The Danish Model

A Study Investigating the Effect of the Flexicurity System on Unemployment

Bladh, Gabriel

Johansson, Erik

Supervisor
Assistant Professor Petra Thiemann

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Abstract

The main objective of this paper is to assess the impact of the flexicurity system, which was implemented in Denmark in 1994, on unemployment. The Synthetic Control Method (SCM) is used to construct a counterfactual scenario of what the situation would have been like in Denmark in the absence of the flexicurity reform. Our results suggest that the unemployment level in Denmark has been on average 2.431 percentage points lower for women, 0.902 percentage points lower for men, and 1.521 percentage points lower in total during the period 1994–2008 than it would have been without the flexicurity system. The results also pass several placebo and robustness tests, which strengthens the validity of the results.

Key words: **Flexicurity, Unemployment, Denmark, Synthetic Control Method**

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1 Introduction

Concerns regarding unemployment policies are among the most prominent political debates within countries, irrespective of which country of reference. It is once again actualized since the outbreak of Covid-19, which has had a significant negative effect on unemployment. Historically, there have been two different political views concerning labour laws. One dominant policy has included strong labour unions and strong labour laws where it is difficult to terminate workers, and unemployment benefits have existed for unemployed people. The other dominant policy has included weak labour unions and labour laws with high flexibility for employees and low or non-existing unemployment benefits. Denmark was the first country who found a compromise between these two contradictory views and thus managed to facilitate the needs of both employers and employees.

Denmark experienced large issues with unemployment during the late 1980s and early 1990s, and it peaked in 1993, with approximately 12 per cent. In an attempt to break this concerning development, the Danish parliament reformed the labour market. The reform came into effect on January 1st 1994, when the government decided to focus on more Active Labour Market Policies (ALMP), together with the policies of flexibility and security earlier established; this later became known as the flexicurity system. Post the reform, the unemployment level decreased significantly and reached levels below 2 per cent in 2008 (World Bank, 2021; Kongshøj Madsen, 1999). The unemployment rate increased after this during the Great Recession; however, the increase was lower in Denmark than in many other countries. After the recession, the unemployment rate has steadily decreased and reached levels around 3 per cent before the next crisis – the Covid-19 pandemic – hit Denmark and the rest of the world.

This essay attempts to answer the following question: how much of the low levels of unemployment can be attributed to the flexicurity system? In other words, what effect has the flexicurity system had on the levels of unemployment? Measuring the effect of the flexicurity system is difficult since unemployment could be influenced by several other factors, e.g. business cycles, trade shocks, natural disasters, etcetera, which can be challenging to take into account. In the case of Denmark, an economic crisis occurred between 1987 and 1993 (Abildgren and Thomsen, 2011), and since the flexicurity reform was introduced in 1994, the decrease in unemployment could be attributed to the economic recovery of the crises. Such factors could cause endogeneity issues since it is difficult to isolate the effect of the flexicurity reform.

We want to examine what would have happened in Denmark if the flexicurity reform had not been introduced; the problem is that we never observe Denmark in the counterfactual state. The previous is why we do not choose to apply a regular regression analysis, since if an, e.g. OLS-regression, were used, we would not observe what would have happened in the absence of the flexicurity reform. Instead, we employ the Synthetic Control Method (SCM) to address this problem. Ideally, we want two (nearly) identical countries, where one introduces the policy and the other does not. Of course, this does not happen in practice; therefore, we need to construct a synthetic country that combines features from different countries and mirrors the unemployment trajectory of Denmark before the policy was introduced. We choose countries within the Organisation for Economic Co-operation and Development (OECD) and apply the SCM, which constructs a counterfactual Denmark by constructing a weighted average of the included countries. The differences in outcome between the actual Denmark and the counterfactual Denmark are then attributed to the flexicurity system's effect. By using this method, we find that the unemployment level in Denmark has been on average 2.431 percentage points lower for women, 0.902 percentage points lower for men, and 1.521 percentage points lower in total during the period 1994–2008 than it would have been without the flexicurity system.

The remaining part of this essay is structured as follows: section 2 provides an overview of relevant background information; this includes a definition and historical overview of the flexicurity system and relevant economic theories concerning unemployment and its determinants. Section 3 consist of an empirical overview where the results of earlier research on the subject are presented. Section 4 and 5 describes the empirical method and the dataset adopted to answer the research question. The results are presented in section 6 and discussed in section 7. Section 8 contains a conclusion and suggestions for future research.

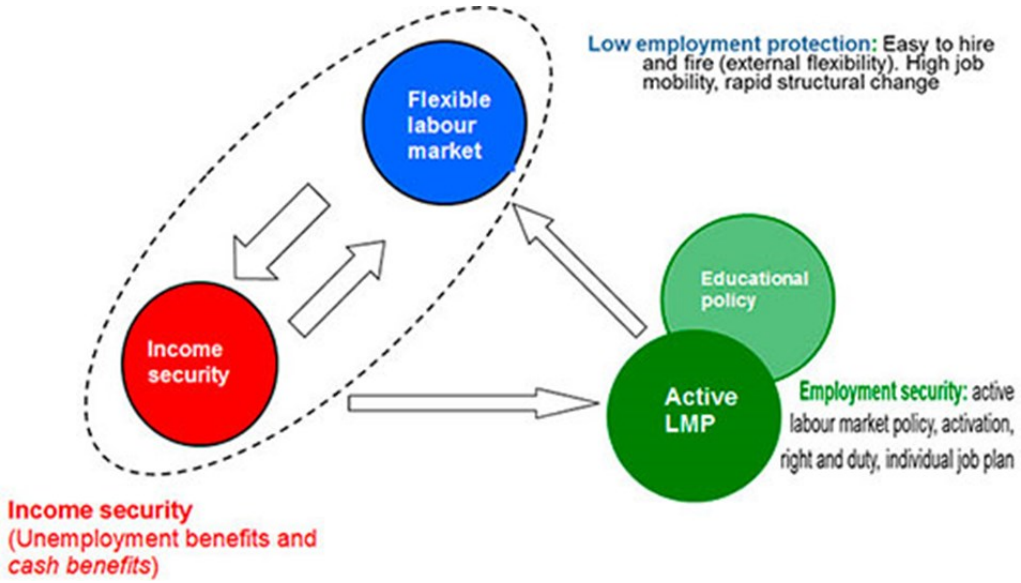
2 Background

2.1 Flexicurity

2.1.1 Flexicurity – Definition

The term is a portmanteau of the words **flexi**bility and se**curity**. The definition of the term is, however, not univocal. A vague definition is a labour market that combines flexibility for the employer and social security for the employees. A narrower and more specific definition is viewing it as a particular system implemented in Denmark. Flexicurity is, therefore, in some regards, a misnomer for the "Danish model" (Andersen and Svarer, 2007).

The Danish model is often referred to as a golden triangle, as visualized in figure 1 below.



Source: Danish Agency of Labour Market and Recruitment, 2020.

Figure 1: The Golden Triangle

The three elements of this golden triangle are:

- **Flexible Labour Market**
  Employers need to be allowed flexibility to reconfigure the workforce to adapt to changing market conditions. A relatively low Employment Protection Legislation (EPL) is necessary to allow employers this flexibility – although collective agreements and legal provisions are still in place. A high level of external numerical mobility, i.e. a high level of job-to-job mobility and worker flows

in and out of employment and unemployment (Danish Agency of Labour Market and Recruitment, 2020).

- **Income Security**
  The income security system in Denmark has a relatively high compensation rate. Low-income groups benefit from around 90 per cent of their previous earnings for two years, provided that they are members of an unemployment fund. Those who are unemployed without membership in an unemployment benefit fund are entitled to means-tested cash benefits at a lower rate than the unemployment benefit (Danish Agency of Labour Market and Recruitment, 2020).

- **Active Labour Market Policy**
  The objective of the active labour market policies is to ensure a well-functioning labour market. The policies consist of several measures aimed at both employed and unemployed workers seeking employment or undergoing job training or education. A substantial part of Denmark's public expenditures is spent on active labour market policies (Danish Agency of Labour Market and Recruitment, 2020). In 2008 Denmark spent about 2.4 per cent of their GDP on active labour market policies. In comparison, Sweden spent 1.4 per cent, and Norway spent 0.7 per cent (OECD, 2021).

2.1.2 The Implementation of Flexicurity in Denmark

The flexible employment protection legislation and the generous social security in Denmark date back to 1899 when the so-called "September Agreement" was signed. The agreement stated that employers had the right to employ and terminate employments. In return, a public system of unemployment benefits was implemented to provide coverage for the unemployed (EU Commission, 2007).

During a long period afterwards, the system rested on these two legs – flexibility for employers and social security for employees. Although, during this period, the system's performance was not admirable. Unemployment levels from the mid-1970s were increasing and reached a maximum of 12 per cent in 1993, and the fraction receiving public transfers was approximately 30 per cent. It was not until 1994, when the system was balanced with a third leg – active labour market policies – that the performance of the system improved significantly (Kongshøj Madsen, 1999). These policies aimed to motivate the unemployed to search for jobs and improve their qualifications; this improved the system's function. Before the reform, the welfare system functioned as a passive player between workers benefiting from social security and employers benefiting from flexibility. When active labour market policies were implemented, it was possible to strengthen employment while simultaneously maintaining social security and flexibility (Andersen and Svarer, 2007).

2.2 Economic Theory

This section presents relevant economic theories. The aim is to provide the reader with necessary background information. The variables included in our method, see section 4 and 5, are also based on the economic theories presented in this section.

2.2.1 Unemployment

Different definitions and causes for unemployment exist; this section aims to provide a brief overview.

Classical unemployment occurs when the wages that workers demand for a job exceeds the market-clearing wage, and the number of job seekers will outnumber the vacancies. The ones that end up without employment will be the (classically) unemployed. Classical unemployment is sometimes also referred to as real wage unemployment, and it is affected by demand and the wage level. Strong labour unions and government regulations, e.g., minimum wage, will cause the wage level demanded by workers to rise and subsequently lead to a rise in classical unemployment (Coen et al., 1987).

Cyclical unemployment, sometimes also referred to as Keynesian unemployment, occurs when the aggregate demand is not sufficient to employ everyone seeking employment. The name is coming from the ups and downs of the business cycle. During downturns, the demand for most goods and services falls, and hence fewer workers are demanded. The wage level does not decrease due to sticky wages, which results in unemployment (Coen et al., 1987).

Structural unemployment is not caused by aggregated demand or the wage level. Instead, the cause is a mismatch between the skills demanded by employers and the skills supplied by the job seekers; this can take many forms; two examples are workers replaced by machines due to mechanisation and lack of sufficient language skills (Amaedo, 2020).

Frictional unemployment, sometimes referred to as search unemployment, occurs because it takes time to find a suitable match between an employer and a jobseeker. New entrants in the labour market, e.g., graduate students, are particularly vulnerable to frictional unemployment (Amaedo, 2020).

The flexicurity mainly addresses frictional unemployment and structural unemployment. Structural unemployment was the largest and the most challenging type to tackle, and a large proportion of the unemployed in Denmark belonged to this group (OECD, 1997). The Danish government began to spend more of its GDP on ALMP during the mid-1990s and targeted the issue with mismatches on the labour market. The government aimed to provide workers with the right skills for the labour market by putting them into job-training programs.

2.2.2 The Philips Curve

Historically, there has often existed a trade-off between unemployment and inflation. This relationship is called the Phillips curve, named after A.W. Philips in 1958. Phillips found an inverse relationship between the level of unemployment and inflation; low unemployment is associated with high inflation and vice versa.

The validity of the Phillips curve is questioned. During the 1950s and 1960s, the relationship between the two variables was quite clear. During the 1970s, there seemed to be little to no relationship between the two variables. In more recent years, the Phillips curve has flattened, suggesting that the relationship is not as strong as it once was (Engemann, 2020).

In reality, the flexicurity reform proved the Philips curve to be wrong in this case. Seeing as the large decrease in unemployment in Denmark did not occur at the expense of increased inflation (Kungshöj Madsen, 1999). Our collected data shows that the Danish inflation rate was close to the targeted two per cent each year from 1994 to 2007 (World Bank, 2021).

2.2.3 Okun's Law

There exists a relationship between the changes in output (GDP) and changes in the unemployment rate, known as Okun's law. The law is a standard tool used by policymakers and forecasters. A simplified version of the law is the following rule of thumb; a 2 percentage point drop in GDP is associated with a one percentage point drop in the unemployment rate. Historically, the relationship has been relatively steady in the United States, where most research is conducted. However, the relationship exists in other countries as well, albeit with different magnitudes, and the validity of the law is commonly accepted (Daly et al., 2014).

3 Empirical Overview

3.1 The Legs of the Golden Triangle

3.1.1 Flexibility

This overview is inspired by an extensive research overview of the effects of flexibility conducted by Arestis et al. (2020).

Labour market institutions have been outlined as the leading determinant of labour market performance. Institutions that enhance flexibility when an economic shock occurs lead to lower levels of unemployment and higher levels of employment (Blanchard and Wolfers, 2000). Therefore, countries with a flexible labour market show the best results for unemployment and employment. Subsequently, the policy recommendations are clear: labour markets should be reformed to make them more flexible. Encouraged by these arguments and recommendations made by several influential international institutions such as the OECD, the International Monetary Fund (IMF) and the European Commission (EC), several countries have approved labour market reforms. The reforms have targeted what is believed to be the primary source of rigidities in the labour markets: collective bargaining, Employment Protection Legislation (EPL) and unemployment protection schemes (Arestis et al., 2020). It was taken for granted that these reforms would generate higher employment and lower and more stable unemployment rates in the long run. Despite the intensity of these reforms, the empirical evidence of their effect on employment and unemployment is not conclusive (Avdagic and Salardi, 2013; Bertola, 2017; Kugler, 2019). Several studies investigating the role of labour institutions in the labour market have focused on the impact of EPL. EPL aims to provide workers with a certain level of security and protection in their jobs by specifying rules that employers must follow when hiring and dismissing workers. EPL is believed to generate rigidities in the labour market, which generates unemployment (Arestis, 2009; Blanchard and Wolfers, 2000; Fadda, 2013). Since the 1980s and onwards, many countries have introduced labour market reforms that hold down firing costs and favoured non-standard contracts, leading to a rising share of temporary contracts. The lower protection of these workers explains this increase. Temporary workers also have lower wages in general, which incentivizes employers to use these kinds of contracts. There is no unambiguous empirical evidence on the impact on unemployment and employment rates of these reforms (Bertola, 2017; Boeri et al., 2015; Heyes and Lewis, 2015; OECD, 2018).

Measures taken to increase security in the late 1970s led to an increase in structural unemployment in European countries, according to Blanchard and Wolfers (2000). On the other hand, several studies have concluded that EPL has no negative impact on unemployment (Adams et al., 2019; Avdagic, 2015; Avdagic and Salardi, 2013; Bertola, 2017; Boeri et al., 2015; Flaschel et al., 2012; Heyes and Lewis, 2015; Myant and Brandhuber, 2016).

The uncertainties about the effect of EPL has increased further in recent years, with studies that focus on the period after the Great Recession. Studies suggest that high EPL for permanent workers are associated with higher increases in unemployment in Europe (Druant et al., 2012; Boeri and Jimeno, 2016; Sharma and Winkler, 2018). On the other hand, other studies found that countries with high EPL showed the best labour market results during the Great Recession (Ferreiro and Gomez, 2017; Tridico, 2013, 2017).

In summary, the effects of EPL are not apparent. Whether it affects employment and unemployment rates have not been conclusively proven or disproven. The OECD has adopted the view that EPL "tends to have either no or a small negative effect on employment" (OECD, 2012).

3.1.2 Social Security

This section gives an overview of the empirical evidence of unemployment benefits and is inspired by an extensive research overview of the effects of social security conducted by Tatsiramos and van Ours (2014).

It will focus on two things: how the benefits system affects the outflows from unemployment and the inflows to unemployment.

The empirical literature on how unemployment insurance affects the exit rate from unemployment focuses on two dimensions: benefit level and benefit duration (Tatsiramos and van Ours, 2014). Benefits are generally found to have an insignificant or weak effect on unemployment outflow in most continental European studies. In contrast, the effect in American and British studies often finds significant effects (Holmlund, 1998). The disincentive effect of benefit levels also differs between the duration of unemployment, with higher effects for short-term unemployment (Nickell, 1979; Fallick, 1991).

The literature on how the duration of benefits affect the unemployment exit rate is extensive. Influential studies are, e.g., (Ham and Rea, 1987; Meyer, 1990; Katz and Meyer, 1990; Hunt, 1995; Carling et al., 1996; Winter-Ebmer, 1998) and the main conclusion drawn from these studies is that changes in the duration of benefits significantly affect unemployment duration. The magnitude of the effects differs between policy changes and countries. However, an extension of the duration of unemployment benefits increases the actual unemployment duration by approximately 20 per cent of the duration extension. Another typical result is that the exit rate increases sharply close to the expiration date of the benefits.

In summary: The job searching behaviour of unemployed workers is influenced by the duration and level of unemployment insurance. Existing evidence suggests that both types of increases in the generosity of the insurance system lead to longer unemployment durations.

The empirical literature on how unemployment benefits affect the unemployment inflow is not as extensive as the literature on outflow. Most empirical studies focus on eligibility rules. The question is how eligibility rules for entry into unemployment benefits affect workers' decision to resign and the decision for firms to fire workers, and the employment duration. Studies that aim to answer these questions are, e.g., (Christofides and McKenna, 1995,1996; Green and Sargent, 1998; Green and Riddell, 1997) and the main conclusion from these studies is that the exit rate from employment to unemployment increases substantially as soon as the workers qualify for unemployment benefits. Other results suggest that the probability of layoff increases when workers qualify for benefits, see, e.g., (Anderson and Meyer, 1997; Winter-Ebmer, 2003; Lalive and Zweimuller, 2004).

3.1.3 Active Labour Market Policies

Active Labour Market Policies (ALMP), the third leg of the Danish Golden Triangle visible in figure 1, is public sector-sponsored employments and job training programs used to integrate unemployed and economically disadvantaged people into the labour workforce (Heckman et al., 1999); this can be done through the public provision of job training, job search assistance and wage subsidies (Heckman et al., 1999). The authors further argue that many of these programs are ineffective for the targeted unemployed and the public sector.

A large study conducted in recent years found that different groups are affected differently by market programs. The authors of this study summarize over 200 other studies that measured the effect of ALMP. One group that benefits more from these programs is female participants or people who suffer from long-term unemployment. They also conclude that ALMP seems to have larger positive gains if there is a recession (Card et al., 2017).

3.2 Flexicurity

The empirical literature on how the flexicurity system affects unemployment is not substantial, particularly not for Denmark. Early evaluations estimated that the flexicurity system reduced unemployment by 60–70,000 people in Denmark in 1995; this is a significant amount considering that the total number of unemployed was 288,000 at the time (Bonoli, 2002).

Another study found that the flexicurity system fails to increase the unemployment prospects for people with weak employment prospects, e.g. people with low education or disabilities. The study compared outcomes for this group between countries with the flexicurity system (Denmark and the Netherlands) with the outcome in countries with only high security (Sweden) and only high flexibility (the United Kingdom). The results suggest that the employment prospects for this group are lowest in Denmark and highest in Sweden, the country with the highest security and lowest flexibility in the study (McAllister et al., 2015).

The Danish "job miracle" has partly been attributed to the Danish flexicurity system. The unemployment rate in Denmark reached 12.3 per cent in 1993 but dropped to 5.7 per cent in 1999. The employment rate during the same period is a surplus of 169,000 people, from 2 531 000 in 1993 to 2 700 000 in 1999. Even though the unemployment rate fell dramatically during these years, Kungsøj Madsen argues that the true Danish "miracle" is that the economic growth and rising employment have been made without any inflation in wages, which is the expected outcome of a significant decrease in unemployment (Kungsøj Madsen, 1999).

Some researches suggest that evidence regarding the Danish "miracle" should be doubtfully considered; the workforce decreased by 24,000 people between 1994 and 1999, which reduced the unemployment rate. Further, the flexicurity reform in 1994 put participants into labour market measures, and the participants in labour market schemes were not registered as unemployed. The people in the schemes accounted for 119,000 persons in 1999, a doubling from 1990; of those, 45 per cent were enrolled in educational programs, and 55 per cent were enrolled in various kinds of job training programs (Albæk et al., 2008).

The three concepts described in section 3.1 together create the Danish model of flexicurity. Before flexicurity was introduced to the broader public, the two concepts that form flexicurity had been seen as contradictory to each other for a long time. Flexibility for employees and security for employers was considered contradictions, and the political aim was to end the conflict between efficiency and equity.

What makes flexicurity especially attractive from a political perspective is that it is a "win-win" situation. There will be wage earners who feel economically secure and employers that can easily hire, fire and allocate their workforce due to the high flexibility. The outcome will be growth and prosperity for society as a whole. However, the positive aspects described above is ideal if the system works. Trade unions and political actors have raised concerns regarding flexicurity, and some have called it a "Trojan horse", which is designed to abolish traditional job protection and remove the victories won by the European workers throughout the 20th century (Kungshöj Madsen, 1999).

Whether flexicurity works or not is, in the end, an empirical question. We will approach this question with the SCM, which to our knowledge, has not been conducted before.

4 Empirical Model

4.1 Method

The empirical model used in this thesis is the Synthetic Control Method (SCM). The SCM is a statistical technique that can be implemented to estimate the effect of events or policy interventions on an aggregate, e.g. country, level. In order to measure the effectiveness of an intervention, one needs to know the unobserved counterfactual, i.e., what would have happened in the absence of the intervention; this is usually done by comparing the actual outcome with the outcome of a control group. However, it can be challenging to find a suitable control group. The counterfactual and the subsequent result are, therefore, likely to be misleading. The SCM solves this issue by statistically constructing a synthetic control country.

To be able to measure the effect of the flexicurity reform, we, therefore, need to construct a synthetic country that combines features from different countries and mirrors the unemployment trajectory of Denmark before the policy was introduced.

If the method is applicable and implemented correctly, the trajectories of the outcome variable for the country of concern and the control countries will closely mimic one another until the intervention takes place. After the interventions, the two trajectories will be offset by the effect of the intervention, if the intervention had any effect.

To be more concrete, the synthetic control method can be represented by a $Jx1$ vector of weights, $W = (w_2, ..., w_{j+1})'$, where J represent countries. It helps us find the value of the outcome variable that would have been observed if the intervention did not occur. The synthetic control method is a combination of the characteristics of countries in the donor pool, which is the collection of countries similar to Denmark; see section 4.3 for further information. The donor pool will approximate the characteristics more sufficiently than any unaffected country alone. So instead of comparing with just a single country, the synthetic control method is the weighted average of countries in the donor pool. The estimators of the synthetic country will then be given by the following equations:

$$\hat{Y}_{1t}^{N} = \sum_{j=2}^{\mathrm{J}+1} w_j Y_{jt} \tag{1}$$

$$\hat{\tau}_{1t} = Y_{1t} - \hat{Y}_{1t}^{N} \tag{2}$$

Where $\hat{Y}_{1t}^{N}$ is the outcome variable for the synthetic units at time t, Y_{jt} is the outcome variable for country J at time t, w is the weight assigned to country J, and the sum of the weights is one. $\hat{\tau}_{1t}$ is the treatment effect at time t, derived as the difference between the real unit and the synthetic units

(Abadie, 2020).

A previous study called "Comparative Politics and the Synthetic Control Method" has been an inspiration for this thesis, and we will use this study to provide an example of how the SCM works in practice. The authors of this study conducted an experiment where they wanted to examine the economic effect of the German reunification, especially the effect for West Germany. The authors create a synthetic West Germany that never reunited with East Germany by assign weights from 0 to 1 to countries most similar to West Germany. The synthetic West Germany consisted of the weighted average of the following countries: Austria, Japan, the Netherlands, Switzerland, and the United States. The combination of these countries mirrors West Germany well and therefore constitutes a suitable control group. It would have been difficult to find a suitable control group with another method, e.g. if a diff-in-diff was used, no country similar to West Germany reunited; hence, such a comparison is impossible. The authors find that West Germany would have been economically better off without reunification with East Germany (Abadie et al., 2015).

4.2 Assumptions and Data Requirements

The credibility of a synthetic control estimator greatly depends on its ability to undeviatingly track the trajectory of the outcome variable for the affected unit during the period before the intervention. With only a tiny number of pre-intervention periods, this is difficult to achieve. Therefore, it is crucial to collect data for a sizeable pre-intervention period (Abadie, 2020). The pre-intervention period in this thesis ranges from 1986 to 1993, and we do indeed argue that nine years prior to the intervention is enough to conduct this study.

It is also essential to collect data for a sufficiently sizeable post-intervention period. It might take time before the effect of some intervention emerges, and if the post-intervention period is too short, these effects will be missed. Conversely, the effect might also be significant during a few initial periods before the effect dissipates. Therefore, an extensive post-intervention period is desirable since it paints a more precise picture of the effects over time. The post-intervention period in this thesis ranges from 1994 to 2008, which is enough to measure the effect of the flexicurity reform.

A balanced panel data set is required in order to implement the SCM using statistical software. This requirement can be limiting since any variable or control unit that does not contain data points for all years; both pre-and post-intervention must be excluded since no gaps are allowed in the panel.

Another critical requirement is the availability of a suitable comparison group (Abadie, 2020) — more on this in section 4.3.

4.3 Donor Pool

The very definition of a comparative case study implies that inference based on the method will be misleading in the absence of a suitable comparison group. A suitable comparison group, or donor pool, consists of several countries that fulfil specific requirements.

It is essential to restrict the donor pool to countries with similar characteristics as the treated country, Denmark, in this case (Abadie, 2020). Therefore, the donor pool has been restricted to countries belonging to the OECD. The OECD members from Asia, South- and Central America have been excluded since they are believed to differ too much from Denmark.[1] The same goes for countries that previously belonged to

[1] Chile, Columbia, Mexico, Turkey, Israel, Japan, and South Korea

the so-called east-block.[2] Germany was divided during some of the years of the pre-intervention period. Data points before the reunification, therefore, comes from West Germany.

Another necessary restriction is that countries that adopted similar interventions during the period must be excluded. Whether this is the case or not is not entirely easy to determine, seeing as the definition of flexicurity is not clear, as mentioned in the background. However, the Netherlands has been excluded from the donor pool since their system resembles the Danish.

In summary, the countries that meet these requirements and subsequently are considered suitable are listed in table 1 below.

Table 1: Donor Pool

Denmark	Finland	Italy	Spain
Australia	France	Luxembourg	Sweden
Austria	Germany	New Zealande	Switzerland
Belgium	Greece	Norway	United States
Canada	Ireland	Portugal	United Kingdom

4.4 Robustness and Placebo Tests

The following two questions arise as a way of estimating the significance of our results; what are the chances that our results are driven entirely by chance? How often would we obtain results of the same magnitude if we had chosen a country at random to conduct our study instead of Denmark? In order to answer these questions, we implement several placebo tests; this is done by iteratively applying the SCM to countries that did no implement the flexicurity system during the estimation period, i.e., all the other countries in our donor pool; this is referred to as an in-space placebo test. If the in-space placebo studies show that the gap estimated for Denmark is unusually large in relation to the other countries, then the interpretation is that our analysis provides significant evidence of an unemployment reducing effect of the flexicurity system. If, on the other hand, the in-space placebo tests produce gaps of similar magnitude to the one estimated for Denmark, then the interpretation is that our analysis does not provide significant evidence of an unemployment reducing effect of the flexicurity system. When these in-space placebo tests are conducted, it is customary to remove the largest outliers. To identify the outliers, the countries Mean Square Prediction Errors (MSPE), a standard measure of the quality of a prediction, is used. The countries with large pre-intervention MSPE are excluded from the in-space placebo tests since they do not produce representative outcomes. There is no clear definition of how large the pre-intervention MSPE has to be in order to be considered large. However, it is usually evaluated compared to the pre-intervention MSPE of the treated country (Abadie, 2020). We have conducted four different in-space placebo tests, where countries with a pre-intervention MSPE 20, 10, 5 and 2 times higher than Denmark have been excluded in turn. Our in-space placebo tests are presented in section 6.3 and appendix A.

One way to further evaluate the unemployment gap in Denmark to the gaps obtained from the placebo runs is to investigate the distribution of post-/pre-intervention Root Mean Square Prediction Errors (RMSPE) ratios, which is simply the squared root of the MSPE described above. The ratio for Denmark is supposed to be the largest and stand out significantly. If no other country achieves such a large ratio,

[2] Estonia, Latvia, Lithuania, Poland, Hungaria, Czech Republic, Slovakia, Slovenia

the probability of obtaining a ratio as large as Denmark at random would be one over the number of countries in the donor pool, i.e. 1/20=0.05, which is the significance level usually adopted in inference (Abadie, 2020). The post-/pre-intervention RMSPE ratios are presented in section 6.3.

The 1/20=0.05 procedure can also be applied to the in-space placebo tests. If Denmark distinctly stands out and has the largest negative treatment effect, then we can conclude that if we were to pick a country at random from our donor pool and apply our method, the chances of obtaining an as large result would be 0.05.

In-time placebo tests are tests where the model is rerun with another year for the intervention, which follows the approach of Abadie et al. (2015). In this thesis, it means that a placebo test is reiterated with the flexicurity reform occurring in 1990, which is in the middle of the pre-treatment period, instead of 1994. Ideally, there should be no perceivable effect, and Denmark and the synthetic Denmark should not diverge considerably. The in-time placebo tests are presented in section 6.3 and Appendix B.

In order to check the robustness of our results, we perform what is known as a "leave-one-out" robustness test. This is done by iteratively reestimate the baseline model to construct a synthetic Denmark omitting in each iteration one of the countries that receive weights in the donor pool. When we exclude countries, we sacrifice some goodness of fit, but this sensitivity check enables us to investigate to what extent any particular country drives our results. The robustness checks are presented in section 6.4 (Abadie et al., 2015).

Our methodology for verifying the results using the placebo tests and robustness checks presented in this section is inspired by the three following papers (Abadie and Gardeazabal, 2003; Abadie et al., 2010; Abadie et al., 2015).

5 Data

5.1 Data Sources

The data set for our empirical estimation is collected from two sources; The World Bank Open Database and The Organization for Economic Co-operation and Development. Data on active labour market policy expenditures are collected from the OECD database, and all the other variables are collected from the World Bank Open Database. The dataset contains panel data from 1986 to 2008. Since both of these sources are considered highly reliable, we see no reason to question their validity.

5.2 Variables

5.2.1 Outcome Variable

The unemployment rate for men, women, and in total has been chosen as the outcome variable of interest. We distinguish between men and women with the aim to investigate if the flexicurity reform has affected men and women differently. As we would like to investigate how the labour market is affected, unemployment is a fairly obvious choice.

Unemployment data was available both quarterly and yearly. We decided to use the yearly data since the other variables were reported yearly. Another reason for not using the quarterly data, even though it would have provided us with more data points, is that unemployment varies throughout the seasons.

5.2.2 Predictors

The choice of predictors is a fundamental part of the estimation task. The following variables are believed to influence the unemployment level:

- **Unemployment 1987, 1990, and 1993 (%)**
  It is customary in the SCM to include some pre-intervention measures of the outcome variable. We have chosen to include the unemployment level from three years; one in the beginning, one in the middle, and one at the end of the pre-intervention period.

- **Inflation (%)**
  The relationship between unemployment and inflation was described in section 2.2. Even though the validity of the Philips curve is questioned, we have decided to include inflation as a predictor.

- **GDP Growth (%)**
  The relationship between unemployment and the growth rate was also described in section 2.2. We consider it to be a powerful predictor.

- **Active Labour Market Policy Expenditures/GDP (%)**
  One of the three legs of the golden triangle, active labour market policies, is also adopted to combat frictional and structural unemployment. We, therefore, consider it to be a good predictor.

- **GDP per capita (US$)**
  GDP per capita measures the level of aggregate demand in relation to the population in the economy. Aggregate demand is, as described in section 2.2, an essential determinant for the level of unemployment.

- **GNI per capita (US$)**
  GNI per capita is used as a proxy for wages. Wages are, as described in section 2.2, an important determinant for the level of unemployment.

See appendix C for more detailed information concerning definitions and data sources.

5.3 Time Frame

The evaluation period is 1986–2008. 1986 is chosen as the starting point due to data limitations prior to this year, and 2008 is chosen as the endpoint due to the financial crisis. The financial crisis heavily affected unemployment levels, making it difficult to know whether the effect is from the flexicurity system or the financial crisis. We avoid this issue by ending the evaluation period in 2008.

Since the flexicurity reform was introduced in 1994, this gives us eight pre-intervention periods and 15 post-intervention periods. For reasons discussed in section 4.2, more years would have been desirable, but for the reasons described above, it is not possible to include more pre-intervention periods and not advisable to include more post-intervention periods.

6 Results

This section contains the main findings of the thesis, as well as placebo and robustness tests that have been conducted.

6.1 Main Results

6.1.1 Total

Table 2 displays the weight assigned to each country in the donor pool; these countries and their respective weights are the ones that will act as the synthetic Denmark for the total population. As can be seen, most countries are assigned the weight zero; this is expected since it will only be the countries with similar predictor means that will be assigned weights.

Table 2: Country Weights – Total

Country	**Weight**	**Country**	**Weight**
Australia	0	Luxembourg	0
Austria	0	**New Zealand**	**0.432**
Belgium	0	**Norway**	**0.310**
Canada	0	Portugal	0
Finland	**0.013**	**Spain**	**0.245**
France	0	Sweden	0
Germany	0	Switzerland	0
Greece	0	United Kingdom	0
Ireland	0	United States	0
Italy	0	**Total**	**1.00**

Table 3 displays the predictor means when the total workforce is considered in Denmark and in the synthetic Denmark. These predictors and their respective numbers are the ones that are used to match Denmark and the synthetic Denmark and to create figure 2 and 3 below. The unemployment rate predictors match well throughout the pre-intervention period. However, the other included predictors fit quite poorly. The sample mean is an average of the countries in the donor pool, where Denmark is excluded; this shows the difference between the weighted average in the synthetic Denmark and averages without weights to specific countries. The sample mean is only included as a reference and is not used throughout the analysis.

Table 3: Predictor Means – Total

Predictor	Denmark	Synthetic Denmark	Sample Mean
Unemployment 1987 (%)	7.5	7.6	7.8
Unemployment 1990 (%)	9.3	9.1	6.7
Unemployment 1993 (%)	11.9	11.7	9.5
Inflation (%)	3.2	5.9	5.1
GDP Growth (%)	1.3	2.0	2.5
ALMP Expenditures (%)	5.5	2.4	2.1
GDP per capita (US$)	24 255	16 479	19 284
GNI per capita (US$)	19 596	13 002	15 942

Notes: The predictor means is the average value of the whole pre-intervention period 1986–1993 for each predictor respectively, except for unemployment which is only measured for 1987, 1989, and 1993.

Figure 2 displays the unemployment rates in per cent for Denmark and the synthetic Denmark between 1986–2008. The synthetic Denmark reproduces Denmark's unemployment rate pleasingly during the pre-intervention period, seeing as the bold and the dotted lines are closely connected. The effect of the flexicurity reform in 1994 is the difference between Denmark (the bold line) and the synthetic Denmark (the dotted line); it is visualized in figure 3, this is also the outcome using equation (2). During the first years of the flexicurity reform until 2002, there is a large decrease in the unemployment rate in Denmark. The unemployment rate decreased from 11.8 per cent in 1994 to 4.8 per cent in 2002. Synthetic Denmark displays larger values, indicating that the unemployment rate did not decrease at the same pace as Denmark. Although, it did decrease, from approximately 11.4 per cent in 1994 to 6.5 per cent in 2002. However, in 2005, the unemployment rate for Denmark and the synthetic Denmark was almost crossing, but shortly afterwards, the unemployment rate decreased for Denmark. When the financial crisis hit the world in 2008, Denmark's unemployment rate was at its lowest, while the unemployment rate in the synthetic Denmark increased.

Since the synthetic Denmark acts as the actual Denmark in the absence of the flexicurity system; one can conclude that Denmark without flexicurity would have been worse off regarding unemployment.

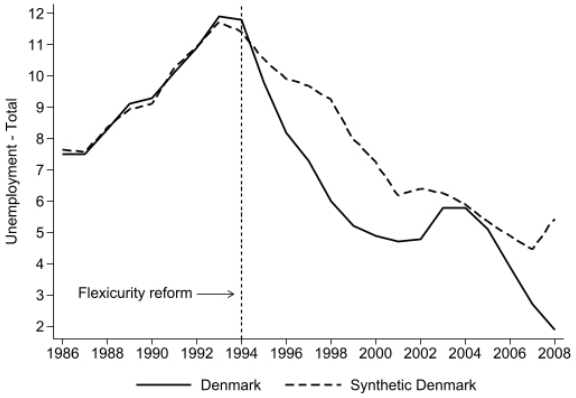


Figure 2: Unemployment rate in total

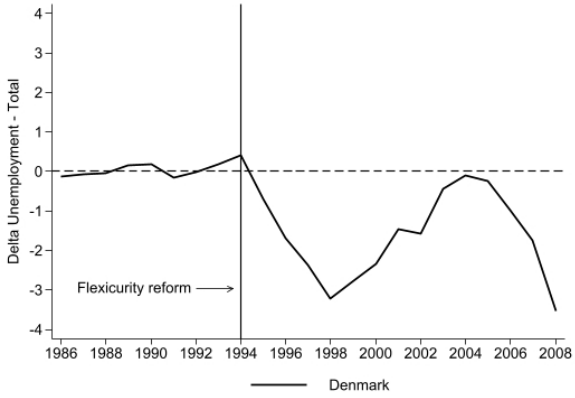


Figure 3: Unemployment gap in total

6.1.2 Men

Table 4 displays the weight assigned to each country in the donor pool; these countries will act as the synthetic Denmark for the male population and follows the same reasoning as for table 2.

Table 4: Country Weights – Men

Country	Weight	Country	Weight
Australia	0	Luxembourg	0
Austria	0	**New Zealand**	**0.142**
Belgium	0	**Norway**	**0.512**
Canada	0	Portugal	0
Finland	**0.112**	Spain	0
France	0	Sweden	0
Germany	0	Switzerland	0
Greece	0	United Kingdom	0
Ireland	**0.234**	United States	0
Italy	0	**Total**	**1.00**

Table 5 displays the predictor means when only men are considered. There are quite large differences between Denmark and the synthetic Denmark, at least for the predictors that are not unemployment.

Table 5: Predictor Means – Men

Predictor	Denmark	Synthetic Denmark	Sample Mean
Unemployment 1987 (%)	6.1	6.2	6.7
Unemployment 1990 (%)	8.0	7.6	5.8
Unemployment 1993 (%)	10.9	10.5	9.1
Inflation (%)	3.2	4.6	5.1
GDP Growth (%)	1.3	2.4	2.5
ALMP Expenditures (%)	5.5	2.4	2.1
GDP per capita (US$)	24 255	20 187	19 284
GNI per capita (US$)	19 596	15 609	15 942

Notes: The predictor means is the average value of the whole pre-intervention period 1986–1993 for each predictor respectively, except for unemployment which is only measured for 1987, 1989, and 1993.

There is a good fit in the pre-intervention period when considering only men, but not as good as when the total population is included. Figure 4 displays the unemployment in Denmark compared to unemployment in the synthetic Denmark. The unemployment rate for men in Denmark decreased from 10.5 per cent in 1994 to 4.4 per cent in 2002. The unemployment rate for men in the synthetic Denmark also decreased during this period, but not at the same pace. The effect of the flexicurity reform is the difference between the bold line and the dotted line, and the decrease for men is smaller than when the total population was considered. However, during almost the entire post-intervention period, the unemployment rate for males in Denmark is lower than for the synthetic Denmark.

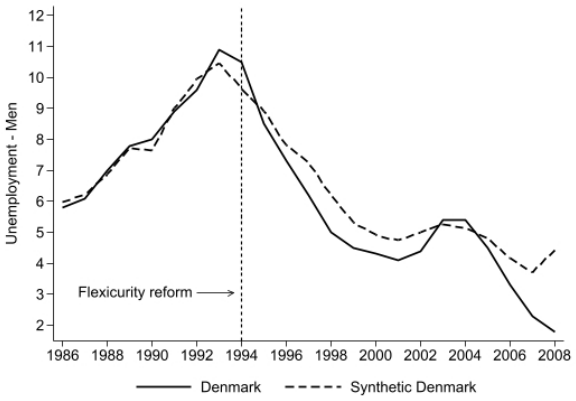


Figure 4: Unemployment rate for men

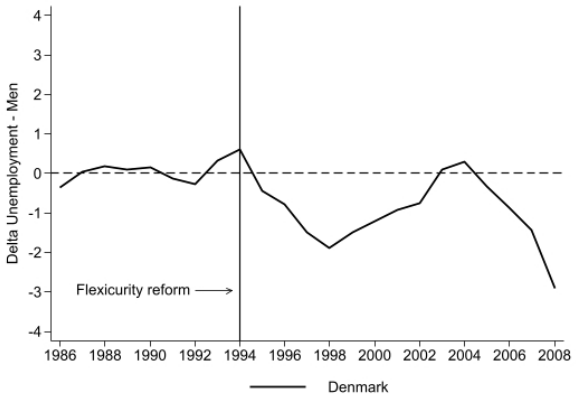


Figure 5: Unemployment gap for men

6.1.3 Women

Table 6 displays the weight assigned to each country in the donor pool; these countries will act as the synthetic Denmark for women and follows the same reasoning as for table 2.

Table 6: Country Weights – Women

Country	**Weight**	**Country**	**Weight**
Australia	0	Luxembourg	0
Austria	0	**New Zealand**	**0.604**
Belgium	0	Norway	0
Canada	0	Portugal	0
Finland	**0.073**	**Spain**	**0.165**
France	0	Sweden	0
Germany	0	**Switzerland**	**0.057**
Greece	0	United Kingdom	0
Ireland	0	United States	0
Italy	**0.101**	**Total**	**1.00**

Table 7 displays the predictor means for women and is sufficiently well-matched when considering the unemployment rate. However, it is poorly matched for the other predictor means.

Table 7: Predictor Means – Women

Predictor	Denmark	Synthetic Denmark	Sample Mean
Unemployment 1987 (%)	9.1	9.3	9.4
Unemployment 1990 (%)	10.8	10.4	8.3
Unemployment 1993 (%)	13.1	13.0	10.5
Inflation (%)	3.2	6.0	5.1
GDP Growth (%)	1.3	1.7	2.5
ALMP Expenditures (%)	5.5	2.3	2.1
GDP per capita (US$)	24 255	14 758	19 284
GNI per capita (US$)	19 596	11 969	15 942

Notes: The predictor means is the average value of the whole pre-intervention period 1986–1993 for each predictor respectively, except for unemployment which is only measured for 1987, 1989, and 1993.

Figures 6 and 7 displays the results for the female population in Denmark and the synthetic Denmark. The reproduction in the pre-intervention period is sufficient, where the unemployment rates are matching well. Regarding the post-intervention period, there are large differences throughout almost the entire period, where the unemployment rates for females in Denmark are significantly lower than for the synthetic Denmark. The unemployment rate for women in Denmark decreased from 13.2 per cent in 1994 to 5.2 per cent in 2002, while it did not decrease at the same magnitude for women in the synthetic Denmark. There is a constant decrease in unemployment for women in Denmark until 2003–2004, where the rate begins to increase slightly, but quickly recovers and decrease to its lowest in 2008.

When considering only women, the differences between Denmark and the synthetic Denmark is larger than for the total population and for men; this could be due to several different factors and will be further discussed in section 7.

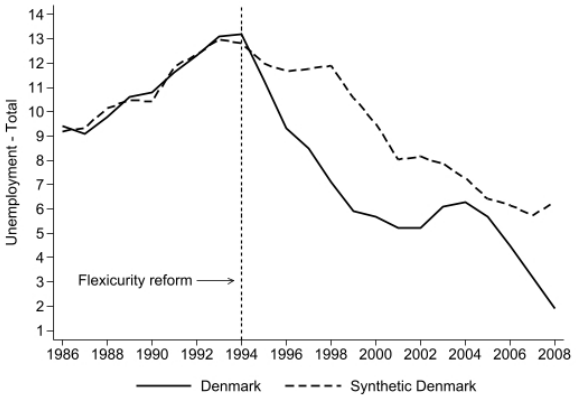


Figure 6: Unemployment rate for women

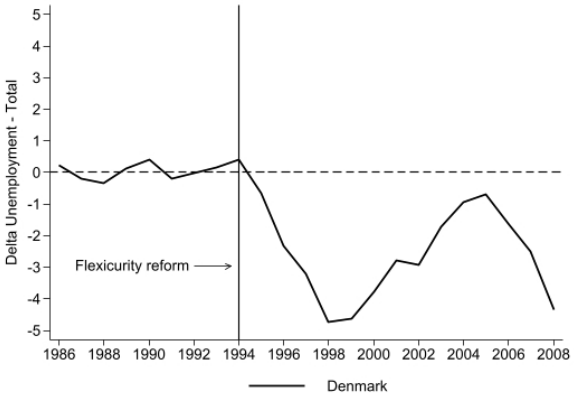


Figure 7: Unemployment gap for women

6.2 Result Overview

Table 8 below displays the treatment effect, i.e., the difference between the unemployment in Denmark and the synthetic Denmark, for all the years in the evaluation period. The effects have been displayed graphically earlier in figures 3, 5, and 7. The mean treatment effect is displayed at the bottom of table 8.

Table 8: Main Results

Year	Total	Men	Women
94	0.403	0.596	0.424
95	-0.705	-0.452	-0.673
96	-1.692	-0.781	-2.328
97	-2.370	-1.487	-3.220
98	-3.231	-1.894	-4.739
99	-2.777	-1.485	-4.610
00	-2.336	-1.198	-3.782
01	-1.466	-0.920	-2.798
02	-1.585	-0.757	-2.921
03	-0.450	0.099	-1.728
04	-0.094	0.287	-0.954
05	-0.245	-0.314	-0.688
06	-0.985	-0.879	-1.619
07	-1.752	-1.438	-2.498
08	-3.526	-2.904	-4.328
Mean	**-1.521**	**-0.902**	**-2.431**

Notes: The unit is percentage points, and the values can be seen in figures 3, 5, and 7.

The results show that the flexicurity reform has reduced the unemployment rate for women, men, and in total. The effect has been greater for women than for men. The mean treatment effect over the post-treatment period was -2.431 percentage points for women, -0.902 percentage points for men and -1.521 percentage points in total. These results suggest that flexicurity reduced unemployment for Denmark throughout the various groups.

The results also pass several placebo and robustness tests, which strengthens the validity of the results. These are presented in section 6.3 and 6.4.

6.3 Placebo Tests

6.3.1 In-space

The purpose of these tests is to verify that the results are not driven by chance, as described in more detail in section 4.4. Therefore, we have investigated what would have happened to the other countries in our donor pool if they had implemented the flexicurity system in 1994, just like Denmark. Figures 8, 9, and 10 depict the final in-space placebo tests for unemployment for women, men, and in total. By final, we mean that outliers have been discarded. Only the countries with a pre-intervention MSPE lower than two times Denmark's MSPE is included. The reason for this is that the pre-intervention match between Denmark and the synthetic Denmark is poor for the excluded countries. We encourage the reader to look at appendix A, where more placebo tests are presented.

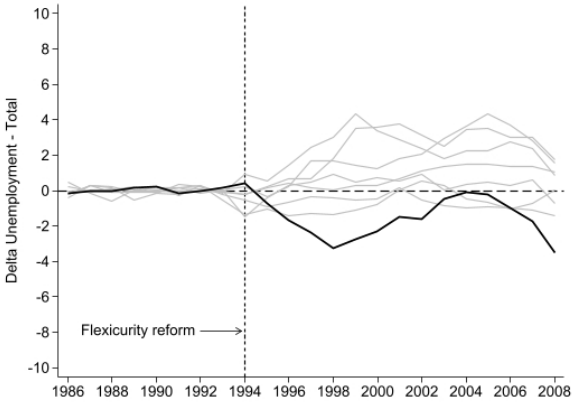


Figure 8: In-space placebo test in total

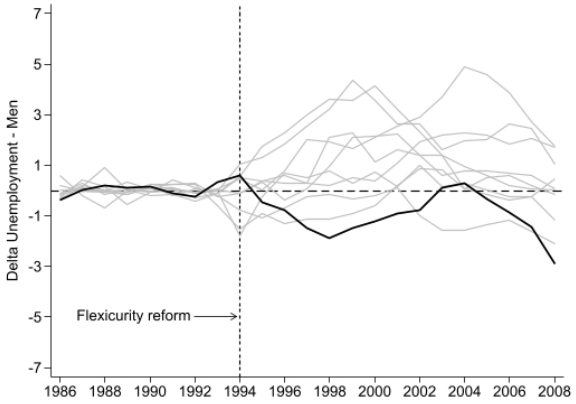


Figure 9: In-space placebo test for men

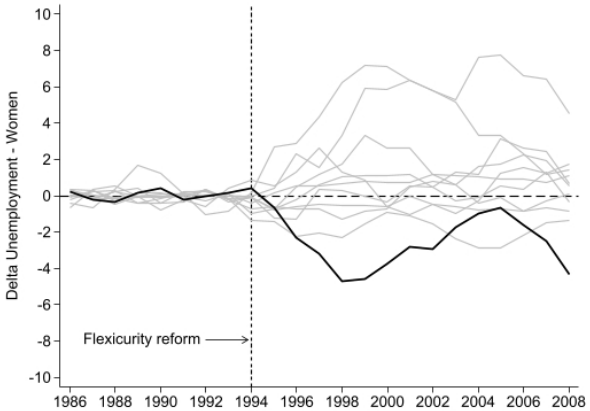


Figure 10: In-space placebo test for women

Notes: The bold lines represents Denmark.

Denmark stands out in all three cases. There are some years where one or two countries displays a larger negative effect but viewed over the whole post-intervention period Denmark is the country with the largest reduction in unemployment.

To further investigate the in-space placebo tests, we examine the post-period RMSPE divided by the pre-period RMSPE ratios. The ratio will be high if the gap between the real country and its synthetic counterpart is negligible before the intervention and large after the intervention. If the flexicurity reform indeed had a significant effect, Denmark should stand out in relation to the other countries where placebo tests were conducted. The ratio will be equally high regardless of whether the unemployment rate has increased or decreased; it is only a measure of magnitude. All countries in the donor pool are included in figures 11, 12, and 13 below, regardless of the direction. The countries where the unemployment rate has decreased are coloured grey, and the countries where the unemployment rate has increased are coloured black.

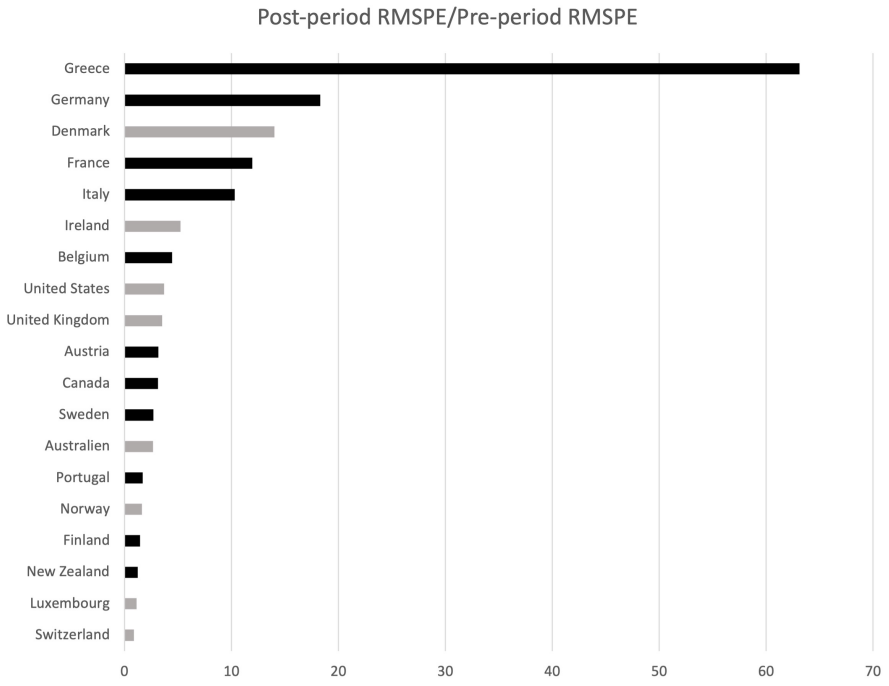


Figure 11: RMSPE ratio in total

In figure 11, Denmark does not stand out; instead, Greece is the country that truly stands out, but Germany also has a larger ratio than Denmark. However, Greece and Germany have one thing in common; the average treatment effect is positive, i.e. the unemployment level has increased. If we only consider the countries (coloured grey) with a negative average treatment effect or, in other words, countries where the unemployment level have decreased, Denmark distinctly stands out, and the ratio is almost three times as large as the country with the second-highest ratio. Based on these ratios, we can conclude that no other country has had an as large negative effect on the total level of unemployment.

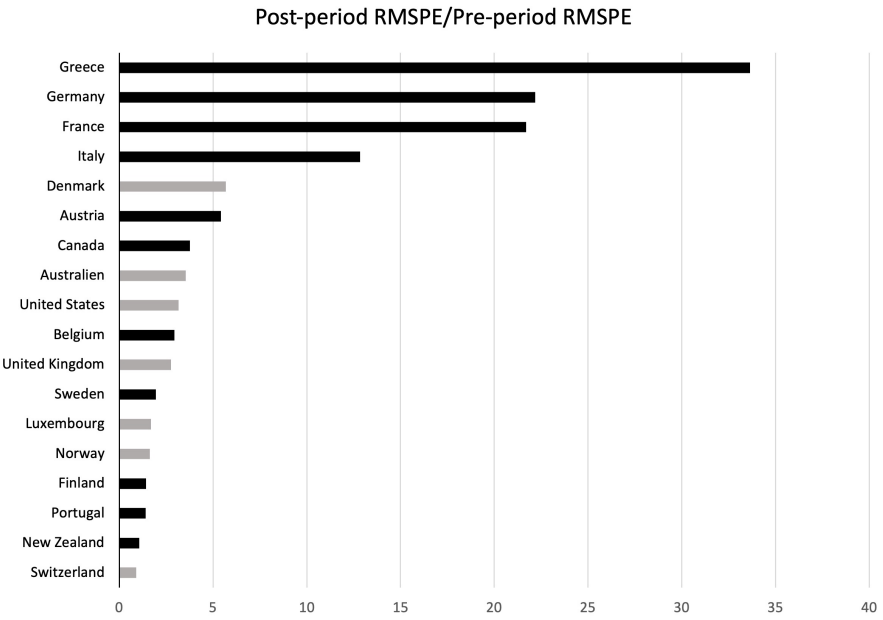


Figure 12: RMSPE ratio for men

When examining the ratios for men, the same pattern emerges. Denmark does not stand out in figure 12. At the top, we once again find Greece and Germany, but also France and Italy. However, the countries with a greater ratio than Denmark do, just like when considering the total unemployment level, all have a positive mean treatment effect. Denmark has the highest ratio and stands out reasonably clear if we only consider the countries (coloured grey) with a negative mean treatment effect. Based on these ratios, we can conclude that no other country has had an as large negative effect on the level of male unemployment.

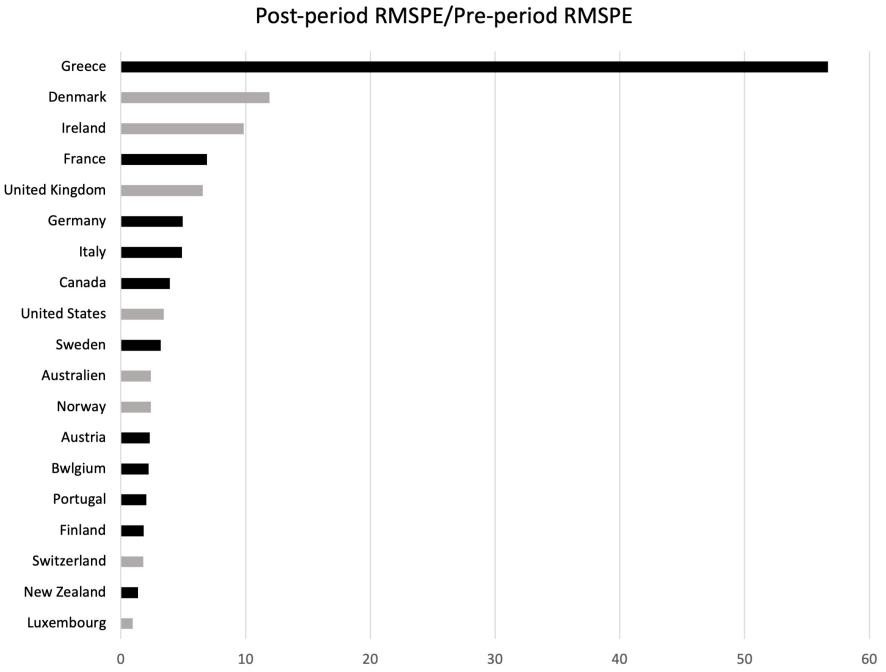


Figure 13: RMSPE ratio for women

When examining the ratios for women, the same pattern, once again, emerges. It is Greece that stands out in figure 13, not Denmark. The mean treatment effect in Greece is positive. If we only consider the countries (coloured grey) with a negative treatment effect, Denmark has the highest ratio but does not clearly stand out since Ireland also has a large ratio. Although, since Denmark has the highest ratio, we can conclude that no other country has had an as large negative effect on female unemployment.

If we were to pick a country at random, the chance of picking a country with an as large negative effect would be 1/20=0.05, which is the significance level usually adopted in inference; this is true in all three cases, both for men, women and in total.

6.3.2 In-time

The in-time placebo tests are conducted with the flexicurity reform occurring in 1990 instead of the actual intervention year of 1994. The year 1990 is chosen since it is the year in the middle of the pre-intervention period. These figures are presented in appendix B, and as one can see, there seems to be no effect on the unemployment rate between Denmark and the synthetic Denmark, neither for the total population, for men, nor women.

6.4 Robustness Tests

To strengthen the validity of our results, we perform a robustness test; this is done using the so-called leave-one-out procedure, which was described in section 4.4.

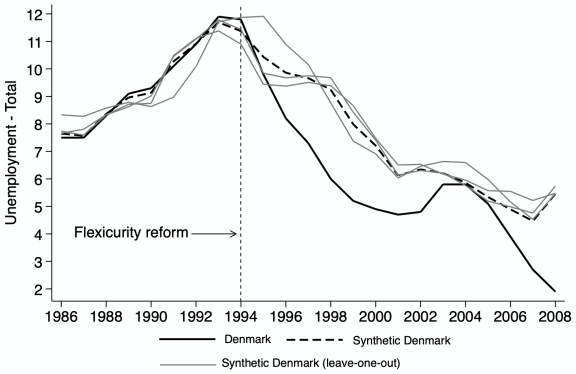


Figure 14: Leave-one-out in total

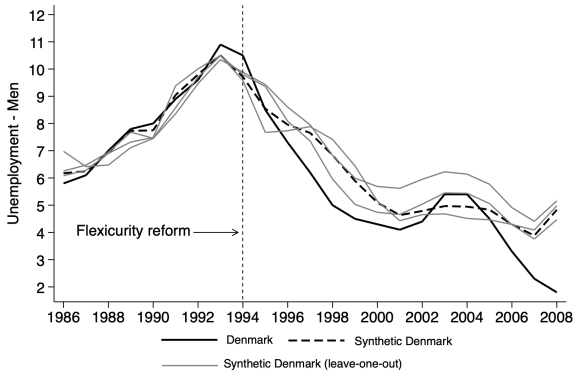


Figure 15: Leave-one-out for men

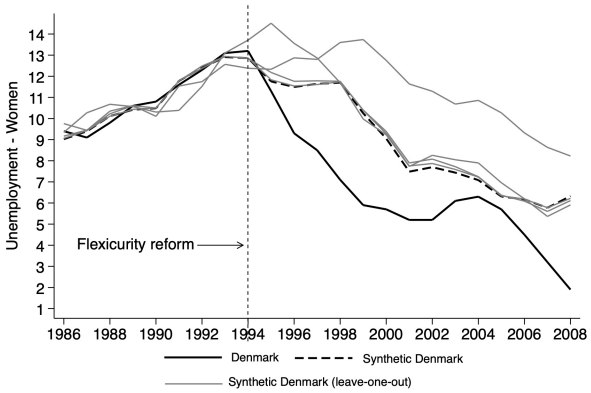


Figure 16: Leave-one-out for women

Figures 14, 15 and 16 reproduces figures 2, 4, and 6 (the bold and dashed lines) while also incorporating the leave-one-out estimate (the grey lines). These figures show that our results are fairly robust to excluding any countries in the donor pool assigned with weights. It is evident from the figures that the leave-out-estimates produces worse pre-intervention matches than original synthetic Denmark; this is not surprising, seeing as original synthetic Denmark is designed to fit as good as possible. All of the leave-one-out estimates do, however, produce reasonably good pre-intervention matches. The unemployment level in Denmark is lower than all of the leave-one-out estimates, except that the unemployment rate for men in Denmark was higher than some of the synthetic counterparts between 2002 and 2005. This was also the case in figure 4 with only Denmark and the original synthetic Denmark.

This test confirms that our results are robust to the exclusion of weight-assigned countries from the donor pool. We can conclude that our results are not driven by a specific country in our donor pool.

7 Discussion

We start the discussion by recalling what was presented in the empirical overview. The three legs of the golden triangle (flexibility, social security, and active labour market policies), observed in isolation from one another, seem to be working against each other in the goal of limiting unemployment. Flexibility and active labour market policies will, in theory, reduce unemployment; however, the empirical evidence does not conclusively back up the theory. High flexibility does not seem to reduce unemployment but instead seems to lead to a segmented labour market with many temporary contracts. The literature also suggests that active labour market policies often are ineffective in general, albeit with larger effects for particular groups, e.g., women, and during economic downturns. On the other hand, social security, or (generous) unemployment insurance, will, according to the literature, reduce unemployment outflows, increase unemployment inflows, and increase the duration of unemployment.

Judging by the empirical evidence from the three components in isolation, the flexicurity system does not seem very likely to lower the unemployment level with one element that disincentivizes employment and two elements that, in theory, will reduce unemployment but does not seem to be very effective in reality. Our results, however, suggest that the flexicurity system has been effective. It has significantly reduced the unemployment level for both men and women during the whole post-intervention period. Perhaps it is the combination of the three components, the golden triangle, that is the key?

Our results indeed suggest so. It is difficult to compare our results with previous research since the literature on the effects of the system in Denmark is quite scarce. However, some comparisons are, of course, possible. As mentioned in section 3.2, it was estimated that the flexicurity reform reduced the number of unemployed by 60–70,000 people in 1995; this amounted to a reduction of the unemployment rate with between 2.0 to 2.4 percentage points.[3] This effect is somewhat larger than what was estimated by our model; however, it closely resembles the results in the years 1996 and 1997, as can be seen in table 8. One possible reason why our results indicate a smaller effect is that the workforce was reduced.

As was presented in section 3.2, the large decrease in the unemployment rate in Denmark should be, to some degree, doubtfully considered. The unemployment rate did indeed fall dramatically during the evaluation period. However, as Albæk et al. (2008) argued, it could be the case that this drop in unemployment is a consequence of more people being assigned to labour market schemes, which includes enrollment in educational programs and job training programs, and the persons in these schemes were not registered as unemployed.

Another factor that could explain the decrease in the unemployment rate, apart from flexicurity, is the economic crisis in Denmark between 1987–1993 (Abildgren and Thomsen, 2011). Since the flexicurity reform and the end of the economic crisis occurred almost simultaneously, the decrease in the unemployment rate could be due to economic recovery, hence not due to the flexicurity reform. However, if one examines figures 2, 4, and 6, the synthetic Denmark's unemployment rates also decreased. This decrease is likely due to the recovery from the crisis. However, the decrease in unemployment was sharper for the real Denmark, and the difference is attributed to the flexicurity reform.

The effects of the flexicurity reform are greater for women than for men; this could be because there are

[3] In 1995, the number of unemployed workers amounted to 288,000, and the unemployment rate was 9.8 per cent. Reducing the number of unemployed workers by 60–70,000 is the same as reducing the unemployment rate by 2.04 to 2.38 percentage points.

generally more women working part-time compared to men. We do not observe whether this is true or not in this thesis, but it has been shown in several previous studies. The larger decrease in the unemployment rate for women could then be that with the flexicurity reform, more part-time jobs were created, which in turn affects women to a larger degree. The unemployment level for women was also higher than for men before the reform were implemented. Another reason why the effect is greater for women could be that the active labour market policies have larger effects for women than for men, as Card et al. (2017) argued.

Even though our results pass both the placebo and the robustness tests, we still have one concern regarding the validity of the results. The concern is that the pre-intervention means for some of the predictors do not match between Denmark and the synthetic Denmark; this can be seen in tables 3, 5, and 7. The unemployment rate predictors all match well across all groups. The fact that some of the matches are poor is not very strange. If we consider ALMP expenditures, for example, Denmark has significantly higher expenditures and no other country in our donor pool comes close, which is why we obviously cannot obtain a good match for this variable. However, a similar explanation for the mismatch of some of the other predictors does not exist. As was stated in section 5.2, the credibility of a synthetic control estimator greatly depends on its ability to undeviatingly track the trajectory of the outcome variable for the affected unit during the period before the intervention; this is something that we manage to achieve in all three cases, despite the somewhat poor matches of some predictors. The sound matches of the unemployment variables are one explanation for this. Another possible explanation is the fact that the synthetic Denmark both overscore and underscore the real Denmark. For instance, GDP and GNI per capita are lower in the synthetic Denmark, but the growth and inflation rates are higher. It is likely that the combined effect of these over- and underscores, together with the predictors that match well, makes the synthetic Denmark a good fit overall. Our results suggest that this is the case, seeing as we can track the outcome variable during the whole pre-intervention period closely, as can be seen in figure 2, 4, and 6.

One interesting, or perhaps strange, finding is that the treatment effect goes down during some years, around 2003 and 2004; this is true for all groups. The unemployment rate in Denmark increased during these years, something that the synthetic Denmark failed to anticipate — suggesting that the rise in unemployment during these years was due to some factor that our predictors failed to incorporate. What this reason was, we do not know.

8 Conclusion

This essay has attempted to answer the question: to what degree did the flexicurity system in Denmark affect the unemployment rate?

The results show that the flexicurity reform has reduced the unemployment rate for women, men and in total. The effect has been greater for women than for men. The mean treatment effect over the post-treatment period, 1994–2008, was -2.431 percentage points for women, -0.902 percentage points for men and -1.521 percentage points in total. The results also pass several placebo and robustness tests, which strengthens the validity of the results.

This paper contributes to the existing literature on how flexicurity affects unemployment, although with a new method. The same methodology could be applied to other countries with similar systems,

such as the Netherlands. Another interesting topic for future research would be investigating how the flexicurity system affects the unemployment rates for various groups, such as, e.g. immigrants.

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A Appendix A – In Space Placebo Test

A.1 Placebo – Total

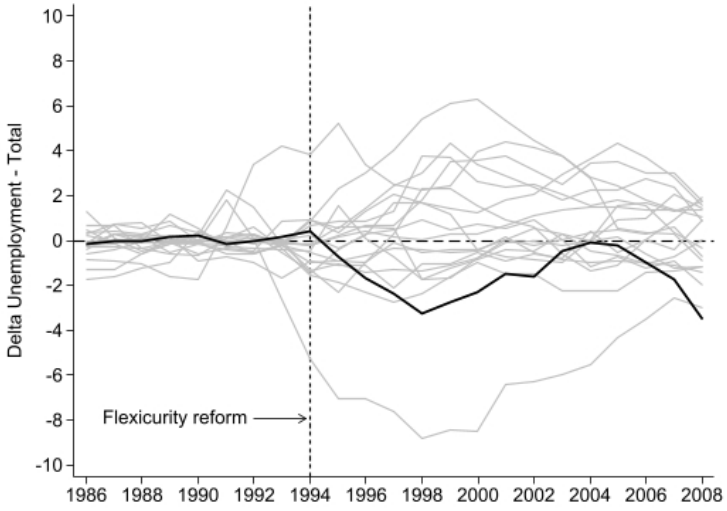

Figure 17: Placebo Test 1 – Total

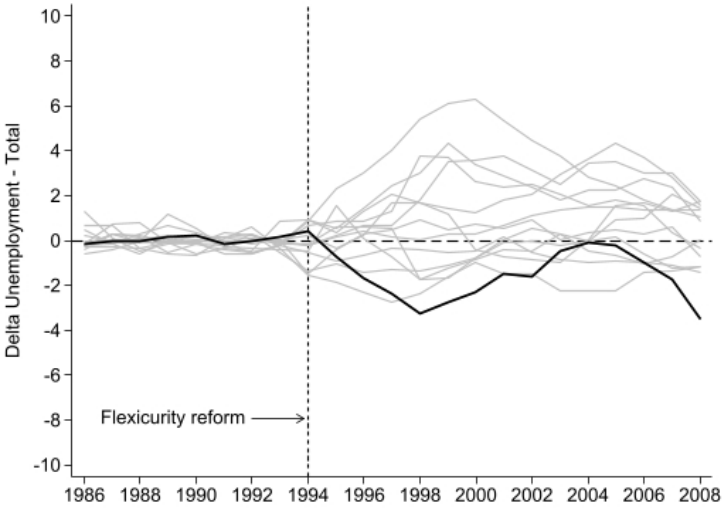

Figure 18: Placebo Test 2 – Total

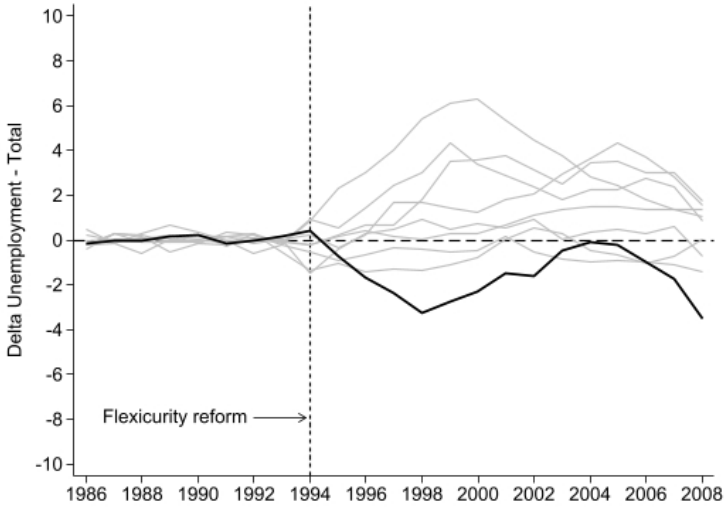

Figure 19: Placebo Test 3 – Total

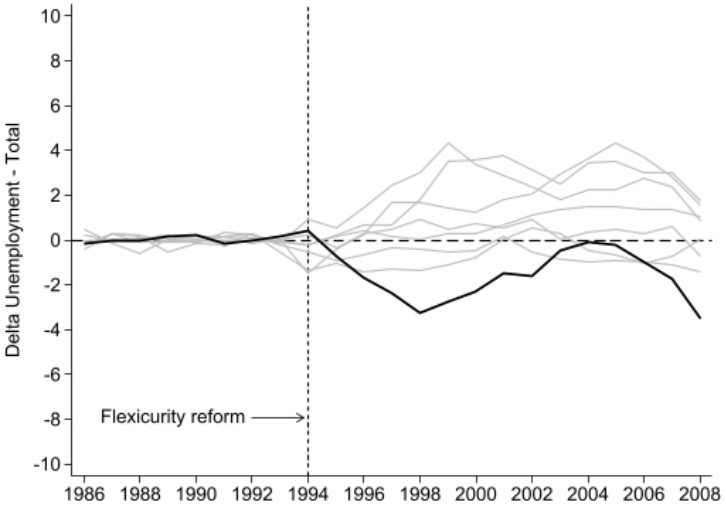

Figure 20: Placebo Test 4 – Total

Notes: In Placebo Test 1, all countries in the donor pool are included. Placebo test 2 discards countries with pre-intervention MSPE 20 times higher than Denmark's. In placebo test 3 and 4, the inclusion criteria has been lower to 10 and 5 times Denmark's MSPE respectively.

A.2 Placebo – Men

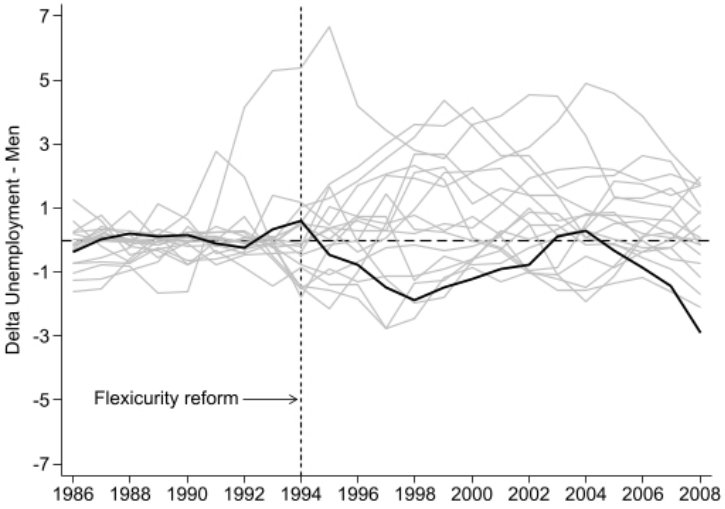

Figure 21: Placebo Test 1 – Men

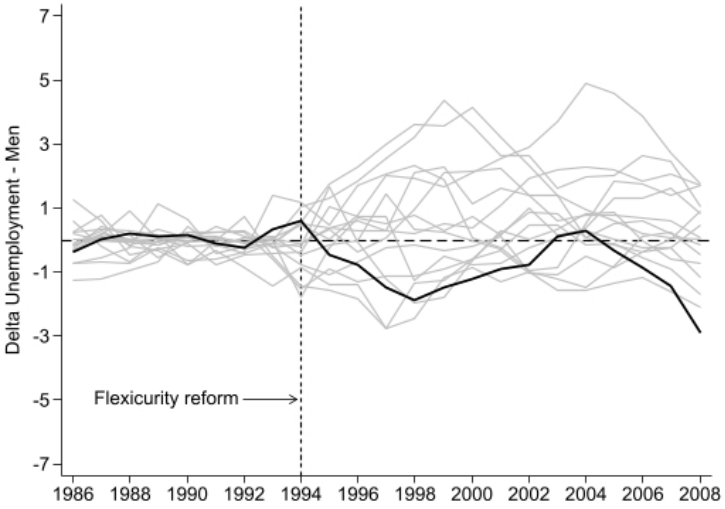

Figure 22: Placebo Test 2 – Men

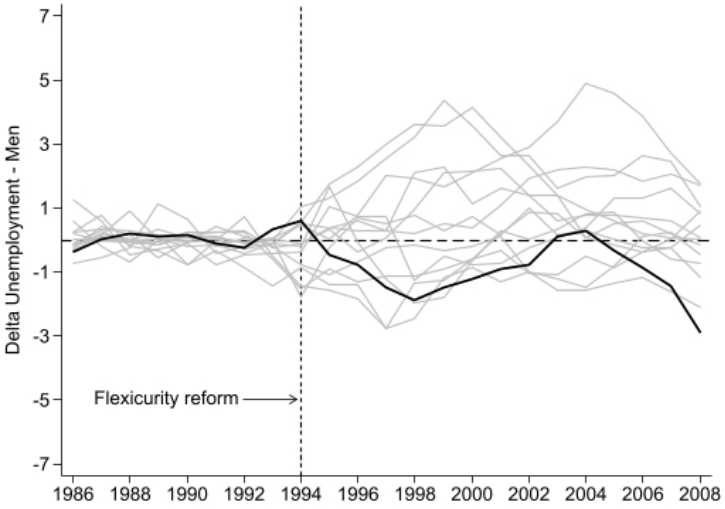

Figure 23: Placebo Test 3 – Men

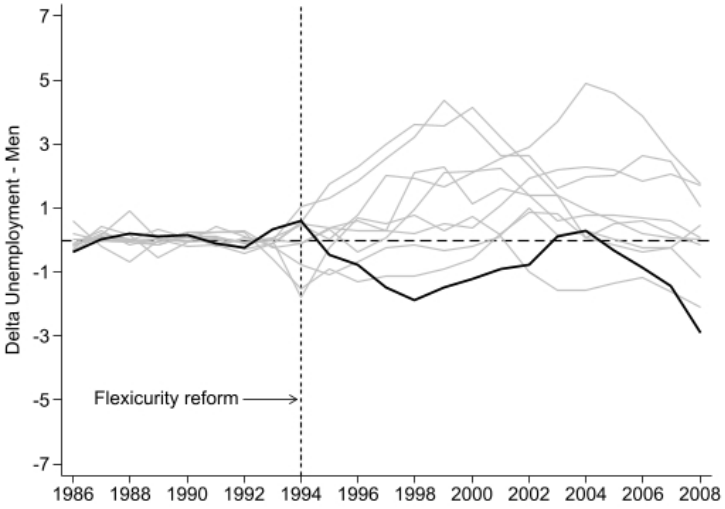

Figure 24: Placebo Test 4 – Men

Notes: In Placebo Test 1, all countries in the donor pool are included. Placebo test 2 discards countries with pre-intervention MSPE 20 times higher than Denmark's. In placebo test 3 and 4, the inclusion criteria has been lower to 10 and 5 times Denmark's MSPE respectively.

A.3 Placebo – Women

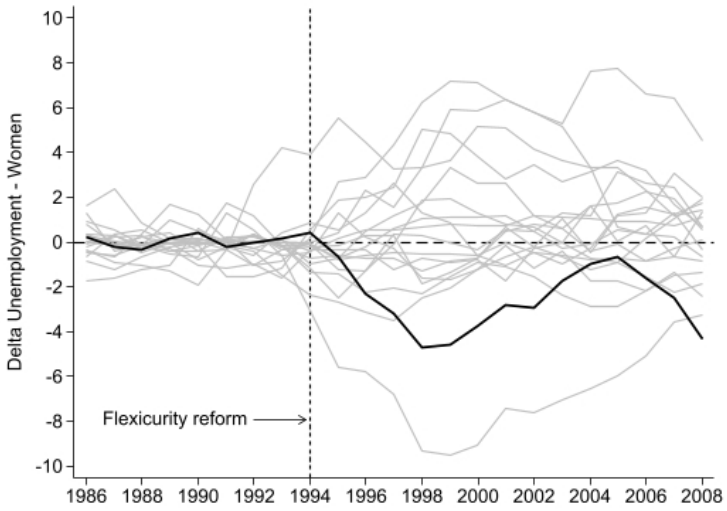

Figure 25: Placebo Test 1 – Women

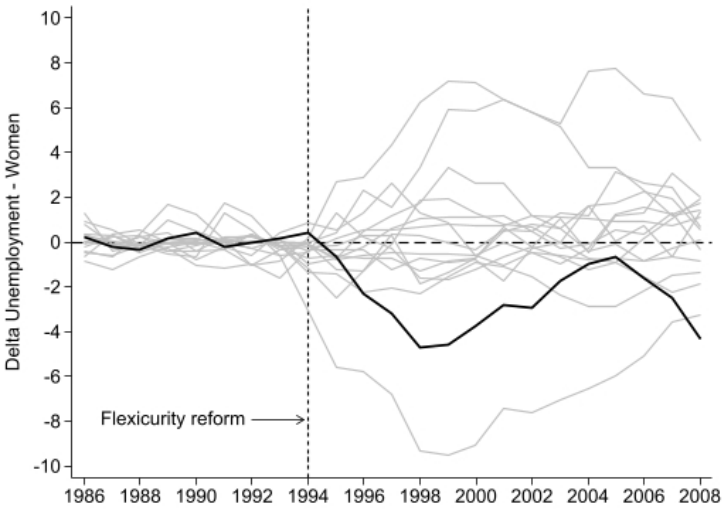

Figure 26: Placebo Test 2 – Women

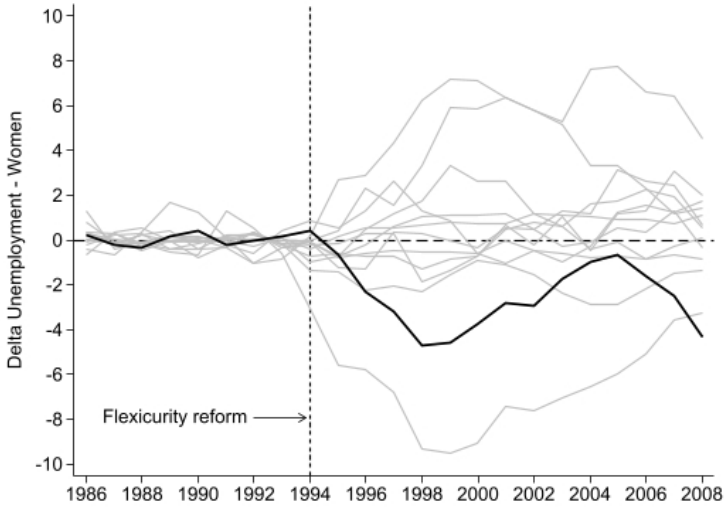

Figure 27: Placebo Test 3 – Women

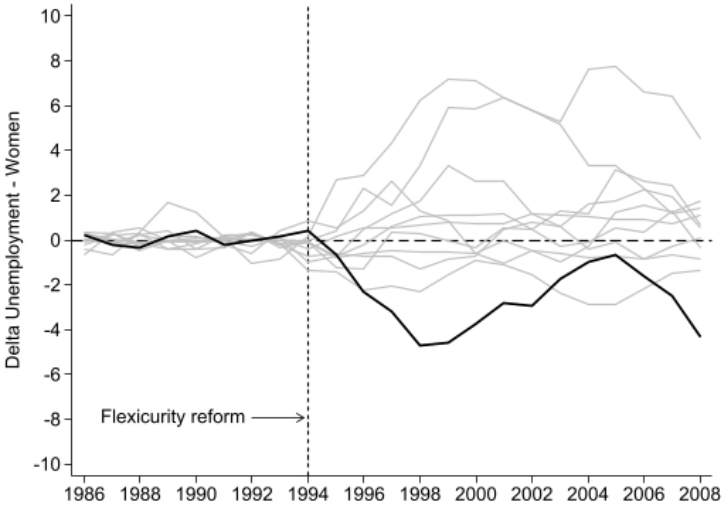

Figure 28: Placebo Test 4 – Women

Notes: In Placebo Test 1, all countries in the donor pool are included. Placebo test 2 discards countries with pre-intervention MSPE 20 times higher than Denmark's. In placebo test 3 and 4, the inclusion criteria has been lower to 10 and 5 times Denmark's MSPE respectively.

B Appendix B – In Time Placebo Tests

The in-time placebo tests are conducted where the flexicurity reform is set to occur in 1990, instead of the actual intervention year of 1994.

Figure 29: In-time placebo test in total

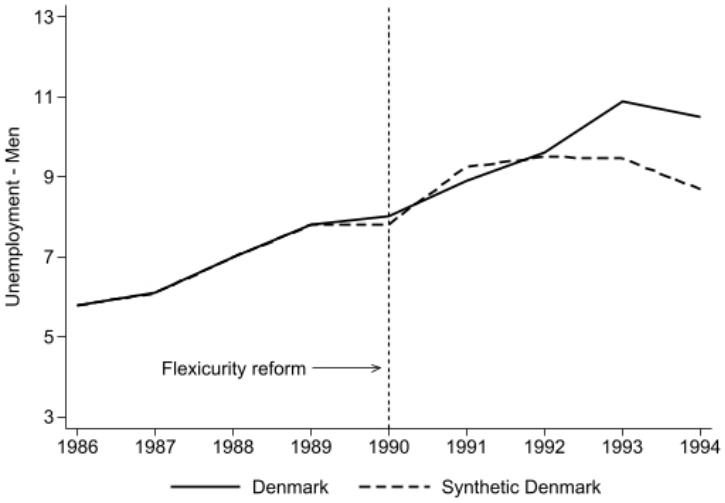

Figure 30: In-time placebo test for men

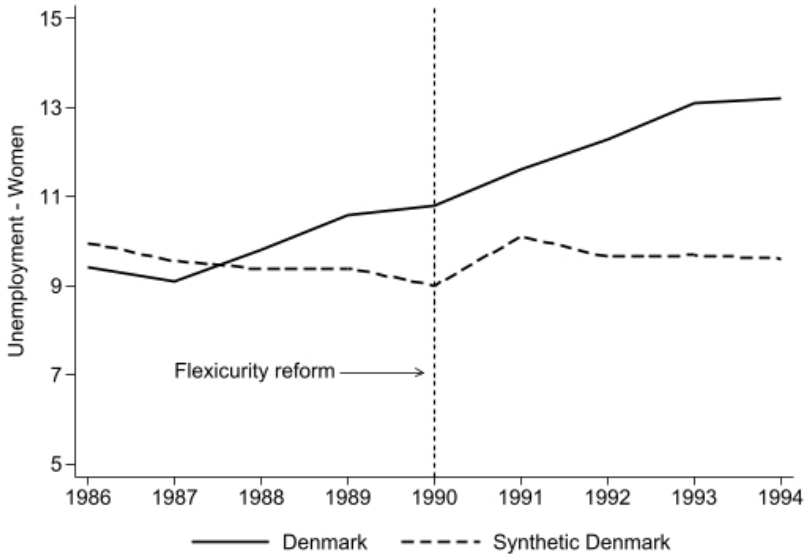

Figure 31: In-time placebo test for women

C Appendix C – Variable Definition

Bellow follows a list of our variables, definitions and data sources.

Variable	Definition	Source
Outcome Variables		
Total unemployment	Total unemployment as percentage of the labour force for each OECD-country respectively	
Unemployment men	Male unemployment as percentage of the male labour force for each OECD-country respectively	The World Bank
Unemployment women	Female unemployment as percentage of the female labour force for each OECD-country respectively	
Predictors		
Inflation	Annual percentage of consumer prices	
GNI per capita	Gross national income per capita measured in current US$	
GDP growth	Gross national product growth measured as annual percentage growth	The World Bank
GDP per capita	Gross national product per capita measured in current current US$	
ALMP expenditures	Active labour market expenditures measured as percentage of each country's GDP	OECD database