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Modelling the societal value of probation in the Netherlands using large data sets

Summary:

In this paper we present a framework to map the social costs and benefits of the Dutch probation services and present the initial results of a social cost benefit analysis using large data sets. The social benefits of the Dutch probation services seem to add up to about double the costs of probation. Even though there is still a margin of uncertainty in the analysis, and the social benefits of the probation services' impact on the probationer's environment and avoided victims are not yet included, it can already be concluded that the benefits of the Dutch probation services exceed the costs.

Keywords: Social Cost Benefit Analysis, Probation, Large data sets

A. Introduction

The Dutch probation services, consisting of three organisations, namely: the Dutch Probation Foundation, the Salvation Army Youth Protection & Probation and Addiction and Probation Service Mental Healthcare and Substance Abuse Treatment (SVG), work in a society that increasingly demands an understanding of the effectiveness of policies and the associated costs and benefits of public investments. Over the years, there has been an increasing

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insight into the effects of probation work. However, there is still no overall insight into the societal value of probation in the Netherlands.

In the context of Dutch crime policy, Van Velthoven (2008) indicated that a social cost-benefit analysis (SCBA) can answer the question of whether an investment contributes to social welfare by listing all the positive and negative effects of efforts. In doing so, an SCBA compares the societal benefits with the costs of efforts regarding crime policy.

The Anglo-Saxon literature is more developed than the Dutch literature, in the early zeros there were already overviews of cost-benefit analyses surrounding crime policies (Aos *et al.*, 2001; Farrell *et al.*, 2005; Aos *et al.*, 2006). A more recent article by Manning *et al.*(2018) presents a similar framework towards a cost-benefit analysis tool, focusing on crime policy in general, however with a narrower focus regarding the possible effects.

In the Netherlands, SCBA is increasingly used within the security domain to measure the impact of policies on society (Koopmans *et al.*, 2023). For example, Versantvoort *et al.*(2005) has prepared an initial analysis and calculation model to identify the costs and benefits of judicial interventions. Furthermore, several cost-benefit analyses have been carried out for more specific issues. De Wit *et al.*(2016) conducted a study on the costs and benefits of alcohol use and De Koning *et al.*(2016) conducted a review of the costs and benefits of the social (re-)integration of both adult and juvenile (ex-)prisoners. Focusing on addiction rehabilitation, Bakker *et al.*(2013) and Broekhuizen and Wonderen (2015) obtained initial insights into recidivism reduction and a number of associated potentially avoided costs based on existing datasets.

However, a comprehensive SCBA focusing on probation work in the Netherlands is still lacking. Given the annual costs of approximately 200-250 million euros per year and the societal demand for accountability, it is relevant to conduct such an analysis. Moreover, the results could provide insights into how the probation service can serve probationers and society even better. The latter requires insight in how added value for society can be increased. Furthermore, the results of such an analysis provide insight into which parties benefit to what extent.

In this study we focus on answering the question how the societal value of the Dutch probation services in the Netherlands can be determined and present initial results.

B. Research method

I. Social cost-benefit analysis

The framework of a SCBA forms the starting point of this study (figure 1). This framework requires the identification of the (1) activities of Dutch probation services, (2) direct effects on probationers, (avoided) victims and both their environments, and (3) how these translate into benefits for society. The input, throughput and output components are determined by the work of the probation services (1). The outcome consists of effects resulting from the work of the probation services and correspond to the concept of effects (2) commonly used in a SCBA setting. Finally, benefits (3) are the various resulting societal benefits.

*Figure 1: SCBA framework for probation*
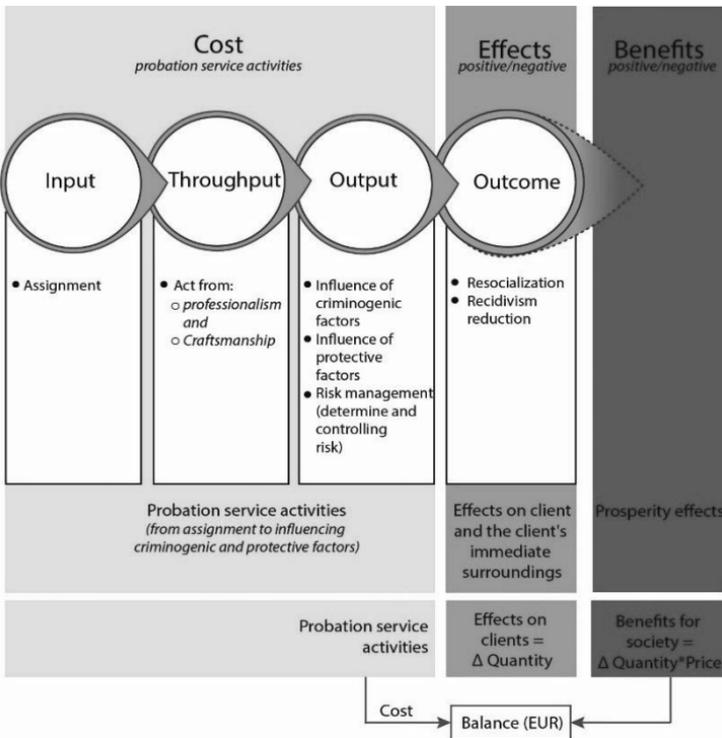
II. Construction of qualitative causal model

To further develop the framework presented in Figure 1, several interviews and focus groups were held with professionals working in and around the probation services. Literature research was also conducted on the costs, effects and societal benefits of probation work. The primary focus was on possible benefits (positive and negative) and their underlying possible effects. Possible relationships and dependencies between variables were also examined. It is important to note that benefits and effects can be both positive and negative.

Based on the initial results, a list of possible effects, side effects and benefits was compiled. Using this list, several causal diagrams were created to arrive at simplified rationales. These rationales were tested through additional literature reviews, focus group sessions with professionals and several expert meetings with researchers and professionals.

The result of this work is a qualitative causal model for a SCBA of the Dutch probation services (see figure 2).

Figure 2: Qualitative causal model for a SCBA of the Dutch probation services.
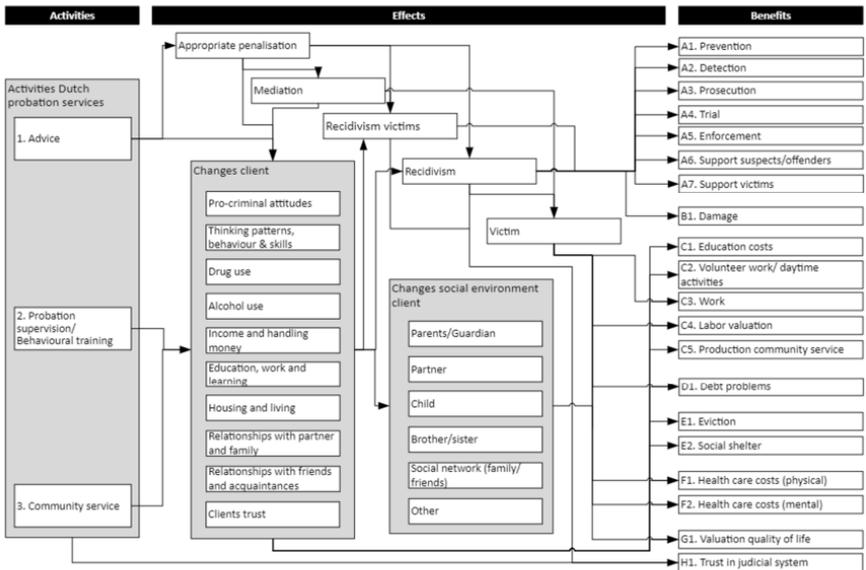
III. Quantification and monetization causal model

For all the different effects and benefits we developed a quantification method. Using data from the Dutch probation services combined with Microdata of Statistics Netherlands, supplemented with data from other relevant sources and literature, we were able to analyze changes in time surrounding probationers to quantify a large number of the effects and benefits. For the items for which we did not have data we based the quantification on values found in literature or expert judgement.

For now, we assume that (1) 10% of the observed changes can be related to probation activities and (2) a three to five year period encompassing the influence of probation activities. Also, two aspects that require further research are: (1) to what extent are the (observed) changes the result of the effort of probation services and (2) how many years can certain changes be attributed to the probation services. In our ongoing research we are working on this using a developed typology of probationers (Visser *et al.*, 2022).

In addition, for each benefit we indicate how we translate it into euros (monetize). This allows us to calculate the magnitude of the benefits in euro's, but more importantly to make them comparable to the costs incurred (See Németh *et al.*, 2022).

IV. Research population

The study population consists of all probationers with an active involvement in 2016 (N=83,794). Active involvement means that the probation was actively working on the relevant assignment for the client. The duration of involvement of probation supervision, community service and behavioral interventions is defined here as from the date of program creation to the actual end date of the program and/or end date of the assignment/program combination in the case of derivative assignments. For early intervention, supervision, and forensic care placements, the end date was taken because these assignments do not explicitly target behavior change over a specific period of time and can therefore be seen as a "snapshot" for this study. An active involvement by probation services includes the following trajectories:

– All early assistance visits;
– All prepared pre-sentence and other advisory reports for the judicial authorities;
– All supervision trajectories (with date first face to face contact);
– All community services work penalties (with date first work day);

– All behavioral trainings (with date first meeting);
– All completed placements in forensic care.

Assignments for which the probation department made an effort, but which did not result in actual commitment, are not included.

We want to use an as recent as possible population, with the requirement that we can follow people for at least three years. Since the probation data and most Statistics Netherlands data are available until 2020 at the time of this research, we chose 2016 as base year. This allows us to look back- and forward in time. In this study, we consider the group as a homogeneous group.

C. Framework social cost-benefit analysis

I. *Work of probation services*

The work of the probation service is divided into three types of work in Figure 2:

(1) Preparing pre-sentence and other advisory reports for the judicial authorities;
(2) Implementing supervision measures or special conditions imposed by the court or the public prosecutor and executing behavioral interventions;
(3) Implementation of community service work.

This division of probation work is a simplification of reality. In practice, it is more nuanced. The probation service decides which activities or combination of activities is most desirable and possible based on their assignment and the context of the probationer.

II. *Effects*

The activities of the probation services can result in changes in the behavior and the lives of probationers (Figure 2). Starting point for identifying relevant items with the purpose of a SCBA and the underlying causal model is the classification used in the risk assessment tool (abbreviation RISc) (Hildebrand *et al.*, 2014) of the Dutch probation services. The RISc includes items on procriminal attitudes, thinking patterns, behavior and skills, drug and alcohol use, income and coping, education, work and learning, housing and living, relationships with partner/family/friends, and emotional well-being.

A change in these areas of life can lead to a change in criminal behavior (Bol, 1995; Wermink et al., 2009; Wartna et al., 2016).

In addition, a large number of other individuals directly or indirectly are impacted by probation work. Probationers can have parents/guardians, (former) partner(s) and child(ren), as well as other family members and members in their social network in or their vicinity (Figure 2). Moreover, the work of the probation service may also affect (avoided) victims and their possible parents/guardians, (ex-)partner(s), children, family and social network (Figure 2).

In this first phase of the SCBA of the Dutch probation services, the focus is on the effects among probationers themselves.

III. Societal benefits

The identified social benefits are categorized into eight groups: A. Security costs, B. Damage, C. Participation, D. Debts, E. Housing, F. Health, G. Quality of life, and H. Trust in judicial system. Although these categories are considered separately, we expect that the benefits may interact in reality (for detailed justification see Németh *et al.* (2022)):

– A. Security costs consist of avoided costs in the areas of prevention, detection, prosecution, trials, execution of penalties, support for suspects/offenders, and support for victims. CBS microdata is used to measure changes in the severity and frequency of criminal behavior.
– B. Damage comprises of avoided damages resulting from property offenses and vandalism. The underlying assumption is that probation interventions lead to a change in criminal behavior, thus preventing the damage costs. CBS microdata is used to estimate changes in severity and frequency of criminal behavior.
– C. Participation encompasses the sum of extra costs for education, increased formal and informal productivity, the added value of improved quality of labor, and the production achieved within community service. The assumption here is that probation helps clients in: finding and maintaining employment, pursuing education or engaging in volunteer work. Thereby creating a meaningful and stable daily routine for clients and added societal value. Changes in participation are estimated using CBS microdata, data from the Dutch probation services and literature.
– D. Debts is based on the assumption that probation can assist clients with debt problems, for example by teaching financial skills or aiding in debt repayment through financial management assistance or connecting probationers with organizations that can help them further. This trans-

lates to reduced societal costs related to debt issues. Changes in debts are estimated using CBS microdata and literature.

– E. Housing encompasses avoided costs related to avoided evictions and avoided use of social shelters. It is assumed that there will be less use of social shelters due to reduced recidivism, less incarceration leading to social shelter, and potential encouragement for individuals to (temporarily) reside in social shelters to address housing issues. Furthermore, it is assumed that assistance with debt issues will result in fewer forced evictions with associated societal costs. These benefits are mapped using literature.

– F. Health is divided into physical health and mental health. Physical health of probationers is improved by reducing addiction issues, reducing recidivism and new prison sentences, and promoting physical activity by probationers. Mental health is improved by providing professional mental help. Initially, healthcare costs may rise, but in the long term, this can lead to stabilization of health related costs and possibly even decrease the costs. This benefit is based on literature and expert judgement.

– G. Quality of life is a category that requires further investigation. It is a non-financial benefit that is about what value society places on a more pleasant life for various stakeholders (including society itself).

– H. Trust in judicial system is based on the idea that by providing appropriate guidance leading to a reduction in recidivism, a positive effect on the amount of societal trust in the legal system is achieved. An increase in this trust should positively influence economic confidence, stimulating economic growth.

D. Results

At €507 million (see Table 1), the benefits are significantly greater than the annual costs of the three probation organizations (€217 million in 2016 (Ministerie van Financiën, 2022)). Despite a margin of uncertainty and the current exclusion of benefits related to the probationer's environment and avoided victims, it can be concluded that the societal benefits of probation in the Netherlands outweigh the costs. Additional benefits are anticipated for the probationers' environment and avoided victims.

Table 1: Total benefits from probation in million euro's (rounded to €0.5 million)*.

Benefits	Probation client	Parents/guardian	Partner	Children	Family	Social network	(avoided) victims	Parents/guardian	Partner	Children	Family	Social network	Total
A1. Avoided prevention costs	135,5												135,5
A2. Avoided detection costs	51												51
A3. Avoided prosecution costs	15												15
A4. Avoided costs for trail	9												9
A5. Avoided costs for enforcement	99												99
A6. Avoided costs for support suspects/offenders	22,5												22,5
A7. Avoided costs for support victims	2												2
B1. Avoided damage	5,5												5,5
C1. Extra education costs	-6	X	X										-6
C2. Increase volunteer work/daytime activities	2	X	X				X	X	X				2
C3. Increase work	41,5	X	X	X	X		X	X	X	X	X		41,5
C4. Increase labor valuation	1	X	X										1
C5. Production community service	31												31
D1. Debts	0,5	X	X	X			X	X	X	X			0,5
E1. Avoided evictions	0						X						0
E2. Avoided social shelters	2,5						X						2,5
F1. Avoided health care costs (physical)	0,5	X	X	X			X	X	X				0,5
F2. Avoided health care costs (mental)	22,5	X	X	X			X	X	X	X			22,5
G1. Valuation quality of life	PM	X	X	X	X	X	X	X	X	X	X	X	PM
H1. Trust in judicial system	71	X	X	X	X	X	X	X	X	X	X	X	71
Total €	507	X	X	X	X	X	X	X	X	X	X	X	507

E. Conclusion

We presented a framework which can be used to determine the benefits of probation. Large data sets such as described in Németh *et al.* (2022) help quantify the benefits together with effect sizes described in the literature.

The analysis shows that it is plausible that the avoided security costs cover the costs of probation. In addition to this, a whole range of other societal benefits linked to probationers are achieved by the activities of the probation. For example, the added value of the increased productivity by probationers, the guidance to work by the probation service as well as the added value of community service also yielding significant societal benefits. In addition, we also expect significant societal benefits around

avoided health care costs and the contribution of probation to the trust in the judicial system appears to provide large societal value.

F. Reflection

I. *General*

This analysis provides a good first indication of the benefits directly related to probationers. But this indication deserves further refinement. First, because for the purpose of this initial SCBA we consider the group of probationers as a homogeneous group, while they actually consist of different types of subgroups with each their own risks, needs and problems, each of these subgroups might also have a different focus in their probation supervision and different (social) effects might be achieved. Furthermore, for some benefits we have not yet been able to do a data analysis, resulting in having to rely on key figures found in literature and expert judgement. As a result, for a number of benefits, the margins of uncertainty are still large. Moreover, for those elements where we have been able to perform a data analysis, the match between the existing available data and what we ideally would like to have in terms of data is not always optimal. Therefore, we have deliberately chosen to be on the conservative side with the calculations.

Furthermore, we had to make several estimates that ideally require solid justification. This requires further research. These include the share of the probation service in the (observed) changes and the number of years that certain changes can be attributed to the probation service (as in e.g. the work and health measures). In our ongoing research we elaborate this further linked to a drafted typology of probationers (Visser *et al.*, 2022).

II. *Additional income*

In this study we have only quantified the benefits that are directly linked to the probationer, except for the benefit of trust in the judicial system. Besides the benefits directly related to the probationer, a large number of benefits can also be expected around the environment of probationers and around (avoided) victims and their environment. In particular, we expect that the benefits around avoided victims of serious crimes can be significant. For example, we expect significant avoided reductions in their added value concerning work and avoided health costs. The price tags of these benefits are large, and combined with a large number of years over which these

effects occur, would most likely result in large societal benefits if prevented. Furthermore, the long-term impact on the social network of probationers including children is also expected to yield benefits of significant magnitude. Therefore, it is expected that these benefits could significantly increase the estimated size of the benefit-cost ratio of the Dutch probation services.

III. Cohort

Because processing times and activities can vary widely from one probationer to another, it is not straightforward to compare the benefits around all probationers from 2016 to the annual costs of probation. We assume here that an appropriate approach is to assume that the benefits of a cohort can be compared to that year's costs. To properly determine the comparison between costs and benefits, it is important to make an analysis at subgroup level. This allows us to look at what the activities and associated costs are at the subgroup level and compare them to the expected effects and benefits at the subgroup level.

IV. More value added

The constructed framework and its quantification and monetization provide insight into pathways along which societal benefits are generated. This insight can be used to determine how to generate additional added value. For example, this study has shown that guidance to work, despite the small numbers of probationers who go from unemployed to employed, produces a lot of added value. It is conceivable that if more attention is paid to this aspect, this can lead to a significant increase in social added value. We also see that a change in criminal behavior leads to large societal benefits. De Vries *et al.* (2015) show that focusing on youth and young adults early on (i.e., the group up to age 25) can lead to a significant reduction in criminal behavior (13%). Involving the probation service earlier in this group could therefore possibly provide much additional social added value. The examples mentioned above are only initial ideas as a result of this research. The next step is a systematic analysis of possible options on how more social added value could be realized. Moreover, it is interesting to look at the justice chain as a whole, perhaps even combined with the chains around health care and social work, to see if more social added value can be realized for this target group.

G. Accountability and acknowledgements

List of References

Aos, Steve/Miller, Marna/Drake, Elizabeth, Evidence-based public policy options to reduce future prison construction, criminal justice costs and crime rates, in: Olympia: Washington State Institute for Public Policy 2006

Aos, Steve/Phipps, Polly/Barnoski, Robert/Lieb, Roxanne, The comparative costs and benefits of programs to reduce crime, Version 4.0, in: Olympia: Washington State Institute for Public Policy 2001

Bakker, Inge/Tierolf, Bas/Los, Vita, Daar doen we het voor! Opbrengsten en effecten van verslavingsreclassering, Verwey-Jonker Instituut 2013

Bol, M.W, Gedragsbeïnvloeding door strafrechtelijk ingrijpen: een literatuurstudie, Gouda Quint & WODC 1995

Broekhuizen, Jolijn/Van Wonderen, Ron, Daar doen we het voor (tweede meting), Verwey Jonker Instituut 2015

De Koning, Jaap/Gravesteijn, José/De Hek, Paul/De Vries, Daisy, Kosten en baten van maatschappelijke (re-)integratie van volwassen en jeugdige (ex-)gedetineerden, SEOR, Erasmus Universiteit Rotterdam 2016

De Vries, Sanne L.A./Hoeve, Machteld/Assink, Mark/Stams, Geert J.J./Asscher, Jessica J., Practitioner review: effective ingredients of prevention programs for youth at risk of persistent juvenile delinquency–recommendations for clinical practice, in: Journal of Child Psychology and Psychiatry 56(2) 2015 p. 108-121

De Wit, G.A./Van Gils, P.F./Over, E.A.B./Suijkerbuijk, A.W.M./Lokkerbol, J./Smit, F./Mosca, I./Spit, W.J./Evers, S.M.A.A./De Kinderen, R.J.A., Maatschappelijke kosten-baten analyse van beleidsmaatregelen om alcoholgebruik te verminderen, Rijksinstituut voor Volksgezondheid en Milieu, Report 2016-0133 2016

Farrell, Graham/Bowers, Katherine J./Johnson, Shane D., Cost benefit analysis for crime science: making cost-benefit analysis useful through a portfolio of outcomes, In: N. Tilley & M.J. Smith (red.), Crime Science: New Approaches to Preventing and Detecting Crime 2005 p. 56-84

Hildebrand, Martin/Poort, René/Sperna Weiland, Aleid, Handleiding RISc 4. Reclassering Nederland, Stichting verslavingsreclassering GGZ, Leger des Heils, Jeugdzorg en Reclassering 2014

Koopmans, Carl/Van Eijkel, Remco/Op 't Hoog, Gabriëlle/Hulsker, Walter/Ritmeester, Yannick/ De Swart, Linette, Kosten en baten van justitie- en veiligheidsbeleid, Werkwijzer voor maatschappelijke kostenbatenanalyses, SEO Economisch Onderzoek 2023

Manning, Matthew/Wong, Gabriel T.W./Graham, Timothy/Ranbaduge, Thilina/Christen, Peter/Taylor, Kerry/Wortley, Richard/Makkai, Toni/Skorich, Pierre, Towards a smart cost–benefit tool: using machine learning to predict the costs of criminal justice policy interventions, in: Crime Science 7 (12) 2018 p. 1-13

Ministerie van Financiën, Rijksbegroting. Rijksfinanciën. Retrieved October 3, 2022, from https://www.rijksfinancien.nl/memorie-van-toelichting/2016/1SUPP/VI/onderdeel/d16e 924

Németh, Attila/Linnenbank, J.H. Michel/Roeland, Mijneke/Visser, Anouk/Duijnstee, Douwe/ SteginK, Martine/Van den Heuvel, Silvio, De waarde van reclasseren in Nederland, Eerste raming van maatschappelijke baten rond cliënten van de reclassering, Hogeschool Saxion 2022

Velthoven, Ben C.J. van, Kosten-batenanalyse van criminaliteitsbeleid, in: Tijdschrift voor strafrechtspleging (PROCES) nr. 2008/4 jaargang 87 2008 p. 108-120

Versantvoort, M.C./Verster, A.C.M./Jannink, J./van den Broek, L.G.J.M./Van Zutphen, F./ Donker van Heel, P.A., Kosten en Baten van Justitiële Interventies, Ontwikkeling van een analyse- en rekenmodel, Eindrapport, Ecorys 2005

Visser, Anouk/Roeland, Mijneke/Steginck, Martine/Linnenbank, Michel/Németh, Attila, Typologie reclassenten, Ten behoeve van een MKBA, Saxion Hogeschool 2022

Wartna, B.S.J./Tollenaar, N./Verweij, S./Alberda, D.L./Essers, A.A.M., Recidivebericht 2015. Landelijke cijfers over de terugval van justitiabelen bestraft in de periode 2002-2012. WODC 2016

Wermink, Hilde/Blokland, Arjan/Nieuwbeerta, Paul/Tollenaar, Nikolaj, Recidive na werkstraffen en na gevangenisstraffen, in: Tijdschrift voor Criminologie 51(3) 2009 p. 211-227