4 Development of a Methodological Framework for the Empirical Analysis of Crime

4.1 The Methodology

4.1.1 Criminometrics

The terminus "criminometrics" has been made popular by Eide (1994). In accordance to the definition of econometrics provided by Maddala (2001:3), criminometrics can be defined as the application of statistical and mathematical methods to the analysis of crime data, with the purpose of giving empirical content to criminological theories and verifying them or refuting them.

The nature of criminometrics can be even better understood with the help of the schematic description depicted in Fig. 15. Analogous to econometrics which is based on economic theory, criminometrics builds on crime theory. How do we get from Box 1 to Box 2? This can be best explained with the help of an example. As we have already expounded in Section 3.2.3, the economic crime theory states that the number of crimes committed in a society is negatively related to the level of deterrence. It is argued that ceteris paribus higher probabilities of conviction and more severe punishments reduce the expected utility of illegal activities for potential offenders. Consequently, illegal activity becomes less attractive in comparison with legal work and, thus, individuals reduce their involvement in delinquent behaviour and the crime rate falls. The formal representation of this connection can be written as follows: \( O = O(p,f,U) \) with \( O_p = \partial O/\partial p < 0 \) and \( O_f = \partial O/\partial f < 0 \), where \( O \) - the "supply" or number of offences in society - is a function of the probability of conviction \( (p) \), the monetary equivalent of the punishment \( (f) \) and a vector of other factors \( (U) \). \( O_p \) and \( O_f \) are the partial derivatives of the supply of offences function with respect to \( p \) and \( f \) which express mathematically the negative relationship between higher deterrence (i.e. higher values of \( p \) or \( f \) and the number of offences.
One possible criminometric representation of the theoretical statement above is
\[ O = \alpha + \beta_1 p + \beta_2 f + \gamma' U + \varepsilon, \]
where \( \alpha \) is a constant term always included in estimations, \( \beta_1 \) and \( \beta_2 \) are the coefficients of \( p \) and \( f \), \( \gamma' \) is the vector of coefficients belonging to \( U \), and \( \varepsilon \) is the error term. After having translated the theoretical model into a
criminometric specification the coefficients of the latter have to be estimated using
adequate data. In our example the estimation requires data on \( p, f \) and \( U \). If such
data is not available, it should be collected in future (arrow from Box 2 to Box 3).

Source: Adapted from Maddala (2001:7).

**Fig. 15.** Schematic description of the steps involved in a criminometric analysis

Provided the required data is at our disposal, we are ready for the estimation (Box 4), which will be carried out with a computer using suitable software packages.\(^{47}\) After having run the estimation one has to check whether the criminometric model

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\(^{47}\) The most popular software packages for econometrics / criminometrics are (in alphabetical order) EViews, Gauss, Limdep, SAS, SPSS, Stata and TSP.