THE RATIONAL VILLAIN MYTH.
STATISTICS AND PSYCHOLOGY
VERSUS ECONOMIC ANALYSIS OF LAW[1]

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Abstract: *The aim of this paper is to critically assess the economic theory of punishment and the associated decision-making model from the perspective of empirical legal studies and behavioural law and economics. In the second half of the 20th century, the economic theory of punishment was the main theory of punishment and had a significant impact on criminal justice policy in the United States. In the early 21st century, numerous statistical studies showed limited effectiveness of the economic approach to criminal law on the one hand and the harmful effects of incarcerating a large number of inmates on the other. Consequently, there emerged the need to develop a new model of criminal decision-making. Psychologists, behavioural economists and proponents of behavioural law and economics were able to identify several factors influencing criminal decision-making such as hyperbolic discounting, optimism bias and affective forecasting, to name a few.*

Słowa kluczowe: *homo economicus, behavioural analysis of law, criminal law, decisions.*

MIT RACJONALNEGO ŁOTRA. STATYSTYKA I PSYCHOLOGIA KONTRA EKONOMICZNA ANALIZA PRAWA

Streszczenie: *Celem tekstu jest ocena ekonomicznej teorii kary i powiązanego z nią modelu podejmowania decyzji z perspektywy empirycznych studiów nad*

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prawem i behawioralnej analizy prawa. Ekonomiczna teoria kary w drugiej po-łowie XX wieku była podstawową teorią kary i miała znaczący wpływ na polity-kę karania w Stanach Zjednoczonych. Na początku XXI stulecia liczne badania statystyczne pokazały z jednej strony ograniczoną skuteczność ekonomicznego podejścia do prawa karnego, a z drugiej – szkodliwe efekty przetrzymywania w więzieniach dużej liczby osadzonych. Pojawiła się więc konieczność opraco-wania nowego modelu podejmowania decyzji przez przestępców. Psychologowie, ekonomiści behawioralni i zwolennicy behawioralnej analizy prawa zidentyfi-kowali szereg czynników wpływających na podejmowanie decyzji o popełnieniu przestępstwa, by wymienić choćby dyskontowanie hiperboliczne, błąd nadmier-nego optymizmu czy prognozowanie afektywne.

Słowa kluczowe: *homo economicus, behawioralna analiza prawa, prawo karne, decyzje.*

1. Introduction

Until recently, the main theory of punishment and punitive policy that made it possible to predict the impact of changing the severity of punishment on crime statistics had been the economic theory of punishment formulated in the 1960s by the US economist and Nobel Prize laureate Gary Becker (Becker, 1968) and developed by his supporters. Although representatives of criminal law, in particular in Poland, essentially never agreed with Becker, who maintained that the greater the severity of punishment or likelihood of being caught, the lower the crime rate, criminal law scholars failed to produce an alternative theory of punishment that makes it possible to determine the severity of punishments for specific offences on the one hand and predict how those punishments affect the general crime level on the other.

The explanatory and predictive value of the economic theory of punishment *per se* is naturally not enough to regard it as the best tool possible for creating criminal justice policy. Importantly, however, for several decades it seemed that Becker's theory accurately describes reality as the US crime figures began to markedly decline in the 1980s. Only statistical analyses revealed a number of factors that had had an impact on that crime drop, including the legalisation of abortion in 1973 and a shift in demographic trends as well as the change in the approach to criminals with mental illness.

With the development of behavioural analysis of law (Rachlinski, 1999; Sunstein, 2000; Tor, 2008) as well as empirical legal studies (Abramowicz, Ayres and Listokin, 2011; Cane and Kritzer, 2012; Epstein and Martin, 2014), the success of the economic

approach to criminal policy may not be as spectacular as it seemed at first sight. Nevertheless, this paper is not going to become a report on the flaws of the economic analysis of criminal law but rather an illustration of a natural process of developing research methods employed in criminal justice policy; a process whereby research methods succeed, complement and modify one another and research hypotheses are occasionally falsified (Popper, 2002).

Since it was no longer possible to rely on Becker's decision-making model, questions arose whether the model can be improved to provide a more accurate account of actual criminal decision-making processes. Several solutions were proposed as part of the behavioural analysis of criminal law. Becker's theory was modified (taking into account hyperbolic discounting, the impact of optimism bias, problems with affective forecasting, etc.) and new factors that were omitted from the economic model altogether were identified, e.g. the great significance of loss aversion in the case of certain categories of criminals. Although the behavioural approach is not as mathematically elegant as Becker's theory, its advantages include the fact that the behavioural analysis of criminal law takes into account considerably more factors that affect criminal decision-making.

2. A NEW HOPE, OR THE ECONOMIC THEORY OF CRIME AND PUNISHMENT

Of all traditional criminal law theories, it was retributivism that, until recently, used to be the most popular and influential theory of punishment and criminal policy. The theory holds that the aim of punishment is just retribution. The more serious the crime, the more severe the punishment. The prevalence of this approach presumably results from the sense of justice requiring that the good be rewarded and the bad punished. Using the language of philosophy, one may say that retributivism is classified as a deontological justification of punishment. Unlike the consequentialist approach, which justifies punishment by referring to its effects (consequences), retributivism regards punishment as the most suitable response to a violation of laws (or moral principles) without taking into account its social, economic or political effects. Retributivism is based on three problematic *a priori* assumptions. First, the guilty deserves punishment. Second, one may not morally justify retracting from punishing a criminal. Third, institutions or individuals responsible for punishment always know how severe a punishment to impose (Primoratz, 1997).

Some philosophers and lawyers who are more critical of this concept believe that retributivism is nothing but revenge. Consequently, civilised societies founded on the principles of human rights can do better than exacting revenge. On the other

hand, more favourably disposed commentators believe that retributivism responds to society's need for justice. Nonetheless, it was not a theory that could be used to predict the impact of changing the severity of punishments on the crime level (Maroń, 2011).

Much changed in the approach to criminal law and criminal policy, at least in the United States, in the 1960s when the economist Gary Becker published his work on crime and punishment analysed from the perspective of economics (Becker, 1968). That gave rise to the phenomenon now known as economics imperialism, i.e. the use of economic tools to solve problems traditionally associated with other social sciences and humanities (Brzeziński, Gorynia and Hockuba, 2008; Murak, 2014). Completely unexpectedly, this unprecedented case of economics imperialism turned out to have a dominant influence on the US criminal justice policy in the second half of the 20th century.

Although Becker's work is not as readable as works on retributivism due to the mathematical formulae presented in it, many may find the conclusions from Becker's theory equally intuitive. However, what makes retributivism and economic analysis of punishment different is the fact that the latter intends to determine what acts should be punishable and what and how severe punishments should be imposed for specific offences (Ulen and Cooter, 2009). By estimating potential profits and losses that result from committing a crime, the economic analysis of punishment can be used to formulate proposals concerning a future list of punishments.

The economic theory of the criminal law not only is thought by its proponents to answer those questions but also has substantially more to offer. First, the economic approach can be used to create a uniform, readily usable economic model of criminal behaviour (Maraszek, 2011). Second, the resulting model can serve as a basis for predicting changes in the crime level resulting from changes in criminal policy. Third, the economic theory of criminal policy precisely defines the purpose of criminal law, which is to maximise social well-being and minimise social costs.

3. The rational villain myth

The economic analysis of law is a field of research that studies institutions of law by applying concepts classified mainly as part of mainstream microeconomics. Proponents of this approach use such concepts as alternative costs, cost-benefit analysis, expected utility hypothesis and the Coase theorem in the process of studying selected legal institutions (Becker, 1990; Becker and Posner, 2013; Bełdowski and Metelska-Szaniawska, 2007; Calabresi, 2016; Georgakopoulos, 2005; Hatzis and

Mercuro, 2015; Mercuro and Medema, 2006; Polinsky, 1989; Pomaskow, 2015; Stelmach and Soniewicka, 2007; Szczepaniec, 2012; Ulen and Cooter, 2009; Veljanovski, 2006).

As opposed to civil law, criminal law is not – even from the economic perspective – only a tool for compensating the victim for the losses caused by the offender. The purpose is not only to financially compensate for a wrongdoing but also to punish the wrongdoer and warn other potential offenders that the potential costs of committing a criminal offence vastly exceed the benefits. Consequently, the purpose is to punish and deter as well as protect the freedom of other members of society. It follows that even if criminal law made it possible to pay perfect compensation, i.e. compensation that makes a potential victim indifferent about whether the crime is committed or not, such a solution is not possible from the perspective of both the purposes of criminal law and the subjective sense of justice. Furthermore, an accurate appraisal of the loss is sometimes impossible in the case of offences against the person and extremely difficult in the case of other offences, as shown by some studies (Kolber, 2007).

Everyone who has ever skimmed through any textbook on criminal law will find these paragraphs glaringly obvious. However, they need not be perceived as such from the perspective of the economic analysis of law. If the purpose of law according to the economic analysis of law is to maximise social well-being, the cost-benefit analysis may lead to solutions that are economically effective yet socially unacceptable. For example, it may turn out that, from the perspective of social well-being, it would be better if wealthy people paid multimillion fines for manslaughter or murder instead of being sentenced to imprisonment. Such a solution may well prove financially beneficial for the state and the family of the victim but it will not be accepted by society (and presumably by the family of the victim).

If we look at criminal law through the lens of economics, we must assume that the economic analysis of criminal law rests on the assumption that the addressee of legal norms behaves as a reasonable person should behave according to the requirements of mainstream microeconomics. The addressee or, in this case, the villain behaves like *homo economicus*. We assume that the criminal is rational, i.e. able to properly estimate costs and benefits of their action, knows how to calculate the probability of future events, has a consistent, complete and transitive set of preferences (or, in layman's terms, always knows what he or she wants), is capable of choosing between two courses of action and if they prefer A to B, and B to C, they also prefer A to C (Malawski, Wieczorek and Sosnowska, 2004). Other attributes of the rational criminal model (*homo economicus*) are unconvincing even on a very general level; it is assumed that they have unlimited cognitive abilities and are not bound by time pressure when deciding whether to commit a crime or obey the law. Specifically,

the time of decision-making does not serve as a factor limiting decision-making capabilities. In addition, the rational criminal calculates whether to commit a crime while not being bound by morality or even their own conscience.

In its most simplified form, the economic theory of punishment holds that when deciding to commit an offence, a criminal calculates 'the expected value of committing the crime, which equals the benefits reduced by the severity of the punishment and multiplied by the probability of being caught and convicted' (Ulen and Cooter, 2009). The probability of being convicted and incarcerated is also of significance; in Poland, for instance, the number of guilty verdicts where the sentence was temporarily suspended varies from a few to 41% of rape cases (Czubakowska and Klinger, 2017).

An amoral rational criminal should, therefore, know the benefits they may expect if their criminal action succeeds and the punishment they will face if they are caught and convicted as well as the probability of being caught, convicted and incarcerated for committing the offence they are planning.

In the language of mathematical formulae, this line of reasoning should be presented as follows:

Expected net benefit from crime x – NetBenefit (x)

Profit from crime x – $z(x)$

The probability of being caught, convicted and punished – $w(x)$

The severity of the punishment for crime x – $k(x)$

NetBenefit $(x) = z(x) – w(x)k(x)$

The best way to illustrate this line of reasoning is with a hypothetical example. If a thief is considering stealing a television set worth PLN 2,000 $(z(x))$, and the probability of being caught, convicted and punished with a PLN 2,000 fine $(w(x))$, i.e. returning the stolen equipment, is 50%, the expected net benefit from the crime is PLN 1,000 $(kn(x))$:

NetBenefit $(x) = 2000 – 0.5 \times 2000 = 1000$.

If the expected benefit from the crime is a positive number, the criminal with a neutral attitude to risk will decide to commit it. Ulen and Cooter use a more technical language to describe this interrelationship for entire society:

'Summing the number of crimes of a particular type committed by each criminal gives the aggregate number of these crimes in society. An increase in p' (the marginal probability), f' (the marginal seriousness of punishment) or a decrease in y' (the marginal benefit to the criminal) causes a decrease in the aggregate number rather than severity of crimes committed by rational criminals'(Ulen and Cooter, 2009, p. 606).

Accordingly, if increasing the probability of receiving a punishment or increasing the severity of the punishment decreases the number of all crimes committed by every criminal, the number of crimes committed by all criminals also must decrease. The more severe the expected punishment, the lower the criminals' demand for committing crimes.

It is immediately apparent that the economic model of punishment rests on the assumption that the criminal knows the possible sanctions for committing an offence. They also know the probability of being caught, convicted and punished for committing a specific offence and are well aware of the benefits they can gain (Ulen and Cooter, 2009). Although it is a highly simplified model, it draws its power from one of the fundamental laws of economics, namely the law of demand. The law states that as the price of a good increases, the demand for it decreases, hence the demand curve sloping down. The law of demand is based on the same decision-making model as the economic model of punishment. Consequently, if the law of demand works, so should the economic theory of punishment, thereby potentially becoming a tool of an effective criminal policy[2].

4. WHAT THE STATISTICS SHOW

Before we move on to discuss statistics, it should be reminded that the supposed aim of criminal law from the perspective of the economic theory of punishment is to maximise social well-being. This means that if the costs of combating crime exceed the losses inflicted by criminals, one should perhaps consider changing the organisation of law enforcement agencies, or the entire criminal justice policy altogether.

Perhaps it is advisable (considering that criminal law protects not only the interests but also freedoms of citizens) to decriminalise certain behaviour or impose non-custodial sentences. Criminal law is supposed to maximise well-being rather than justify severely punishing every citizen who broke the law because of the assumption that this is the only way to reduce crime.

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[2] Having said that, the law of demand also takes into consideration phenomena such as price elasticity of demand, i.e. a change in demand in response to a change in price. Certain goods, e.g. staples and fuels, are inelastic, which means that even as the price increases, the demand does not decrease or decreases disproportionately. Therefore, if the demand for crimes also proved inelastic, a change in the severity of punishment or probability of conviction would not be an effective tool influencing the crime level. One should look for other factors such as the unemployment rate, the number of young men in the population and social culture. However, this would considerably reduce the simplicity and utility of the economic model of punishment. Furthermore, the government would lose a tool of crime control that is relatively easy to use. It is substantially easier to raise maximum sentences in the Criminal Code than create more jobs.

In very simplified terms, this is the aim of criminal law from the perspective of the economic theory of punishment. Cited below are statistical data showing the practical results of its implementation in the US legal system.

The US criminal justice policy in the 20th century was based on the economic model of punishment, with the result being a fivefold increase in the number of prisoners from 500,000 to 2,500,000 in 2007. By the end of the 20th century, federal courts had considerably less discretion over sentencing due to a change in criminal justice policy whereby judges were to pass the most severe custodial sentences possible. At the same time, the parole system virtually ceased to exist. As a result, judges passed severe sentences and prisoners were not paroled (Ulen, 2015).

At first glance, the economic model of punishment and punitive policy seemed to live up to expectations. By the end of the 20th century, violent crime figures in the US dropped to a level unseen since 1950. Nevertheless, this extraordinary effectiveness of the new criminal policy caught scholars' interest, almost immediately raising doubts about whether this success is truly a result of implementing the model developed by Becker.

Arguments based on statistical research appeared in source literature, questioning the impact of the economic analysis of law on the crime decline in the United States.

First, one of the main reasons behind the crime decline was the legalisation of abortion in the US by the Supreme Court in 1973 (Roe v. Wade, 410 US 113). The legalisation reduced the number of punishments imposed for performing illegal abortions but also had another, less obvious effect. According to Guttmacher Institute data, the number of abortions increased from 744,900 in 1973 to 1,608,600 in 1990, reaching a historic high in the 20th century. This led to considerably fewer births than an extrapolation of demographic trends might suggest.

Most violent crimes are committed by people aged 18-24. Significantly, the crime rate began to decline steeply in 1992, i.e. 19 years after the legalisation of abortion. The authors of the study also examined the changes in crime rates in five states that legalised abortion before 1973. In their cases, a steep decline in crime figures was recorded considerably earlier. The changing demographic structure in the US caused by the legalisation of abortion in 1973 led to a crime decline by an average of 25% in the 1990s, although that percentage was different for different categories of crimes. Furthermore, the authors of the study also verified whether the crime decline was influenced by factors such as changes in the number of prisoners, the number of police officers or the economic level of the state. The resulting conclusion was that it was the legalisation of abortion that had had a dominant influence on the crime decline in 1992-1997 (Donohue and Levitt, 2001).

Young people born after 1973 grew up in better financial conditions because their parents were in control of when they would be born. Ulen argues that since the mid-1970s children have been born into families in which the parents were employed, had health insurance and the elder siblings could look after the younger ones. In such conditions, young people were less likely to decide to commit an offence. This, in turn, led to a crime decline by an additional 25% in the 1990s (Ulen, 2015).

Another argument that also throws the effectiveness of the criminal justice policy based on Becker's theory into doubt is some studies indicating that if a substantial number of prisoners were released, the number of offences against property would increase slightly while the number of offences against the person would increase minimally. The authors of a report containing an analysis of empirical and statistical research also suggested that judges should be allowed discretion in sentencing, perhaps even by the abolition of mandatory minimum sentences for specific offences, that the paroling procedure should be restarted, and even that the states and counties with a low incarceration rate should be rewarded. The fight against crime that takes place in the US is very expensive, generating not only financial costs involved in detaining two and a half million prisoners but also social costs in the communities from which the prisoners originate (Raphael and Stoll, 2014).

The crime decline in the US in the 1990s is also attributable to the fact that more than two million people more likely to commit crime than the overall population were simply put in prison, thus reducing the number of potential criminals. An additional decrease in the violent crime rate by 12% in 1997-2004 was a result of administering psychotropic drugs to criminals suffering from mental disorders (Marcotte and Markowitz, 2011).

Given the seemingly limited effectiveness of the economic theory of punishment, its fundamental principles began to be questioned, including the analogy between the goods and services market and the market of criminal behaviour as well as the rationality of the criminal (criminal as *homo economicus*), which in turn helped provide an outline for the behavioural theory of punishment.

First, theoretical arguments were advanced showing a lack of analogy between the market of criminal behaviour and the goods and services market. Second, empirical methods were used to examine the impact of various factors on the crime level and its changes in the second half of the 20th century.

As stated before, the economic theory of punishment is based on a decision-making model characteristic of *homo economicus*. Equally significant, however, are the conditions in which the model is supposed to work. The ideal conditions for *homo economicus* are those of a natural market mechanism whereby individuals

acting against the axioms of the rational choice theory are eliminated from the market. Meanwhile, individuals who enter the market must quickly abandon their pre-acquired and ineffective acting and thinking habits to be able to compete successfully. In other words, the market or, more specifically, market forces are a constant learning opportunity.

Does a criminal have an opportunity to constantly learn how to behave properly in the market of criminal behaviour? Not necessarily. One need only imagine a situation where a criminal misestimates the probability of being caught, convicted and incarcerated, or the benefit they may gain from committing an offence. Committing a crime whose net benefit is negative does not necessarily entail disappearing from the market forever. Miscalculating the costs and benefits, such a criminal does not necessarily create an added value for other participants of the market. Furthermore, the criminal can successfully continue their criminal 'career' because this does not have to be a definite end for them (e.g. life imprisonment, the death penalty or a long sentence).

One of the main arguments against equalling the classical market and the market of criminal behaviour is the fact that if anyone enters the classical market once and fails, they can always try to enter it with a new business, a new idea and a better business plan. On the other hand, the market of criminal behaviour does not present many opportunities for entering and leaving the market repeatedly. An ineffective, from Becker's perspective, beginning of a criminal career does not have to serve as a good learning opportunity. Furthermore, leaving that market is nowhere near as simple as in the case of the classical goods and services market. A convicted criminal has considerably fewer opportunities to embark on a new career than a start-up owner who failed to survive (Jolls, Sunstein and Thaler, 2000).

5. BEHAVIOURAL ANALYSIS OF PUNISHMENT

The terms 'behavioural analysis of law' (Tor, 2008), 'behavioural law and economics' (Sunstein, 2000) and, occasionally, 'the new law and psychology' (Rachlinski, 1999) are used to denote an analysis of legal rules, entire branches or individual institutions of the legal system that employs the findings of research into judgement- and decision-making processes.

Legal studies may be classified as part of the behavioural analysis of law if and only if studies intended to review a legal institution have their starting point in empirical research in cognitive and social psychology, decision theory, medicine, economics and other related academic disciplines whose aim is to study judgement- and decision-

making. Proponents of this approach believe that conducting such studies will result in the ability to abandon the abstract model of *homo economicus* on the one hand and clarify or, where necessary, modify the existing, eclectic human model employed in legal theory on the other (Tor, 2008).

Although the behavioural analysis of punishment does not falsify Becker's theory, behavioural law scholars point out the flaws of the classical economic theory of punishment. As shown below, criminals are not necessarily aware of the punishments they may face for an offence they plan to commit. However, if they are aware of the severity of the punishment, perceiving it as a punishment delayed in time decreases its severity at the moment of making the decision to commit the crime. However, even if criminals wanted to discount the severity of punishments as the rational choice theory dictates, not all of them are capable of that due to their intellectual limitations. Furthermore, criminals do not estimate the probability of being caught and convicted accurately, not only because such estimates require adequate knowledge and data but also because, predictably, they overestimate their skills and therefore perceive the probability of being convicted as lower than it actually is. Criminal decision-making may also be affected by factors such as incorrectly predicting emotional reactions to possible punishments in the future.

Adopting the behavioural perspective in criminal law studies almost immediately produced interesting results. In 2004, Robinson and Darley published a paper arguing that deterrence-based criminal justice policy does not work. They explained that criminals are often unaware of the severity of the punishment imposed for a specific criminal offence. Only 22% of criminals know the punishment for the crime they are going to commit; as many as 35% do not consider the severity of the punishment a relevant factor, and as many as 18% are entirely unaware of the punishment for the crimes they possibly intend to commit. Moreover, even if they know the punishment, this knowledge has no bearing on them while committing a criminal offence for social or cultural reasons or – generally speaking – due to the way their set of preferences is structured. However, even if they attempted a cost-benefit analysis in the vein of the economic analysis of criminal law, the benefits would still outweigh the costs in most cases, because criminals usually underestimate the probability of being convicted. Because the costs of committing a crime are a matter of a distant future, or so it seems, the discount rate they apply tends to be lower than the short-term benefits (Robinson and Darley, 2004). In other words, criminals do not calculate costs and benefits as Becker would like them to. This is a very serious accusation as it questions the ability of criminals to estimate the expected punishment or net benefit. Consequently, a criminal policy based on the belief in the simple causal power of criminal laws does not guarantee success.

Robinson and Darley point out the actual decision-making processes behind a decision to commit a crime, which is why their work may be classified as part of the behavioural analysis of criminal law. They indicate that criminals perceive costs of a crime as time-delayed and therefore lower from the perspective of the moment at which they are to commit the crime. This method of delayed cost-benefit analysis is known as hyperbolic discounting and constitutes one of the more important achievements of behavioural economics (Wilkinson and Klaes, 2012).

Discounting is a change in value (but also in broadly defined utility) over time. The discount rate is a percentage value that defines the extent to which we forgo future benefits in favour of immediate benefits. The higher the discount rate, the more inclined we are to choose immediate gains. The discount rate is also called the decision-maker impulsivity indicator (Zaleśkiewicz, 2013). If the annual discount rate of a criminal is 10% and the value of a television set they intend to steal is PLN 1,000, the value of the television set in a year, from the perspective of making the decision whether to steal it or wait 12 months, would equal only PLN 900. Consequently, the immediate theft of the TV set would ensure them an additional PLN 100. If they were a more impulsive individual and their discount rate were 50%, the subjective value of the same TV set they could buy in a year from today would equal only PLN 500. Discounting is a subjective assessment of the change in the value of a given stimulus over time.

The classical discounting model sees a slow and gradual decrease in the values of delayed benefits or costs. In the case of hyperbolic discounting, without going into mathematical details, the value of delayed benefits or costs first rapidly declines to drop in value at a significantly slower rate later. With hyperbolic discounting, there also occurs the reversal of preferences over time. If asked whether they would prefer to receive 50 euros today or 100 euros tomorrow, most people would likely answer that they would prefer to wait and receive 100 euros tomorrow. However, if we were able to delay the payment of 100 euros for a year, most would prefer to receive 50 euros today than 100 euros in a year. But if we were again to change the payment method so as to offer the choice between 50 euros in a year or 100 euros in a year and a day, most people would again choose 100 euros (Zaleśkiewicz, 2013).

Even Richard Posner, one of the founders of the economic analysis of law, points out the phenomenon of discounting future custodial sentences. If the probability of conviction decreased by 25%, e.g. due to cuts in funding to criminal prosecution and detection, it would not be sufficient to raise the maximum sentence by 25% to offset the deterrence effect; the change in sentencing will be discounted and, depending on the discount rate, the additional deterrence effect may amount to only 6, 8 or 9% (Posner, 2002). In addition, as Posner points out on slightly different grounds than

proponents of behavioural law and economics, criminals, or at least a large part of them, are not among the most intelligent members of society and may therefore find it too difficult to imagine the utility of buying a PLN 1,000 television set in 12 months. The more delayed the costs and benefits that are to be discounted, the higher the costs of imagining the associated utility (imagination costs). The higher the imagination costs, the higher the discount rate and, consequently, the criminal's impulsivity and inclination to commit a crime (Posner, 2002). This is another line of reasoning that people responsible for criminal justice policy should consider. The deterrent effect of punishments is neutralised by hyperbolic discounting and Posner's imagination costs.

Criminals' problems with discounting future costs and benefits involved in an offence are not the only obstacles facing a criminal justice policy based on Becker's economic theory of punishment.

An additional factor that should be considered when creating new Criminal Code regulations is the fact that a typical criminal underestimates the probability of being caught. This optimism is not exclusive to criminals. The phenomenon is so common that it has come to be known as 'optimism bias' in psychology (Bar-Gill, 2006; Baumol and Quandt, 1964; Segerstrom, 2001; Sharot et al., 2007; Shepperd et al., 2002). The bias leads us to underestimate the probability of our own failure or a negative event. One of the classic examples of optimism bias is the belief among nearly all newlyweds that their marriage will last forever, despite the fact that divorces in Poland constituted 35.6% of new marriages in 2016 (Główny Urząd Statystyczny, 2016). Asked about their skills, a majority of drivers claim that they drive better than most other motorists. Naturally, this is impossible. In the case of criminals, optimism bias affects their situational judgement: 'Legal literature abounds in practical examples of optimism bias. For instance, criminals tend to inaccurately estimate the probability of being caught, arrested and punished. They usually overestimate their skills and believe that they are better at committing crimes than others. If this is the case, they cannot accurately estimate the expected sanction for an offence, which in turn means that the sanctions do not serve their purpose as a deterrent. The RCT [rational choice theory], on the other hand, holds that criminals can estimate this probability fairly accurately and can theoretically be deterred from committing a crime.' (Ulen, 2011).

However, source literature also provides another thesis on how optimism bias may affect criminal decision-making. Empirical and behavioural research in criminal decision-making helped gain a better understanding of this specific decision-making mechanism (Ulen and McAdams, 2008). For instance, existing studies indicate that criminals feel more certain if they know the effectiveness they must expect from law enforcement in the event they commit a crime. This is more important than the

certainty of the severity of the punishment to which they may be sentenced if caught. Consequently, a criminal justice policy should focus on the severity of the punishment for a given offence combined with a lack of certainty as to the effectiveness of law enforcement. Such a criminal justice policy introduces an additional element of uncertainty and is more effective in terms of deterrence (Harel and Segal, 1999). The aim, in this case, is to take advantage of the effect of uncertainty bias. If a criminal does not know the probability of being punished, it may turn out that they decide not to commit a specific offence. In this sense, the effect of optimism bias that occurs when the probability of being convicted and sentenced is known becomes neutralised.

The behavioural analysis of law has more to offer than mere criticism of the economic model. Although the behavioural decision-making model is not as uniform as the economic model, it also can be used to describe and predict criminal behaviour. Even if it does not offer a seemingly simple prediction of changes in crime figures as a response to criminal justice policy changes, its predictions are more accurate and diverse.

Influencing the crime level is substantially more complicated than it seems at first glance. Until recently, the dominant punitive measures in European competition law were financial penalties, which were gradually increased. Unfortunately, the increase in financial penalties did not translate to greater law-abidingness in the area of competition law. What the European Union failed to achieve proved successful in the United States. The key factor was the introduction of custodial sentences, which drastically curbed cartel activity in the United States. Why, then, did the immediate custodial sentence prove effective in this case? It is difficult to find a single explanation. One of the possible solutions to this puzzle is to refer to the phenomenon of loss aversion (Kahneman and Tversky, 1979; Tversky and Kahneman, 1991). However, there is no single answer to the question of why it is (freedom) loss aversion that is more effective than high financial penalties in the case of white-collar workers. If a potential criminal, in this case a white-collar worker, is considering violating applicable competition laws in order to maximise their own or their company's gains, the potential loss of money as a result of conviction does not deter as effectively as incarceration.

Moreover, the more widely publicised the cases of sentencing white-collar workers to imprisonment, the greater the probability that they abstain from illegal activities. The reason is that a potential criminal estimates the probability of being caught, convicted and incarcerated using availability heuristic (Dube-Rioux and Russo, 1988; Kuran and Sunstein, 1999; Tversky and Kahneman, 1973), i.e. a mental shortcut that estimates the probability based on the ease with which one can recall similar cases from the past instead of estimating it accurately. Consequently, if the media covers

stories about effective performance of the police, public prosecution service and courts, this may translate to an additional decline in crime perpetrated by managers and employees of large companies (Heinemann, 2015).

Furthermore, people poorly predict their emotional reactions to future events (affective forecasting) (Wilson and Gilbert, 2005). This is also true for criminals, so if we are looking for effective methods for deterring criminals, we should not rely on the model of a rational criminal calculating future costs and benefits of their criminal activity. One study determined that increasing the severity of punishment from two to three years has a marginal deterrent effect, since criminals are unable to imagine the difference in emotional impact between two and three years of imprisonment (Lee and McCrary, 2005). Scholars also examined the relationship between the impact of prison conditions and recidivism. Once again, the findings came as a surprise as the prison security level, and therefore the level of inconvenience involved in serving the sentence, have the opposite effect to that expected. The harsher the prison conditions, the higher the recidivism rates (Chen and Shapiro, 2007).

The behavioural analysis of punishment is an example of a bottom-up strategy. It takes a specific phenomenon as a starting point, evaluates it from the perspective of empirical behavioural research and selects proper tools in order to achieve the objectives of criminal justice policy. A growing number of studies into the actual knowledge of people deciding to commit a crime, studies into the criminals' ability to estimate probability and discount punishments, the impact of affective forecasting, impulsivity, optimism bias, uncertainty bias, loss aversion and many other phenomena have provided a new perspective on traditional solutions in criminal law.

6. Conclusion

An effective criminal policy depends on several interrelated factors. First, one should know who its addressee is. How do potential and actual criminals make the decision to commit an offence? How do they estimate costs and benefits of committing crimes? Or perhaps they do not estimate them at all? Second, if we have a good criminal decision-making model, we should properly select tools of criminal justice policy such as changing the range of punishments and punitive measures available or reorganising the work of law enforcement agencies. One should also answer the question of which criminals should be sentenced to imprisonment and which to heavy financial penalties.

Gary Becker proposed solutions that no one in criminal law had considered before, let alone believed possible: a scientific explanation of criminal justice policy based on

economic models. Economics, defined as a study of decision making, was to provide answers to all relevant questions. The works of economists and lawyers such as Gary Becker and Richard Posner were the first examples of innovative interdisciplinary studies in criminal law. However, the most interesting part was yet to come. At the turn of the 21st century, representatives of the behavioural analysis of law employed the classical economic analysis of law as a starting point, giving this type of research fresh momentum and a more empirical angle.

Only 30 years after the first publications on the economic theory of punishment was it possible to successfully study and isolate the impact of this new legal policy on the US crime level. Empirical, statistical and psychological studies determined that the effectiveness of the economic theory of punishment and criminal justice policy is not as high as some might expect. The crime decline in the US was more a result of the legalisation of abortion, evolving demographic trends and the resulting improvement in the financial well-being of families as well as the change in the treatment of criminals with mental illness than the implementation of Becker's approach to criminal justice policy.

In view of this, scholars began to ask the same questions that had prompted Becker to deal with criminal law in the 1960s: Which punishments will be the most effective? How can social sciences be used to shape criminal justice policy? They also began to ask questions about the aims of criminal law. This gave rise to studies that either elaborated on or were at variance with the works of Becker and his successors.

With the emergence of behavioural scientists, it was determined that criminals are often simply unaware of the punishments they can face for an offence or benefits they can expect from it; that they misjudge the probability of success of their criminal activity (optimism bias, uncertainty bias), and that they perceive the severity of punishments differently than previously thought (hyperbolic discounting, imagination costs, affective forecasting). Last but not least, it turned out that financial penalties may have a different deterrent effect, depending on the category of the criminal (white-collar vs blue-collar workers).

All those factors ultimately have an impact on estimating the expected benefit from committing a crime. If the aim of criminal justice policy is to effectively reduce crime, then they should be taken into consideration. Becker's economic theory of punishment should, therefore, be at least expanded to include the legacy of the behavioural and empirical analysis of law.

Richard Thaler is convinced that behavioural economics will soon lose the adjective, simply becoming economics. It seems that a similar statement can be made about the behavioural analysis of law, also known as behavioural law and economics,

as opposed to the economic analysis of law, also known as law and economics. Perhaps the term 'law and economics' will soon encompass studies conducted in the vein of both Gary Becker and Cass Sunstein.

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