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Master Thesis [Policy Economics]

The use of short-term work compensation schemes during the Covid-19 pandemic: a case study in the US and the Netherlands.

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Abstract

This paper evaluates the use of short-term work schemes used during the Covid-19 pandemic to reduce unemployment rates. Two countries are used to investigate the effectiveness and the equity of these policy instruments where difference-in-difference frameworks are applied. In the US, where short-term work is less prevalent, the effectiveness of short-term work schemes is tested by comparing unemployment rates between states that do and do not utilize this policy instrument. In the Netherlands, which has historically effectively used short-term work schemes during recessions, the distributional benefits are compared between flexible and permanent workers. The results indicate that short-term work schemes in the US were not successfully utilized during the Covid-19 pandemic. However, in the Netherlands, STW schemes seem to have had a significant impact on encouraging employment of flexible workers.

Keywords: Short-term work schemes, United States, Netherlands, Covid-19 pandemic

1. Introduction

The Covid-19 pandemic hit the world economy hard as global trade fell and companies started cutting down their production in response to the falling demand for many goods and services. This has resulted in the worst global recession since the Great Depression (World Bank, 2020). The Dutch economy is no different and has been adversely affected. According to Statistics Netherlands (CBS), gross domestic product (GDP) in the Netherlands declined by 9.87% from Q4 2019 to Q2 2020. The drop in GDP represents an increase in unemployment as companies lower their level of production to meet the falling demand. To help the population cope financially during the recession, countries adopt various policies and relief packages that are targeted at lower-income brackets who are most heavily affected by the pandemic. While the recession is common to all countries, the approach to dealing with it is different across countries. While some countries, most noticeably the US, have tried to cushion the blow of the recession by offering relief packages such as the CARES Act which includes a one-time cash payment and increased unemployment benefits. This relief package was implemented in response to the anticipated increase in unemployment. With unemployment at 14.8% which was the highest rate observed since 1948, the amount of money needed to be supplemented to these relief packages would be huge (Falk, 2021).

Currently, in the US, about half of the states have a short-term work (STW) scheme in place where employers can apply for a reduction in their employee's work hours. Under the CARES Act, participating workers in states with STW schemes in place will also receive additional unemployment benefits. However, in general, the US still largely operates under an unemployment benefit system rather than a STW system. In contrast, the Netherlands has adopted a different approach in dealing with the negative economic impacts of the pandemic. Instead of providing financial aid directly to the unemployed, the Dutch government has implemented policies, namely the NOW-scheme, to help employers bear the burden of employee wages during the pandemic. This NOW-scheme was introduced to replace an old STW scheme called *wektijdverkotring* (*wtv)* due to an unprecedented increase in applications for the old STW scheme. Without such STW schemes, employers will reduce the number of employees since their level of production is lower during the pandemic. However, in

the presence of such policies, employers are incentivized to retain employees instead of retrenching them which reduces the level of unemployment.

1.1 Research question

This paper researches the effectiveness of unemployment policies in reducing the level of unemployment during the Covid-19 pandemic. The STW schemes implemented in the US and the Netherlands are analyzed by studying how unemployment levels change between participants and non-participants of the STW scheme. After STW schemes were introduced in the respective countries, there should be a change in the difference in unemployment levels between the groups that participate in STW schemes and the control group. A difference-in-difference (DiD) framework will be used to study the effectiveness of the STW schemes. Thus, factors that affect unemployment rates will not be discussed in this paper because they apply to both the groups, which will be described later, that do and do not use STW schemes.

In the US, the effect of STW schemes will be estimated by comparing unemployment levels between states that do and do not use STW schemes. In the Netherlands, the distributional effects of STW schemes between permanent and flexible workers will be investigated. The Dutch STW scheme called the NOW allowed flexible workers to participate which contrasted the old STW scheme called WTV. By studying how unemployment levels between permanent and flexible workers change around the introduction of the NOW scheme, the distributional effect of STW schemes between these two groups of workers can be estimated.

If unemployment can be reduced through STW, then its additional advantages, such as psychological benefits of keeping temporarily unproductive workers employed and a quicker economic recovery phase after the pandemic, can be justified over the use of additional unemployment benefits during a crisis. Similar to giving our additional unemployment benefits, STW schemes are costly to the government, and has been the NOW-scheme was the most expensive government aid implemented during the Covid-19 pandemic. Though there has been substantial evidence for the effectiveness of STW during the Great Recession in Europe, the use of STW in the US is still relatively new and has not been thoroughly investigated. The different institutional factors of the US and Europe may lead to different outcomes and warrant further investigation of the effectiveness of STW in the US. On the other hand, the

distributional effects of such STW schemes like the NOW-scheme, in Europe, are still unclear. The literature has provided evidence for the ability of STW to prevent excessive unemployment during recessions, but many of these papers do not investigate how the benefits are distributed. Theoretical arguments have been on how these benefits are distributed among the labor force, but more empirical tests have to be done to confirm these hypotheses.

In the rest of the paper, the underlying theory of STW schemes is first discussed in Section 2 where economic mechanisms and other features critical to limit excess unemployment during economic downturns are described. Next, in Section 3, the specific STW schemes in the Netherlands and the US are described, along with country-specific institutional settings that impact the effectiveness of these STW schemes. Section 4 and 5 describes the lockdown measures introduced in both countries and the respective institutional settings that could affect the effectiveness of the STW schemes. After that, Section 6 presents the data and DiD methodology used to perform the statistical tests. Identifying assumptions for the DiD framework is also checked in Section 6. In Section 7, the results to the DiD tests are presented. Section 8 examines the results and offers possible explanations. Finally, Section 9 concludes with a summary of the findings and certain possible limitations of the paper are explained. Potential areas for future research regarding STW schemes are also suggested.

2. Underlying theory of STW

2.1 Economics mechanism

During an economic recession, firms will face an expected fall in demand for their goods and services. To match the fall in demand, firms lower their level of production. Labor is an input of production that can be more easily changed compared to other factors that are more fixed such as capital and infrastructure. Assuming a substitutability in the labor input between the number of employees and hours worked per employee, there are two main ways in which labor can be adjusted. Firms can either reduce the number of employees or reduce the average number of hours worked per employee. A reduction in the number of hours worked per employee is referred to as an adjustment along the intensive margin. This is often accomplished by reducing the number of hours worked per employee so that workers receive less

income than they normally would with normal working hours. An adjustment in labor is classified as along the extensive margin if the number of employees changes. This is accomplished when companies lay off workers in response to a recession and expected fall in production output. Though a combination of both methods is possible, in practice it is much easier to choose one method instead of a combination of the two. This has typically been the case when there are production technologies that allow for the substitutability of labor input (Rosen, 1985; Fitzroy and Hart, 1985).

The prevalence of adjustment along the extensive margin can be explained by considering the cost minimization problem for firms facing exogenous variations in demand for their goods and services (Boeri and Bruecker, 2011). Firms produce output using only labor, which is substituted between the number of workers and the hours worked per employee and a fixed amount of capital. Firms optimize between the number of workers and hours worked per employee at the desired output level to minimize costs. Boeri and Bruecker (2011) show that the optimal choice of hours worked is independent of the level of production which implies that changes in the level of output will only impact the number of workers and not the number of hours worked per employee. This is consistent across industries with approximately the same working hours per employee but different sizes and levels of production. As it is more efficient for firms to adjust labor along the extensive margin, many workers will lose their jobs during economic downturns, and this will increase the level of unemployment.

Short-term work compensation (STWC) schemes are used during economic downturns with the objective of reducing layoffs. This is accomplished by making it easier for employers to adjust the number of hours their employees work so that labor can be matched to the fall in demand during economic downturns (Cahuc, 2019). Therefore, instead of laying off employees, companies can choose to make use of STWC schemes and retain valuable employees. If companies can hold on to valuable employees while still being able to operate profitably during economic downturns, it is easier for companies to return to their pre-recession levels of output and profitability (Cahuc, 2019). Thus, the objective of STW, during a financial crisis, is to incentivize employers to adjust their labor usage by reducing the number of hours worked by employees instead of retrenching employees.

It is arguable that STW is a more equitable and efficient outcome for the number of hours worked for everybody to decrease rather than specific industries (Reid, 1985).

One of the inefficiencies of labor adjustment along the extensive margin is the costs of retrenching workers and then rehiring them after the economic downturn. There are fixed fiscal costs associated with the hiring and firing processes and this can be seen as a redundancy given the temporary nature of economic downturns. Thus, holding on to the employee with reduced hours could be more efficient in the long run. Another reason for the inefficiency is due to the different levels of risk aversion of firms and employees. Workers are more risk-averse and would prefer a reduction in income to job losses. On the other hand, firms that have access to the capital market are more risk-neutral. Thus, theoretically, firms could sell employees insurance in the form of a private STW scheme that encompasses job security in exchange for lower wages to overcome this inefficiency. Another inefficiency arises when a negative externality is exerted on the government who has to increase unemployment benefits in response to higher levels of unemployment (Cahuc and Carcillo, 2011). The labor adjustment along the extensive margin can lead to excessive loss of jobs if firms do not internalize the social costs of firing decisions. This can be a reasonable assumption since most firms are profit-maximizing. Thus, STW schemes could better align the different risk profiles of firms and employees by making firms incentivize the social costs of excess layoffs which would be a desirable outcome for workers (Giupponi and Landais, 2018).

There are distributional issues regarding the benefits of STW schemes. Hijzen and Venn (2011) studied STW schemes during the Great Recession and found that the benefits of SWT were concentrated among workers who held permanent contracts. This is an expected outcome that is aligned to the literature that argues that companies want to retain their most valuable and experienced workers who most likely have a permanent contract (Cahuc, 2019). There is little incentive to retain workers on temporary contracts who can easily be replaced by companies. Therefore, the benefits of STW schemes are largely concentrated among workers with permanent contracts while disregarding workers with temporary contracts (Cahuc, 2017). The extent of this effect in the Netherlands may vary due to institutional factors, particularly the unemployment protection legislation for permanent contracts. It is relatively more difficult to retrench workers with a permanent contract compared to other OECD countries (Gerritsen & Høj, 2013). Therefore, the institutional factors may also impact how the benefits of STW schemes are distributed.

2.2 Private and public STW arrangements

STW schemes can either be privately implemented between workers and employers or publicly offered where employers can choose to utilize the wage subsidy provided by the government. In principle, private STW schemes between employers and workers are one possible solution to counteract the preference employers have towards layoffs as a form of labor adjustment (Boeri and Bruecker, 2011). Private STW schemes are arguably the most efficient solution to excessive layoffs during economic downturns. Private STW allows for greater flexibility in STW arrangements and agreements at the firm level. As compensation for employers adjusting their employees' work hours, additional job security is provided to employees. However, there are several obstacles that render this first-best solution unfeasible. In practice, collective bargaining over wage and work hours are usually centralized at a level higher than the firm, such as the industry, state, or national level (Boeri and Bruecker, 2011). Even in situations where collective bargaining is decentralized, there are usually no collective units of workers at the firm. Another obstacle of private STW schemes is the imperfection of capital markets (Boeri and Bruecker, 2011). Typically, the size of a firm correlates to the level of access firms have to capital markets. This implies that smaller firms will have limited access to capital markets and could face a degree of liquidity constraints. In private STW schemes, firms have to keep workers employed, although at a lower wage, and without sufficient access to capital, smaller firms might not have enough liquidity to offer private STW schemes to workers. All these factors prevent the provision of flexible private STW schemes that employers would be willing to implement.

With private STW being practically unfeasible, public STW might be the only solution left to curb rising unemployment during economic downturns. In the presence of wage rigidities, firms adjust labor along the extensive margin which leads to excessive unemployment during economic downturns. Public STW schemes can help prevent this by making STW take-up attractive for firms. This implies that utilizing the STW scheme has to be more beneficial for the firm than adjusting along the extensive margin. By preserving their workforce during an economic crisis, firms can reduce firing, matching, rehiring, and retraining costs which otherwise have to be incurred when laying off workers. Thus, STW prevents inefficient loss of jobs in a temporary downturn. This applies especially to small and credit-constrained firms that do not

have to resources to survive revenue drops (Cahuc, Kramarz & Nervoux, 2018). For public STW schemes to successfully prevent unemployment rates from rising excessively during economic downturns, a significant proportion of firms, that without the availability of the public STW scheme would have otherwise retrenched workers to reduce labor costs, should utilize the public STW scheme provided by the government and hold on to a majority of their workforce. This implies that the take-up rates of the STW scheme would have to be significant enough to stop excessive layoffs. In addition to requiring a high take-up rate to be successful, public STW schemes also have some potential issues which could hinder their ability to curb rising unemployment during economic downturns.

2.3 Aspects that could impact take-up rates

One factor that should be taken into account when studying STW schemes is the take-up rate. According to Hijzen and Venn (2011), the take-up rate of STW schemes has, in practice, been measured as the total number of participants of the scheme relative to the number of employees. A high take-up rate is key to the success of STWC. A low take-up rate implies that employers rather retrench employees to reduce labor costs than retain them at the subsidized labor costs. In this case, the STW scheme failed to incentivize employers to retain their employees and thereby failed to prevent the unemployment rates from rising during a crisis. During the Covid-19 pandemic, the Dutch government subsidized up to 80% of wage costs to encourage a higher take-up rate.

There are several factors that contribute to the take-up rate of a particular STW scheme. However, some of these factors are institutional and difficult to be changed in a short period of time. The factor that can be varied easily by the government and directly impacts the take-up rate of STW schemes is the percentage of wage costs subsidized. Countries vary in the percentage of wage costs that they subsidize. If the government subsidizes a larger proportion of a firm's wage cost, it becomes more attractive for a firm to utilize the STW scheme than lay off workers. Governments that want to quickly influence the take-up rate of their STW scheme can vary the percentage of wage costs subsidized which can be quickly changed. For example, during the Great Recession, the percentage of wages reimbursed was 60 percent in Germany where only 6.5% of firms accessed the STW scheme (Balleer, Gerhrke,

Lechthaler and Merkl, 2016). During the Great Recession in Italy, the STW scheme subsidized approximately 80 percent of the wages forgone due to lower work hours and roughly 5 percent of the workforce participated in the scheme (Giupponi and Landais, 2018). As can be seen from these two countries, the government's contribution rate towards subsidizing workers' forgone earnings is not solely responsible for a STW scheme's take-up rate.

In addition, the maximum duration in which a firm can participate in the STW also impacts the take-up rate of firms. A long duration is regarded as a more generous STW scheme as firms are able to obtain more subsidized wage costs. The maximum duration can also be quickly changed by the government as a means to incentivize firms to take up the STW scheme. However, given the temporary nature of STW as a solution to excessive unemployment during a crisis, this should be done which caution as there are possible negative effects of a prolonged STW scheme which could hinder the recovery phase of the economy (Hijzen and Martin, 2013).

Institutional factors that impact the take-up rate of STW such as employment protection are relatively more difficult to be changed in the short term to influence take-up rates. Employment protection legislation makes it difficult and costly for firms to retrench workers. The costlier layoffs are, the more incentives firms have to utilize STW schemes (Lydon, Mathä & Millard, 2019). Employment protection reduces the output elasticity of permanent employment (Hijzen and Martin, 2013). In contrast, the presence of unemployment benefits increases the elasticity of employment with regard to output. This implies that the higher unemployment benefits are paid out, the more likely it is for jobs to be lost during economic downturns. These two contradicting effects can be seen during the Covid-19 crisis when comparing the US who increased unemployment benefits and the Netherlands who introduced the NOW-scheme, a STW scheme to protect jobs. Hijzen and Martin (2013) studied the role of institutional characteristics for the use of STW across different countries and found that, in general, there are no robust relationships between take-up rates and the institutional features of STW schemes. Therefore, though in theory differences in institutional features of STW schemes could lead to different take-up rates, it appears that in practice these factors negligibly contribute to the take-up rates seen across countries. This implies that firms pay little attention or weight to the intricate costs and benefits that come with specific institutional features of a particular STW scheme. In the perspective of the government who plays a role in influencing the take-up rate of STW schemes, this is

not necessarily troubling since institutional features of STW schemes cannot be easily changed in the short term. Boeri and Bruecker (2011) also confirm this finding in their study of STW schemes in Germany during the Great Recession. They found that STW take-up rates are mostly impacted by anticipated shocks instead of long-standing structural problems. Thus, more attention could be paid to aspects such as the percentage of wage costs subsidized, eligibility requirements, and the maximum duration of the STW scheme which can be more easily adjusted to meet the goal of the STW scheme.

2.4 Deadweight and displacement effects

As a policy that intervenes in the free market adjustment of labor during economic downturns, STW schemes can potentially produce negative effects on the economy. STW schemes have varying degrees of eligibility that specify which firms qualify for the subsidy. Given the objective of preventing excessive job losses, STW schemes are targeted at firms that are financially constrained. However, all firms that seek to reduce their output through labor adjustments along the intensive margin would benefit from utilizing the STW scheme. If the eligibility criteria of STW schemes cannot successfully limit STW schemes to financially constrained firms, wage cost subsidies could be inefficiently allocated. If firms that would have already retained their employees even in the absence of the STW scheme gain access to STW schemes, they produce deadweight effects since no additional jobs are saved with the wage cost subsidy (Hijzen and Martin, 2013). The deadweight loss of a particular STW scheme can be estimated by comparing the number of jobs saved with the number of employees taking up the STW scheme (Boeri and Bruecker, 2011).

The extent to which deadweight effects are present depends largely on the type of firms that are using the STW scheme. Deadweight effects are minimized when STW schemes can successfully target financially constrained firms. On the other hand, deadweight effects can be extensive when large firms that can withstand temporary declines in output are using the STW schemes. Cahuc and Nevoux (2018) studied the increased use of STW schemes during the Great Recession in France. They found that large firms were the primary users of the STW schemes in France and argue that was an inefficient policy in response to the recession as it could amplify the reduction in output. Large firms are relatively more able to withstand demand fluctuations and it is important for firms to minimize the reduction in output so as to bolster the economy's

recovery (Lydon et al., 2019). However, by granting these firms access to STW schemes, they have a greater incentive to reduce the working hours of their employees and further reduce output than necessary.

Another possible effect of STW schemes is the displacement effect. In contrast to the deadweight effect, the displacement effect refers to jobs that would not have been economically viable without the STW scheme even after the economic downturn and when business conditions improve (Lydon et al.,2019; Hijzen and Martin, 2013). During the recovery phase, when the STW scheme rolls back and wage costs subsidies stop, these jobs will eventually become unsustainable. By preserving these unsustainable jobs, STW schemes create inefficiencies in terms of retraining and labor mobility of these workers towards other jobs. However, instead of allowing workers of these unproductive jobs to get retrenched and find employment elsewhere, they are locked into these low-productive jobs by the STW scheme (Hijzen and Venn, 2011). It is difficult to predict the extent of the displacement effect even more so during the Covid-19 crisis which could potentially restructure jobs with more and more people working from home and the increased use of technology to replace human labor (Kramer and Kramer, 2020).

The duration of which firms can participate in STW schemes can vary across countries. STW schemes with longer durations are intended to allow firms to adjust structurally while shorter duration STW schemes are designed for temporary shocks (Boeri and Bruecker, 2011). However, the longer the duration, a moral hazard issue may arise which results in inefficiencies. Boeri and Brucker (2011) studied the STW schemes used during the Great Recession in Germany and Italy which reflects this situation. The eligibility criteria of the most widely used German STW scheme, STW for economic reasons, is designed to filter out firms that are facing a temporary economic or exogenous shock that will result in unemployment. In contrast, in Italy, one of the STW schemes allows for structural adjustment which lasts relatively longer than temporary shocks that reduce employment. Furthermore, social security contributions must only be paid for the actual hours worked, unlike in Germany. During the Great Recession, the Italian government introduced a relatively new STW scheme, Cassa Integrazione in Deroga (CIGD), that aimed to extend the duration of the other existing STW schemes. Furthermore, in this new STW scheme, employers did not have to pay a portion of the contributions since the entire wage cost subsidy was paid out of government revenues. The features of these two STW schemes create different

incentives for firms. In Germany, firms have to prove a temporary decline in business conditions and have to share a burden of the loss in earnings due to hours not worked. Furthermore, with experience-rating, it becomes more and more costly to firms as they utilize the STW scheme. Therefore, firms are incentivized to eventually adjust employment back to normal. In contrast, the expansion of STW in Italy during the Great Recession, where costs are paid entirely out of government revenues, created substantial incentives for firms to inefficiently reduce working hours to zero. Thus, output falls unnecessarily than it would during the recession while firms do not bear the costs of this inefficiency. The CIGD accounted for less than 5% of STW in Italy but that percentage rose to approximately 33% during the Great Recession (Boeri and Brucker, 2011). Therefore, a high take-up rate of STW schemes does not necessarily imply efficiency.

2.5 Possible solutions and design tools to reduce inefficiencies

One method commonly used in STW schemes to reduce displacement effects, where economically unviable jobs are preserved is, by including conditionality requirements. Conditionality requirements mandate that employers and workers have to undertake specific behaviors when participating in STW schemes (Hijzen and Venn, 2011). These behavioral requirements may even extend to short periods after the STW scheme has ended. For example, in countries like Austria, Hungary, the Netherlands, New Zealand, and Poland, firms are not allowed to retrench workers during and sometimes for a short period after participating in STW schemes (Hijzen and Venn, 2011). With this requirement, firms that are economically unviable will not participate in the STW scheme, as they would not survive without the STW and would have to retrench workers. In line with the approach to retain valuable employees for an accelerated recovery phase, STW schemes also can require participating firms to develop a recovery plan (Hijzen and Martin, 2013). Requiring a development plan is necessary for Italy, Luxembourg, Poland, Spain, and Belgium (Denisova, 2020). By doing so, the government can be more certain that these firms will contribute to the economy during the recovery phase and survive after the STW scheme has ended. With regard to workers, some STW schemes could require participating workers to receive training and/or actively search for jobs. If workers participate in training

activities, there is a higher likelihood that they will be able to find employment, not necessarily at the same firm, after the STW scheme has ended.

Another way to ensure that the STW scheme does not target economically unviable firms and firms that do not require the subsidy is through the eligibility criteria. The eligibility criteria determine which firms can access the STW scheme and the government can alter this to limit participation to firms that actually need it. Eligibility criteria are designed to minimize deadweight losses that occur when firms, who would not have retrenched workers even without the STW scheme, participate in the STW scheme (Brey and Hertweck, 2016). However, the eligibility criteria directly affect the take-up rate of STW schemes (Boeri and Bruecker, 2011). Stricter criteria, while aimed to limit the STW to firms that actually need it, could also have the opposite effect as these firms will face more difficulty in proving their eligibility. Hijzen and Martin (2013) attributed the increase in STW schemes during the Great Recession to governments relaxing their eligibility criteria. However, more research needs to be done on the type of firms that participated in the STW schemes. Though relaxing the eligibility criteria would cause take-up rates to surge, it could also come at the cost of increased deadweight losses if a large proportion of these firms do not actually need the STW scheme. Therefore, the eligibility criteria should always be strict enough to identify financially distressed firms in order to maximize jobs saved and minimize deadweight losses.

To prevent inefficient reductions in employees' working hours down to zero, experience-rated STW schemes could be useful. Experience-rated STW schemes work by requiring firms to pay the social costs of any layoffs it makes. Experience-rated schemes can either be partial or full where firms pay a portion of, or the full induced social costs of any layoffs made. This would force employers to internalize the fiscal externality of firing decisions and reduce excessive layoffs. The social contribution of employers depends on the induced social costs of any layoffs the firm makes and the utilization of STW compared to other similar firms (Kolm, 2011). When STW schemes are offered to firms over an extended period of time as in Italy during the Great Recession, firms are incentivized to reduce working hours to zero which is inefficient as output falls excessive (Boeri and Bruecker, 2011). Since inefficiencies arise when firms repeatedly make use of STW schemes, experience-rated STW schemes would help to lower recurrent use and reduce these inefficiencies. Thus, experience-rated STW schemes would encourage firms to participate only temporarily

and aim to survive without the subsidy as intended. Including minimum working hours as a conditionality requirement could also reduce the inefficient reduction of work hours. However, full experience-rated STW schemes have limitations and come with certain drawbacks. Particularly, smaller firms that are relatively more financially constrained might not be able to afford to cover the social costs of firing decisions. Requiring them to do so would bankrupt them and result in higher unemployment. Therefore, partial experience-rated STW schemes seem to be a more viable solution.

2.6 Combining STW and Unemployment Insurance

Given the plausible unfeasibility of full experience-rating STW schemes as well as the excessive number of layoffs of an unemployment insurance system, a combination of STW and unemployment insurance may offer a more efficient and equitable solution to managing unemployment during economic downturns (Cahuc and Carcillo, 2011). The unemployment insurance system incentivizes excess layoffs since workers will be able to claim the subsidies paid out by the government and firms do not have to internalize this social cost. A partial experience-rating system where an employer's social contribution depends on the social costs of their firing decisions reduces the incentive to retrench workers. In addition, with proper conditionality requirements in place where firms that cannot survive without the wage costs subsidy do not participate in the STW scheme, unemployment insurance can help affected workers while they find employment elsewhere. Compared to a system which only utilizes an unemployment insurance system, the number of affected workers here will be arguably lower since workers are largely risk-averse and would prefer employment with temporarily lower wages to being unemployed with unemployment insurance. Therefore, a partial experience-rating STW scheme combined with unemployment insurance may reduce excessive layoffs during economic downturns while still reallocating towards workers who still find themselves unemployed.

3. The NOW-scheme

The Temporary Emergency Bridging Measure for Sustained Employment, also known as NOW, is the STW scheme the Dutch government implemented in response to the Covid-19 pandemic. Before NOW was implemented, there was an unemployment benefits scheme (WTV) in place where employers can apply to decrease their

employees' work hours. However, due to an unprecedented number of applications for WTV, the government decided to replace WTV with NOW. Before the Covid-19 pandemic, the Dutch government received approximately several hundred applications for WTV (NOS, 2020). However, several days before the new NOW-scheme was introduced in March 2020, this number rose to 78 000. Therefore, the Ministry of Social Affairs and Employment implemented the emergency NOW-scheme.

One critical difference between the two STW schemes is that, unlike the WTV, the NOW applies to flexible workers. Furthermore, unemployment benefits are no longer related to how much unemployment benefits workers can receive in the future. Therefore, any compensation received from NOW does not come at the expense of the unemployment benefits the employee accrues (van Dam and Engelsman, 2020). Employers currently holding WTV licenses can no longer renew them and will have to switch to the NOW scheme for the renewal of their employee hour reductions. Thus, after the current WTV license has expired, all STW schemes will be under the NOW scheme.

NOW provides employers with a wage cost subsidy if their revenue was significantly affected by the Covid-19 pandemic. To qualify for this subsidy, a loss of at least 20% turnover was required. Furthermore, there are other conditionality requirements such as requiring employers to stimulate employees to participate in retraining or reskilling courses. Employers must also help employees who face dismissal to find employment elsewhere in addition to informing the Employee Insurance Agency (UWV). However, the NOW-scheme is not an experience-rated STW scheme as it makes no difference whether employers have applied for NOW before.

Since it was first implemented in March 2020, the NOW has been modified three times. The different NOW-schemes were all mostly similar and only differed in requirements and rules for payment of bonuses or dividends. The loss of at least 20% revenue criterion remained constant throughout the different modifications. However, the maximum revenue loss allowed fluctuated within 80% and 90% as the government was trying to control the displacement effect where workers are locked into unproductive jobs (UWV, 2021). The first NOW-scheme, NOW1, compensated employers for 90% of wage costs. Employers only had to pay for 10% of forgone employee earnings. NOW1 was implemented for three months from 17 March 2020 to 1 June 2020. NOW2 was an extension that lasted from 1 June 2020 to 1 October

2020. NOW3, which ran from 1 October 2020 to 1 July 2021, later required employers to pay 15% of wages. The percentage contributed by employers increases as the government wants to reduce the take-up rate of the NOW-scheme and incentivize firms to become increase output as the economy moves into the recovery phase. In July 2020, more than 148 000 firms applied for the NOW-scheme. In contrast, during the financial crisis, only 926 companies participated in the comparable Dutch STW scheme which was then the WTV scheme (CPB, 2020). The last NOW4 ran from 1 July 2021 to 30 September 2021.

In the first three quarters of 2020, the Dutch government spent approximately €20 billion on Covid-related measures of which €14 billion was made up of NOW-related expenses (CBS, 2020). Financial support related to Covid-19 is expected to equal €45.8 billion and the NOW is expected to take up 40% of this sum (CBS, 2021). Though similar to the amount of financial support provided during the Covid-19 pandemic, the Netherlands, however, is focused on job retention (Nauta and Van Eijkelenburg, 2020). For example, the US provided citizens, with an annual income lower than $75 000, a one-time payment of $1200. In addition, all citizens above that threshold also received a one-time payment which decreased with income.

4. Lockdown measures

To reduce the spread of the coronavirus, governments around the world implemented lockdown measures where non-essential businesses were closed and many workers had to either stop working completely or work from home. On March 15, 2020, a lockdown was implemented in the Netherlands, which became effective almost immediately, closed down schools, day-care centers, cafes, restaurants, sports clubs, and other non-essential businesses (Darroch, 2020). At this point, the number of infections was slightly over a thousand cases. Shortly after, the additional financial support measures were announced on March 17, 2020, after rapid increases in unemployment benefit applications.

In the US, around the same time in March 2020, lockdown measures were being implemented across the country after President Trump declared the Covid-19 pandemic a national emergency (AMJC, 2021). On March 19, 2020, California became the first state to issue a stay-at-home order and only essential jobs could continue. Other states followed suit in the next few days such as in New York where all non-

essential workers had to work from home. As a result of these lockdown measures, unemployment rates in both countries rose sharply to unprecedented rates.

5. Institutional settings

5.1 Netherlands

The Netherlands utilizes a two-tier unemployment insurance system. The majority of the labor force, excluding the self-employed, are protected by the Unemployment Insurance Act (WW) for which employees pay a premium while employed. On the other hand, income provision is determined via flat-rate and means-tested social assistance. The employee insurance scheme insures workers, who find themselves unemployed, even if due to illness or any inability to work, by providing them with a temporary income based on their previous income. For each year that workers work in the Netherlands, they are entitled to one month of unemployment benefits. The level and length, a maximum of 24 months, of unemployment insurance depends on a person's work history and last earned income (Rijksoverheid.nl, 2021). Though the length of unemployment insurance and the generosity of social assistance has decreased over the years, the Dutch unemployment provision is still one of the most generous and comprehensive systems globally (Hoogenboom, 2011). More generous and longer durations of unemployment benefits incentivize unemployed workers to stay unemployed (Nickell et al. 2005). Unemployed workers are able to hold on to a higher reservation wage which is described as the lowest wage an unemployed worker is willing to accept when finding a new job (de Graaf-Zijl et al., 2015).

Employment protection legislation (EPL) in the Netherlands is relatively strict for permanent contracts across OECD countries. In 2008, EPL strictness was above the OECD average (Gerritsen & HØj, 2013). Terminating a permanent contract is difficult as it requires either a costly court procedure or a lengthy administrative procedure through the Employee Insurance Agency (UWV). Furthermore, with each year an employee is employed at the same firm, the severance pay increases. With these strict EPL, employers run the risk of incurring the high firing costs of newly recruited employees, especially if the recovery phase is uncertain (de Graaf-Zijl et al. 2015). Therefore, EPL amplifies the incentives employers have to participate in STW schemes.

However, the opposite holds true for flexible contracts that are not well-protected. Temporary contracts still represent a significant proportion of total jobs in the Netherlands at 20% and can warrant some concern for the disparity in EPL levels between the two. The difference between employment protection of permanent and temporary contracts is one of the highest across Europe (Myant and Brandhuber, 2016). Since temporary workers are not entitled to severance pay at the end of their contracts, there is less incentive for employers to retain the same employees. Furthermore, the unemployment insurance of temporary workers will also be less generous and shorter as they usually have a relatively shorter work history than those with permanent contracts. Part of this can be attributed to younger workers holding a majority of temporary contracts (Gerritsen & HØj, 2013). Although temporary workers are not as well protected, this may not as problematic if temporary workers actually want a flexible contract. The main benefit of a flexible or temporary contract is that workers have greater freedom to switch between jobs or have non-standard work and working hours (Hoogenboom, 2011). In contrast, permanent workers are incentivized to remain in the same job given all the financial benefits aforementioned. Likewise, employers also benefit from retaining these permanent workers. This has led to the Netherlands having one of the lowest job mobility across Europe (Gerritsen & HØj, 2013). Thus, the low EPL for temporary workers may actually be beneficial for temporary workers if they benefit more from greater job mobility. On the other hand, with these various incentives in place, it becomes attractive for employers to offer new employees temporary contracts without ever offering them a permanent contract (Myrant and Brandhuber, 2016). This could leave these workers vulnerable and without job security for a significant period. With regard to STW schemes during economic downturns, employers will be more willing to retain only their permanent workers and retrench temporary workers (Cahuc, 2019). Therefore, STW schemes may further exaggerate the inequality in job security between permanent and temporary workers.

5.2 United States

The unemployment insurance system in the US is comprised of a joint effort of the federal government and individual states. The basic program, which is run solely by the states as allowed by the Social Security Act, provides up to 26 weeks of benefits

to workers equal to half of previous earnings, on average (Stone and Chen, 2014). On average, unemployment benefits sum up to $300 a week and last for 15 weeks. However, the amount of unemployment benefits can vary depending on the state and previous earnings. Aside from a few federal requirements, states are in general able to design their own eligibility criteria and benefit levels. However, the states bear most of the costs of funding their own unemployment benefits. In situations where workers remain unemployed beyond the duration of their basic unemployment insurance program, the permanent Extended Benefits program allows workers to claim up to an additional 20 weeks of benefits. This extended program is usually targeted towards states that have been disproportionately affected by economic downturns. The federal government usually shares the costs of this extended program equally with states.

During recessions where unemployment levels can remain high for prolonged periods, the federal government has historically created and funded temporary unemployment insurance programs. In response to the Great Recession, the federal government introduced the Emergency unemployment Compensation program which provided up to 34 weeks of benefits in all states which lasted up to 53 weeks (Stone and Chen, 2014). More recently, the $2 trillion stimulus bill called the Coronavirus Aid Relief and Economic Security (CARES) Act was passed by policymakers in response to rising unemployment rates during the Covid-19 pandemic. The CARES Act provided unemployment benefits of $600 per week which lasted for a period of 4 months to workers already participating in a STW scheme. Furthermore, under the CARES Act, firms participating in STW schemes are fully reimbursed for unemployment benefits paid to workers whose hours have been reduced. Direct cash payments were also made to households earning less than $75 000. Adults were paid $1200 and $500 for children.

Despite the renowned ability of STW to reduce layoffs and unemployment rates during economic downturns, especially by European countries during the Great Recession, STW schemes have not been heavily utilized in the US. Increasing unemployment benefits has been the main approach to dealing with rising unemployment rates during recessions. Currently, only 27 states across the US make use of STW schemes (Brewer et al., 2020). Furthermore, the take-up rates in these states are substantially lower than the countries in Europe. The average take-up rate of STW schemes in those 27 states was 0.2% before the pandemic and rose to 0.8%

as of the beginning of July 2020 (Krolikowski and Weixel, 2020). These states are listed in Table 1.

Table 1. List of states that do and do not use STW schemes.

STW States	Non – STW states
Arizona, Arkansas, California, Connecticut, District of Columbia, Florida, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New York, Ohio, Oregon, Pennsylvania, Rhode Island, Texas, Vermont, Washington, Wisconsin	Alabama, Alaska, Colorado, Delaware, Georgia, Hawaii, Idaho, Illinois, Indiana, Kentucky, Louisiana, Mississippi, Montana, Nevada, New Mexico, North Carolina, North Dakota, Oklahoma, South Carolina, Tennessee, Utah, Virginia, West Virginia, Wyoming

6. Data and Methodology

To study the changes in unemployment level in the Netherlands, Statistics Netherlands (CBS) provides data on monthly level of unemployment. With regard to the US, the US Bureau of labor statistics provides the monthly unemployment rates across all US states. The unemployment rates provided by CBS and the US Bureau of labor statistics are seasonally adjusted which accounts for seasonal effects. The unemployment rates are calculated by dividing the unemployed labor force by the total labor force.

This paper uses difference-in-difference (DiD) to investigate the effects of the NOW scheme on unemployment rates. The DiD analysis will consist of two time periods – period 1 consists of the unemployment rates before the NOW scheme was implemented while period 2 consists of the unemployment rates after its implementation. However, in one model implemented, a monthly dummy variable is used to examine how the effects of the policy intervention changes over time. I use the DiD estimator to estimate how the difference in unemployment levels between the treatment and control group changes across the two time periods. If all other factors are controlled for, this effect can be attributed to the STW schemes which is the only noncontinuous factor that has changed during this period that affects unemployment.

Ideally, the effect of STW schemes should be determined by the changes in unemployment levels at the firm level by comparing firms that applied and were eligible for the NOW scheme compared to firms that did not receive this treatment. This gives a much more accurate measurement as there is greater certainty on which groups utilized the STW schemes. However, as data on which specific firms applied for and received the benefits of the NOW-scheme in the Netherlands is not readily available, this paper uses the DiD econometric technique to control for the unobserved differences between groups that do and do not utilize STW schemes. With the NOW-scheme, flexible workers who were previously were not allowed to participate in STW schemes in the country, can now do so like permanent workers who have always had access to STW. With permanent workers being able to participate in STW schemes throughout the testing period, they can function as a control group. On the other hand, flexible workers can act as the treatment group where treatment begins after the implementation of the NOW-scheme. A significant difference in the change in the number of workers between the two groups after the treatment indicates evidence of the effectiveness of the NOW-scheme in equalizing employment between flexible and permanent workers. With regard to the US where the use of STW schemes is not as prevalent compared to the Netherlands, a comparison of states that utilize STW schemes and states that do not will be used to investigate the effectiveness of STW schemes in curbing excessive unemployment during economic downturns. Different models will be used to perform the DiD analysis, namely a weighted average of state unemployment rates, a state-level analysis, and a final model which uses a monthly dummy variable after the implementation of the treatment.

6.1 Identification strategy

The DiD framework is a quasi-experimental research technique often used to study the causal effects of various policy interventions in the field of public health. One of the important identifying assumptions for the DiD model is strict exogeneity as described by Wing, Simon, and Bello-Gomez (2018). In essence, strict exogeneity requires that the timing of the implementation of the policy intervention or treatment be independent from the potential outcomes of the treatment and control groups. The common trend assumption along with economic arguments are used to verify the

validity of strict exogeneity. Checks on the common trend assumption will be performed later in this section.

With the aim of identifying the net effect of STW schemes on unemployment in comparison to an unemployment benefits system, as aforementioned, a difference-in-difference (DiD) framework will be used. In the DiD analysis, two different analyses will be conducted on the US and the Netherlands. First, the effect of the relatively new STW schemes in the US on unemployment will be tested. Currently, there are 24 states that do not have a STW scheme in place as shown previously in Table 1. The CARES Act, in response to the Covid-19 pandemic, provided additional funding towards workers participating in STW schemes. By comparing the changes in the level of unemployment, around the Covid-19 pandemic when the CARES Act was enacted, between states with STW schemes and states without STW schemes, the effectiveness of STW schemes in preventing excessive unemployment during economic downturns can be measured. In Model A, the weighted-average unemployment rates of the US states will be used to estimate the effect of the STW schemes. The weighted average unemployment rates will be calculated for STW states and non-STW states. For ease of calculation, the weights will be calculated based on the distribution of GDP across states in 2021. The weights given to each state are proportional to GDP across states. Calculating the weights based on a single year seems minimalistic but this method would not drastically affect the estimates, since these weights remain relatively constant over time, while also allowing for easier calculations. In Model B, state-level unemployment rates are used instead of an aggregated weighted-average. This allows for state-level fixed effects. The following DiD regression is run for model A and B:

$$U_{it} = a + B_1 \times STW_i + B_2 \times post_i + B_3 \times (STW \times post)_{it} + e_{it}$$

where *U* is the aggregate unemployment rate in type of state *i* in model A and the state unemployment rate in state *i* in model B at month *t*. *STW* is a dummy variable that equals 1 when a new STW scheme has been implemented and equals 0 otherwise. *Post* is a time dummy variable that equals 1 after the STW scheme has been implemented and equals 0 before the treatment was in place. *(STW x post)* represents the interaction term of the two dummy variables *STW* and *post.* Therefore, the

parameter of interest is B_3 which captures the DiD estimate of the STW scheme on unemployment. The error term is represented by e. Robust standard errors and clustered state standard errors are used to obtain the estimates in model A and B respectively.

A third model C will be used for the US analysis to examine how the policy intervention's effect changes over time. To do this, a monthly dummy variable is used post-intervention instead of just a *post* dummy variable that describes the entire period post-intervention. The following DiD regression for model C is run:

$$U_{ik} = a + B_1 \times STW_i + \sum_{k}^{14} (B \times post\_month)_k + \sum_{k}^{14} (B \times post\_month \times STW)_{ik} + e_{ik}$$

where U represents the state-level unemployment rates and STW is a dummy variable that is 1 for states that have a STW scheme and 0 otherwise. *post_month* is a dummy variable that describes the number of months after the implementation of the STW scheme. *post_month x STW represents the interaction term between STW* and post_month.

Next, in the Netherlands, the newly implemented NOW scheme in response to the Covid-19 pandemic which replaced the old WTV scheme consists of a key difference in which type of employees are eligible for the STW scheme. Unlike the old scheme, the NOW scheme now allows flexible workers to participate in the STW scheme. This difference between the two schemes will be used to investigate the distributional effects of STW schemes by estimating how unemployment changes between flexible and permanent workers. The literature suggests that flexible workers are less likely to benefit from STW because employers are less willing to retain workers with less experience (Cahuc, 2019). With the new NOW scheme, both flexible and permanent workers are now able to participate in STW schemes. If the difference in unemployment between flexible and permanent workers reduces significantly, this would suggest that employers are actually also willing to retain flexible workers during economic downturns, in addition to permanent workers. Given that flexible workers are disproportionately younger than permanent workers, different age groups will be analyzed to check for how the impact of STW schemes changes as the ratio of permanent to flexible workers vary. A DiD framework will also be used to estimate this

effect. However, unlike the first DiD analysis, the DiD framework for the test on inequality between flexible and permanent workers in the Netherlands will identify pre-treatment effects instead of post-treatment effects. In the pre-treatment period, only permanent workers are able to participate in STW schemes. After the treatment, both permanent and flexible workers can participate. Therefore, the effect of the change in the STW criteria on the difference in unemployment rates is identified in the pre-treatment period. To estimate the effects of the "DiD in reverse" for the case of the Netherlands, a transformation where the time order is reversed will be done.

6.2 Time and cross-sectional fixed effects

To accurately identify the treatment effect, time and cross-sectional fixed effects are often added to control for any observed and unobserved effects as is commonly done in fixed effects model. However, there is no need to add any additional terms to control for these effects because the variables in the basic DiD model inherently captures these fixed effects. The DiD framework is designed to eliminate any confounding effects through the differencing technique that removes time and group fixed effects (Wing, Simon & Bello-Gomez, 2018). Firstly, time fixed effects are designed to control for effects that changes across over time that are common cross-sectionally within each unit of time which could be individuals, firms, or states. This is usually done by including time dummies for each unit of time. However, in the basic DiD model, a time variable is already included to distinguish between the pre- and post-treatment periods. For example, the coefficient of the time dummy STW, in the analysis of STW in the US, captures the time-invariant difference between the treatment (STW) and control group (non-STW). This eliminates any confounding effect that is responsible for the difference in unemployment rates between STW and non-STW states within each unit of time. Given that the DiD utilizes the difference between pre- and post-treatment periods, it would be sufficient to control for time fixed effects in these two periods rather than for every unit of time. Therefore, specific time dummies for each unit of time will not be necessary in a DiD model and the broader time dummy that distinguishes between the two periods will be sufficient.

Next, cross-sectional fixed effects eliminate any unobserved or observed effects that are constant over time. Typical example of cross-sectional fixed include age, gender, ethnicity, and firm identification. However, cross-sectional fixed effects

do not have to be added because the terms of the basic DiD model already captures these effects. Part of the DiD model requires that a dummy variable is used to identify and distinguish between the treatment and control group. This acts as an identification that controls for cross-sectional fixed effects between the treatment and control group. More specific to this paper, the dummy variables are for type of state in the US (STW or non-STW) and type of worker in the Netherlands (permanent or flexible). The coefficient of the time dummy *post* captures the difference in the aggregate effect of all covariates between the treatment and control groups that changes over the pre- and post-treatment periods but affect both groups similarly. Though these dummy variables make a distinction at a larger scale than compared to cross-sectional fixed effects that often occur at an individual level, this would not be necessary for a DiD analysis since the treatment or policy intervention also occurs at a group scale. Therefore, it would be sufficient for cross-sectional fixed effects to be controlled for at a group level too.

6.3 Descriptive statistics

Table 2. Descriptive statistics.

Group	Variable	Obs	Mean	Std. Dev.	Min.	Max.
STW states	Weighted average unemployment rate	30	4.49	2.29	2.64	10.65
Non – STW states	Weighted average unemployment rate	30	1.47	0.73	0.91	3.84
STW states	State unemployment rate	780	5.47	3.14	4.7	14.2
Non – STW states	State unemployment rate	720	5.43	3.13	2.6	13.2
Flexible	Total number of workers (thousands)	74	1546.91	284.47	1026	2008
Permanent	Total number of workers (thousands)	74	5501.08	209.45	5121	5777

Age 15 – 74	Ratio of permanent to flexible workers	74	3.70	0.82	2.63	5.53
Age 15 – 24	Ratio of permanent to flexible workers	74	0.73	0.29	0.38	1.41
Age 25 – 34	Ratio of permanent to flexible workers	74	3.79	1.15	2.41	6.30
Age 35 – 44	Ratio of permanent to flexible workers	74	7.33	1.46	5.24	10.46
Age 45 – 54	Ratio of permanent to flexible workers	74	9.36	1.86	6.41	12.93
Age 55 – 64	Ratio of permanent to flexible workers	74	9.29	0.89	8.01	11.41
Age 65 – 74	Ratio of permanent to flexible workers	74	0.92	0.48	0.45	2.47

6.4 Common Trend Assumption

With a DiD analysis, the common trend assumption has to be justified where in the absence of the STW scheme, the difference between the unemployment rates in the treatment and control group would have remained constant throughout the pre-treatment period and the post-period treatment period. This ensures that a suitable counterfactual is established so that the DiD estimate obtained will accurately represent the treatment effect. Expressed in potential outcome notation, this assumption can be written as:

$$E[Y_i|p = 0, t = 1] - E[Y_i|p = 0, t = 0] = E[Y_i|p = 1, t = 1] - E[Y_i|p = 1, t = 0]$$

One common practice in the DiD literature to test the validity of the common trend assumption is to carry out a visual inspection of the trends in the pre-treatment period exhibited by the treatment and control group. If the trends of the two groups in the pre-treatment period are parallel, then this could lend support to the common trend assumption. However, testing the pre-treatment trends alone is not sufficient in proving

this assumption. Economic justification also has to be given to argue that in the absence of the treatment, both the control and treatment group would still continue to have similar trends. The graphical analysis could be used to visualize how factors such as the infection rates and death rates vary between the two countries. If the two countries are affected to similar extents, the common trend assumption can be justified. Figure 1 shows the number of permanent and flexible employed workers in the Netherlands from the 1st quarter of 2003 through the 2nd quarter of 2021.

Based on figure 1, it can be seen that before the NOW-scheme was implemented, there was an upwards and downwards trend for permanent and flexible workers respectively in the age group 15 - 24. Throughout the pre-treatment period, where the previous STW scheme (WTV) has been already implemented for a significant amount of time, there seems to be a diverging trend among permanent and flexible workers. The number of permanent workers has been increasing from 2011 to 2nd quarter of 2019. After that, the number of permanent workers decreased by almost 200 000. In contrast, the number of flexible workers showed a slight decreasing trend from 2011 to 2017 and then this trend reversed from 2017 to the 1st quarter in 2020. However, after the 2nd quarter in 2020, the trends for both permanent and flexible workers appear to shift after the introduction of the NOW-scheme which, compared to the old STW scheme (WTV), allows both permanent and flexible and permanent workers to participate in the STW scheme. Though the post-treatment period is relatively limited given how recent the NOW-scheme was introduced, the trend in both categories appears at first glance to have equalized. Given the DiD in-reverse framework that is performed, this gives support to the common trend assumption after the NOW-scheme was introduced. Therefore, age group 15 – 24, with ratio of permanent to flexible workers at 0.73, seems to be the most reliable group for a DiD analysis based on graphical analysis. The trends between flexible and permanent workers seem to converge after the introduction of the NOW-scheme. One possible reason for age 15 – 24 being the most ideal group for analysis is that the ratio of permanent to flexible workers is close to 1. Unlike other groups which have ratios that vary from 3 to 9, except for age group 65 – 74 which has a ratio of 0.92. However, age group 65-74 is unlikely to be ideal because of the limited number of observations.
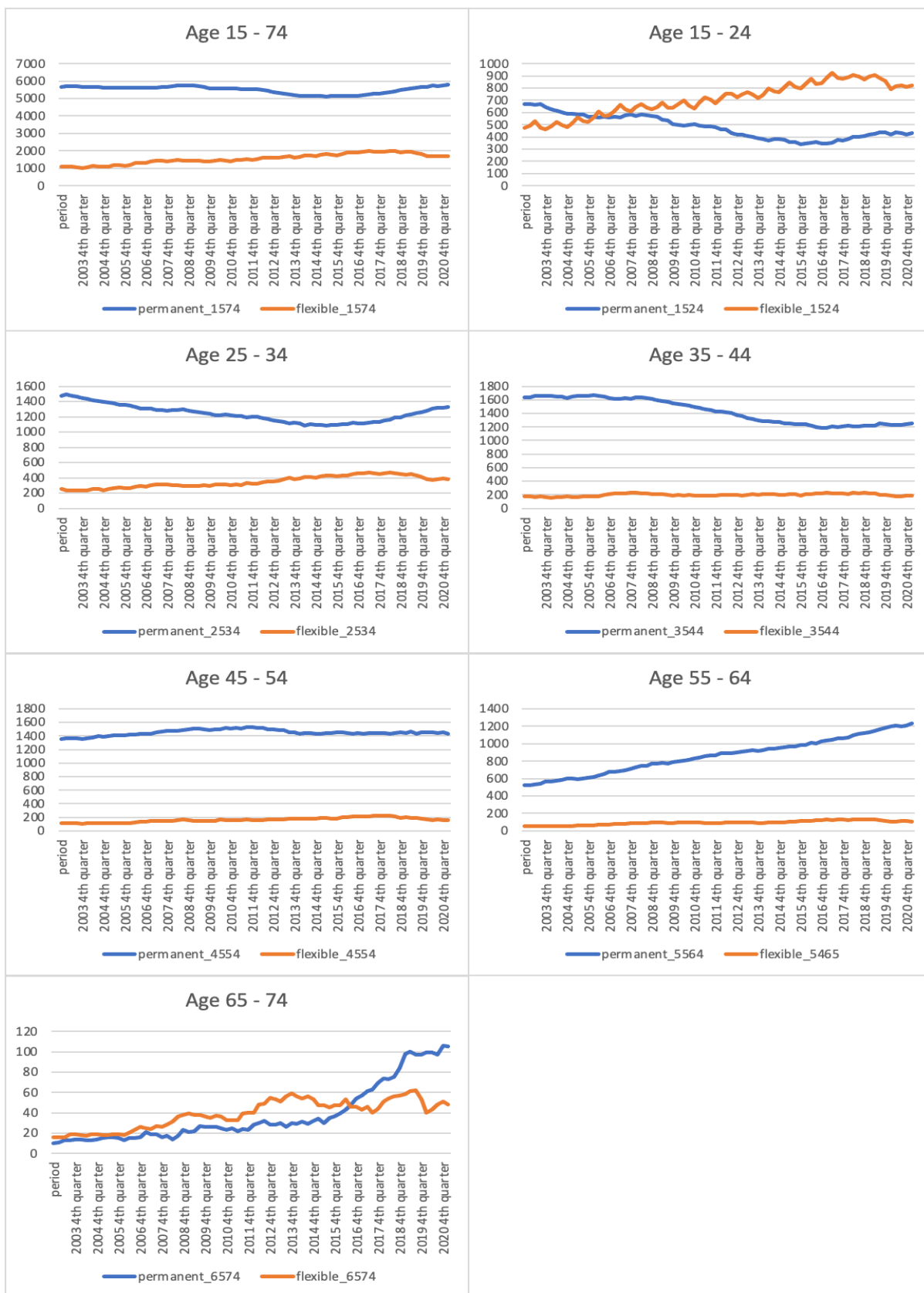
Figure 1: Number of permanent and flexible workers in the Netherlands.

Going back to the traditional DiD framework that is applied to investigating STW schemes in the US, the historical monthly unemployment rates are shown in figure 2. From 2016 to 2021, the unemployment rates in states without STW schemes were always higher than states with STW schemes by approximately 2%. However, it is unclear why the average unemployment rate is higher in states with STW schemes. Several possible reasons could account for this observation which is still unclear from the literature. The combined GDP of states with STW accounts for approximately 70% of the total GDP of the US. A higher GDP could represent some form of structural unemployment that is causing the higher unemployment rates in the STW scheme states. According to de-Graaf-Zijl et al. (2015), STW schemes could lead to long-term unemployment if it becomes difficult for firms to lay off workers. However, given that the take-up rates of STW schemes in the US are relatively low, it should be reasonable to rule out the STW schemes as the reason for the difference in unemployment rates between STW and non-STW states.
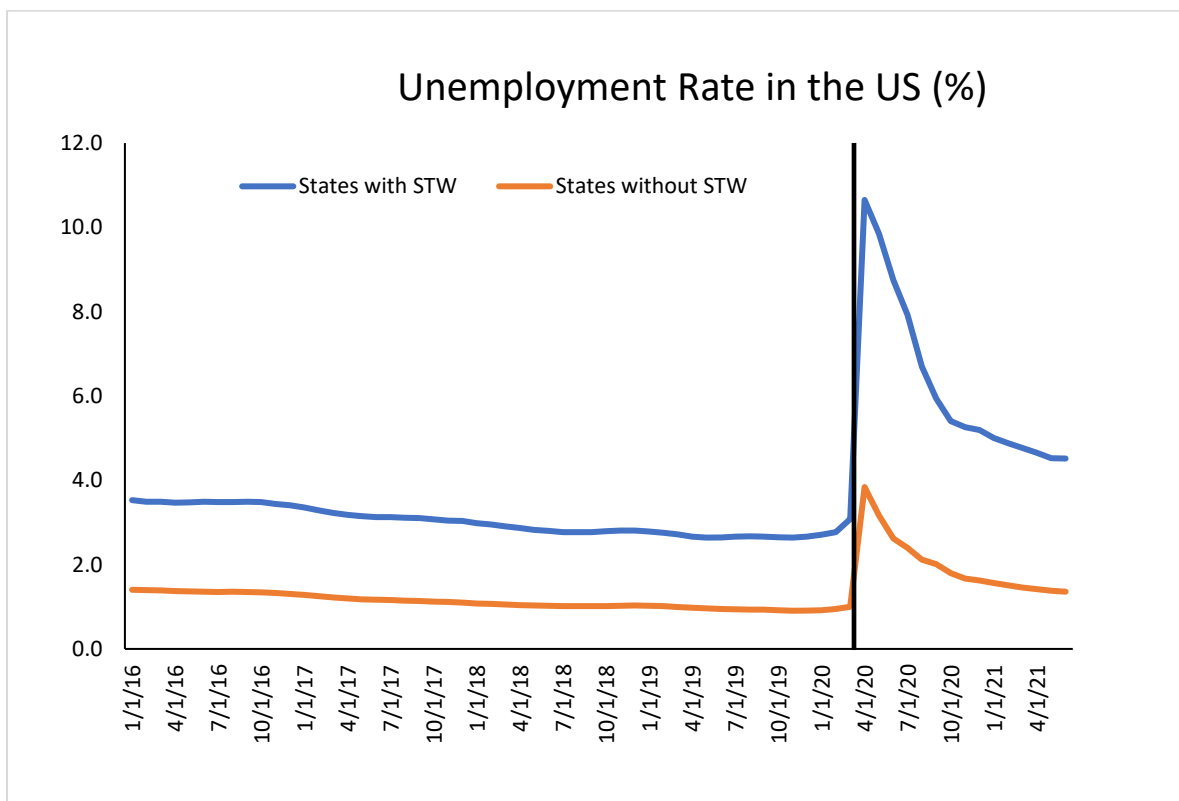

Figure 2: Unemployment rates in STW and non-STW states in the US.

In the literature, it is not uncommon to account for a delay in employers taking up the information, a certain time lag could be implemented to account for the time needed for employers to utilize the new scheme (Cahuc, 2019). The duration of the time lag depends on whether employers expected the NOW scheme which could be determined by the time gap between the announcement and implementation of the STW scheme. Another factor could be how familiar employers are with STW schemes. If STW schemes are a common practice and have been implemented for a significant period of time already, employers would be quicker to participate in them since they do not have to spend as much time researching or calculating how beneficial it would be for their firm to participate in the STW schemes. Looking at the context of STW schemes in the US and the Netherlands, it seems that a time lag is not needed for the following analysis. STW schemes have been in place in the US for the entirety of the testing period, specifically from 2016 to May 2021. Thus, employers in STW states can be considered familiar with STW schemes and will react quickly to the Covid-19 pandemic and the CARES Act in terms of deciding whether or not to participate in the STW scheme of their respective state. With regard to the Netherlands, there was practically no difference in the announcement and implementation date of the NOW-scheme. However, this should not be taken as evidence for the introduction of a time lag which accounts for the delay in employers taking up the STW scheme. Before the NOW-scheme, there was already an older STW scheme (WTV). Employers, therefore, can be reasonably assumed to be familiar with STW schemes. The main difference between the two STW schemes is that the newer NOW-scheme allows flexible workers to participate. While it is possible that employers may value flexible workers differently compared to permanent workers, and therefore require more time to weigh the costs and benefits of retaining flexible workers through the NOW-scheme, the prolonged experience employers have with regard to STW schemes should enable them to decide quickly on whether to enroll flexible workers into the STW scheme. Therefore, the analysis in this paper does not implement a time lag.

7. Results

7.1 United States

The regression estimates of the effect of STW schemes on unemployment rates in the US are shown in Table 2. The variables of interest that demonstrate the impact of STW

schemes during the Covid-19 pandemic are the interaction terms between the time dummy and the dummy for treatment. model A which uses aggregated weighted average unemployment rates show that i.post##i.STW is significant at the 1% significance level. However, a surprising result is that the coefficient is positive, 2.51, which was expected to be negative since STW is supposed to reduce unemployment rates. Model B uses state-level unemployment rates and the interaction term was found to be insignificant with a coefficient of 0.411. Model C uses several time dummies to demonstrate how the treatment effect changes over time. This effect is plotted and shown in figure 3. The results of model C shows that the effect of STW schemes were only significant in the second month after the introduction of the intervention. However, similar to model C, the sign of the coefficient is unexpectedly positive which implies that unemployment rates in states with STW schemes actually increased more than that of those without.

Table 2. DiD estimates of STW schemes on unemployment rates in the US from Jan 2019 to June 2021.

Unemployment rate	Model A (weighted average)	Model B (state level)	Model C (treatment over time)
Post	1.041***	3.575***	-
	(0.188)	(0.416)	
STW	1.760***	-0.157	-0.147
	(0.030)	(0.226)	(0.364)
Post x STW	2.510***	0.411	-
	(0.561)	(0.514)	
constant	0.953***	3.643***	4.273***
	(0.010)	(0.192)	(0.262)
post_month			
1	-	-	7.172***
2	-	-	4.997***

3	-	-	4.368***
4	-	-	3.293***
5	-	-	2.901***
6	-	-	2.272***
7	-	-	1.747***
8	-	-	1.593***
9	-	-	1.418***
10	-	-	1.268***
11	-	-	1.135**
12	-	-	0.989**
13	-	-	0.822*
14	-	-	0.764*
STW x post_month			
1	-	-	0.674
2	-	-	1.303**
3	-	-	0.898
4	-	-	0.500
5	-	-	-0.004
6	-	-	-0.044
7	-	-	0.419
8	-	-	0.369
9	-	-	0.221
10	-	-	0.263
11	-	-	0.254
12	-	-	0.285
13	-	-	0.340
14	-	-	0.402
R^2	0.783	0.364	0.363
Observations	60	1500	1500
Number of groups	2	50	50

a. Robust standard errors are shown in parentheses for Model A. Clustered standard errors at the state level are shown for Model B. The standard errors for t_relative and i.treated##t_relative are 0.4753 and 0.6592 respectively. The standard errors are not shown as they are repetitive and doing so would result in untidiness.
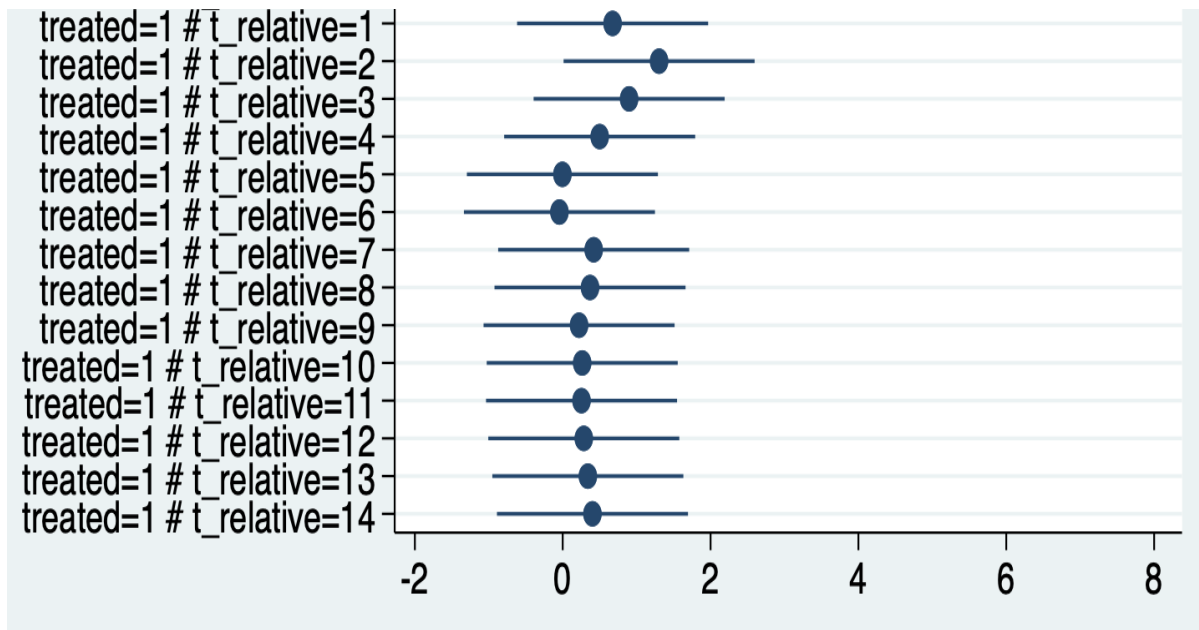
Figure 3: coefficient plot of Model C diff-in-diff analysis in the US.

7.2 Netherlands

The coefficient estimates of the DiD analysis on the effect of STW schemes on equalizing employment between flexible and permanent workers are shown in Table 3. The main age group of interest that is the age group 15 – 24 which has a relatively equal number of permanent and flexible workers. The interactin term i.post##i.flexible has a coefficient of -169.62 which is significant at the 1% significance level. Based on a reverse DiD framework, this implies that the number of flexible workers between ages 15 and 24 were lower than permanent workers by 1696200 before the implementation of the STW scheme. This means that after the implementation of the NOW-scheme, the trends of the flexible and permanent workers between ages 15-24 equalized and before that, flexible workers were employed at lower rates compared to permanent workers as only permanent workers were granted access to STW schemes. Therefore, this result points at the effectiveness of the NOW-scheme in equalizing employment between flexible and permanent workers in the Netherlands as compared to the previous STW scheme in place. This could be attributed to the fact that the new NOW-scheme allows the participation of flexible workers while the old scheme did not.

Table 3. DiD estimates of STW schemes in the Netherlands from 2016 to June 2021.

Dependent variable	Age group						
Number of workers (thousands)	15-74	15-24	25-34	35-44	45-54	55-64	65-74
Post	-245.7**	57.94***	-71.66***	206.69***	3.568	-374.4***	-67.99***
	(28.549)	(12.456)	(15.471)	(22.31)	(6.356)	(23.147)	(3.300)
flexible	-4040**	384.60***	927.00***	-1056.8**	-1285**	-1100.6**	-55.20***
	(15.069)	(5.804)	(7.173)	(4.237)	(3.801)	(5.545)	(2.422)
Post x flexible	92.05**	-169.62**	35.98**	-187.5***	-3.252	357.06**	60.04***
	(45.913)	(21.179)	(18.159)	(22.603)	(7.863)	(23.368)	(14.53)
Constant	5730.2***	427.2***	1308***	1237***	1446.2**	1210.4***	101.20***
	(13.617)	(2.915)	(6.769)	(3.231)	(3.146)	(5.361)	(1.632)
R-squared	0.985	0.506	0.958	0.961	0.996	0.903	0.296
Observations	148	148	148	148	148	148	148

a. Robust standard errors are shown in parentheses.

b. Significance at the 10%, 5%, and 1% are represented by *, **, *** respectively.

7.3 Strict exogeneity

One of the important identifying assumptions of the DiD framework applied in this paper is the strict exogeneity of the experiment as described by Wing, Simon and Bello-Gomez (2018). This requires that the timing of treatment, which is the implementation of STW schemes to the respective treatment group in this paper, be independent of the potential outcomes of the treatment and control groups. In this case, the outcome variables are monthly state unemployment rates in the US and quarterly number of employees in the Netherlands. Strict exogeneity, in practice, can

fail to hold due to various reasons such as certain groups anticipating the policy intervention or treatment and thus, altering their behavior to benefit from it. For example, if some employers anticipated that STW schemes in the Netherlands would be extended to flexible workers in the near future, they may have hired or retained more flexible workers leading up to the implementation of the policy so that they would have a larger group of flexible workers to put on STW schemes. Employers acting based on certain expectations or inside knowledge that was available to only a select group would threaten the reliability of the DiD analysis.

Another reason could be that policy makers change their interventions based on the outcome variables. Using the DiD analysis in the US of the effect of STW schemes on unemployment rates, this could prove to be a concern as it is arguable that rising unemployment rates affect the decision to increase financial benefits of STW schemes. For strict exogeneity to hold, treatment exposures that occur in the post-treatment period cannot be anticipated by outcome variables in the pre-treatment period (Wing, Simon & Bello-Gomez, 2018). If some states in the US based their decision to implement STW schemes on state unemployment rates, then there may endogeneity in the model via reverse causality where state unemployment rates predict the implementation of STW schemes. Based on the nature of the CARES Act and that the STW states in the US have already a STW scheme in place for a substantial period of time, it could be argued that there is little cause for concern of a case of reverse causality in this DiD analysis. The increase in funding provided to workers participating in STW schemes, through the CARES Act, was implemented by the federal government who have not authority to govern the implementation of STW schemes across states. Therefore, the increased financial aid given towards STW schemes act only as an incentive, if any, to states. Furthermore, STW states already had schemes in place for a period of time and it seems unlikely that non-STW states would suddenly implement STW schemes in addition to the familiar unemployment benefit system during the Covid-19 pandemic. For a case of reverse causality, non-STW states would have to implement STW schemes in their respective states as a result of rising state unemployment rates. Though it seems plausible that states would try to implement STW schemes in response to rising unemployment rates, it is argued in this paper that higher unemployment rates during the Covid-19 pandemic has little weight in the decision of non-STW states to suddenly implement STW schemes rather than to just increase unemployment benefits.

These factors that threaten the validity of the DiD framework could possibly be detected in the common trend assumptions test, however, to only a limited degree of certainty since the common trend assumption is not statistically testable in a two-group two period DiD framework (Wing, Simon & Bello-Gomez, 2018). With regard to certain groups anticipating the implementation of STW schemes, only certain groups would act according to some exclusive information and the trends in the group for flexible workers would likely see a sudden volatility, if any, prior to the date of implementation of the STW scheme. In this paper, visual plots were offered and argued in favor of the common trend assumption holding as shown in Figure 1 and Figure 2. However, graphical evidence becomes less convincing as the number of observations decreases. On the other hand, increasing the number of observations would lead to higher volatility and noise as different adjustments and interventions are put into place. All in all, there are several factors that could potentially pose a threat to the validity of the DiD analysis in this paper. While common trend assumption checks were performed and various economic arguments given, they are no guarantee that the identifying assumptions hold true and the results should be interpreted with caution.

8. Discussion

Based on the results performed on the DiD analysis, STW schemes during the Covid-19 pandemic did not have significant effects on curbing unemployment. In the US, states that utilized STW schemes did not see a significantly lower change in unemployment rate than states that did not use STW schemes. This is against the literature which shows that STW schemes provide incentives for employers to retain workers during economic downturns if the government provides sufficient incentives and financial aid (Cahuc, 2019). There are several possible reasons for STW schemes not being effective in the US. The use of STW schemes is relatively new in the US compared to other countries. Unfamiliarity with STW schemes among employers could discourage them from participating. A low number of employers participating would mean a low take-up rate which is detrimental to the overall effectiveness of STW schemes in reducing unemployment during the economic downturn. This is supported by the low take-up rate of less than 1% before and after the beginning of the Covid-19 pandemic (Krolikowski and Weixel, 2020). Another reason for the low take-up rate could be that the financial incentive provided by the government was insufficient to stimulate higher take-up rates. From an employee's perspective, the costs of

participating in a STW schemes would be higher for the Covid-19 pandemic compared to other economic downturns since it comes with the cost of increased risk of being exposed to the virus and thus more health costs. If the financial aid and job security provided by the STW schemes is not sufficiently high, there is a high chance that workers would rather be laid off and receive unemployment benefits during the Covid-19 pandemic. This looks more likely to be the case as well if the Covid-19 pandemic is disproportionately more adverse for flexible and more junior workers who are less likely to be retained by employers.

In the Netherlands, the DiD analysis performed shows that the use of STW schemes called the NOW-scheme in the Netherlands equalized employment trends between flexible and permanent workers between age group 15 – 24. Using a reverse DiD framework where prior to the implementation of the NOW-scheme, flexible workers did not have access to a STW scheme while permanent workers did, the trend of employment between flexible and permanent workers seemed to equalize significantly. This implies that the NOW-scheme, which allowed the participation of flexible workers compared to the previous STW scheme, did have significant effects on equalizing employment between flexible and permanent workers during the Covid-19 pandemic. This result contradicts the results of Lydon, Mathä and Millard (2019) who found discrepancies in the effects of STW schemes on permanent and temporary workers during the Great Recession. They show that firms utilizing STW schemes are less likely to retrench permanent workers during economic downturns. However, there is no impact of STW schemes on the likelihood of temporary workers to retain their jobs in response to a negative economic shock. A possible explanation for their result can be found from the literature where employers have a higher incentive to retain workers with more experience (Boeri & Bruecker, 2011). Flexible workers are usually the first to be laid off during an economic downturn as they possess relatively lesser knowledge and experience that is valuable to a firm. They can be rehired quickly once production increases during the economic recovery phase. With the NOW-scheme, the inclusion of flexible workers in STW schemes aimed to protect them during the Covid-19 pandemic since they are disproportionately more affected by the economic downturn. However, in this paper, it seems that employers have been willing to retain flexible workers using the NOW-scheme more so than with permanent workers. This could be due to the nature of the Covid-19 pandemic. As a result of lockdown measures applied with many public spaces closed such as restaurants and shopping

malls, delivery and courier services have increased due to people demanding more of such services like food delivery. Most of these kinds of jobs are performed by younger people like students who often perform it as a part-time job and are likely to be placed on a flexible contract instead of a permanent one. Therefore, this could be an explanation of why STW schemes had a significant effect of flexible workers during the Covid-19 pandemic but not during the Great Recession as found by Lydon, Mathä and Millard (2019).

One additional factor that should be noted when interpreting the results of this paper is the amount of emphasis that was, or was not, placed on the STW schemes. This paper performs a DiD analysis on STW schemes implemented in the US and the Netherlands. In the US, the use of STW schemes is relatively scarce compared to other regions in the world. In addition to approximately only half of the states utilizing this policy intervention, states that do have STW schemes implemented show a discouraging take-up rates. With a disproportionate number of workers participating in STW schemes, it is likely that state unemployment rates would remain unaffected, or undetected by statistical tests, by the policy intervention even if these STW schemes are indeed effective in helping employers retain valuable workers and overall beneficial during an economic downturn. Therefore, though insignificant results were found in the DiD analysis in the US, it would be unwise to conclude that STW schemes have no place in the US unemployment benefit system when evidence of the ability of STW schemes to reduce excessive unemployment during economic downturns already exists in other parts of the world. Perhaps more research on the specific eligibility requirements and other key aspects of the STW schemes implemented in the US could reveal why these interventions failed to significantly reduce unemployment rates during the Covid-19 pandemic.

Lydon, Mathä and Millard (2019) conducted an analysis of several European countries on the determinants of take-up rates of STW schemes. One insight that they provided, that could be related to the results found in the US in this paper, was that STW use was higher during the Great Recession in countries with formalized STW schemes. Formalized schemes give credibility and confidence to employers and workers to participate in them. This could possibly explain the inability of STW schemes in the US to curb excessive unemployment during the Covid-19 pandemic since the use of STW schemes is the US is relatively new and an uncommon practice as compared to the unemployment benefit system. Therefore, employers in STW

states may not have been willing to participate in STW schemes and were forced retrench workers during the crisis. Future research could also be done to investigate why employers choose or choose not to utilize STW schemes. Factors such as confidence in the scheme or the percentage of wage costs borne by the government are likely crucial to that decision and in turn affect the ability of STW schemes to curb excessive unemployment.

For the NOW-scheme implemented in the Netherlands, the extension of the STW scheme to flexible workers had effects in encouraging more employment of flexible workers for the age group 15 – 24. A possible explanation offered for this result was the nature of the Covid-19 pandemic which resulted in a higher demand for delivery services and other jobs that favored flexible contracts. The result found here contradicts the literature that employers are less willing to retain flexible workers who, on average, do not have a lot of experience that is valuable to firms (Cahuc, 2019). Thus, allowing flexible workers to participate in the NOW-scheme was in essence providing an option that very few employers would be interested in. However, this appears to not be the case in this paper which found that employers actually hired more flexible workers after the NOW-scheme was extended to this group. However, for other age groups between 25 – 74, it is unclear whether the NOW-scheme was successful in equalizing employment opportunities between the two types of contracts. This remains a concern the number of flexible contracts in those age groups are significant and their welfare during a pandemic should also be considered. In this paper, the ratio of permanent to flexible workers in age groups from 25 – 74 varied relatively greatly and was not close to a value of one. When compared to the number of permanent workers, the number of flexible workers affected by STW schemes may be minute and remain insignificant. This affected the ability to implement the DiD design on these groups. Therefore, a different result could be obtained if the analysis was conducted at a smaller level such as the firm-level. If there were data on which firms actually made use of the NOW-scheme to retain flexible workers, a more precise comparison could be made between the use of the NOW-scheme on permanent and flexible workers that could lead to a different result than as seen in this paper.

To obtain a clearer picture of the effects of STW schemes in various countries, data at smaller scales, especially at the firm-level where the decisions on whether to utilize STW schemes take place. Lydon, Mathä and Millard (2019) found that firms with a greater number of long-tenured workers tend to participate more in STW

schemes. This relates to their firm-specific skills that are valuable by companies who are willing to retain them through economic downturns. Future research could investigate how to obtain firm-level data on how firms actually utilize STW schemes. This would give insight into the decision-making process of firms and confirm whether employers are only willing to retain permanent workers on STW schemes during economic downturns. One method to gain more data at the firm-level explored by Lydon, Mathä and Millard (2019) was to conduct surveys on firms to investigate how they make decisions. They asked firms how different factors, such as hiring and firing costs, impact their decision to either fire workers or retain them on STW schemes during economic downturns. And if that were the case, then there will be more information to inform decisions policy makers can make to compensate for how STW schemes disproportionately protects permanent workers and leave flexible workers vulnerable.

9. Conclusion

Since the Great Recession, STW schemes have been used widely around many European countries and other countries like Japan. STW schemes have been shown to be effective in preventing excessive unemployment during economic downturns and more and more countries are beginning to employ them. However, with many different aspects of STW schemes like eligibility criteria and percentage of wage costs shared by the government, the outcome of different STW schemes can vary greatly. In this paper, the effects of STW schemes during the Covid-19 pandemic are examined in the Netherlands and the US during the Covid-19 pandemic. Moreover, the effect of STW schemes on flexible and permanent workers is also examined. Therefore, the distributional effects between different types of workers are also investigated. Using a difference-in-difference framework, unemployment rates are compared before and after the introduction of STW schemes. Moreover, a distinction is made between countries that have already been using STW schemes for a substantial period of time. The results indicate that, in the US where STW schemes are relatively less utilized, they did not significantly reduce unemployment in states that implemented STW schemes. In the Netherlands, where STW schemes have been shown to be effective during the Great Depression, the newly implemented NOW-scheme which replaces the old STW scheme did have significant effects on equalizing employment opportunities for flexible and workers. Another finding was that the ratio of permanent

to flexible workers varied substantially across different age groups. The graphical analysis showed that the age groups that did not have a ratio of permanent to flexible workers close to one did not see a significant change in the trends of employment between those two groups of workers after the implementation of the NOW-scheme.

Even though the effects of the STW schemes did not have certain effects in the US, they still potentially have the ability to curb excessive unemployment during economic downturns if other measures and criteria are also used together. A sufficient financial incentive has to be given to participants so that take-up rates are high enough to influence unemployment rates. When evaluating the benefits STW schemes can bring about to society, it might be wise to consider the social value which includes psychological health benefits of job security in addition to the financial costs saved from avoiding firing and rehiring processes. By only considering the gross financial value of STW schemes, which profit-maximizing employers often do, they might not be willing to retain workers during economic downturns. Therefore, the government has a role in evaluating the social benefits of STW schemes and can stimulate higher take-ups, assuming a positive net value, through the percentage of wage costs contributed by the government.

The data used in this paper is recent and centered around the initial outbreak of Covid-19 pandemic in Europe and the US. However, with the reverse difference-in-difference framework applied in the Netherlands, one limitation could be that a different result might have been obtained if more observations were available to allow for a longer post-treatment period. Furthermore, omitted variables could pose a threat to the empirical validity of the difference-in-difference model. For example, flexible and permanent workers could be facing a different trend in the pre-treatment period which was not detected by the graphical analysis of the common trend assumption. Another limitation could be the age group analyzed which consisted of workers from age 15 to 24. This paper focused on this age group as it represented the most even distribution of flexible and permanent workers. However, further investigating the distributional effects of the NOW – scheme on flexible and permanent workers in different combinations of age groups might reveal other insights. This paper tried to do so but it was not appropriate to use the samples on these other age groups for a DiD analysis.

The unequal distributions in benefits of flexible and permanent workers continue to remain a concern of the effects of STW schemes. It is unclear whether the trends of flexible and permanent workers equalized due to the STW schemes or the

nature of the Covid-19 pandemic that encouraged more employment of jobs that favored flexible contracts. During economic downturns, flexible workers bear a larger share of the negative impacts. To redistribute resources to protect the welfare of flexible workers, other policy instruments should be used in combination with STW schemes to accomplish this.

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