

The Effect of a Dutch Alternative Punishment Program on Future Educational Outcomes

Iryna Rud, Chris Van Klaveren

Wim Groot and Henriette Maassen van den Brink*

Abstract

This study examines the effects of a Dutch alternative punishment program (Halt) on early school leaving, educational attainment and grade retention. The program focuses on adolescent first- and second-time offenders and aims to prevent and combat juvenile crime, and to influence the behavior and attitudes of young offenders. Identical programs are implemented many other countries, such as the US, Canada, Australia and the United Kingdom.

To determine the Halt effect we use (I.) data from a unique experiment data in which 945 juveniles were randomly assigned to the Halt program and a control group, and (II.) registered data on the educational careers of the participants of the experiment.

We find that Halt reduced early school leaving by 6 percentage points and increased the educational attainment of offenders enrolled in vocational education by 9 percentage points. We do not find a statistically significant effect of Halt on grade retention.

JEL Codes: I2, K4, C93

Keywords: Alternative Punishment, Education, Juvenile Crime, Field Experiment

*All authors are affiliated with The Top Institute for Evidence Based Education Research, TIER, Maastricht University, P.O. BOX 616, 6200 MD Maastricht, The Netherlands. Email of the corresponding author: cp.vanklaveren@maastrichtuniversity.nl.

1 Introduction

The economic literature on education and crime usually departs from the idea that more favorable educational outcomes do not only improve labor market outcomes (e.g. Mincer, 1989; Card, 1999) but also reduce future criminal involvement. It focuses mainly on identifying the impact of education on crime (Jacob and Lefgren, 2003; Lochner and Moretti, 2004; Machin et al., 2011) and tends to ignore that criminal involvement of school-age children may also affect their educational outcomes (Grogger, 1997; McLeod and Kaiser, 2004). The reason for this may be that studies frequently exploit exogenous variation in the considered educational variables (e.g. a change in the compulsory school leaving age, teacher in-service days variation) to identify the effect of education on criminal involvement, while no such exogenous variation is observed with respect to criminal involvement. Because criminal behavior affects educational outcomes negatively (e.g. Webbink et al., 2012), it may be that crime prevention strategies, targeted at young offenders, positively influence the educational outcomes of these young offenders.

This study evaluates the effects of a Dutch alternative punishment program for young offenders (Halt) on early school leaving, educational attainment and grade retention. Halt was developed in 1995 by the Ministry of Justice and Safety, municipalities and the police and stands for ‘The Alternative’ (in Dutch: ‘Het ALternatief’). The program focuses on first- and second-time offenders, aged between 12 and 18, who committed non-violent offenses. The main two program goals are (I.) preventing and combating juvenile crime and (II.) influencing the behavior and attitudes of young offenders positively by addressing behavioral development problems (problems at school, in the family or with friends). It has been well-documented that having behavioral problems at a young age lower future educational outcomes (see, among others, Hinshaw, 1992; McLeod and Kaiser, 2004) and the program may therefore positively influence the educational outcomes of young offenders who

participate in the Halt program.

The underlying theoretical of the Halt-intervention comes from sociological theories of criminal behavior (i.e. Reid, 2011) and the central mechanism by which the program goals should be achieved is by confronting juveniles with the consequences of their criminal behavior. In practice this means that individual programs are designed conditional on the committed offense and on the behavioral problems observed. These individual programs include activities like community service, learning assignments, compensation arrangements, conversations with professionals and apologizing to the victim.

Also in other countries, such as the United States, Canada, Australia and the United Kingdom, alternative punishment programs have become the major formalized sanction for first-time offenders. Similar to the Halt program, these punishment programs are part of the juvenile justice system and aim at the prevention of re-offending behavior of juveniles and improving their social behavior and attitudes. We note that the literature also refers to these alternative punishment programs as restorative justice, community service justice or soft punishment (Sallybanks, 2003).

This study uses unique data from a large-scale field experiment conducted in 2003-2004 in which 945 juveniles were randomly assigned to the Halt program and a control group, conditional on several background characteristics, such as age gender, ethnicity and type of committed offense. These data contain detailed information on the background characteristics of young offenders and their parents, and contain information on the individual programs that were designed. The Halt effects on future educational outcomes are determined by linking the field experimental data to registration data of Netherlands Statistics on the educational careers of all Dutch children who were enrolled in secondary or vocational education in the Netherlands between 2004 and 2010. These registration data contain information on early school leaving, educational attainment and grade retention.

This study contributes to the literature that examines the relationship between crime

and educational outcomes in several ways. First of all, it focuses on how future educational outcomes are influenced by criminal behavior, while the vast majority of studies concentrate on the reverse causation between education and adult crime, or re-offending (see, for example, Lochner and Moretti, 2004, and Wilson et al., 2000).

Secondly, and in contrast to most of the correlational empirical literature, this study aims to measure the causal impact of a Dutch alternative punishment program on educational outcomes by making use of unique field-experimental and registration data. The Dutch program seems, moreover, rather representative for alternative punishment programs in other countries because all alternative punishment programs in other countries are embedded in the juvenile justice system, have similar aims and let juveniles perform similar activities.

The third contribution of this study is that it focuses on the long-term effects of the intervention while many studies tend to focus on the short-term outcomes of (different) childhood intervention programs (Reynolds et al., 1997; Shonkoff and Meisels, 2000).

Finally, empirical findings of this study contribute to the current debate on the value of alternative punishment programs. It is frequently stated that alternative punishment programs are too expensive and complex (Miers et al., 2001). At the same time there is no solid evidence that alternative punishment programs reduce recidivism (see Bradshaw and Roseborough, 2005) and the possible positive effects on social and educational outcomes have not yet been evaluated. The lack of solid evidence together with the high program costs make alternative punishment programs rather controversial, even though they are implemented on a large scale. This study therefore contributes to the debate because it provides evidence on whether alternative punishment programs affect educational outcomes positively.

This study proceeds as follows. Section 2 describes the existing evidence on the relationship between juvenile crime and educational outcomes, and discusses the effectiveness of intervention programs and juvenile justice policies in different countries. Section 3 characterizes the conceptual basis of the Halt program. Section 4 describes the Halt experiment and

Section 5 describes the experimental and registration data. Section 6 presents the estimation model and presents the estimation results. Finally, Section 7 concludes.

2 Review of evidence

Juvenile crime can influence educational outcomes through several channels. Delinquent juveniles often have bad habits such as drinking, taking drugs and sexual misbehavior, and these activities are associated with lower academic performance, school absenteeism and school dropout (Lynskey and Hall, 2000; Austin, 2006; Grant and Hallman, 2008). Certain types of criminal activities most likely find place during the school hours (Soule et al., 2008) and this time cannot be spent on education (see Witte and Witt, 2002). Young offenders are moreover frequently stigmatized at school which can negatively influence their educational outcomes (see Fisher, 1972; Hirschfield, 2004; Hannon, 2003).

There are few empirical studies on the relationship between juvenile crime and education. Hannon (2003) finds that self-reported misbehavior of adolescents is positively related with early school leaving and this relationship is more pronounced for adolescents with a lower social-economic status. Controlling for a large set of characteristics, Hjalmarsson (2008) finds that arrested (incarcerated) individuals are about 11 (26) percentage points less likely to graduate from high school than individuals who were not arrested. Le et al. (2005) use data from the Australian Twin Register to examine the relationship between behavioral problems and educational attainment and find that conduct disorder is associated with early school leaving. Exploring the same data, Webbink et al. (2012) find that early arrests reduce the probability of completing senior high school with about 20 percentage points.

Risk indicators for criminal involvement are related to educational attainment (Case and Katz, 1991; Hannon, 2003). Parents in socially deprived neighborhoods invest less in the education of their children (Moon, 2010) and social deprivation turns out to be a good pre-

dicator of juvenile delinquency (although not independent from other risk indicators) (Utting et al., 1993; Wikstrom and Loeber, 2000). This is the reason why several early childhood and adolescent interventions aim at improving simultaneously crime prevention and educational attainment. Examples of these interventions are the Perry Preschool program, the Chicago Child-Parent Center, the Abecedarian Project, the Nurse-Family Partnership, Head Start, the LA's Best, the Seattle Social Development Project, Big Brother Big Sister, and the National Guard Youth ChalleNGe and Quantum Opportunities Program. Evaluation studies that estimate the long-term effects of these programs on criminal behavior and educational outcomes show rather mixed results (Yoshikawa, 1995).

Other interventions that focus specifically on reducing antisocial behavior among young people are the Multidimensional Treatment Foster Care, the Multisystematic Therapy for Juvenile Offenders, the Functional Family Therapy, the LifeSkills Training Program, the Adolescent Diversion Project, the Aggression Replacement Training and The North Carolinian's Juvenile Structured Day Programs.¹ A study that evaluated the Aggression Replacement Training (ART) showed that children who participated in the program improved their behavior, could better control their anger and improved their skills acquisition and performance (Goldstein and Glick, 1994). The North Carolinian's Juvenile Structured Day Programs provide education and the opportunity to obtain a General Educational Development certificate for "at-risk" juveniles who were suspended or expelled from public school for different reasons such as prior dropout, substance abuse problems and teenage pregnancy. Evaluation studies show that children who participated in the program also participated more in the education provided by these programs and returned to a regular public school more often (Yearwood et al., 2002; McMillen et al., 2002). Even though most of the abovementioned evaluation studies report positive effects of programs targeted at children 'at risk' on their behavior and

¹For further information see [HTTP://WWW.episcenter.psu.edu/ebp](http://www.episcenter.psu.edu/ebp) , [HTTP://evidencebasedprograms.org/wordpress/?page_id=1080](http://evidencebasedprograms.org/wordpress/?page_id=1080) , [HTTP://WWW.uscart.org/ART-Cirriculum-Eval.pdf](http://www.uscart.org/ART-Cirriculum-Eval.pdf)

recidivism, Thornton and Lee (2000) mention publication bias may drive these results.

There are several alternative punishment programs in the U.S., England, Wales, Canada and Australia that are very similar to the Halt program. These programs are targeted at first-time juvenile offenders, who are charged for minor offenses, and offers these juveniles court diversion if they agree to participate in an alternative sanction, such as (a combination of) community work, apologizing to the victim, restitution and training. In several states in the U.S. (e.g. New York, Indiana, Maine and Vermont) the Juvenile Justice Task Force policy (JJTF) allows non-violent juvenile offenders to attend community based programs instead of referring them to the court proceedings. These programs include advocacy groups, community-based organizations, education and training assistance. Young offenders receive the opportunity to avoid a criminal record by accomplishing different assignments focused on the community and the victim. In England and Wales, the Final Warning Scheme was introduced to encourage young people to take responsibility for their criminal behavior and prevent re-offending. In this program, young offenders have to apologize to the victim and participating in practical activities which benefit the victim or the community as a whole.² A similar policy was developed in Canada with the implementation of the Youth Offenders Act (TOP), in 1984, and the Youth Criminal Justice Act, in 2002. These Acts aimed at reducing court use and incarceration of young offenders who committed less serious crimes by providing them with community-based sanctions (services and financial compensation to victims, community services, educational sessions, personal or written apology, and essays or presentations related to the offense).³ Two correlational studies indicated that youth crime rates dropped several years after the implementation of this policy and remained at this lower level (Johnson, 2003; Bala and Anand, 2004). In Australia, the Young Offenders Act came into force in 1997 establishing a hierarchical system of alternative measures from a

²For further information see [HTTP://WWW.tame.gov.uk/yot/finalwarning](http://www.tame.gov.uk/yot/finalwarning)

³For further information see [HTTP://publications.gc.ca/collections/Collection-R/Statcan/85-002-XIE/0089985-002-XIE.pdf](http://publications.gc.ca/collections/Collection-R/Statcan/85-002-XIE/0089985-002-XIE.pdf)

police warning and a formal police caution to a youth justice conference. Vignaendra and Fitzgerald (2006) find that, within 5 years, re-offending rates were higher for offenders from the conference cohort than for those from the caution cohort. At the same time, these rates were not as high as rates for young offenders who received no ‘treatment’ and had to appear in court. However, because offenders were not randomly assigned to the various alternative measures, these results may simply reflected that offenders received different punishments according to the seriousness of their offenses.

3 The Halt Program

The original objective of Halt arrangement in 1981 was to stop vandalism among juveniles and over the years the Halt arrangement became an alternative to court sanctions. Halt developed as a part of the juvenile justice system in the Netherlands in 1995, targeting juveniles who committed vandalism offenses, property offenses and fireworks nuisances. Currently there are 62 Halt-offices spread out over the entire country and the program is applicable to a wider range of offenses, such as public property destruction, shoplifting, public disorderly conduct, minor arson and fare dodging. In Appendix A we show in detail the Halt-worthy offenses for which juveniles are referred to Halt.

The main goal of Halt is to prevent and combat juvenile crime by the enforcement of alternative punishment given to first-time juvenile offenders aged between 12 and 18. Sometimes juveniles are referred to Halt who are 11 or 19 years old. Young offenders who are caught by the police and who have committed a Halt-worthy offense are immediately referred to a Halt Bureau, where they are ‘screened’ by professionals in order to assess whether they are qualified for the Halt sanctions. Juveniles who are referred to Halt are first confronted with the motives and consequences of their criminal behavior, and can then choose between participating in the Halt program or being sent to the Public Prosecutor. Juveniles therefore

have an incentive to choose for the Halt program because they avoid having a criminal record if they successfully complete the Halt program.

A second aim of Halt is to change the behavior and attitudes of young offenders by addressing behavioral development problems (such as problems at school, in the family or with friends). The staff members of Halt are trained professionals and help young offenders to become aware of (the consequences of) their criminal behavior and to accept responsibility for this behavior. Based on individual sessions with the young offenders, alternative punishment programs are designed that correspond best with their behavior. The program specifically focuses on the social-emotional and educational development of juveniles, such that improving the educational careers of juveniles is a sub-goal of the program.

Halt undertakes a wide variety of activities including community-based work, participation in a special learning activity, rectification and/or compensation of any damage done and apologizing to the victim. Juveniles are, for example, asked to clean graffiti from walls, to help in the store where they did the shoplifting, to clean the street litter where they did public disorderly conduct, to attend special training and so on. These working and/or learning activities last 2 to 20 hours per week after-school time (depending on the offense done by a juvenile) and juveniles are supervised by an adult and the duration of the Halt program is 1 year.

Most studies on Halt are correlational and do not provide information on the effectiveness of Halt. An exception is the study of Ferwerda et al. (2006) who conducted a field experiment in 2003/2004 in which almost one thousand juvenile offenders were randomly assigned to the Halt program or to a control group.⁴ One year after the Halt sanction was applied they compared subjective behavioral outcomes and the patterns of recidivism between the Halt and the control group. With respect to the patterns of recidivism, they found that the program is effective for those young offenders who committed a criminal offense under

⁴We provide more detailed description of the experiment in Section 4

peer pressure and that offenders who had to apologize to the victim committed fewer and less serious offenses. With respect to the subjective behavioral outcomes, they found that two-third of the Halt participants indicated that the program changed their behavior and attitude in a positive way and the behavioral effects were larger if, within the designed Halt program, learning assignments were combined with community services. Ferwerda et al. (2006) do not focus on the Halt effect on educational and social outcomes.

Unfortunately, Ferwerda et al. (2006) do not adequately control for the selective dropout that occurs. Young offenders who have characteristics that are associated with a higher probability of committing an offense, and having lower educational outcomes, tend to dropout relatively often from the Halt program and the control group. These dropouts are, however, not considered in the analysis such that the measured Halt effects may be biased. Because the study at hand uses the data from the field experiment that was conducted by Ferwerda et al. (2006) we return to this issue of selective dropout elaborately in Sections 5 and 6.

4 The Halt experiment

From 2003 to 2004, the Research and Documentation Center of the Dutch Ministry of Security and Justice evaluated the Halt program, in cooperation with Beke Consultancy, a research bureau who are specialized in crime and safety research. Twelve of the 62 Halt bureaus were chosen to participate in the evaluation study. These bureaus were selectively chosen such that locations across the Netherlands were considered and such that bureaus from the larger Dutch cities were included.

More than one thousand juveniles who were referred to Halt by the police (the first Halt meeting) received voucher that allowed them to participate in the Halt program. 945 juveniles used this voucher and 120 Juveniles did not use the voucher and were sent to the Public Prosecutor. Ferwerda et al. (2006) reported that refusers were, on average, more

often, non-Dutch and that the main reasons why juveniles refused to participate in the Halt program were: lack of time and/or motivation, a negative attitude towards the experiment, poor language skills or dyslexia problems.

Juveniles who agreed to participate in the experiment came to the Halt bureau together with their parents to complete the pre-test questionnaires (the second Halt meeting). The questionnaire for juveniles includes questions on several demographic background characteristics, on attitudes and social behavior, on school- and family-related problems, on financial issues, on leisure time and friends, on the use of substances and gambling and on earlier contacts with the police. The questionnaire for parents includes questions about their children's offenses, attitudes towards Halt, relationship in the family etc. Also the Halt employee who screened and welcomes the juvenile to fulfill the questionnaires were required to complete a questionnaire which concerned information about the committed offenses (communicated by the police and used to compare the answers of parents with the information delivered by the police) and their impression of the juvenile's behavior.

945 juveniles were randomly assigned to the Halt program (465) and a control group (480) by using stratified block randomization. Stratified block randomization was used because the randomization was performed separately for each Halt bureau and simple randomization could therefore lead to differences in baseline characteristics between the treatment and the control group (Schulz and Grimes, 2002). Intuitively, stratified block randomization means that the random assignment of juveniles to either treatment or control group within each Halt bureau is conditional on relevant baseline covariates. In the halt experiment these covariates were age, gender, ethnicity, committed an offense in a group and the type of offense.

Practically the assignment of juveniles to the Halt program was done in 6 steps. In the first step, one representative staff member was appointed by each of the 12 Halt bureaus. In a second step, 12 Halt bureaus were divided over 5 researchers of Beke Consultancy. In a third step, Halt representatives passed through information on age, gender, ethnicity,

committed an offense in a group and the type of offense to the researcher after the first screening. In the fourth step, the researcher applied the stratified block randomization. In the fifth step, the researcher informs the Halt representative about if juveniles are assigned to the Halt program or the control group. In the sixth and final step, juveniles and their parents are informed about whether they have to participate in the Halt program during their second visit to the Halt bureau when they fill in the pre-test questionnaires. To avoid contamination, group offenders were always assigned to the treatment or the control group as one group. We note that the avoidance of contamination may cause (small) differences between the baseline characteristics of the control and the intervention group.

Juveniles in the control and the Halt group had to return to the Halt bureau, together with their parents, 6 months after the Halt program started to complete a second-round questionnaire. To encourage their participation they received 15 euros during this third Halt meeting. Another incentive for juveniles in the control group (Halt group) was that coming to this third meeting (and completing the Halt program) relieved them from any juridical charges. Juveniles who did not appear at the third Halt meeting, even after sending a reminder, were considered as quitters.

5 Data description

The Research and Documentation Center of the Dutch Ministry of Security and Justice provided us with the data of the Halt field experiment that was conducted in 2003-2004. As is described in Section 4, these data contain detailed information on several background characteristics of the adolescent offenders and their parents. It, moreover, contains detailed information on the specific Halt activities that adolescents had to perform, on the past criminal behavior of adolescents provided by the police, and contains subjective information on the juvenile's behavior, which is an impression of the Halt professionals.

The data on the educational careers of adolescents who were enrolled in secondary and vocational education between 2004 and 2010 came from Netherlands Statistics. Because there did not exist an accurate estimate of the number of students dropping out of secondary and vocational education, the Dutch Ministry of Education decided to develop a tracking system for students in 2004. In this system, all Dutch students receive a personal identification number which made it possible to track the educational careers of all students who were enrolled in secondary and vocational education. These data contain information on grade retention early school leaving and educational attainment and contain information student background characteristics (e.g. ethnicity, family structure, school track, grade, zipcode).

Grade retention and educational attainment are directly observed in the educational data because there is information on education type and grade for each student and each school year. Information on early school leaving had to be constructed from the data. Students are *not* considered as early school leavers if they are registered in secondary or vocational education or if they finished senior general secondary education, pre-university education (HAVO and VWO tracks, respectively) or post-secondary vocational education (at least MBO 2 level) with a diploma. This definition is consistent with the early school leaving definition given by the Ministry of Education and Science (2012), with this difference, that adolescents are not considered if they are still registered as a student (i.e. are still in school).

The Halt experimental data was merged with the educational data, based on the students' family name, address, living place, date of birth and sex, such that the educational careers of adolescent offenders could be tracked. Because it was not allowed to disclose personal information, such as name and address, the data merging had to be carried out by Netherlands Statistics.

945 juveniles were randomly assigned to an intervention group (465) and a control group (480) conditional on age, gender, ethnicity, committed an offense in a group and the type of offense. Table 1 shows the means and standard deviations of these assignment characteristics

and the fourth column shows if there are significant differences between both groups. For the mean differences in the fourth column we show the standard errors in parenthesis. The table shows that there are small but significant differences between the two groups, and these differences exist because group offenders were assigned as on group to the intervention or the control group, to avoid contamination. The proportion of group offenders is slightly higher in the intervention group and, as a consequence, this group contains somewhat more male and Dutch offenders. Juveniles in the control and intervention group committed very similar offenses, even though juveniles in the intervention group were referred to Halt more often because of shoplifting and less often because of property crime. We conclude that there are small differences between the intervention and the control group, even though juveniles were randomly assigned to both groups. Therefore it is important to control for these characteristics in the empirical analysis.

The table shows furthermore that juveniles are, on average, 14.5 years old and the youngest (oldest) juvenile was aged 11 (19). 30 percent of the juveniles were females and around 70 percent of the offenders were Dutch. Most committed offenses were group offenses (respectively .78 and .70 for the intervention and the control group) and the offenses committed the most were demolition, shoplifting and reckless behavior.

We mentioned in Section 4 that juveniles in the intervention group could quit the program by not completing the Halt assignments and that juveniles in the control group could also quit their control treatment, by not showing up at the third halt meeting (which meant that they had to go to the Public Prosecutor). 122 juveniles could be labeled as quitters and because these juveniles may be a selective group, we compare the characteristics of quitters and non-quitters, separately for the control and the intervention group, in Table 2.

Columns 2 up to 3 show that 91 of the 465 juveniles in the intervention group quit the program (19.5 percent). This program dropout is not only substantial, but also clearly selective. Juveniles who did not complete the Halt program are older, more often male and

Table 1: Assignment characteristics of juveniles

| | Intervention | Control | Δ Mean |
|------------------------------------|-----------------|-----------------|--------------------|
| | (N=465) | (N=480) | |
| Age | 14.58 (1.47) | 14.47 (1.53) | -0.11 (0.10) |
| Female | 0.26 (0.44) | 0.31 (0.46) | 0.04* (0.03) |
| Dutch | 0.71 (0.45) | 0.65 (0.48) | -0.06** (0.03) |
| Group offense | 0.78 (0.42) | 0.70 (0.46) | -0.08*** (0.03) |
| Type of offense: | | | |
| Demolition | 0.18 (0.39) | 0.17 (0.38) | -0.01 (0.02) |
| Graffiti | 0.04 (0.20) | 0.03 (0.16) | -0.01 (0.01) |
| Shoplifting | 0.31 (0.46) | 0.38 (0.49) | 0.07** (0.03) |
| Property crime | 0.11 (0.32) | 0.08 (0.27) | -0.03** (0.02) |
| Deliberately handling stolen goods | 0.03 (0.17) | 0.02 (0.14) | -0.01 (0.01) |
| Reckless behavior | 0.14 (0.35) | 0.15 (0.36) | 0.01 (0.02) |
| Light abuse | 0.01 (0.11) | 0.01 (0.09) | -0.01 (0.01) |

Note: */**/** denotes statistically significant at the 10/5/1 percent level.

Table 2: Characteristics of juveniles separately for non-quitters and quitters

| | Intervention (N=465) | | | Control (N=480) | | | Intervention-Control Δ Non-Quitters |
|------------------------------------|-------------------------|--------------------|--------------------|-------------------------|--------------------|--------------------|---|
| | Non-quitters (N=374) | Quitters (N=91) | Δ Mean | Non-quitters (N=449) | Quitters (N=31) | Δ Mean | |
| Age | 14.49 (1.49) | 14.91 (1.32) | -0.42*** (0.17) | 14.50 (1.54) | 14.03 (1.40) | 0.47** (0.28) | 0.006 (0.11) |
| Female | 0.25 (0.43) | 0.33 (0.47) | -0.08* (0.05) | 0.30 (0.46) | 0.42 (0.50) | -0.12* (0.09) | 0.05* (0.03) |
| Dutch | 0.73 (0.45) | 0.62 (0.48) | 0.11** (0.03) | 0.66 (0.47) | 0.55 (0.51) | 0.11 (0.09) | -0.07* (0.03) |
| Group offense | 0.79 (0.41) | 0.75 (0.44) | 0.04 (0.05) | 0.70 (0.46) | 0.72 (0.45) | -0.02 (0.09) | -0.08*** (0.03) |
| Demolition | 0.19 (0.39) | 0.18 (0.38) | 0.01 (0.05) | 0.18 (0.38) | 0.13 (0.34) | 0.05 (0.07) | -0.01 (0.03) |
| Graffiti | 0.04 (0.19) | 0.05 (0.23) | -0.02 (0.02) | 0.02 (0.15) | 0.03 (0.18) | -0.008 (0.03) | -0.01 (0.01) |
| Shoplifting | 0.32 (0.47) | 0.29 (0.45) | 0.03 (0.05) | 0.37 (0.48) | 0.58 (0.50) | -0.22*** (0.09) | 0.05* (0.03) |
| Property crime | 0.13 (0.33) | 0.07 (0.25) | 0.06* (0.04) | 0.08 (0.28) | 0.03 (0.18) | 0.05 (0.05) | -0.04** (0.02) |
| Deliberately handling stolen goods | 0.02 (0.15) | 0.04 (0.21) | -0.02 (0.02) | 0.02 (0.15) | . | . | -0.002 (0.01) |
| Reckless behavior | 0.14 (0.35) | 0.13 (0.34) | 0.01 (0.04) | 0.16 (0.36) | 0.06 (0.25) | 0.09* (0.07) | 0.02 (0.03) |
| Light abuse | 0.01 (0.11) | 0.02 (0.15) | -0.01 (0.01) | 0.01 (0.09) | . | . | -0.002 (0.007) |
| Criminal behavior in the past | 0.30 (0.46) | 0.35 (0.48) | -0.05 (0.05) | 0.31 (0.46) | 0.32 (0.48) | -0.01 (0.09) | 0.01 (0.03) |

Note 1: Standard deviations (standard errors for mean differences) are printed in parenthesis.

Note 2: */**/** denotes statistically significant at the 10/5/1 percent level.

less often Dutch than juveniles completed the Halt program. Program dropout does not seem to be selective with respect to the committed offenses, even though property crime is more often committed by juveniles who do not quit the program.

Columns 4 up to 6 show that 31 of the 480 juveniles in the control group are labeled as quitters (6.5 percent). On the one hand it seems natural that there is more dropout in the intervention group than in the control group, because the Halt program is more intense than the control treatment. On the other hand, it is surprising that 31 juveniles did not attend all three halt meetings because the price for not coming to these meeting (i.e. facing juridical charges) is high. Quitters from the control group are relatively older, more often male and where more often referred to halt (although not assigned to the intervention group) for shoplifting.

The last column indicates if juveniles who completed the Halt program differ from juveniles who completed the control treatment. The differences presented in this last column are very similar to the differences presented in Table 1, meaning that the differences between the intervention and the control group after ‘removing’ the quitters remain equal.

The last two rows of the table show that 30 percent of the juveniles have shown criminal behavior in the past and that the four distinguished groups do not differ significantly from each other.

Tables 1 and 2 show information on how the intervention group and control group differ in the assignment characteristics. This study focuses, however, on educational outcomes, and therefore Table 3 shows how juveniles in both groups differ in the educational track they follow after they finished primary education. We note that the table shows the educational tracks that juveniles follow at the moment the second Halt meeting was held (see Section 4).

Before we discuss the summary statistics in Table 3 we first shortly explain the Dutch educational system. Primary school children in the Netherlands are assigned to different educational tracks at the age of twelve based a test score they achieve on a national test and

Table 3: Educational attainment of quitters and compliers Halt

| | Intervention (N=465) | | | Control (N=480) | | | Intervention-Control |
|---------------------------------|----------------------|----------------|--------------------|-----------------|----------------|-------------------|-----------------------|
| | Non-quitters | Quitters | Δ Mean | Non-quitters | Quitters | Δ Mean | Δ Non-Quitters |
| | (N=374) | (N=91) | | (N=449) | (N=31) | | |
| Primary education | 0.03 (0.17) | 0.05 (0.23) | -0.03 (0.02) | 0.05 (0.22) | 0.13 (0.34) | -0.08** (0.04) | 0.02* (0.01) |
| Vmbo (theoretical track) | 0.32 (0.47) | 0.20 (0.40) | 0.13*** (0.05) | 0.29 (0.46) | 0.39 (0.50) | -0.09 (0.09) | -0.03 (0.03) |
| Vmbo (other tracks) | 0.32 (0.47) | 0.32 (0.47) | 0.005 (0.05) | 0.31 (0.46) | 0.23 (0.09) | 0.09 (0.09) | -0.01 (0.03) |
| Havo | 0.15 (0.35) | 0.15 (0.36) | -0.007 (0.04) | 0.13 (0.34) | 0.06 (0.25) | 0.07 (0.06) | -0.02 (0.02) |
| Vwo | 0.08 (0.28) | 0.05 (0.23) | 0.03 (0.03) | 0.10 (0.31) | . | . | 0.02 (0.02) |
| Mbo | 0.05 (0.21) | 0.09 (0.28) | -0.05* (0.03) | 0.04 (0.21) | 0.10 (0.30) | -0.05* (0.04) | -0.001 (0.01) |
| Graduated from secondary school | 0.09 (0.29) | 0.15 (0.36) | -0.06* (0.04) | 0.08 (0.29) | 0.03 (0.19) | 0.05 (0.05) | -0.0009 (0.02) |
| Dropout from school | 0.03 (0.17) | 0.09 (0.29) | -0.06*** (0.02) | 0.06 (0.23) | 0.07 (0.26) | -0.01 (0.04) | 0.03** (0.01) |

Note 1: Standard deviations and standard errors of mean differences are printed in parenthesis.

Note 2: */**/** denotes statistically significant at the 10/5/1 percent level.

on a primary school advice. Children are assigned to three tracks: pre-vocational secondary education (Vmbo), senior general secondary education (Havo) and pre-university education (Vwo). Pre-vocational education takes four years and prepares children for vocational education, senior general secondary education takes five years and prepares children for higher professional education and pre-university education takes six years and prepares children for academic education at universities. Pre-vocational education has four learning tracks: a basic track (lowest), a middle-management track, a mixed track, and a theoretical track (highest). Finishing a theoretical track gives access to vocational education and to Havo. Finishing the other pre-vocational tracks only gives access to vocational education. Vocational education also have four difficulty levels and finishing the fourth level gives access higher education.

Table 3 shows that there are only minimal differences in the followed educational tracks between the intervention and the control group. The last table column shows if juveniles who complete the Halt program differ from juveniles who do not dropout of the control group and indicates that there is only a small marginal difference in the number of juveniles who are enrolled in a primary school track. There is selective dropout from the Halt program, in the sense that quitters in the intervention group less often follow a Vmbo theoretical track. The last four rows in the table show that this difference is because these quitters already graduated from or dropped out of secondary school.

6 Estimation Strategy and Empirical Results

Section 5 shows that the 91 juveniles who dropout of the Halt program are a selective group and this may impose a bias on the measured effect of Halt on the educational outcomes. To control for this selective dropout we adopt an instrumental variable (IV) analysis in which the actual Halt participation is instrumented by how juveniles were randomly assigned to

both groups. The identifying assumption in IV is that the instrument is only related to the assignment mechanism, and not directly to the outcome variable of interest (Heckman, 1997). In this study the used instrument is the random assignment mechanism, and hence the identifying assumption is satisfied by construction.

We estimate the local average treatment effect estimating a two-stage least squares estimation model (Angrist and Pischke, 2009). In the first stage, the probability of Halt participation is estimated by regressing participation status, H_i , on how juveniles were assigned to the Halt program (Z_i), and a set of covariates, X_i , that are also included in the second stage regression:

$$H_i = \pi_0 + \pi_1 Z_i + X_i' \pi_2 + \xi_i. \quad (1)$$

Subscript i is a student indicator, error term, ξ_i , is assumed to be normally distributed with mean zero and variance σ_ξ^2 , and all explanatory variables are assumed to be independent of the error term. In the second stage we regress the educational outcome variables (Y_{ki}) on the predicted Halt participation probabilities (\hat{H}_i) and the set of covariates (X_i) from the first stage regression:

$$Y_{ki} = \beta_0 + \beta_1 \hat{H}_i + X_i' \beta_2 + \eta_i. \quad (2)$$

Y_{ki} represents the education outcome of i and subscript k refers to one of the three considered educational outcomes (i.e. $k = 1, 2, 3$). As usual, η_i is a normally distributed error term with mean zero and variance σ_u^2 , and the correlation between u_i and v_i are assumed to be nonzero.

If we would estimate the first and second stages separately we would compute the residuals from the instruments rather than from the original variables, such that the standard errors are incorrectly estimated (Wooldridge, 2009). Therefore we simultaneously estimate the first

and second stage model with the STATA `ivreg2` module, such that the correct standard errors are computed.

Each estimation table below shows the Stock-Yogo weak identification test statistic (2005) which provides information on if the instrument is too weak to be trustworthy. The null hypothesis of this test is that bias of 2SLS is some fraction of the bias of OLS (we use less than 10%).

Results on Early School Leaving

Information on early school leaving had to be constructed from the data. The early school leaving definition in this study is consistent with the definition that is used by the Ministry of Education and Science (2012). Juveniles who are registered in secondary or vocational education or who successfully finished a senior general secondary (Havo), pre-university (Vwo) or post-secondary vocational education (Mbo level 2) are not considered as early school leavers. It follows that the dependent early school leaving variable is a binary variable.

Table (4) shows the estimation results on early school leaving. Unfortunately it was not possible to link the experimental data to the educational data for 36 juveniles because they enrolled in special education. The high R^2 and the coefficient of .81 for the Halt assignment variable in the first stage show that receiving a (random) Halt voucher is a good predictor for participation in the Halt program. As a consequence, the Stock-Yogo test statistic of 16.38 indicates that (randomly) receiving a Halt voucher is not a weak instrument. The first stage results furthermore shows that there is selective dropout from the Halt program, because age and ethnic background (i.e. being Dutch) influence participation in the Halt program. The second stage estimation results show that Halt reduced early school leaving by 6 percentage points. The measured effect is, however, marginally significant.

We note that the intention to treat effect can be calculated from estimates presented in Table (4) by multiplying the coefficient of the second-stage Halt effect (-.06) by the coefficient

Table 4: Halt Effect on Early School Leaving

| | First Stage | | Second Stage | |
|---------------------------------|-------------|-----------|--------------|----------|
| | Coef. | Std. err. | Coef. | Std.err. |
| Halt assignment (IV) | 0.81*** | 0.02 | – | – |
| Instrumented Halt participation | | | -0.06* | 0.04 |
| Age | -0.01* | 0.01 | -0.06*** | 0.01 |
| Girl | -0.02 | 0.02 | -0.04 | 0.03 |
| Dutch | -0.05** | 0.02 | 0.03 | 0.03 |
| Single parent household | -0.03 | 0.02 | 0.02 | 0.03 |
| Siblings | -0.01 | 0.01 | -0.001 | 0.01 |
| Parents work | 0.03 | 0.03 | -0.04 | 0.04 |
| Constant | 0.20 | 0.10 | 1.19*** | 0.15 |
| R^2 | 0.69 | | 0.07 | |
| F-statistic | 246.29 | | 7.83 | |
| Stock-Yogo (10%, size) | 16.38 | | | |
| Observations | | | 779 | |

Note: */**/** means statistically significant at the 10/5/1 percent level.

of the first-stage Halt instrument (.81). The intent-to-treat effect is therefore -.04, meaning that giving a Halt voucher to juveniles lowers early school leaving with 4 percentage points.

Results on Educational Attainment for Vocational Secondary Education

We observe three secondary education types: pre-vocational secondary education (Vmbo), senior general secondary education (Havo) and pre-university education (Vwo). Unfortunately, we do not observe if juveniles who finished their Havo or Vwo continue their educational careers and go to higher education. Therefore, we focus specifically on the educational attainment of juveniles who went to Vmbo after they finished primary school. 68 percent of the juveniles (i.e. 554 juveniles) went to pre-vocational secondary education and after successfully finishing Vmbo these juveniles can continue their educational careers by going to vocational, senior general pr pre-university education. Table (5) shows the estimation results for these 554 juveniles and measures how the Halt program affected their educational attainment. Educational attainment is a binary variable that equals 1 if juveniles finish

Table 5: Halt on academic attainment (in vocational education)

| | First Stage | | Second Stage | |
|---------------------------------|-------------|-----------|--------------|----------|
| | Coef. | Std. err. | Coef. | Std.err. |
| Halt assignment (IV) | 0.81*** | 0.02 | – | – |
| Instrumented Halt participation | | | 0.09** | 0.04 |
| Age | -0.01 | 0.008 | 0.09*** | 0.01 |
| Girl | -0.001 | 0.03 | 0.05 | 0.04 |
| Dutch | -0.05** | 0.03 | -0.07* | 0.04 |
| Single parent household | -0.03 | 0.03 | -0.02 | 0.04 |
| Siblings | -0.002 | 0.008 | 0.004 | 0.01 |
| Parents work | 0.07** | 0.03 | -0.001 | 0.05 |
| Constant | 0.13 | 0.12 | -0.59*** | 0.18 |
| R^2 | 0.70 | | 0.13 | |
| Stock-Yogo (10%, size) | 16.38 | | | |
| Observations | | | 554 | |

Note: */**/** means statistically significant at the 10/5/1 percent level.

MBO level 3 or 4, Havo or Vwo, and 0 if they only complete MBO 1 or 2, or stop after finishing VMBO (which is not allowed given the compulsory school age of 18).

The first stage results are similar to those presented in Table (4) and receiving a (random) Halt voucher is a good predictor for Halt participation for juveniles who are enrolled in Vmbo. The second stage results show that Halt participation increases the probability of higher educational attainment by 9 percentage points. It may be that the Halt activities made Halt participants more aware of the value of education (maybe with respect to their future labor market position). The second stage results, furthermore, indicate that the educational attainment is lower for non-Dutch juveniles and higher for juveniles who are older. The latter relationship is probably explained by the fact that we observe longer educational careers for juveniles with higher educational attainments because they stay in school longer and therefore these juveniles are, on average, older. The intent-to-treat effect is 7.3 percentage points.

Table 6: Halt on grade retention (in secondary education)

| | First Stage | | Second Stage | |
|---------------------------------|-------------|-----------|--------------|----------|
| | Coef. | Std. err. | Coef. | Std.err. |
| Halt assignment (IV) | 0.80*** | 0.03 | – | – |
| Instrumented Halt participation | | | -0.02 | 0.04 |
| Age | -0.02* | 0.01 | -0.02* | 0.01 |
| Girl | -0.02 | 0.03 | -0.02 | 0.04 |
| Dutch | 0.07** | 0.03 | 0.02 | 0.04 |
| Single parent household | -0.05* | 0.03 | -0.06 | 0.04 |
| Siblings | -0.005 | 0.06 | 0.02 | 0.07 |
| Parents work | -0.02 | 0.04 | -0.05 | 0.05 |
| Constant | 0.22 | 0.14 | 0.52 | 0.19 |
| R^2 | 0.68 | | 0.02 | |
| F-statistic | 129.27 | | 1.08 | |
| Stock-Yogo (10%, size) | 16.38 | | | |
| Observations | | 425 | | |

Note: */**/** means statistically significant at the 10/5/1 percent level.

Results on Grade Retention in Secondary School

Grade retention occurs when students are recommended to repeat an academic year because their academic performance is insufficient to meet grade-level performance standards. Grade retention in the Netherlands is relatively high and can be up to 27% (OECD, 2010). Grade retention is measured by means of a binary variable that takes the value 1 if students repeat the same grade during two academic years in the period from 2005 to 2010, and zero otherwise. If juveniles are not registered in a particular school year but start in a later school year again in the same grade, we consider this as grade retention. We note, first of all, that grade retention does not occur when graduates of pre-vocational secondary education (VMBO) move to 4th grade of senior general secondary education (HAVO), or graduates of senior secondary education (HAVO) move to 5th grade of pre-university education (VWO). Second of all, we only observe grade retention for juveniles in secondary schools.

The first-stage estimation results are similar to those presented in Tables 4 and 5. The second-stage estimation results show that the Halt program did not affect grade retention.

7 Conclusion

The empirical literature on education and crime mainly focuses on identifying the impact of education on crime and tends to ignore that criminal involvement of school-age children may also affect their educational outcomes. There is however consensus that criminal behavior of adolescents lead to more criminal behavior and lower educational outcomes in the future. This explains why many countries, such as the US, Canada, Australia, the United Kingdom and the Netherlands, currently have very similar alternative punishment programs that are part of the juvenile justice system that aim at (I.) preventing and combating juvenile crime and (II.) influencing the behavior and attitudes of young offenders positively by addressing behavioral development problems. This study estimates the effects of a Dutch alternative punishment program (Halt) for adolescent offenders on early school leaving, educational attainment and grade retention.

The theoretical fundament of Halt comes from sociological theories of criminal behavior and the central mechanism by which the program goals should be achieved is to confront juveniles with the consequences of their criminal behavior. Halt focuses on first- and second-time adolescent offenders who committed non-violent offenses. Conditional on the type of criminal offense and the behavior of the adolescent an individual program is designed by professional which translates in activities such as community service, learning assignments, compensation arrangements, conversations with professionals and apologizing to the victim.

This study exploits unique data from a large-scale Dutch field experiment conducted in 2003-2004 in which 945 juveniles were randomly assigned to the Halt program and a control group. This study identifies the Halt effect by linking the experimental data to registered data of the Netherlands Statistics which tracks the educational careers of all Dutch students enrolled in secondary and vocational education between 2004 and 2010.

The main contributions of this study are that first of all, that it focuses on if future

educational outcomes are influenced by criminal behavior, while the vast majority of studies concentrate on the reverse causation between education and adult crime, or re-offending. Secondly, and in contrast to most of the empirical and correlational literature, this study measures the causal impact of Halt due to the unique nature of the data. The results of this study seem, moreover, rather representative for alternative punishment programs in other countries because all alternative punishment programs in other countries are embedded in the juvenile justice system, have similar aims and let juveniles perform similar activities. The third contribution of this study is that it focuses on the long-term effects of the intervention while many studies tend to focus on the short-term outcomes of (different) childhood intervention programs.

We find that Halt reduced early school leaving by 6 percentage points and increased the educational attainment of offenders enrolled in vocational education by 9 percentage points. We do not find a statistically significant effect of Halt on grade retention.

Our findings are interesting for the current debate on whether alternative punishment programs should be implemented. It is often stated that these programs are too expensive or complex. At the same time there is no solid empirical evidence that alternative punishment programs reduce recidivism. Studies, moreover, tend to neglect that these programs pursue a greater goal and can positively affect social and educational outcomes. This study provides evidence for the Netherlands, that the alternative punishment program Halt increases educational attainment of offenders in vocational training and reduces early school leaving.

Appendix A

Figure A.1 shows for which offenses juveniles are referred to the Halt program. The first column of the figure refers to the section of the book of law, the second column refers to the offense and the third column refers to the category under which the offense falls.

Figure A.1 Halt-worthy offenses

| Section of the Law | Offense | Category |
|---------------------------------|--|------------------------|
| 141(1) Criminal Law (CL) | Public violence possessions | Demolition |
| 157 CL | Incendiaries with danger of goods (not persons) | Public safety |
| 310 CL | (shop)theft + attempt to | Crime against property |
| 311(1) (under 4th) CL | (shop)theft in association with one or more persons + attempt to | Crime against property |
| 321 CL | Fraud + attempt | Crime against property |
| 350 CL | Demolition | Demolition |
| | Graffiti | Demolition |
| 416 CL | Deliberately handling stolen goods | Crime against property |
| 417 CL | Debt handling | Crime against property |
| 326 CL | Change of price tags (fraud) | Crime against property |
| 424 CL | Reckless behavior with danger/disadvantage goods | Reckless Behavior |
| 461 CL | Trespassing | Other |
| 1.2.2 Fireworks Decree | Illegal/defective fireworks | Firework offense |
| 1.2.4 Fireworks Decree | Possession of more than 10 kg in stock | Firework offense |
| 2.3.6 Fireworks Decree | Ignite fireworks outside permitted period | Firework offense |
| General Local Regulation | Fireworks | Firework offense |
| | Reckless Behavior | Reckless Behavior |
| 72 Regulation passenger traffic | Behavior that disturbs (or can disturb) peace, safety and good order | Public safety |
| 73 Regulation passenger traffic | Ignore regulation with respect of peace, safety and good order | Public safety |

References

- Angrist, J.D. and J.S. Pischke (2009), *Instrumental variables in action: Sometimes you get what you need*, Mostly harmless econometrics: An empiricist's companion, Princeton, NJ: Princeton University Press, chapter 4, pp. 113–218.
- Austin, W. A. (2006), 'Adolescent alcohol use and educational outcomes'.
- Bala, N. and S. Anand (2004), 'The first months under the youth criminal justice act: A survey and analysis of case law.', *Canadian Journal of Criminology and Criminal Justice*. **46**(3), 251–271.
- Card, D. (1999), The causal effect of education on earnings, *in* O.Ashenfelter and D.Card,

- eds, 'Handbook of Labor Economics', Vol. 3 of *Handbook of Labor Economics*, Elsevier, chapter 30, pp. 1801–1863.
- Case, A. C. and L. F. Katz (1991), 'The company you keep: The effects of family and neighborhood on disadvantaged youth', pp. 357–364.
URL: <http://www.nber.org/papers/w3705.pdf>
- Ferwerda, H. B., I. M. G. G. van Leiden, N. A. M. Arts and Hauber A. R. (2006), *Halt: Het alternatief? de effecten van halt beschreven*, 244. Onderzoek en beleid.
- Fisher, S. (1972), 'Stigma and deviant careers in school', *Social Problems* **20**(1), 78–83.
- Goldstein, A. P. and B. Glick (1994), 'Aggression replacement training: Curriculum and evaluation.', *Simulation and Gaming* **25**(1), 9–26.
- Grant, M. J. and K. K. Hallman (2008), 'Pregnancy-related school dropout and prior school performance in kwazulu-natal, south africa', *Studies in Family Planning* **39**(4), 369–382.
- Grogger, J. (1997), 'Local violence and educational attainment.', *Journal of Human Resources* **32**(4), 659–682.
- Hannon, L. (2003), 'Poverty, delinquency, and educational attainment. cumulative disadvantage or disadvantage saturation?', *Sociological Inquiry* **73**(4), 575–594.
- Heckman, J. (1997), 'Instrumental variables: A study of implicit behavioral assumptions used in making program evaluations', *Journal of Human Resources* **2**(3), 441–462.
- Hinshaw, P. (1992), 'Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms.', *Psychological Bulletin* **111**(1), 127–155.
- Hirschfield, P. (2004), 'The impact of juvenile justice involvement on educational outcomes'.

- Hjalmarsson, R. (2008), ‘Criminal justice involvement and high school completion’, *Journal of Urban Economics* **63**, 613–630.
- Jacob, B.A. and L. Lefgren (2003), ‘Are idle hands the devil’s workshop? incapacitation, concentration, and juvenile crime’, *American Economic Review* **93**(5), 1560–1577.
- Johnson, S. (2003), ‘Custodial remand in Canada, 1986/87 to 2000/01’, **23**(4).
- Le, A.T., P.W. Miller, A.C. Heath and N. Martin (2005), ‘Early childhood behaviors, schooling, and labor market outcomes: estimates from a sample of twins’, *Economics of Education Review* **24**, 1–17.
- Lochner, L. and E. Moretti (2004), ‘The effect of education on crime: Evidence from prison inmates, arrests, and self-reports’, *American Economic Review* **94**(1), 155–189.
- Lynskey, M. and W. Hall (2000), ‘The effect of adolescent cannabis use on educational attainment: a review’, *Addiction* **95**(11), 1621–1630.
- Machin, S.J., O. Marie and S. Vujic (2011), ‘The crime reducing effect of education’, *The Economic Journal* **121**, 463–484.
- McLeod, J.D. and K. Kaiser (2004), ‘Childhood emotional and behavioral problems and educational attainment’, *American Sociological Review* **69**(5), 636–665.
- McMillen, B., K. Snyder, A. Barefoot and A. Bernholc (2002), Alternative learning programs evaluation: 2000-2001, Public Schools of North Carolina.
URL: <http://www.ncpublicschools.org/docs/data/reports/alp-evaluation00-01.pdf>
- Miers, D., M. Maguire, Sh. Goldie, K. Sharpe, Ch. Hale, A. Netten, S. Uglow, K. Doolin, A. Hallam, J. Enterkin and T. Newburn (2001), An exploratory evaluation of restorative justice schemes, number 9 in ‘Crime Reduction Research Series Paper’, Home Office Research, Development and Statistics Directorate (UK).

- Mincer, J. (1989), 'Human capital and the labor market: a review of current research', *Educational Researcher* **18**, 27–34.
- Ministry of Education, Culture and Science (2012), 'The approach to early school leaving'.
- Moon, S. H. (2010), 'Multi-dimensional human skill formation with multi-dimensional parental investment'. Unpublished manuscript.
- OECD (2010), 'Pisa 2009 results: What makes a school successful? - resources, policies and practices (volume iv)'.
- Reid, Sue Titus (2011), *Crime and Criminology. - Third Edition*, Oxford University Press.
- Reynolds, A. J., E . Mann, W. Miedel and P. Smokowski (1997), The state of early childhood intervention: Effectiveness, myths, and realities, new directions, 19 edn, Focus: Newsletter of the University of Wisconsin Institute for Poverty, chapter 1, pp. 5–11.
- Sallybanks, J. (2003), 'What works in reducing young people's involvement in crime: Aic report and literature review: Review of current literature on youth crime prevention, chief minister's department, canberra.'
- Schulz, K. F. and D. Grimes (2002), 'Allocation concealment in randomised trials: defending against deciphering', *The Lancet* **359**, 614–618.
- Shonkoff, J. P. and S. J. (edit.) Meisels (2000), Handbook of early childhood. second edition, The press syndicate of the university of Cambridge.
- Soule, D., S. Gottfredson and E. Bauer (2008), 'It's 3 p.m. do you know where your child is - a study on the timing of juvenile victimization and delinquency', *Justice Quarterly* **25**(4), 623–646.

- Stock, J.H. and M. Yogo (2005), *Testing for weak instruments in linear IV regression*, Identification and inference for econometric models: Essays in honor of Thomas Rothenberg, Cambridge: Cambridge University Press, chapter 5, pp. 80–108.
- Thornton, A. and P. Lee (2000), ‘Publication bias in meta-analysis: its causes and consequences’, *Journal of Clinical Epidemiology* **53**, 207–216.
- Utting, D., J. Bright and C. Henricson (1993), *Crime and the family. improving child-rearing and preventing delinquency*, London: Family Policy Studies Centre.
- Vignaendra, S. and J. Fitzgerald (2006), ‘Reoffending among young people cautioned by police or who participated in a youth justice conference’, *Contemporary Issue in Crime Justice* (103).
- Webbink, D., P. Koning, S. Vujic and Martin N. G. (2012), ‘Why are criminals less educated than non-criminals? evidence from a cohort of young australian twins’, *The Journal of Law, Economics, and Organization* **28**(2).
URL: <http://jleo.oxfordjournals.org/content/early/2012/04/29/jleo.ews014.full.pdf+html>
- Wikstrom, P. O. and R. Loeber (2000), ‘Do disadvantaged neighborhoods cause well-adjusted children to become adolescent delinquents?’, *Criminology* **38**, 1109–1142.
- Witte, A. D. and R. Witt (2002), *Crime causation: Economic theories*. encyclopedia of crime and justice,, Vol. 1., New York: Macmillan.
- Wooldridge, J.M. (2009), *Instrumental variables and two stage least squares*, Introductory econometrics: A modern approach, 4 edn, Mason, OH: South-Western Cengage Learning, chapter 15, pp. 506–545.
- Yearwood, D. L., J. Abdum-Muhaymin and P. Jordan (2002), *North carolina’s alternative learning programs: An evaluation of juvenile structure day programs for suspended and*

expelled youth, Governor's Crime Commission - North Carolina Criminal Justice Analysis Center.

URL: *<http://www.gcc.state.nc.us/pubs/alp.pdf>*

Yoshikawa, H. (1995), Long-term effects of early childhood programs on social outcomes and delinquency, Vol. 5, pp. 51-75.