

# The welfare/incarceration trade-off in the Netherlands

By Hugo Hanema (4256646)

Supervisor: Weverton Barbosa Machado

Second reader: Lucas Drouhot

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## **Abstract**

Several studies have shown a negative relation between the level of welfare provisions and the incarceration rate in countries or states. This effect is referred to as the “welfare/incarceration trade-off”, and the theoretical explanation of it centers around the idea that welfare and incarceration are related in that they are opposing ways of governing the socially marginal. No studies so far have investigated the welfare/incarceration trade-off in the Netherlands, specifically. Using time-series regression, the extent to which there has been an association between the growth and subsequent decline of the Dutch welfare state and changing incarceration rates since 1960 is estimated. Results show an asymmetrical effect. Increasing welfare was found to be associated with decreasing incarceration. Decreasing welfare was also found to be associated with decreasing incarceration, though this effect was weaker. The results thus indicate that a welfare/incarceration trade-off occurred in the Netherlands during times of increasing welfare, but not during times of welfare retrenchment.

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## Introduction

Welfare and incarceration seem, at first glance, two unrelated social phenomena. However, they may be more closely connected than one might think. Theoretical explanations of the relation between welfare and incarceration have centered around the idea that these are connected in the sense that they are both ways of governing the socially marginal. ‘Socially marginal’ here refers to people who are unable to fully participate in society, for whatever reason. Often this means people who are unable to find employment, but the term may also refer to people who have committed crimes or who are stigmatized for other reasons. The basic premise is that the socially marginal can be governed either in an exclusionary or inclusionary manner. Exclusionary regimes stigmatize the socially marginal and portray them as undeserving and unreformable, whereas inclusionary regimes attempt to address the root causes of social marginality, while improving the position of the socially marginal and integrating them into broader society. As was also argued by Greenberg and West (2001), incarceration separates an individual from society and is thus a means to exclude as well as to punish. Welfare, on the other hand, is a prime example of an inclusionary policy, as it improves the position of impoverished people and provides them with the means that are necessary to participate.

From this it would follow that if a country or state shifts over time from being more inclusionary towards being more exclusionary, both welfare would be reduced and the incarceration rate would increase, and vice versa. Sutton (2000) termed this effect the “welfare/imprisonment trade-off” – although the term ‘incarceration’ may have been more appropriate than ‘imprisonment’, as the phenomenon also relates to people who are kept in jail.

Several studies have found evidence of this trade-off effect. These studies controlled for other relevant variables including the crime rate, thus precluding the possibility that changes in

welfare influence the incarceration rate through changes in the crime rate. However, none of the studies that have been conducted so far focused on the Netherlands, in particular. There is reason to believe that a welfare-imprisonment trade-off may have happened in the Netherlands. The incarceration rate sharply increased from the mid-1970s until the mid-2000s, whereas welfare measures grew until the early 1980s, after which welfare retrenchment was enacted. In fact, both of these developments were unusually strong, compared to other countries. Using time-series data, I will investigate whether a welfare/incarceration trade-off has occurred in the Netherlands.

### **Ethical statement**

The study is approved by the Ethical Review Board of the Faculty of Social and Behavioral Sciences of Utrecht University. The approval is based on the documents sent by the researcher as requested in the form of the Ethics committee and filed under number 23-1422.

### **Theory**

#### **Policy regimes and the welfare/incarceration trade-off**

Garland (1985) observed that already in the 19<sup>th</sup> century, the British government simultaneously expanded social benefits and lessened the severity of the penal system as a means to quell unrest among the working class. A statistical connection between welfare and incarceration was first found by Sutton (2000), who remarked that the existence of this relationship had long been suspected but had never been empirically demonstrated. Sutton used longitudinal data from the period of 1955 up to and including 1985 from Australia, Canada, New Zealand, the United Kingdom and the United States and found that the effect was significant across the sample, but most strongly so in the United States. Greenberg and West (2001) also found evidence of this

effect, using data from the U.S. from the period 1971-1991. Downes and Hansen (2006) studied the welfare/incarceration trade-off in 18 OECD countries in the time period of 1987 up to and including 1998. Social spending was found to significantly predict the incarceration rate. Additionally, they found that the relationship is different in magnitude between different countries. Stucky et al. (2007) provided evidence for the welfare/incarceration trade-off in the U.S. taking not the incarceration rate as the dependent variable, but rather state expenditure on “corrections” from 1980 through 1998. Again welfare was found to negatively predict corrections expenditure.

Beckett and Western (2001) had also found that welfare and penal policies are intertwined. They explained their findings by reasoning that the concurrent reduction in welfare spending and increase in the incarceration rate are indicative of the rise of an “alternative mode of governance” which replaces rehabilitation and welfarism with exclusion and punishment in the approach to governing social marginality. They refer to Esping-Anderson (1990), who coined the term “policy regime”, which is defined as “a clustering of particular kinds of social and economic policies in 20<sup>th</sup> century welfare states.” The idea is that welfare and penal policies are both part of a singular policy regime, which falls somewhere on a spectrum of inclusivity on the one end and exclusivity on the other, and which may shift along this spectrum over time. More support for this policy regime hypothesis was found by Rodríguez-Menés and López-Riba (2020), who studied incarceration in Europe in connection to the 2008 economic crisis. They hypothesized that this economic crisis would have increased incarceration rates due to rising crime as a result of worsened living conditions and higher levels of punitiveness, but that these effects would be moderated by states’ welfare and criminal justice systems. These effects were expected to be stronger in the Anglo-Saxon, South European and East European countries, which have historically emphasized punishment over welfare, and weaker in the Continental and North

European countries, which have done the opposite. Data was used from 28 countries in the period 2002-2015, in which an economic decline and subsequent recovery took place. The findings supported the hypothesis: Northern and Continental European countries were relatively lenient in their punitiveness responses, whereas the Eastern European countries were more strict and the Anglo-Saxon and South European countries even more so.

### **Mechanisms: why are welfare and incarceration part of a singular policy regime?**

There is considerable evidence to indicate that welfare and incarceration are part of a singular policy regime. However, some more in-depth analysis may be necessary to understand why this is the case, and not, instead, that policy related to welfare and incarceration are shaped independently from each other. I will now discuss the mechanisms that have been proposed to explain this connection.

#### **1. Public opinion and policy**

One possible explanation of the connection between policy on welfare and incarceration is that individual's attitudes on the two are connected, and this connection is reflected in policy through individuals' political behavior. Several studies have provided support for this explanation. Rubin (2011) investigated individual's attitudes on welfare and punishment using data from the U.S. General Social Survey from the period of 1972 to 2006. Punitiveness was found to be a significant predictor of decreased support for welfare. Rubin concludes that the welfare/incarceration trade-off that had been demonstrated on the macro level also "strongly" exists at the individual level. Wheelock et al. (2011) furthermore hypothesized that in the U.S., attitudes on welfare and punishment would be conditioned by racial attitudes. It was again found that opposition to welfare spending significantly predicted punitiveness – however, this effect turned nonsignificant once all indicators of racial prejudice were also entered into the model. From

these findings, it was theorized that the welfare/incarceration trade-off on the individual level reflects a broader desire to exert control over marginalized groups.

The link between micro and macro level processes may, however, not be direct or immediate. Rubin (2011) found that the welfare/incarceration trade-off on the level of individual attitudes was persistent over time, but there were variations in its strength. The peaks in the strength of the relationship were concurrent with the Nixon administration and Reagan's, Clinton's and G.W. Bush's second administrations. This finding contrasts with Beckett and Western (2001), who posited that a "strong" negative relationship between welfare and penal policy did not appear until 1995. Thus it seems there is a complex interplay between public opinion, political rhetoric and policy. Rubin suggests that there is a twofold time lag between public opinion and incarceration: first a time lag between the formation of public opinion and the subsequent formation of penal policy, and second a time lag between the formation of penal policy and a noteworthy increase in the incarceration rate.

## **2. Public unrest and social control theory**

Another explanation of the connection between welfare and incarceration is offered by social control theory, which posits that, in times of unrest, states will attempt to increase their influence over the population, which may be done either by threats of punishment in case of noncompliance or by the incentive of rewards in case of compliance, but not both. Fording (2001) studied state responses to mass unrest, particularly in the context of Black insurgency in the 1960s and 1970s in the United States, and found that states often responded to mass unrest by expanding welfare measures.

Testing the external validation of Fording's study, Bleich et al. (2010) studied 'ethnic riots' in Europe, i.e. riots that had some ethnic, racial, or religious character – generally, riots that were



motivated by police repression or abuse of ethnic minorities. It was investigated whether governments would respond to the riots by measures of accommodation, such as increased welfare spending, or measures of repression. The expected inverse relation between repression and accommodation was found to be moderated by electoral incentives: right and left governments were found to be more likely to respond by repression or accommodation respectively, but only when they were secure in their electoral position. When the parties that were in power were concerned with appealing to voters in the middle of the political spectrum, the responses to the riots were more balanced between repression and accommodation. Thus, this mechanism only seems to operate under particular political and electoral circumstances.

### **3. Trust and legitimacy**

Another mechanism of the connection between welfare and incarceration may be that norm-compliance must be enforced through deterrence when it cannot be upheld through trust and legitimacy. Garland (1996) observed that “weak political regimes” have been more inclined towards punitiveness than strong ones. Strong welfare states have higher institutional trust and legitimacy (Lappi-Seppälä, 2008). Thus an underlying mechanism of the welfare/incarceration trade-off may be that decreased welfare would lead to decreased trust and legitimacy, which may in turn lead to increased incarceration. Lappi-Seppälä (2008) has argued that low incarceration rates are a consequence of increased acceptance and trust in the legitimacy of political institutions, thus decreasing the necessity to resort to punishment to force compliance. Scandinavia and Switzerland have both exceptionally high levels of institutional trust and exceptionally low levels of incarceration, whereas the rise of more punitive policies in the U.S. and the U.K. was connected to a loss in public confidence, and a loss in public confidence has been described as a leading cause of increased punitiveness in New Zealand (Lappi-Seppälä, 2008; Lappi-Seppälä, 2011). This

perspective is similar to that of social control theory, but it is also distinct in that it does not require riots or mass public unrest to trigger a welfare/incarceration trade-off; rather, welfare retrenchment on its own may be enough.

#### **4. Political and symbolic punishment**

The level of punitiveness in a given society at a given time is often viewed as synonymous with the incarceration rate. However, this may be an oversimplification. Some evidence suggests that decreased welfare may not be related to increased incarceration rates directly, but rather through its effect on political and symbolic punishment and thus its contribution to a more punitive climate in general. Kutateladze (2011) has conceived of punitiveness as consisting of five separate dimensions, of which incarceration rate is only one, that are measured by a total of 44 criteria. The other four dimensions are political and symbolic punishments (e.g. the use of sex offender registries), punishments for acts that are perceived as immoral (e.g. prostitution), the conditions of confinement (e.g. prison overcrowding) and juvenile justice (e.g. the age up to which young people are treated less harshly by the criminal justice system). Neill et al. (2015) attempted to explain variance in the dimensions of punitiveness between the U.S. states, including welfare as one of the explanatory variables. Somewhat surprisingly in light of previous research, welfare spending was not found to predict the dimension of incarceration. It was only found to negatively predict the dimension of political and symbolic punishment. In other words, welfare spending was found to be negatively associated with forms of punishment that are salient and noticeable by the public.

#### **Does the welfare/incarceration trade-off go both ways?**

The evidence that we have seen so far supports the idea that decreased welfare is related to increased incarceration and vice versa in cross-sectional data. It may be unwarranted, however, to assume that the effect is symmetrical over time, i.e. that increased welfare over time should also

be related to decreased incarceration over time and vice versa. Instead, it may be possible that only decreased welfare over time is associated with increased incarceration but decreased incarceration occurs independently of changes in social spending, or vice versa.

There is a dearth of evidence on this question because in Europe and the U.S., incarceration rates have only begun to level out or decrease relatively recently, so there has not been much opportunity to study the causes of decreased incarceration. Some evidence was provided by Phelps and Pager (2016), who investigated the predictors of U.S. incarceration rates from 1980 to 2013, thus including a period in which the incarceration rate remained stable or declined. Welfare spending was not found to significantly predict incarceration rates. The authors do not go into possible explanations of this finding, but do point out that we should not assume that the same factors that cause the incarceration rate to rise also cause it to decline. Verma (2016) also found that in California, specifically, decarceration could not be accounted for by the same variables as incarceration, however this study did not explicitly include welfare as an explanatory variable.

### **Welfare and incarceration in the Netherlands**

To contextualize a possible welfare/incarceration trade-off in the Netherlands, I will briefly discuss the history of Dutch developments of welfare and incarceration.

*Welfare.* Following the Second World War, Dutch society enjoyed a period of increasing prosperity that lasted around three decades. Per capita income more than doubled between 1950 and 1973 and wealth became more evenly distributed (Bax, 1990). Collective and solidaristic insurance schemes were introduced by the state, resulting in the creation of a national safety net. In the 1960s, social protection came to be viewed as universal and unconditional (Van Oorschot, 2006). The advent of the welfare state was linked to depillarization, which commenced in the 1960s, as people became less reliant on pillarized organizations to provide a social safety net.

Dutch society since the ending of the Second World War until 1973 was characterized by strong social change through modernization and depillarization, while experiencing increasing economic prosperity and equality.

These trends were broken following the 1973 and 1979 oil crises. The economy entered a state of 'stagflation' and the expansion of the welfare state ceased (Van Oorschot, 2006). There was an unprecedented decrease in purchasing power, which reached its lowest point in 1985; in the same year, a record high of 22,5% of households were at risk of poverty, and income inequality increased around this period (Caminada et al., 2021). The economy started to recover around the mid-1980s, but the trend of welfare retrenchment continued (Green-Pedersen, 2001a). Benefit expenditures decreased from 27,3% of GDP in 1985 to 21,8% in 2001 (Van Oorschot, 2006). Income inequality remained stable around its level in 1990 (Caminada et al., 2021). Bos (2006) conducted an elaborate analysis of Dutch social expenditure as a percentage of GDP from 1850 through 2003 and found that it continually increased during most of the 20<sup>th</sup> century, reaching a high point of 61% in 1983, but then declined, falling to 49% in 2003. According to Bos, these developments were due in part to demographic changes, the entrance of women into the labor force and a decreasing interest rate. Government policy, however, also played a part. More strict budgetary policies, moderation of wages and cuts in social benefits and subsidies occurred. Green-Pedersen (2001a) studied welfare state retrenchment in the Netherlands from 1982 to 1998 using data on legislative changes rather than raw spending, and also concluded that a substantial level of retrenchment had taken place in this period. Unemployment benefits, old-age pensions and disability pensions were all reduced significantly. In comparative studies, welfare retrenchment was found to be stronger in the Netherlands than in Austria, Denmark and Germany (Green-Pedersen, 2001b) – in fact, Alber (1998) found that welfare retrenchment was the most severe in

the Netherlands of all rich OECD countries. An analysis by Ferragina (2022) of the period 1980 through 2015 confirmed that the trend of welfare retrenchment in the Netherlands has continued into the 2010s. Though social expenditure in the Netherlands has remained relatively high compared to other European countries, there was a strong shift of emphasis from compensatory policies (unemployment benefits, family allowances and income maintenance) to employment-oriented policies (child care and programs that are aimed at enhancing people's employability). This development was found to be especially strong in the 1990's and 2000's.

*Incarceration.* Three periods are clearly distinguishable when looking at the incarceration rate in the Netherlands. First, from 1950 up to and including 1976, the incarceration rate was low and steadily declining. This first period may be described as a period of decarceration. Nieuwbeerta (2018) described this period as one of a “continuous, structural reduction of the size of the prison system”. Not only was this a period of low incarceration rates within Dutch history, but also compared to other countries (Johnson & Heijder, 1983). Second, from 1977 up to and including 2004, the incarceration rate increased dramatically. It increased nearly sixfold from its lowest rate of in 1976 to its highest in 2004. Other European countries also experienced rising incarceration rates in this period, but the Dutch rate grew “substantially and rapidly” even relative to those other countries (Tonry & Bijleveld, 2007). According to Tonry & Bijleveld (2007), from 1977 to 2004, the Dutch incarceration rate changed with 357,41% whereas the second-largest change in Europe in the same period was 119,2% in Spain. In the third period, since 2005, the Dutch incarceration rate steadily declined again, falling well below the European median. In 2017, it was classified as “low” by the Council of Europe (Aebi & Tiago, 2018).

Presumably there is some connection between incarceration and crime rates (Aebi et al., 2015). Both the incarceration and crime rates in the Netherlands rose strongly throughout the 1970s

and 1980s, as they did in other European countries. Nevertheless, the relation between them is not straightforward. Tonry & Bijleveld (2007) point out that comparative research shows that there is not necessarily a relation between crime and incarceration. The question remains why the Netherlands has seen such a unique development in its incarceration rate, while the development of its crime rate has been similar to that of other countries (Tonry & Bijleveld, 2007).

### **Research questions and hypotheses**

From what has been discussed so far, the following is clear:

1. A welfare-incarceration trade-off has consistently been found across different countries and time periods.
2. Welfare state retrenchment has taken place in the Netherlands, especially since the 1980s, following the oil crises of the 1970s.
3. During approximately the same time as welfare retrenchment was enacted, the incarceration rate grew substantially.

Putting these facts together, we arrive at our main hypothesis:

*H1: In the Netherlands, welfare retrenchment has been associated with increasing incarceration rates.*

Furthermore, there is the question of whether the welfare/incarceration trade-off is symmetrical, i.e. whether changes in welfare are also associated with stabilizing or declining incarceration rates. The sparse evidence that is available on this question seems to indicate that this should not be the case. Therefore the second hypothesis is:

*H2: In the Netherlands, there has been no relation between increased welfare measures and stabilizing or decreasing incarceration rates.*

Finally, it should be noted that several studies (Beckett & Western, 2001; Greenberg & West, 2001; Downes & Hansen, 2006) have found that the welfare/incarceration trade-off became stronger over time. While welfare retrenchment in the Netherlands started in the 1980s, Ferragina (2022) found that welfare retrenchment in the Netherlands was especially strong in the 1990s and 2000s. Bos (2006) also showed that the reduction in spending on social insurance, in particular, as a percentage of GDP was about twice as strong between 1993 and 2003 as it was between 1983 and 1993. From this we derive our third hypothesis:

*H3: In the Netherlands, the welfare/incarceration trade-off effect became stronger over time.*

## **Methods**

### **Data**

#### **Dependent variable: the incarceration rate**

The dependent variable in this study will be the incarceration rate in the Netherlands, i.e. the number of incarcerated people held in penitentiary facilities per 100.000 citizens. Penitentiary facilities include both prisons and jails.

Long-term time series data on incarceration has not been published in any single source. Therefore, data was collected from several sources. From 1950 up to and including 1981, data on the number of people who were incarcerated was retrieved from the Central Bureau of Statistics (CBS) publication *Vijfennegentig jaren statistiek in tijdreeksen* (CBS, 1994). Only for 1974, no data was published. Therefore this value was imputed as the midpoint between the values of 1973 and 1975. For 1982 up to and including 1989, data was retrieved from the 1986 and 1990 editions of the CBS publication *Gevangenisstatistiek* (CBS, 1988, 1992). For 1990 up to and including 1999, it was retrieved from two editions of the CBS publication *Statistisch bulletin* (CBS, 1997,

2000). For 2000 up to and including 2004, it was retrieved from the 2004 edition of *Criminaliteit en rechtshandhaving* (CBS, 2005), a joint publication of the CBS and the Wetenschappelijk Onderzoek- en Documentatiecentrum (WODC). Data from 2004 up to and including 2021 was retrieved from the CBS website (CBS, 2022a). Data on the total population of the Netherlands was retrieved from the CBS website (CBS, 2022b), so that the incarceration rate could be calculated.

### **Independent variable: welfare spending**

The independent variable in this study will be welfare, measured as social expenditure as a percentage of GDP in the Netherlands. I will treat the terms ‘social’ and ‘welfare’ spending or expenditure as synonymous and interchangeable. Again, no long-term time series has been published in a single source. Instead, two data sets were used. From 1960 up to and including 1979, data on social expenditure was retrieved from *Vijfenennegentig jaren statistiek in tijdreeksen* (CBS, 1984). Total spending is reported on a range of different programs relating to social security, income support and social benefits. Spending was reported in guilders, which were converted to US dollars using exchange rates found in that same publication. Data on the GDP of the Netherlands, also in US dollars, was retrieved from the website of the World Bank (World Bank, n.d.), so that social spending as a percentage of GDP could be calculated. From 1980 up to and including 2021, a data set on social expenditure as a percentage of GDP from the OECD was used (OECD, n.d.). The OECD defined social spending as “cash benefits, direct in-kind provision of goods and services, and tax breaks with social purposes” which “may be targeted at low-income households, the elderly, disabled, sick, unemployed, or young persons”. The data set thus created was similar to Bos’s (2006) data on social expenditure in the Netherlands.



## **Control variables**

*Crime rate.* As the crime rate can be reasonably expected to have an effect on the incarceration rate, it was included as a control variable. The crime rate was operationalized as the number of registered crimes per 100.000 of the population. Data was retrieved from the CBS website (CBS, 2022c).

*Severe crime.* Aside from quantitative developments in the number of registered crimes, crime can also change qualitatively – that is, crimes may become more or less severe on average. More severe crimes are likely to result in longer prison sentences. An increase in the average length of prison sentences will have a cumulative effect, i.e. it will result in more people being in prison at a given time, even if the total number of prison sentences remained constant. No data on the length of prison sentences was available. Therefore, data was collected on ‘severe’ crime, as a proxy for sentence length. Severe crime was operationalized as the percentage of registered crimes that related to murder, manslaughter and armed robbery.

As with most variables, no long-term time series has been published in a single source. Data from 1950 up to and including 1992 was retrieved from multiple editions of the CBS publication *Criminele statistiek* (CBS, 1984) and *Criminaliteit en strafrechtspleging* (CBS, 1996). For 1993 and 1994, data was retrieved from the 2001 edition of the CBS publication *Criminaliteit en rechtshandhaving* (CBS, 2003). For 1995 up to and including 2004, data was retrieved from the 2004 edition of the CBS publication *Criminaliteit en rechtshandhaving* (CBS, 2005). For 2005 up to and including 2017, data was retrieved from the 2017 edition of the CBS publication *Criminaliteit en rechtshandhaving* (CBS, 2018).

From 1982 up to and including 1994, data on armed robbery was available but not on murder and manslaughter. Therefore data on total severe crime was imputed for this period; details

are provided in Appendix A. Furthermore, there was no data available for 1974. Therefore this value was imputed as the midpoint between the values of 1973 and 1975.

*Age.* It is a generally accepted fact in criminology that younger people tend to commit more crimes (Hirschi & Gottfredson, 1983). As the average age of the population of the Netherlands has increased considerably over the past decades, thus decreasing the proportion of the population that is young, this is relevant to control for. Data on the average age of the population from 1950 up to the present was retrieved from the CBS website (2022b).

*Dependency ratio.* The dependency ratio is the ratio of people who are of working age versus the people who are not, either because they are too young or too old. If the dependency ratio increases, all else remaining equal, we can naturally expect social expenditure as a percentage of GDP to also increase, mainly through spending on pensions (Haelg et al., 2022). Therefore changes in social expenditure as a percentage of GDP do not, in and of itself, provide a full picture of changes in government policy; the dependency ratio should also be taken into account. Data on the dependency ratio from 1950 up to the present was retrieved from the CBS website (2022b).

*Unemployment.* Unemployment is important to take into account, as it is known to affect both social spending and incarceration (Kizilgol & Selim, 2017; Haelg et al., 2022). Two data sets on the unemployment rate, i.e. unemployed people as a percentage of the total labour force, were retrieved from the CBS website. From one data set, data was retrieved for 1950 up to and including 2013 (CBS, 2014); from the other, data from 2014 up to and including 2021 (CBS, 2023).

### **Analytical strategy: time series regression**

A trade-off between welfare and incarceration might manifest in one or more of three ways: incarceration might have a negative effect on social spending, social spending may have a negative effect on incarceration, or incarceration and social spending may both be affected by a confounding

variable. In that case, incarceration and social spending would be negatively correlated – though, perhaps, asymmetrically – without one having a direct effect on the other. The first possibility, that incarceration has a negative effect on social spending, can be ruled out on theoretical grounds. No studies on the subject of social spending and incarceration have suggested the possibility of such an effect, and it is not clear through which pathways the incarceration rate could possibly have an effect on social spending. Henceforth I will assume that there is no such effect. For the second possibility, that social spending has a negative effect on the incarceration rate, there is a limited degree of theoretical support, as it has been suggested that decreased social spending decreases institutional trust and legitimacy, so that governments would be forced to uphold compliance through deterrence instead. The third possibility, that incarceration and social spending are negatively associated without one having a direct effect on the other, is the most strongly supported by the theoretical framework. A shift from a more inclusive towards a more exclusive policy regime would be a confounding variable that both increases incarceration and reduces social spending.

Regression analysis will be conducted to estimate the effect of social spending on incarceration. The regression model should be interpreted somewhat differently than usual, as my main argument is that the association between social spending and incarceration is actually due to a confounder, whereas normally one would attempt to control for confounding. Following from the argument that social spending and incarceration are related without one having a direct effect on the other, it may seem more appropriate to estimate a partial correlation, i.e. a correlation while controlling for confounders, rather than a regression coefficient. However, it should be noted that regression and partial correlation coefficients are essentially similar – they are only standardized differently. Estimating a regression rather than a correlation coefficient will allow for my results

to be more easily compared to other results from the literature. Furthermore, following from the theoretical framework, it may seem arbitrary whether the effect of social spending on incarceration is estimated or the other way around. This may be true, but again this estimation will allow my results to be more easily compared with the literature on the topic, which has consistently taken incarceration to be the dependent variable. Additionally this set-up allows for the possibility that social spending does in fact have some limited effect on incarceration, for which there is some tentative evidence.

*Stationarity.* When analyzing longitudinal data, the data should be stationary. Stated plainly, this means that the data should not display any particular trend over time, such as a downward or upward trend or a cyclical pattern. If the data is nonstationary, spurious correlations can arise simply due to the fact that the respective variables followed the same general trend over time. To ensure that the data was stationary, all variables were first-differenced, meaning that with all variables the differences in the values from one year to the next were analyzed, rather than the raw values.

*Time lags.* The incarceration rate may not respond immediately to changes in social spending or any of the covariates. The independent variables may therefore have to be lagged, meaning that the change in the incarceration rate between year  $t$  and year  $t - 1$  will be predicted by the change in a given independent variable between year  $t - a$  and  $t - a - 1$ .

The question is, then, what value of  $a$  should be used, i.e. by how many years the independent variable should be lagged. Jacob and Helms (1996) have conducted a time-series analysis of prison admission rates in the US. They lagged all predictors by one year, except the variable for out-of-wedlock births, which was lagged by 19 years, as people who were born out of wedlock would not be incarcerated until their late teens or early twenties. Sutton (2000) included

lagged variables in a time-series analysis of incarceration rates. Most independent variables, including welfare spending, were lagged by three years. Jacobs and Helms (2001) also used time-series regression to investigate the incarceration rate. They lagged some independent variables by one year and others by two years. They argue that their measure of economic stratification should be lagged by two years because that best reflects the time it would take for economic pressures to result in public concern, and for this concern to influence policy. Variables related to politics were lagged by one year in this study, for which, it is argued, there is precedent in political sociology. The crime rate was lagged by two years.

Although ideally the decision by how many years to lag the variables should be based on theory, it needs to be noted that previous research has involved experimentation and, arguably, some educated guesses. Jacob and Helms's (1996) decision of a one-year lag was based on the fact that "other lags produced weaker results", and the 19-year lag for the variable for out-of-wedlock births was based not only on a theoretical consideration but also on the observation that this lag "did best" in the regression analysis. Sutton (2000) decided on three-year lags because shorter lags produced weaker results. Jacob and Helms (2001) did not provide an argumentation on why they decided on a two-year lag for the crime rate.

I will make estimations with two sets of lags. The first set of lags will be based on precedents in the literature. I will follow Sutton (2000) in including a three-year lag for social spending. The dependency ratio will then include a three-year lag as well. The point of including the dependency ratio, after all, is to estimate the effect of changes in social spending on the incarceration rate while controlling for changes in the dependency ratio, as, all else remaining equal, social spending would naturally increase as the dependency ratio increases. Therefore the changes in social spending and the dependency ratio should have the same lags. I will include a

three-year lag for the proportion of males and the average age of the population, following Sutton (2000), who lagged a variable for the proportion of young males in the population with this amount. I will follow Jacob and Helms (2001) in including a two-year lag for the crime rate. The variable for the severity of crime will thus also be lagged by two years. Unemployment will be lagged by two years, following Jacob and Helms's (2001) reasoning that variables related to economic pressures should be lagged by this amount.

The second set of lags will be based on precedents in the literature supplemented by my own observation of the data. The first set of lags presupposes that, following a policy regime shift, social spending changes first and the incarceration rate changes later. However, this may not be the case. It is possible that the incarceration rate responds to a regime shift sooner than social spending. The data shows that the incarceration rate in the Netherlands started rising consistently in 1979: from this year until 1997, it rose every year. Social spending started to decline in 1983: with the exception of a temporary bump from 1989 up to and including 1992, social spending declined every year from 1983 to 2000. Thus the data indicates that social spending would respond to a policy regime change four years later than incarceration, suggesting that it would be appropriate to include a four-year lag for the dependent variable, incarceration. As I have argued above, age, the crime rate, crime severity and unemployment should be lagged with either two or three years with respect to incarceration, thus in this model these should be lagged six or seven years in total. Social spending will not be lagged in this model, and therefore the dependency ratio will not be either. It may seem counterintuitive to estimate a regression model where the 'effect', i.e. the dependent variable, comes first and the 'cause', i.e. the independent variable, comes later. However, it should again be emphasized that I am not using regression here to estimate a cause-effect relationship – rather, the point is, essentially, to show a partial correlation.

*Autocorrelation.* Autocorrelation, particularly positive auto-correlation, is a common problem in time-series regression. If the dependent variable is predicted by previous values of itself, the residuals will be positively correlated. To correct for this, the dependent variable lagged by one year will be included as an independent variable. In this I follow Sutton (2000) and Greenberg and West (2001), although Sutton lagged the dependent variable by three years.

*Asymmetry of the effect.* The second hypothesis states that the association between social spending and incarceration should be asymmetrical, i.e. that decreased social spending should correspond to increased incarceration but the reverse should not be the case. I will follow the procedure proposed by York and Light (2017) to assess the asymmetry of the effect. They recommend to compute something akin to a dummy variable, namely a variable which equals zero when the change in the relevant variable is either positive or negative – in my case, positive – and which otherwise simply equals the value of that variable. If the effect of this variable is found to be significant it would indicate asymmetry, as the magnitude of the effect would then be shown to be different when the effect only moves in one particular direction, rather than when moving in both directions. The slope of the bidirectional effect of  $x$  and  $y$  then, as usual, equals the coefficient of the effect of  $x$  on  $y$ , whereas the slope of the effect of only either a positive or negative change in  $x$  on  $y$  is given by the sum of the coefficients of the regular variable and the ‘dummy’ variable.

*Moderation: the strength of the effect over time.* The third hypothesis states that the effect of social spending on incarceration should become stronger over time. This means time would be a moderator. A moderation variable was calculated as the centered time variable, i.e. the variable indicating from which year a set of observations were taken, multiplied by the centered first-differenced social spending variable. Moderation effects calculated from centered variables have been demonstrated to be functionally equivalent to moderation effects calculated from the

unmodified data, while having the advantage of reduced multicollinearity (Kromrey & Foster-Johnson, 1998).

### Specification of the models

First a symmetrical effect will be estimated and then an asymmetrical effect. The models will be estimated first without and then with the moderation effect. Thus, the models will be specified as follows:

$$(1a) \quad d(\text{incarceration}) = b_0 + b_1[d(\text{incarceration})_{t-1}] + b_2[d(\text{social spending})_{t-3}] + b_3[d(\text{dependency ratio})_{t-3}] + b_4[d(\text{average age})_{t-3}] + b_5[d(\text{crime rate})_{t-2}] + b_6[d(\text{percentage of crime that was severe})_{t-2}] + b_7[d(\text{unemployment})_{t-2}] + e$$

$$(1b) \quad d(\text{incarceration}) = b_0 + b_1[d(\text{incarceration})_{t-1}] + b_2[d(\text{social spending})_{t-3}] + b_3[d(\text{dependency ratio})_{t-3}] + b_4[d(\text{average age})_{t-3}] + b_5[d(\text{crime rate})_{t-2}] + b_6[d(\text{percentage of crime that was severe})_{t-2}] + b_7[d(\text{unemployment})_{t-2}] + b_8[d(\text{social spending})_{t-3} * \text{time}] + e$$

$$(1c) \quad d(\text{incarceration}) = b_0 + b_1[d(\text{incarceration})_{t-1}] + b_2[d(\text{social spending})_{t-3}] + b_3[d(\text{negative social spending})_{t-3}] + b_4[d(\text{dependency ratio})_{t-3}] + b_5[d(\text{average age})_{t-3}] + b_6[d(\text{crime rate})_{t-2}] + b_7[d(\text{percentage of crime that was severe})_{t-2}] + b_8[d(\text{unemployment})_{t-2}] + e$$

$$(1d) \quad d(\text{incarceration}) = b_0 + b_1[d(\text{incarceration})_{t-1}] + b_2[d(\text{social spending})_{t-3}] + b_3[d(\text{negative social spending})_{t-3}] + b_4[d(\text{dependency ratio})_{t-3}] + b_5[d(\text{average age})_{t-3}] + b_6[d(\text{crime rate})_{t-2}] + b_7[d(\text{percentage of crime that was severe})_{t-2}] + b_8[d(\text{unemployment})_{t-2}] + b_9[d(\text{positive social spending})_{t-3} * \text{time}] + e$$



$$(2a) \quad d(\text{incarceration})_{t-4} = b_0 + b_1[d(\text{incarceration})_{t-5}] + b_2[d(\text{social spending})] + b_3[d(\text{dependency ratio})] + b_4[d(\text{average age})_{t-7}] + b_5[d(\text{crime rate})_{t-6}] + b_6[d(\text{percentage of crime that was severe})_{t-6}] + b_7[d(\text{unemployment})_{t-6}] + e$$

$$(2b) \quad d(\text{incarceration})_{t-4} = b_0 + b_1[d(\text{incarceration})_{t-5}] + b_2[d(\text{social spending})] + b_3[d(\text{dependency ratio})] + b_4[d(\text{average age})_{t-7}] + b_5[d(\text{crime rate})_{t-6}] + b_6[d(\text{percentage of crime that was severe})_{t-6}] + b_7[d(\text{unemployment})_{t-6}] + b_8[d(\text{social spending} * \text{time})] + e$$

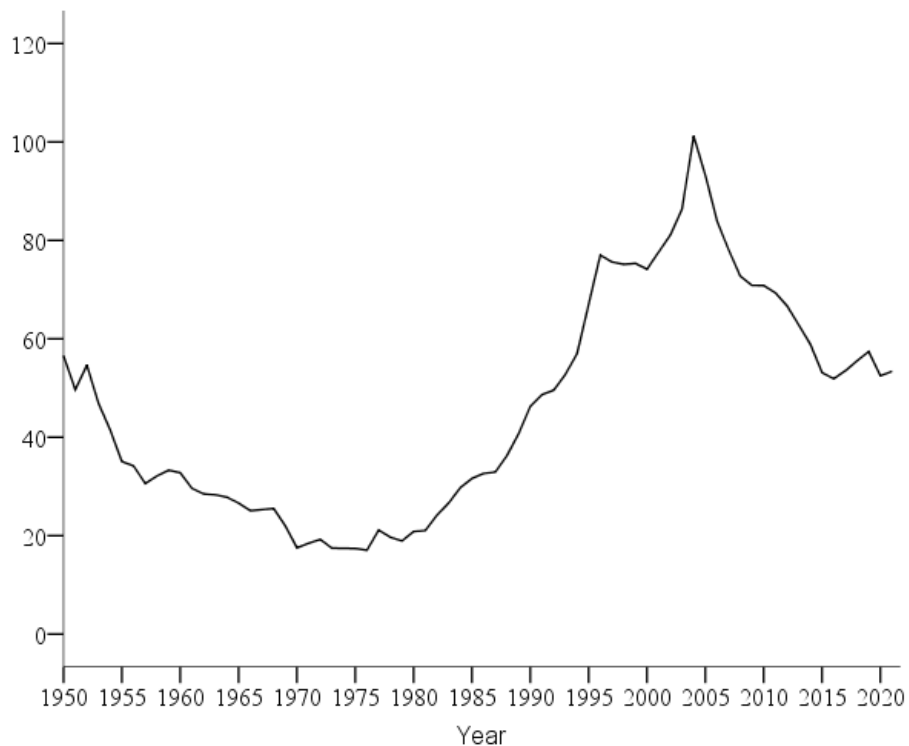
$$(2c) \quad d(\text{incarceration})_{t-4} = b_0 + b_1[d(\text{incarceration})_{t-5}] + b_2[d(\text{social spending})] + b_3[d(\text{negative social spending})] + b_4[d(\text{dependency ratio})] + b_5[d(\text{average age})_{t-6}] + b_6[d(\text{crime rate})_{t-6}] + b_7[d(\text{percentage of crime that was severe})_{t-6}] + b_8[d(\text{unemployment})_{t-6}] + e$$

$$(2d) \quad d(\text{incarceration})_{t-4} = b_0 + b_1[d(\text{incarceration})_{t-5}] + b_2[d(\text{social spending})] + b_3[d(\text{negative social spending})] + b_4[d(\text{dependency ratio})] + b_5[d(\text{average age})_{t-7}] + b_6[d(\text{crime rate})_{t-6}] + b_7[d(\text{percentage of crime that was severe})_{t-6}] + b_8[d(\text{unemployment})_{t-6}] + b_9[d(\text{positive social spending} * \text{time})] + e$$

Note that “ $d(\text{variable})$ ” refers to the value of the variable in year  $a$  minus the value of the variable in year  $a - 1$ . Thus, “ $d(\text{variable})_{t-x}$ ” refers to the value of the variable in year  $a - x$  minus the value of the variable in year  $a - x - 1$ .

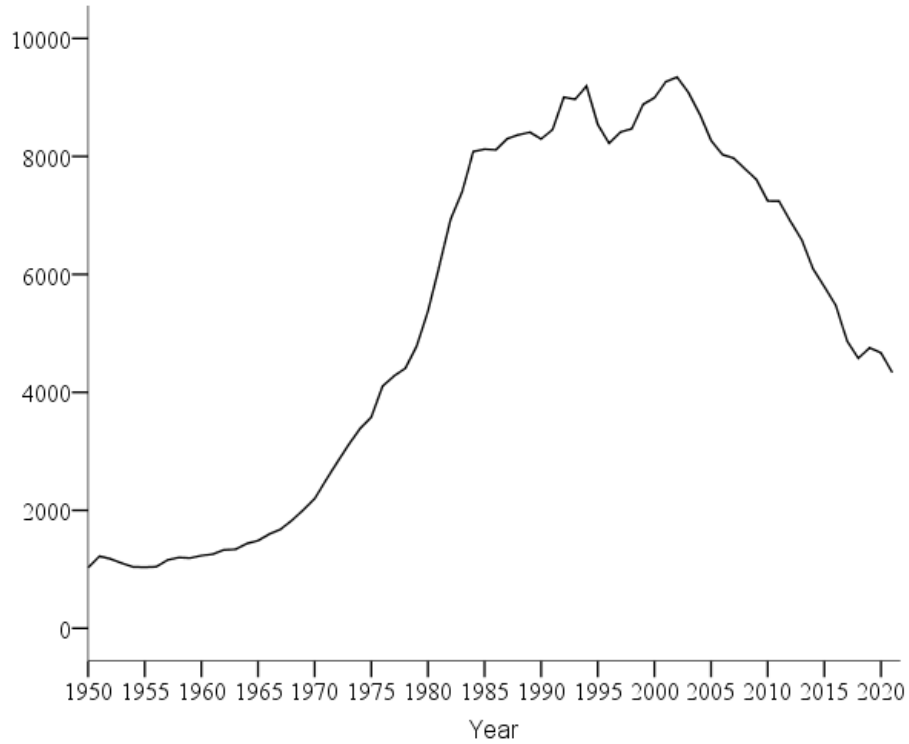
## Results

### Descriptive statistics



*Figure 1.* The incarceration rate of the Netherlands, 1950-2021.

*Incarceration, crime and welfare spending.* Figure 1 shows the incarceration rate over time. The three periods that have been described are clearly visible. The incarceration rate decreased from 56,6 in 1950 to its lowest recorded point of 17,0 in 1976. In the second period, the incarceration rate grew from 21,1 in 1977 to its highest recorded point of 101,2 in 2004. In the third period, the incarceration rate decreased again. From 93,2 in 2005, it declined to 53,4 in 2021.



*Figure 2.* The crime rate of the Netherlands, 1950-2021.

Figure 2 shows the crime rate over time. At 1,03, the crime rate was the lowest at the beginning of the time series in 1950. From there it grew consistently until reaching 8,12 in 1985. It then remained relatively stable until reaching a peak of 9,35 in 2002, and then steadily declined, reaching 4,34 by the end of the time series in 2021.



*Figure 3.* Welfare spending as a percentage of GDP of the Netherlands, 1960-2021.

Figure 3 shows welfare spending as a percentage of GDP over time. From its lowest point of 10,70% at the beginning of the time series in 1960, it rose steadily to 24,92% in 1974. A few years later, in 1984, it reached its highest point of 25,39%. Since then it has generally trended downwards, reaching 18,67% by the end of the time series in 2021.

*Other descriptive statistics.* Descriptive statistics for the remaining variables are displayed in Table 1. All reported statistics are for the time period of 1950 up to and including 2021 ( $N = 72$ ), with the exception of the percentage of crime that was severe, for which data was available only from 1950 up to and including 2017 ( $N = 68$ ).

It is notable that the average age of the population of the Netherlands increased substantially, from 30,8 in 1950 to 42,3 in 2021. The dependency ratio changed correspondingly. It reached its highest point of 90,4 in 1966, after which it dropped to its lowest point of 60,1 in 1994. Since then, it has been rising again, reaching 70,1 in 2021. Unemployment was particularly

high in the early 1980s, reaching its peak of 10,7% in 1983. The percentage of crime that was severe rose consistently until its peak of 0,45% in 2004, after which it declined again, reaching 0,32% in 2016.

Variable	<i>M</i>	<i>SD</i>	Minimum (in year)	Maximum (in year)
Average age of the population	35,8	3,61	30,8 (1950)	42,3 (2021)
Dependency ratio	73,3	10,63	60,1 (1994)	90,4 (1966)
Unemployment	10,72%	2,68%	0,83% (1964)	10,7% (1983)
Percentage of crime that was severe	0,20%	0,13%	0,06% (1963)	0,45% (2004)

*Table 1.* Descriptive statistics of the average age of the population, dependency ratio, unemployment and the percentage of crime that was severe.

Prior to conducting the data analyses, all variables were first-differenced to ensure stationarity. Descriptive statistics of the first-differenced variables are displayed in Table 2.

Variable	<i>M</i>	<i>SD</i>	Minimum	Maximum
d(social spending)	0,13	0,98	-3,48	2,60
d(incarceration rate)	-0,05	0,42	-0,93	1,49
d(crime rate)	0,05	0,30	-0,65	0,79
d(percentage of crime that was severe)	-0,00	0,05	-0,32	0,14
d(average age of the population)	0,16	0,08	0,0	0,3

d(dependency ratio)	-0,17	0,82	-2,1	1,2
d(unemployment)	0,03	0,80	-1,46	2,48

Table 2. Descriptive statistics of all first-differenced variables.

### Results of the data analyses

Table 4 displays the results of the models with the first set of lags. The dependent variable is d(incarceration). The unstandardized *b*-coefficients are reported. Not all data was available for every year and listwise deletion was applied, so that these estimates are based on the time period of 1964 up to and including 2020.

Effect	Estimate ( <i>SE</i> )			
Model	(1a)	(1b)	(1c)	(1d)
(Constant)	-,035 (,126)	,009 (,139)	,100 (,133)	,083 (,137)
d(incarceration) <sub><i>t</i>-1</sub>	,376** (,127)	,363** (,128)	,356** (,121)	,365** (,123)
d(social spending) <sub><i>t</i>-3</sub>	-,045 (,060)	-,066 (,066)	-,241* (,088)	-,256* (,104)
d(negative social spending) <sub><i>t</i>-3</sub>	-	-	,356* (,150)	,421* (,182)
d(dependency ratio) <sub><i>t</i>-3</sub>	,014 (,081)	,022 (,082)	,001 (,078)	-,008 (,080)
d(average age) <sub><i>t</i>-3</sub>	,256 (,672)	,134 (,694)	,178 (,643)	,281 (,667)

d(crime rate) <sub>t-2</sub>	,487*	,521*	,532**	,508*
	(,203)	(,209)	(,195)	(,200)
d(percentage of crime that was severe) <sub>t-2</sub>	,821	,690	,907	1,047
	(1,003)	(1,021)	(,959)	(,990)
d(unemployment) <sub>t-2</sub>	-,057	-,069	-,051	-,038
	(,068)	(,070)	(,065)	(,069)
d[(social spending) <sub>t-3</sub> *time]	-	,003	-	-
		(,004)		
d[(negative social spending) <sub>t-3</sub> *time]	-	-	-	-,003
				(,005)
R <sup>2</sup>	,330	,338	,401	,406

Table 4. Results of the models with the first set of lags. Notes: \* $p < .05$ , \*\* $p < .01$ .  $N = 57$ .

Models 1a and 1b did not find a significant effect of social spending, indicating that no symmetrical effect of social spending on incarceration was present. However, models 1c and 1d found significant coefficients for both the regular social spending variable and the variable for negative changes in social spending, indicating the presence of an asymmetrical effect. Furthermore only the lagged version of the incarceration rate and the crime rate were found to significantly predict the incarceration rate.

Table 5 displays the results of the models with the second set of lags. The dependent variable is  $d(\text{incarceration})_{t-4}$ . The unstandardized  $b$ -coefficients are reported. Estimates are based on the time period of 1961 up to and including 2017.

Effect	Estimate (SE)			
Model	(2a)	(2b)	(2c)	(2d)
(Constant)	,024 (,107)	,009 (,119)	,034 (,132)	,034 (,135)
d(incarceration) <sub>t-5</sub>	,384** (,133)	,388** (,135)	,387** (,137)	,387** (,139)
d(social spending)	-,093 (,048)	-,086 (,055)	-,103 (,087)	-,102 (,088)
d(negative social spending)	-	-	,019 (,142)	,018 (,169)
d(dependency ratio)	,032 (,068)	,029 (,069)	,030 (,069)	,030 (,071)
d(average age) <sub>t-7</sub>	-,045 (,584)	,013 (,621)	-,064 (,608)	-,067 (,652)
d(crime rate) <sub>t-6</sub>	,475* (,194)	,460* (,203)	,473* (,197)	,474* (,205)
d(percentage of crime that was severe) <sub>t-6</sub>	-1,417 (1,968)	-1,456 (1,990)	-1,481 (2,045)	-1,480 (2,067)
d(unemployment) <sub>t-6</sub>	-,058 (,057)	-,056 (,058)	-,059 (,059)	-,059 (,060)



d[(social spending)*time]	-	-,001	-	-
		(,003)		
d[(positive social spending)*time]	-	-	-	,000
				(,007)
$R^2$	,374	,376	,375	,375

Table 5. Results of the models with the second set of lags. Notes: \* $p < ,05$ , \*\* $p < ,01$ .  $N = 61$ .

No significant effects of social spending in any way were found. The asymmetrical and moderation effects were all found to be nonsignificant. Again, only the lagged version of the incarceration rate and the crime rate were found to significantly predict the incarceration rate.

### Assumptions

*Normality of the residuals.* Kolmogorov-Smirnov tests were conducted to check whether the residuals were normally distributed. The Kolmogorov-Smirnov is appropriate when  $n \geq 50$  (Mishra et al., 2019). Models 1a, 1b and 2b were found to have non-normally distributed residuals ( $p > ,05$ ).

*Multicollinearity.* VIF and tolerance statistics were calculated to check for multicollinearity. Bowerman & O'Connell (1990) suggest that a tolerance statistic below ,1 is cause for concern. Menard (2002), more conservatively, suggest that values below ,2 are cause for concern. No values below ,2 were present, indicating that multicollinearity was not an issue.

*Autocorrelation.* The Durbin-Watson statistics fell between 2 and 2,3, indicating that autocorrelation was likely not an issue. However, it should be noted that the interpretation of this statistic is complicated when a lagged version of the dependent variable is included as an independent variable.

*Homoscedasticity.* Breusch-Pagan tests for homoscedasticity were conducted. All models were found to be heteroscedastic ( $p < ,05$ ).

*Stationarity.* Phillips-Perron tests were conducted to check whether the first-differenced variables were stationary. This was confirmed to be the case ( $p < ,01$ ) for all variables, except for the dependency ratio, which was still nonstationary ( $p = ,878$ ).

## **Discussion**

### **Interpretation of the results and historical context**

When incarceration is lagged by four years with respect to social spending, the results show no association between social spending and incarceration. It is notable that the symmetrical effect of social spending found in model 2a trended towards significance ( $p = ,059$ ), and was found to be significant when the dependency ratio was not included as a covariate. As there are theoretical reasons why the dependency ratio should be included and the coefficient is, after all, nonsignificant, I will not comment on this any further, but I provide results of all models without inclusion of the dependency ratio in Appendix B and leave it up to the reader to infer their own conclusions.

When social spending is lagged by three years with respect to incarceration, the results suggest that changes in social spending are asymmetrically related to changes in incarceration. The symmetrical effect was found to be negative and significant in models 1c and 1d, indicating that decreased social spending is associated with increased incarceration and vice versa. However the effect of, specifically, decreases in social spending was also found to be significant, indicating asymmetry. The effect of decreases in social spending should be understood as the sum of the coefficients of the regular variable and the coefficient of the asymmetrical variable, so, for example,  $b = ,356 - ,241 = ,115$  following from model 1c. This value is positive, indicating that when social

spending decreases, the incarceration rate decreases. It is also smaller than ,356, indicating that this effect is weaker than the decrease in the incarceration rate when social spending increases. Stated plainly, increased social spending was found to be relatively strongly associated with decreased incarceration, whereas reduced social spending was relatively weakly associated with reduced incarceration. The effect of social spending thus indeed seems asymmetrical, but in the opposite direction than was hypothesized: actually it is decreasing incarceration rates that are most strongly associated with changes in social spending.

The real-world meaning of this result is not immediately obvious; some historical context is needed to explain it. A first clue may be provided by Bleich et al.'s (2010) finding that policy regimes tend to be consistently focused on either accommodation or repression in times of electoral security but more balanced in the absence of such security. In the Netherlands, the Christian democratic parties were highly secure in their electoral position (Green-Pedersen, 2001a) in the first decades after the Second World War. Even though they formed coalitions with parties both to the left and to the right of them, the security in their electoral position combined with economic prosperity seems to have guaranteed that the policy regime remained centered on "accommodation". In this period, penal policy in the Netherlands was shaped around the idea that, through the social sciences and welfare services, society should be reformed to reduce the need of individuals to resort to crime, and those who did resort to crime should be resocialized (Downes & Van Swaaningen, 2007). This inclusionary policy regime seems to have consistently 'traded off' incarceration in favour of welfare, which may explain why we see a strong relation between increased welfare and decreased incarceration.

However, the oil crises and the fumbling responses to it endangered this electoral security (Green-Pedersen, 2001a). Around the same time, left-leaning parties, particularly the Labour Party

(PvdA), were moving towards the center in order to increase their chances of governing (Marx & Schumacher, 2013). This shift of more traditional social democracy towards the center is known as ‘Third Way’ social democracy. The Third Way paradigm is centered around job creation, active labour market policies and labour market participation, macro-economic stability and wage moderation (Green-Pedersen et al., 2001). As such, it was less amenable to the traditional ideal of the welfare state – in the words of Green-Pedersen et al., the Third Way was about “turning welfare into work”. Given that the Third Way aims to find compromises between the political left and right, it is perhaps not surprising that it also entails a mixed stance on crime and punishment. In an exploration of the Third Way stance on penal policy, Annison (2014) shows that the Third Way approach towards crime and punishment contains both rehabilitative and eliminatory elements – it aims to be both “tough on crime and tough on the causes of crime”. Annison states that Third Way politicians are motivated both by a desire to rehabilitate offenders, but also by a desire to protect the public from potentially dangerous offenders through incarceration. That Third Way-style social democracy came to prominence during a time of welfare retrenchment in the Netherlands combined with the fact that it does not take a principled stance on being either consistently inclusionary or exclusionary, may explain why no trade-off effect was found between decreased welfare and increased incarceration.

It is not clear, however, how this interpretation should be reconciled with the findings of Staff and Wenzelburger (2021), who studied legislative events in Denmark, Germany, the United Kingdom, France and Denmark in the period 1990-2014. They found that even though the share of cabinet seats held by liberal and green parties was negatively related to punitiveness and the share held by conservative and market-liberal parties was negatively related to welfare, a trade-off between the two was only found when Third Way parties were in power.

There is also no clear explanation of the finding that decreased social spending was associated with decreased incarceration. It should be noted that a reduction in social spending as a percentage of GDP may reflect an increase in GDP as well as a reduction in welfare measures. One possibility is, then, that actually increases in GDP were associated with decreased incarceration. As a suggestion for future research, it would be interesting to know whether the same result would be found when using a measure of welfare that is unaffected by GDP.

More investigation is also necessary as to why, contrary to previous research, it was not found that the welfare/incarceration trade-off became stronger over time. One limitation of my empirical approach to this question was that it assumed that the strength of the effect over time would change linearly for the entire time series. Other studies that found the effect to become stronger over time only included data from the 1970s up to the 2000s. It may be possible that in the Netherlands the effect also became stronger in that period, but from this it does not have to follow that the strength of the effect either increased or decreased continually for the entire time period which I studied.

However, my results do not actually seem support this idea. The finding that increasing social spending was relatively strongly associated with decreasing incarceration in combination with the fact that social spending increased strongly and consistently up to the 1980s suggests that in the Netherlands, actually, the trade-off effect was strongest – or, possibly, only existed at all – in the 1960s and 1970s. This would contradict previous research. Beckett and Western (2001), for example, posit that a “strong” trade-off effect did not exist until 1995. Although contradictory, both propositions may be true, as none of the previous studies that found the effect to be strongest around the 1990s included data on the Netherlands. It is plausible that the trade-off effect developed differently over time in the Netherlands than in other countries.

The empirical results that I found should be interpreted with some degree of caution. A number of issues with the data and analytical strategy were present, which I will now discuss.

### **Limitations of the data**

As was also noted by Jacob and Helms (1996), there are often “severe problems” with finding reasonably complete time series data. For severe crime, I was able to use a largely complete time series, but still had to rely on imputation for a period of 12 years. A noticeable jump was present from the last year of the imputed data to the first year after, indicating that the data imputation may have underestimated an upward trend. A complete time series was available for the average age of the population, however it may have been more appropriate to use data on the share of the population within a given age range, for example 15 to 25. Such data was not available. Data on unemployment was taken from two different sources. Although the unemployment rate remained consistent between the two data sets, in absolute numbers the workforce suddenly increased with over one million people from one year to the next, indicating that a different methodology was likely used in gathering or classifying the data. The data on incarceration from 1950 up to and including 1981 included both adults and juveniles, whereas the data from 2000 and onwards included only adults. For the other data, it was not clear whether only adults or adults and juveniles were included.

### **Limitations of the regression analyses**

*Normality of the residuals.* One of the assumptions of linear regression is that the residuals are normally distributed. In models 1a, 1b and 2b, this was not the case. As a consequence of the residuals not being normally distributed, the standard errors of the *b*-coefficients will increase and therefore the *p*-values of the estimated coefficients will decrease, although the coefficients themselves remain accurate (Baissa & Rainey, 2020). There is therefore an increased likelihood

of a type II error having occurred, i.e. that actually significant coefficients were falsely judged to be nonsignificant. Furthermore a non-normal distribution of the residuals may indicate a non-linear relation between the dependent and independent variables (Pek et al., 2018). Therefore a potentially interesting avenue for further research may be to investigate whether welfare and incarceration are related non-linearly.

*Heteroscedasticity.* All models were found to display heteroscedasticity, according to the Breusch-Pagan test. Figure 4 shows a scatterplot of the standardized predicted values and standardized residuals of model 1c. The residuals do not seem to vary in any systemic way, but there are some outliers. The outliers all seem to occur around the standardized predicted value of 1, suggesting that the model was least accurate when predicting moderate increases in the incarceration rate. The other models displayed the same pattern.

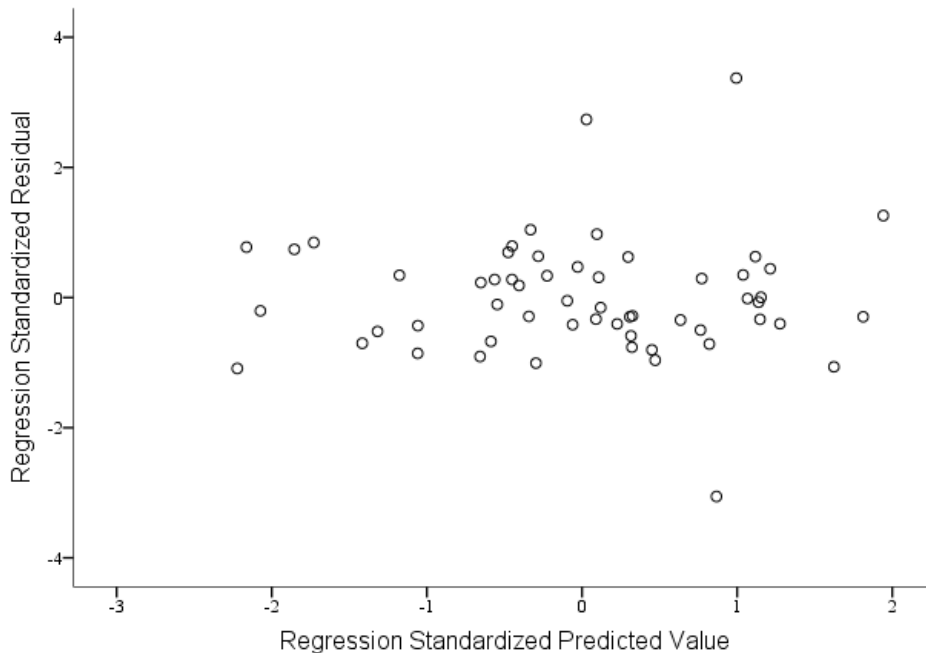


Figure 4. Standardized predicted values and standardized residuals of model 1c.

*Stationarity.* The dependency ratio was still found to be non-stationary after first-differencing. Nevertheless I argue that it should be included in the analyses. There are theoretical grounds for this, and it should be noted that the dependency ratio was the only variable that was non-stationary. Therefore, in principle, there is no possibility of spurious relations based on the dependency ratio sharing some trend over time with another variable.

### **Conclusion**

Strictly speaking, none of the hypotheses were confirmed. Welfare retrenchment was not found to be associated with increasing incarceration rates while increased welfare was found to be related to decreasing incarceration rates, and the effect was not found to become stronger over time. Still, an asymmetrical relation between changes in welfare and changes in incarceration was found to be present. The results lead to the conclusion that a welfare/incarceration trade-off was present when welfare increased, but not when welfare decreased. As the Dutch welfare state grew in magnitude since the end of the Second World War until the 1980s, the findings indicate that the trade-off effect was present in the period up to and including the 1970s, but not after.

### **Policy advice**

Research on the welfare/incarceration trade-off is primarily fundamental in nature, and therefore does not lend itself easily to concrete policy advice. The main practical takeaway of this study is that organisations who conduct research and advocacy on the topic of imprisonment should try to see the ‘bigger picture’ – that is, to investigate the connections between imprisonment and other topics, even if these topics seem unrelated to imprisonment at first glance. The presence of an asymmetrical welfare/incarceration trade-off effect in the Netherlands suggests that advocacy in favour of welfare may lead to the same result as advocacy opposing



incarceration. More broadly, events like, for example, the Dutch childcare benefits scandal or certain criminal trials being highly publicized in the media, while not having a direct impact on the nation-wide incarceration rate, may be viewed as harbingers of an increasingly punitive trend in society, and therefore as indicative of the dominant policy regime becoming more exclusionary. At the same time, it should be remembered that these effects are not always symmetrical – in other words, it may not be the case that the dominant policy regime would be shifted back towards the inclusionary end by a mere ‘reversal’ of the events that caused it to become more exclusionary, and vice versa.

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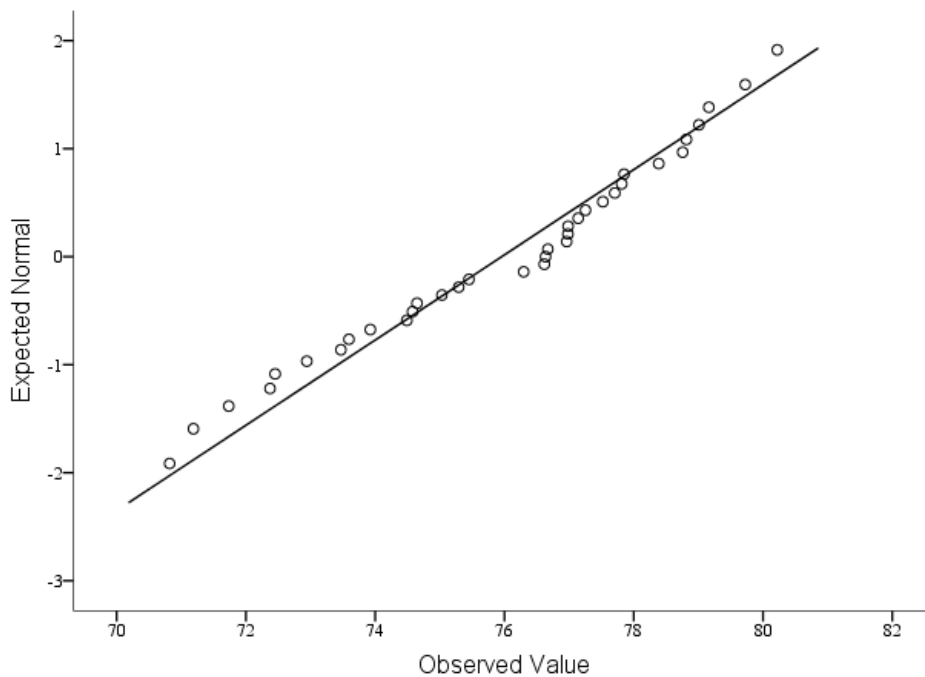
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## Appendix A: data imputation

The severity of crime was operationalized as the percentage of all registered crimes that related to murder, manslaughter or armed robbery. However, for 1982 up to and including 1994, no data was available for the number of crimes that related to murder or manslaughter. Data on the total number of crimes and the number of armed robberies was available for all years.

From the data that was available, it was apparent that the percentage of all severe crime that was armed robbery was relatively stable from 1970 onwards. A Shapiro-Wilk test confirmed that these percentages were normally distributed ( $W = ,962, p = ,261$ ). Figure A1 shows the normal Q-Q plot of the data that was available.



*Figure A1.* Normal Q-Q plot of the percentage of severe crime that was armed robbery from 1970 onwards, before imputation.

Therefore, the missing percentages of all severe crime that was armed robbery were imputed as values that were randomly generated from a normal distribution with these parameters.

This was done using the =NORMINV(RAND(),A,B) command in Excel, where *A* refers to the mean and *B* to the standard deviation of the normal distribution. From knowing the total number of crimes and the number of armed robberies and having imputed the percentage of all severe crime that were armed robberies, the percentage of all crimes that was severe was then calculated. Figure A2 shows the data before imputation; missing data is represented with the value 0. Figure A3 shows the data after imputation.

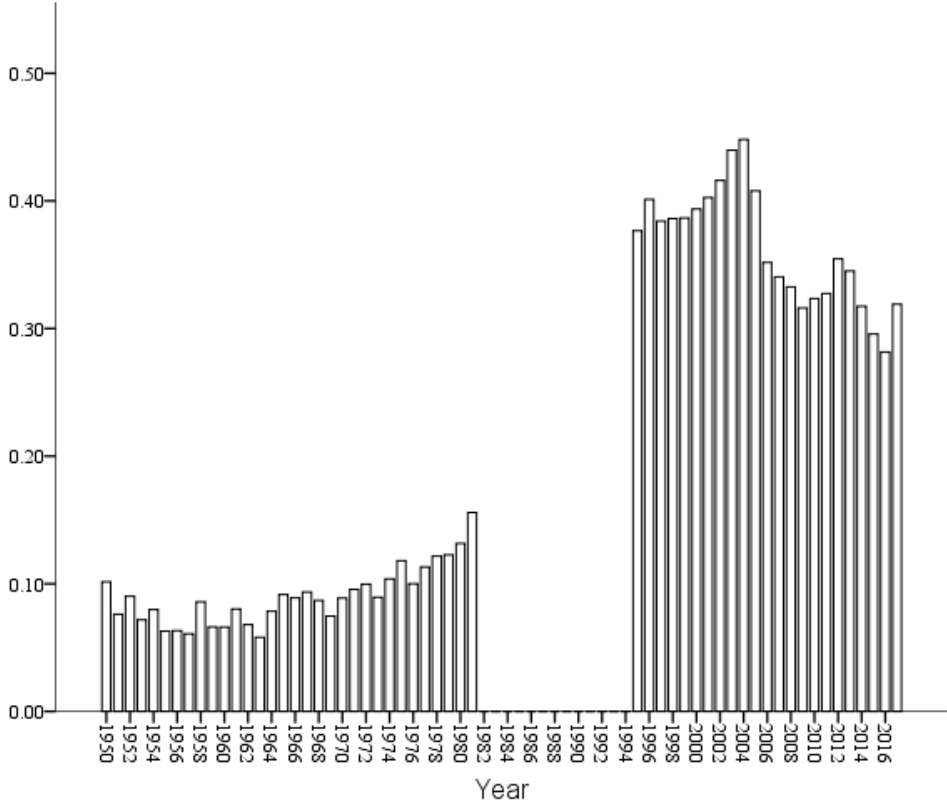


Figure A2. The percentage of total crime that was severe, before imputation.

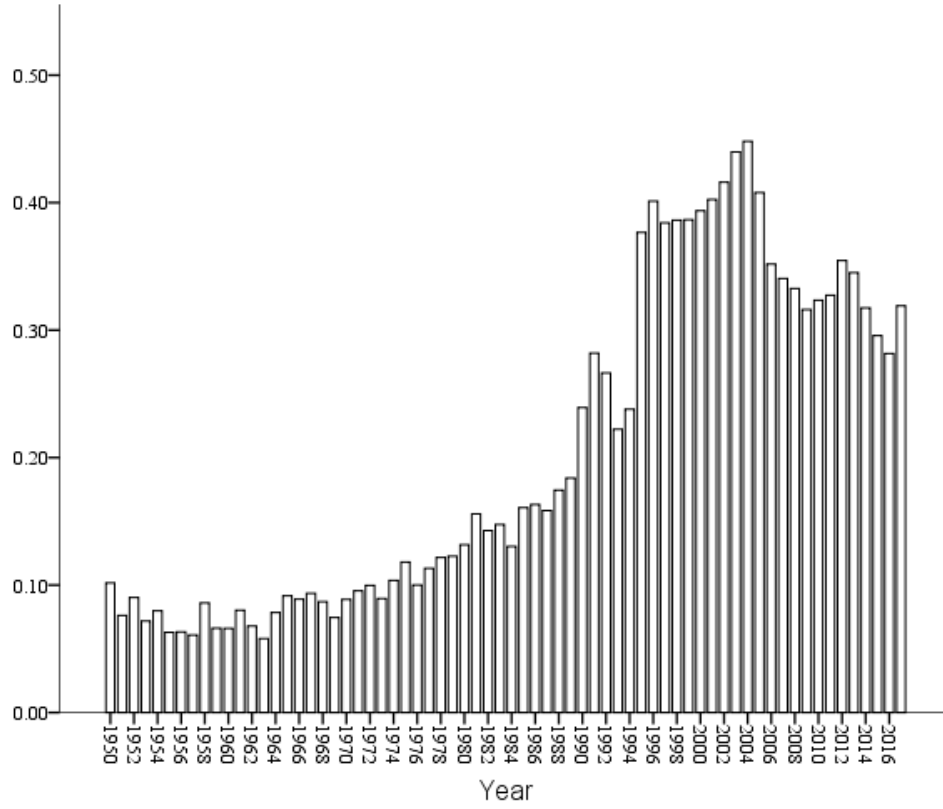


Figure A3. The percentage of total crime that was severe, after imputation.

**Appendix B: results excluding the dependency ratio**

Effect	Estimate (SE)			
Model	(1a)	(1b)	(1c)	(1d)
(Constant)	-,034 (,125)	,008 (,137)	,100 (,132)	,083 (,135)
d(incarceration) <sub>t-1</sub>	,373** (,124)	,359** (,126)	,356** (,119)	,367** (,121)
d(social spending) <sub>t-3</sub>	-,046 (,059)	-,067 (,065)	-,241* (,098)	-,255* (,101)
d(negative social spending) <sub>t-3</sub>	-	-	,357* (,148)	,418* (,178)
d(average age) <sub>t-3</sub>	,233 (,652)	,103 (,678)	,177 (,623)	,292 (,653)
d(crime rate) <sub>t-2</sub>	,465** (,157)	,486** (,160)	,531** (,153)	,521** (,154)
d(percentage of crime that was severe) <sub>t-2</sub>	,788 (,975)	,646 (,998)	,904 (,933)	1,061 (,971)
d(unemployment) <sub>t-2</sub>	-,056 (,067)	-,066 (,068)	-,051 (,064)	-,040 (,066)
d[(social spending) <sub>t-3</sub> *time]	-	,003 (,004)	-	-

d[(negative social spending) <sub>t-3</sub> *time]	-	-	-	-,003 (,005)
R <sup>2</sup>	,329	,337	,401	,406

Table B1. Results of the models with the first set of lags, excluding the dependency ratio. Notes:

\* $p < .05$ , \*\* $p < .01$ .  $N = 57$ .

Effect	Estimate (SE)			
Model	(2a)	(2b)	(2c)	(2d)
(Constant)	,017 (,106)	,000 (,116)	,032 (,131)	,031 (,134)
d(incarceration) <sub>t-5</sub>	,393** (,131)	,397** (,132)	,398** (,134)	,398** (,135)
d(social spending)	-,098* (,047)	-,088 (,054)	-,112 (,084)	-,112 (,085)
d(negative social spending)	-	-	,029 (,139)	,034 (,163)
d(average age) <sub>t-7</sub>	-,026 (,578)	,042 (,612)	-,058 (,603)	-,045 (,645)
d(crime rate) <sub>t-6</sub>	,424* (,159)	,411* (,164)	,424* (,161)	,422* (,165)

d(percentage of crime that was severe) <sub>t-6</sub>	-1,635 (1,899)	-1,656 (1,915)	-1,718 (1,957)	-1,719 (1,976)
d(unemployment) <sub>t-6</sub>	-,061 (,057)	-,059 (,058)	-,063 (,058)	-,062 (,059)
d[(social spending)*time]	-	-,001 (,003)	-	-
d[(positive social spending)*time]	-	-	-	,000 (,007)
$R^2$	,372	,373	,372	,372

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*Table B2.* Results of the models with the second set of lags, excluding the dependency ratio. *Notes:*

\* $p < ,05$ , \*\* $p < ,01$ .  $N = 61$ .