Summary

A forecasting Model of the Dutch Justice Chains: the Criminal Justice Chain

In 2003 the ministers of Finance, Justice, and Internal Affairs agreed that the ministry of Justice would take the lead in developing a model for the complete justice chain. The model serves as a tool in the preparation of the yearly budget and forms the basis for the yearly budget of the Ministry of Justice.

The Dutch justice chain consist of three pillars: the criminal justice chain, the civil law chain and the administrative law chain. This report describes the first version of the model for the criminal justice chain. After reviewing several other models developed in this area, it was decided that the existing WODC-model would form the basis for the new model.

The model developed for the criminal justice chain is a forecasting model for the need for capacity. Based on the developments up to the last year for which data are available, the model forecasts the expected workload for several government agencies operating within the criminal justice chain. The model is not without limitations. For example, it is not possible to calculate the optimal allocation of finances.

The model contains data on a yearly basis for several relevant crime categories but not data on an individual level. Therefore the model does not imply any causal relationships. Instead it identifies background or risk factors which may influence the inflow into a government agency operation within the criminal justice chain.

The model for the criminal justice chain is divided into a model for adults and a model for youth. Both models consist of several modules representing the various government agency operation within the criminal justice chain, such as the police, prosecutor’s office, sentencing, prisons, youth services, resettlement organizations, subsidized legal aid, forensic investigation, victim aid organizations, interpreters and the judicial collection agency. The model distinguishes between several crime categories and categories for the duration of prison sentences.

Because the model is a chain model, the input of one government agency is related to the output of the previous government agency, with the exception of the first government agency at the beginning of the chain. This input of this agency is related to internal or external influences such as background or risk factors which may influence the inflow into a government agency operation within the criminal justice chain, chances of getting caught or getting a prison sentence, or changes in the penal law.
The model for adults consists of 316 equations and the model for youth consists of 156 equations. The parameters of these equations are estimated using econometric techniques. If too few observations are available parameters are sometimes held constant at the last known level. In some cases the parameters represent percentages but in many cases the parameters represent elasticities. An elasticity indicates what the percentage change in the dependent variable will be when there is a 1% change in the explanatory variables.

The main question is of course whether the model is suited for its purpose, which is forming the basis of budget for the Justice department. This is a tricky question to answer, since it is impossible to establish how far the forecast were off. First of all, the model makes forecasts based on data up to a certain date. Usually the data trail six to twelve months behind. Any policy changes or amendments to the law that take effect after this date are not included in the forecasts. However they are included in the actual figures. So if the forecasts do not concur with the actual figures it is impossible to tell whether the forecasts were wrong or whether new policy had effect. Secondly, econometric practice shows that models that give an accurate description of reality often do not predict very well while models that predict very do not necessarily give the best description of the reality.

To get some insight into the performance of the model the actions were taken. First the model was evaluated by a commercial research agency. There conclusion was that the model was a big step forward in the direction of forecasting model of the justice chain. The model was considered to be well founded and up to econometric standards. Secondly, an out of sample forecast was made. The model for adults was re-estimated for data up to 1999 and forecasts were made from 2000 onwards. The model of youth was re-estimated for data up to 2001 (due to a lack of data before 1995) and forecasts were made from 2002 onwards. These forecasts were compared to actual figures. The forecasts for the first two years were usually reasonably well. Thereafter the uncertainties increase. That is why the model yearly updated.

The conclusion is that the model is generally well built, but it needs fine tuning in some areas. The forecasting performance seems reasonably well, especially for the first two years. Nonetheless the effects of policy changes and amendments to the penal law remain difficult calculate in advance.

In the near future the model for the criminal justice chain will be refined and supplemented. Confidence intervals will be added. Currently the WODC is also working on two models for the civil law chain and the administrative law chain.