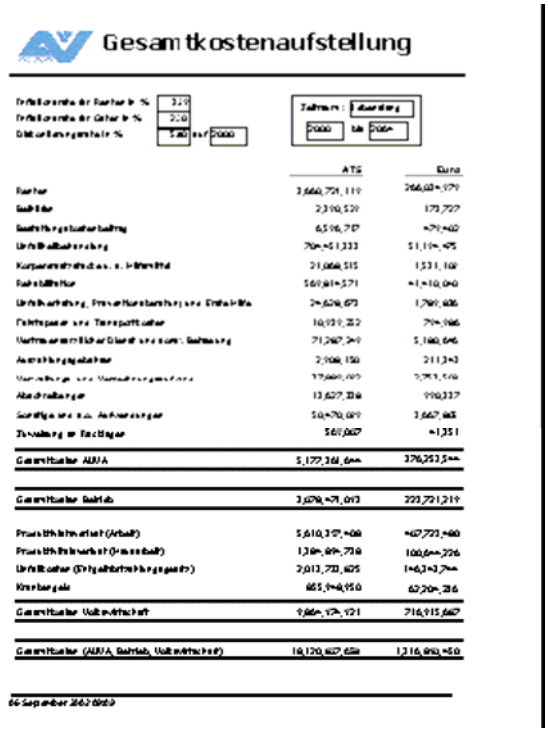

Figure 4: Illustrative cost summary

Export

This button provides access to exporting the most recently calculated data into a dbf file, for use in the PORT program. This may then be used to explore which factors influence costs, incidence rates etc (see PORT document). The user may chose from (Figure 5):

- Export all data (all individual cases)
- Pension-only cases
- Non-pension only cases

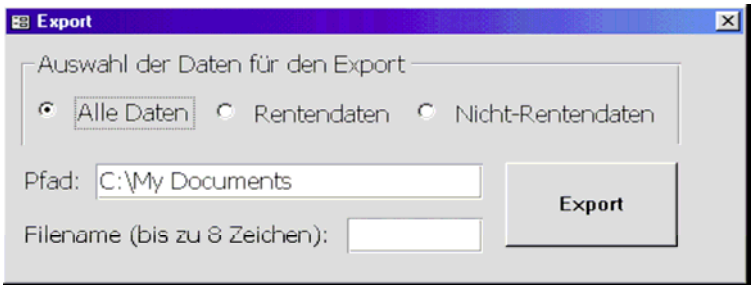

Figure 5: Exporting data

Depending on the size of the dataset, this may take some time. An alternative is to use only a sample of the data for use in PORT (e.g. 20% of all cases). The list of variables that are exported include all of the total costs for each person by category (as shown on the main form and report summary).

PORT Analysis

For the analysis in PORT, you may wish to use the individual costs as dependent variables (for analysis), e.g. Betriebe, Renten. Alternatively you may wish to use the total sum for each individual (e.g. sum of all AUVA costs). The list of independent variables to include will typically include alter, beza, sex, MDE, KR1 etc. to explore whether these influence average costs per case (see documentation on "Patient Classification and the PORT Package").

Program Logic

The system has been coded using complex costs calculating rules for each category, whilst accounting for user-chosen variables and inflation/discount parameters and time period. A printout of the Visual Basic code is given in the Appendix.

SUMMARY

A cost calculating tool has been constructing, incorporating complex cost calculating rules whilst permitting the user to change a number of default variables and parameters for scenario analysis. The tool has been designed with flexibility and user-friendliness in mind. MS-Access has been used and enhanced with Visual Basic coding. The primary purpose of the tool is to allow for predictions on total future costs to AUVA, the Economy, and Employers, based on the supplied data for processed claims during 2000 and 2001.