

Software Engineering

To what extent did the refugee crisis in 2015
impact employment outcomes on a national
and regional level comparing Switzerland
and Germany?

Analysis of Swiss and German data using a difference-in-difference approach
in Python

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1. INTRODUCTION

The year 2015 marks the start of what later is famously called the "European refugee crisis". In 2015 more than a million people crossed into Europe as migrants and refugees. The crisis led to countries struggling with the influx, and it created a division within the EU and Europe as a whole. Most of these people arrived by sea, but some also made their way over land. Most of the people came from Syria, Afghanistan, and Iraq. According to statistics, Germany received the highest number of new asylum applications in the year 2015, registering more than 486'000 applications.¹

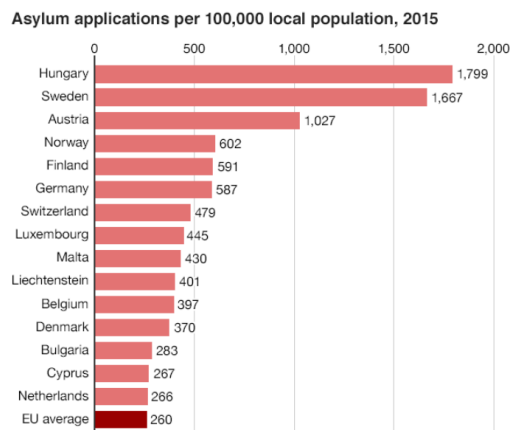


Figure 1: *Asylum Applications 2015*¹

Considering Figure 1, it is visible that especially Hungary and Sweden had the most applications per 100'000 local population. Additionally, the figure shows that Germany had more applications than Switzerland. The refugee crisis is still a widely discussed topic, and even in recent years, there is still a large intake of refugees and migrants in European countries.²

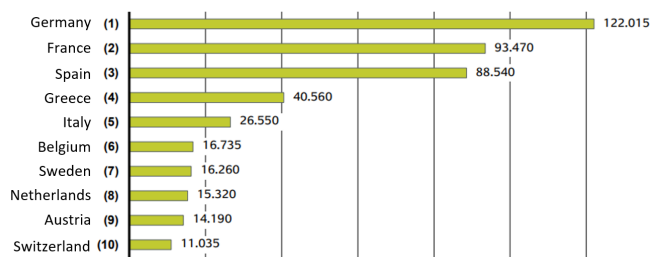


Figure 2: *Asylum Numbers Europe 2020*²

In the following analysis, a particular focus is set on Germany and Switzerland. The goal is to analyze the impact of the European refugee crisis on employment outcomes,

¹BBC News (2016). Migrant crisis: Migration to Europe explained in seven charts.

²Bundesamt für Migration und Flüchtlinge (2021). Das Bundesamt in Zahlen 2020.

including unemployment numbers. The research question is: *To what extent did the refugee crisis in 2015 impact employment outcomes on a national and regional level comparing Switzerland and Germany?* To answer this question, we use a difference-in-difference approach. We divide the analysis into two parts, where we first focus on national data and compare Germany with Switzerland as whole countries. For this analysis, we assume that Germany is a country that had to deal with a large number of refugees, whereas Switzerland had a lower amount of refugees. Secondly, we analyze regional data, comparing "Bundesländer" within Germany and cantons within Switzerland to find regional differences. In Germany, we focused on "geringfügige Beschäftigungsverhältnisse", which describe employment relationship on a maximum of 450 Euro basis per month or a work assignment of a maximum of 70 days per year.

Looking at the data for asylum applications for Switzerland, there is a clear peak in the year 2015.³ The refugees in Switzerland arrived especially from Eritrea, Syria, Afghanistan, and Turkey. Switzerland has fewer refugees than Germany because Switzerland is quite unattractive as a destination country due to the restrictive asylum policy.⁴ In Switzerland, refugees with a B permit or F permit, meaning recognized refugees, provisionally admitted refugees as well as stateless people, are allowed to seek employment if they register it at the responsible office. Asylum seekers with an N permit and refugees of all permit types living in an asylum center cannot engage in employment. They would need special approval to work.⁵

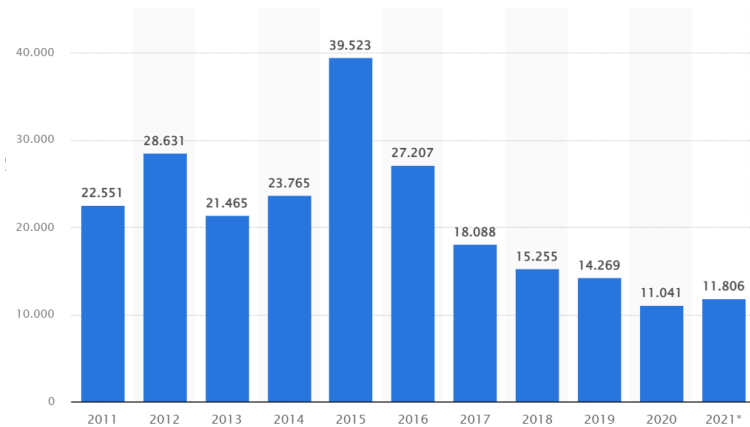


Figure 3: Asylum Applications Switzerland³

Looking at the German data for asylum applications, there is a peak in the year 2015. Overall, the number of applications is higher than in Switzerland, but it is essential to consider that Germany's population is ten times higher than in Switzerland.⁶ Most

³Statista (2021). Anzahl der neuen Asylgesuche in der Schweiz von 2011 bis 2021.

⁴Amnesty International (2020). Zahlen und Fakten zu Asyl in der Schweiz.

⁵Staatssekretariat für Migration (2021). Erwerbstätige aus dem Asylbereich.

⁶Bundesamt für Migration und Flüchtlinge (2021). Das Bundesamt in Zahlen 2020.

of the asylum applications were from people that arrived from Syria, Serbia, Kosovo, Albania, Iraq, and Eritrea. Germany is especially attractive due to EU regulations and since Germany is considered a country of hope and opportunities. ⁷ In Germany, asylum seekers are allowed to work after three months and if they are not obligated to live in a host facility or after six months if they have children. They are allowed to seek employment after nine months even if they still live in a host facility. Only tolerated people are allowed to work after six months if they are obligated to live in a host facility; otherwise, after three months. ⁸

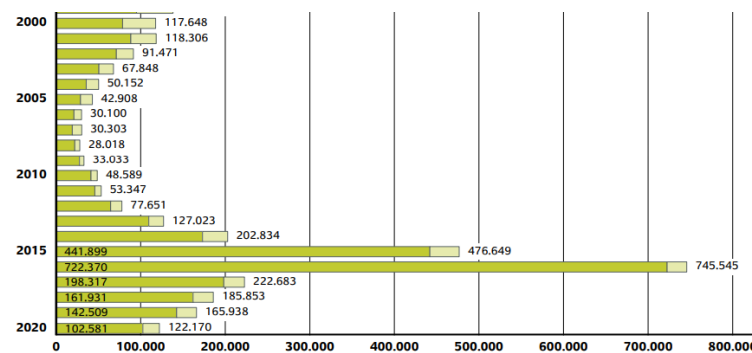


Figure 4: Asylum Applications Germany⁶

⁷Bundesministerium des Innern und für Heimat (2016). 2015: Mehr Asylanträge in Deutschland als jemals zuvor.

⁸Landeszentrale für politische Bildung (2021). Flüchtlinge und Schutzsuchende in Deutschland.

2. EMPIRICAL METHOD

To analyze the impact of the refugee crisis on employment in Switzerland and Germany a **difference-in-difference approach** was conducted. In the following this empirical method will be explained with a special focus on the relevant assumptions.

The difference-in-difference method can be defined as a quasi-experimental approach that compares the changes in outcomes over time between a treatment group and a control group. The treatment group receives the treatment the researcher is interested in; in this analysis, the treatment is the acceptance of many refugees. The control group receives either no treatment or a standard treatment whose effect is already known, which would be none or a lower amount of refugees in this analysis. To implement this method, we need data on outcomes in the treatment group and the control group for the period before and after the treatment. In this case, we need data for the control and treatment group before 2015 and after 2015, defined as the peak or start of the refugee crisis. Therefore, difference-in-difference is an analytical approach that facilitates causal inference even when randomization is impossible. By comparing the before and after changes in outcomes for the two groups, the method estimates the overall impact of the treatment.⁹

The following assumptions need to be fulfilled for the difference-in-difference method to work¹⁰:

- *Common Trend*: The common trend assumption states that in the absence of the treatment the difference between the control and the treatment group should be constant or "fixed" over time. The assumption can be stated as following:

$$\begin{aligned} & E[Y^0|X = x, T = 1, D = 1] - E[Y^0|X = x, T = 0, D = 1] \\ &= E[Y^0|X = x, T = 1, D = 0] - E[Y^0|X = x, T = 0, D = 0] \\ &= E[Y^0|X = x, T = 1] - E[Y^0|X = x, T = 0], \forall x \in \chi \end{aligned} \quad (1)$$

- *Common support*: This assumption states that for any value of the confounding variables a unit can potentially be observed with $D=1$ or $D=0$; $0 < P(D = 1 | X = x) < 1$ for all x in the support of X . This means that for identical individuals based on x , being $D=1$ or $D=0$ is random. Hence the conditional treatment probability (propensity score) is bounded away from zero and one.
- *Exogeneity of confounders*: The covariates are not affected by the treatment in a way that is related to the outcome variables. This means that the confounders are not influenced by the treatment itself. A sufficient condition for exogeneity

⁹The World Bank (2021). Difference-in-Difference. Quasi-Experimental Methods.

¹⁰Lechner, M. (2021). Lecture on Differences-in-Differences as part of Data Analytics II: Causal Econometrics. Personal Collection of M. Lechner, University of St. Gallen, St. Gallen.

would be: $X^d = X^{1-d}$. If we do not have exogeneity, we have the problem of conditioning already on part of the treatment effect, which will lead to a bias in the treatment effect (converges towards 0).

- *SUTVA*: This assumption excludes spillover effects. It means that the observed outcomes in one treatment state correspond to the potential outcome of this state for the specific individuals/ observations of this state: $Y = DY^1 + (1 - D)Y^0$. Hence everybody needs to be specifically assigned to either treatment group and there cannot be any relevant interactions between the treatments. Receiving treatment for individual A does not influence the potential outcome for individual B.

The parameter of interest for this analysis is the average treatment effect of the treated (ATET), which is the overall assessment of the treatment on the treated. The basis for the ATET is the average treatment effect (ATE), which is a measure for average population effects and defined as: $ATE = E(Y^1 - Y^0) = E(Y^1) - E(Y^0)$. Where Y^1 is the potential outcome for the treated and Y^0 is the potential outcome for the untreated or for the controls. The ATE is a measure of the difference in the mean of the potential outcome of the treated and the mean of the potential outcome of the untreated. It is important to allow for effect heterogeneity. It is possible to use the ATE and represent the ATET as well:

$$\begin{aligned}
 ATE &= E(Y^1) - E(Y^0) \\
 &= \underbrace{[E(Y|D=1) - E(Y^0|D=1)]}_{\text{identified}} \underbrace{P(D=1)}_{\text{identified}} + \underbrace{[E(Y^1|D=0) - E(Y|D=0)]}_{\text{counterfactual}} \underbrace{P(D=0)}_{\text{identified}}
 \end{aligned} \tag{2}$$

Where $[E(Y^1|D=1) - E(Y^0|D=1)]$ is the average treatment effect on the treated, $P(D=1)$ and $P(D=0)$ are the population effects and $[E(Y^1|D=0) - E(Y^0|D=0)]$ is the average treatment effect on the non-treated. Furthermore, the potential outcomes Y^1 and Y^0 cannot be observed simultaneously for each participant. We can only observe $Y = DY^1 + (1 - D)Y^0$ of the specific participant.

3. PROCESS OF PROJECT

3.1. Data Preparation

National Data

For the analysis, we gather different data for Germany and Switzerland using the Python file *Project_national data* for the Swiss and German data. All the functions used for the whole project are visible in the Python file *Project_Functions*. We faced the problem of varying availability of information in the different countries. For Germany, we find relevant information, especially on "geringfügige Beschäftigungsverhältnisse", meaning low-income employment positions. This data is of particular interest since one could assume that an increased number of refugees who start working within Germany could potentially impact these employment positions. There is no comparable information for Switzerland since the data in Switzerland sets a focus on the different economics sectors. In the end, we use the information to overview the trends and characteristics of the relevant country. For the analysis on a national level, we focus on data on employment in general, employment of foreigners, and unemployment.

Regional Data

For the regional analysis, we used the Python file *Project_regional data* containing regional data for the Bundesländer and cantons. We find the same information for the Bundesländer as we saw for Germany as a whole country. Therefore, we now have the opportunity to compare the "geringfügige Beschäftigungsverhältnisse" and how they change related to the increase in the number of refugees. Therefore we focus on "geringfügiges" employment, employment of foreigners, and the unemployment rate. For Switzerland, the cantonal data is less comprehensive. No data on regional employment levels is available, complicating the analysis. For Switzerland's cantons, we focus on data on unemployment and the unemployment rate.

3.2. Data Selection

For the national analysis we first look at the development of refugees relative to the population of the corresponding country.

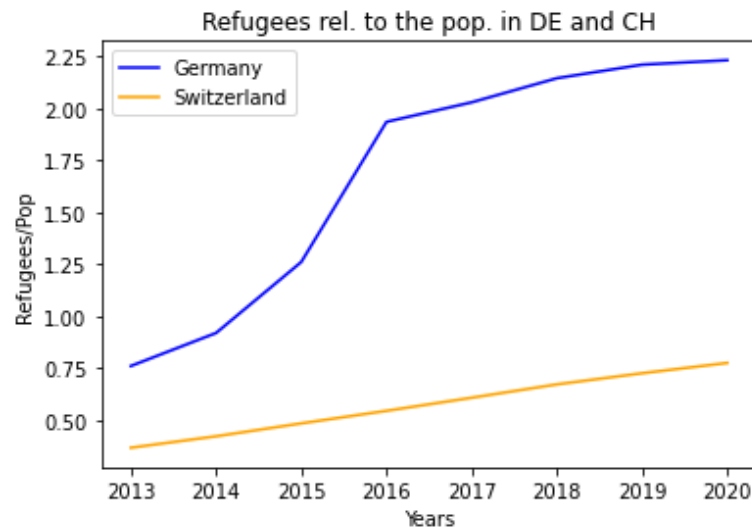


Figure 5: *Refugees to Population DE and CH*

When we look at the number of refugees relative to population size, we can see a development as expected. The numbers in Germany increase exponentially from mid-2014 while they only increase linearly in Switzerland. After 2016 this exponential trend levels off. For this analysis, we define Germany as the treatment group due to a large number of refugees compared to Switzerland. Switzerland is then defined as the control group. Switzerland accepted some refugees as well, but there is no prominent peak in 2015 as observed in Germany.

For the regional analysis, we first analyzed the trends in the different cantons and Bundesländer by looking at the development of refugees relative to the population and the development of total employment in German Bundesländer. By calculating the change in refugees relative to the people, we try to find two cantons/Bundesländer which are comparable in characteristics but display significant differences in the shift in refugees to population. For Germany, we observe the following:

Change in Ref/Pop	Bundesland
0.755626733	Mecklenburg Vorpommern
0.764559468	Bayern
0.810784781	Thüringen
0.834395532	Sachsen
0.90304238	Rheinland Pfalz
0.923485108	Baden Württemberg
0.939977921	Brandenburg
0.983573702	Sachsen Anhalt
0.993372367	Hessen
1.029406357	Berlin
1.131682447	Niedersachsen
1.161130898	Hamburg
1.23509063	NRW
1.244470672	Schleswig Holstein
1.387643143	Saarland
1.838892106	Bremen

Figure 6: *Refugees to Population German Bundesländer*

Looking at the table, we conclude that two Bundesländer which would be suitable for comparison are Mecklenburg-Vorpommern and Schleswig-Holstein as they are very comparable since they are located next to each other and have a similar size. Also, they are on opposite ends regarding the change in refugees per population. Another idea would be to compare Mecklenburg-Vorpommern and Bremen since they took in the least and most refugees relative to their people, respectively. However, one is a city, and one is not densely populated, so they may not be directly comparable. We define Schleswig-Holstein as the treatment group since it has a higher number of refugees than Mecklenburg-Vorpommern, the control group. Therefore we conduct our analysis on Mecklenburg-Vorpommern and Schleswig-Holstein and gather the information in the following graph:

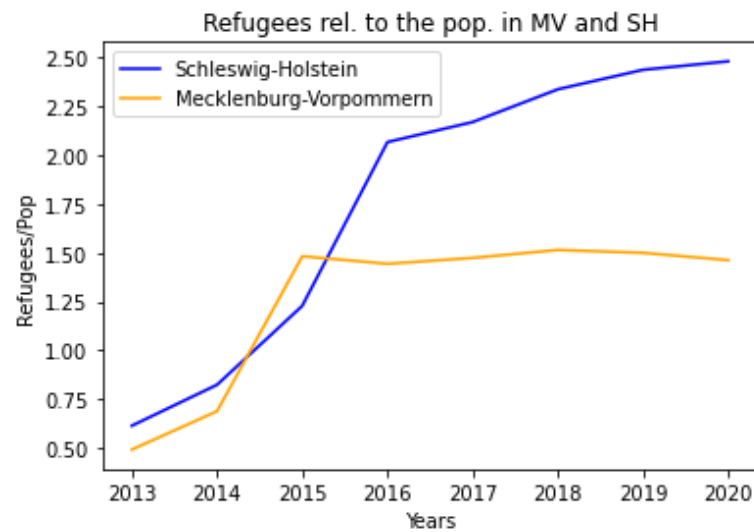


Figure 7: *Refugees to Population MV SH*

For Switzerland we observe the following trends in change in refugees to population:

Change in Ref/Pop	Canton
0.067009155	Thurgau
0.077792445	Genf
0.08807731	Schwyz
0.089323684	Basel S
0.094326738	Zürich
0.102412755	Appenzell I
0.106134784	Aargau
0.111749924	Obwalden
0.111884747	St. Gallen
0.114667983	Tessin
0.116754768	Uri
0.126049714	Graubünden
0.126242299	Schaffhausen
0.126447123	Basel L
0.133005689	Nidwalden
0.13401974	Luzern
0.136938298	Zug
0.144544222	Bern
0.144909139	Freiburg
0.15005755	Glarus
0.157551314	Wallis
0.161473868	Appenzell A
0.162573759	Vaud
0.166702975	Solothurn
0.176701208	Jura
0.179220241	Neuenburg

Figure 8: *Refugees to Population Swiss cantons*

Looking at Figure 8, we conclude that cantons that would be good for comparison are Aargau and Solothurn, Vaud and Geneva, or Schwyz and Glarus. These canton pairs are located next to each other and have comparable characteristics. And they

have as well an opposite trend regarding the change in refugees per population. We decide to compare as well Aargau and Solothurn and Vaud and Geneva. We define Solothurn as the treatment group due to the higher amount of refugees and Aargau as the control group. Regarding the other pair of cantons, Vaud is considered the treatment group due to the same reasoning, and Geneva is the control group. We gather the information in the following graphs:

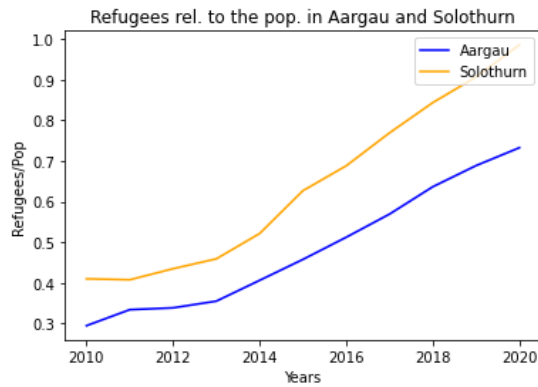


Figure 9: *Refugees to Population AG and SO*

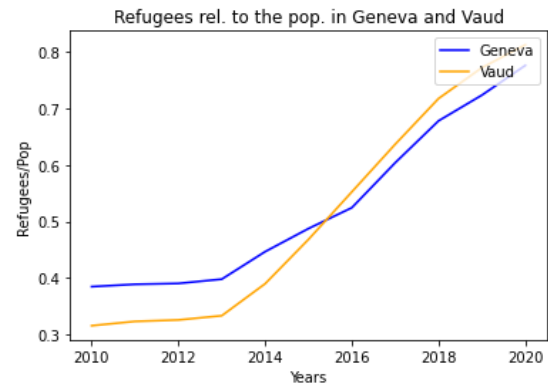


Figure 10: *Refugees to Population GE and VD*

3.3. Difference-in-Difference Approach

National Data

By comparing Germany and Switzerland, two countries that were to some extent differently impacted by the refugee crisis in 2015, we can define the situation as a *quasi-natural experiment*. This is due to the fact, that the refugee crisis was to some extent unexpected. Similar is the situation within the countries, where some cantons/Bundesländer experienced a large increase in the number of refugees whereas other cantons/Bundesländer only experiences small to no changes in the number of refugees. In the following, the identifying assumptions for the difference-in-difference method will be analyzed. The assumptions must be validated for the method to lead to valuable results. At first, we look at the assumptions used for the national data. In addition, for the regression we used the Python file *Project_national_data_regression*.

- *Common Trend*: In order to validate the necessary common trend assumption, we looked at the development of the unemployment rate, the total employment level, the employment level of foreigners as well as the population data over time in Switzerland and Germany.

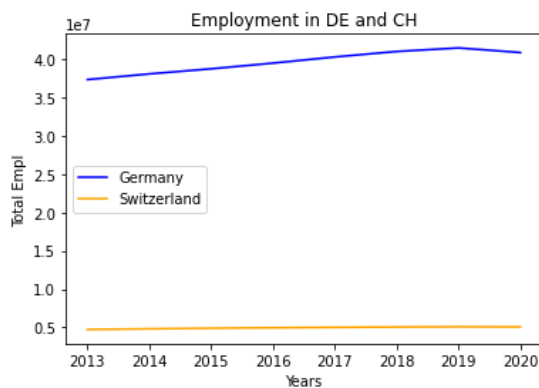


Figure 11: Employment DE and CH

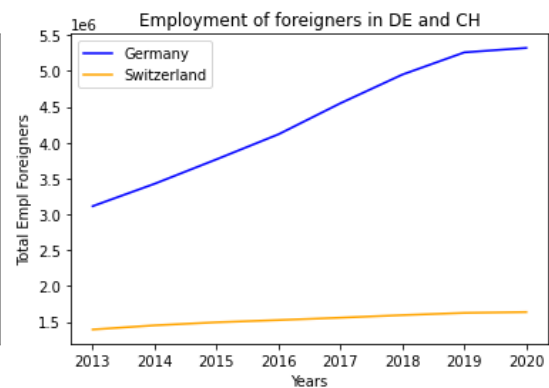


Figure 12: Employment Foreigners DE and CH

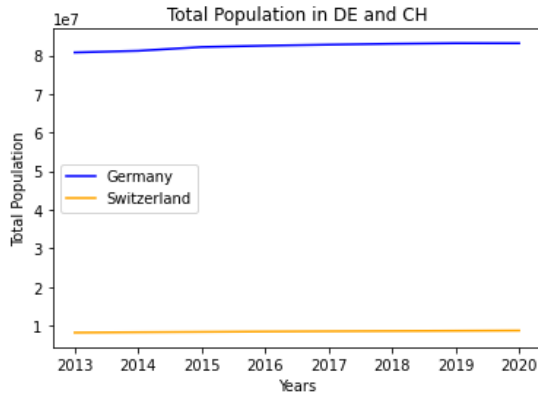


Figure 13: Population DE and CH

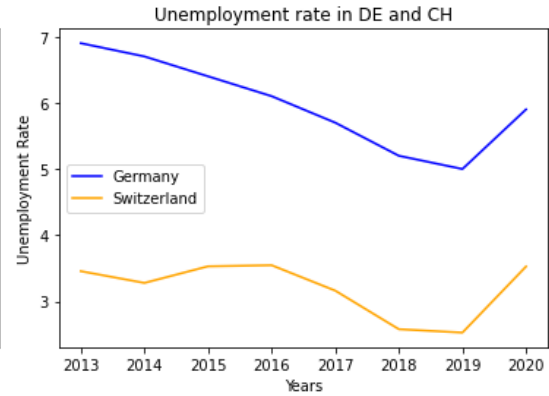


Figure 14: Unemployment Rate DE and CH

As one can see, the trends pre-2015 (pre-treatment) are similar but not all the same. However, we can assume that Germany and Switzerland are comparable since they have similar demographics, institutions, etc. Therefore, the common trend assumptions can be verified, and the two countries have a common pre-treatment trend.

- *Common support:* For common support to hold, the probability of belonging to the treatment or the control group has to be as good as random. In the case of the national data, it has to be mentioned that taking in refugees as a country is not entirely random but depends on international agreements and other circumstances and obligations. Additionally, since Germany is part of the EU, which entails additional agreements regarding refugees, Germany's probability of taking more refugees in than Switzerland is more significant than zero. Therefore, the amount of refugees in a specific country relates to some conditions. Still, overall it can be assumed that if refugees decide to enter Switzerland or Germany is as good as random as they start their migration to Europe since the two countries are comparable. To conclude, we assume that there is conditional random assignment of the treatment states, in this case, meaning the assumption of common support can be validated.
- *Exogeneity of confounders:* We assume that the covariates are not related to the treatment in a way that as well impacts the potential outcome. This means that the used covariates we observe are not associated with the fact that the number of refugees increased in a way that simultaneously affects employment or unemployment levels. We could assume that individuals in Germany already anticipate the increase in the number of refugees and change their behavior accordingly. If they do this in a way that also impacts the employment or unemployment levels (outcome variables), the endogeneity of such control variables is a problem. In our case, it is relatively unlikely that the two countries' populations anticipated the rapid increase in refugees in 2015. To conclude, we

assume that since we do not detect any contradicting information, the exogeneity assumption holds.

- *SUTVA*: For the SUTVA assumption to hold, receiving treatment in Germany has no impact on the potential outcome for Switzerland. According to the data and general observations, there is no clearly visible way in which the admission of refugees in Germany impacts employment trends in Switzerland. One could state that an increased number of refugees in Germany decreases the country's open employment positions. Therefore Germans seek employment in Switzerland and ultimately impact employment levels. And this might impact as well unemployment outcomes since this process could lead to a lower amount of available jobs for the Swiss working population. However, we assume that this turn of events is relatively unlikely and will not be further discussed. Therefore, we conclude that since we do not detect any contradicting information, the SUTVA assumption can be validated, and there are no general equilibrium effects.

To summarize, according to our analysis all the identifying assumption can be verified using some generalizations and the analysis should lead to a plausible result.

Regional Data

Now we consider the assumptions used for the difference-in-difference estimation using the regional data within Germany and Switzerland. In addition, for the regression we used the Python file *Project_regional_data_regression*.

- *Common Trend*: At first we look at the common trend assumption for the regional data within **Germany**. As discussed earlier we compare Mecklenburg-Vorpommern and Schleswig-Holstein.

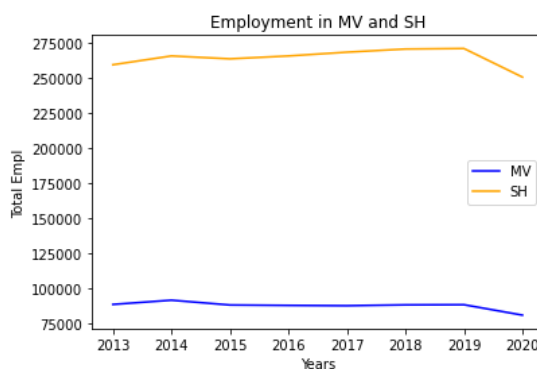


Figure 15: Employment MV and SH

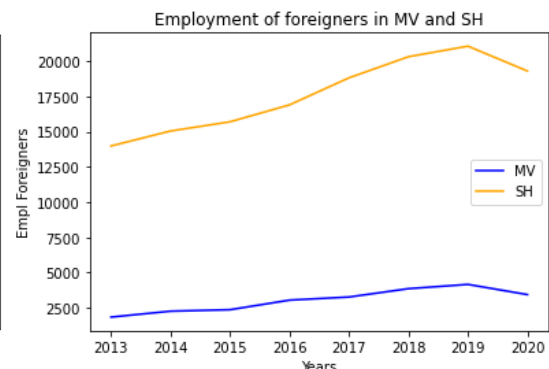


Figure 16: Employment Foreigners MV and SH

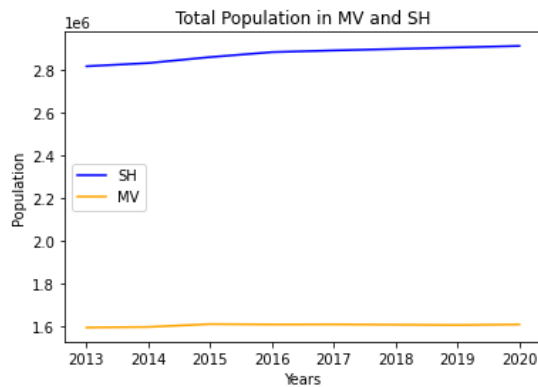


Figure 17: Population MV and SH

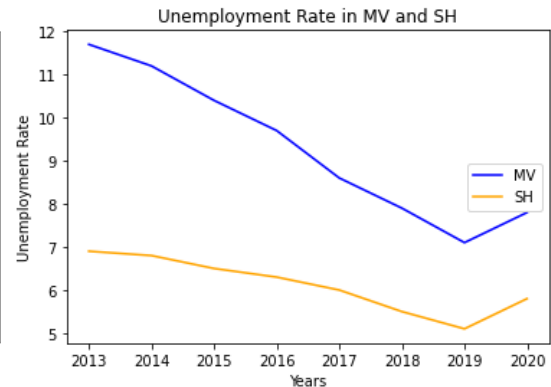


Figure 18: Unemployment Rate MV and SH

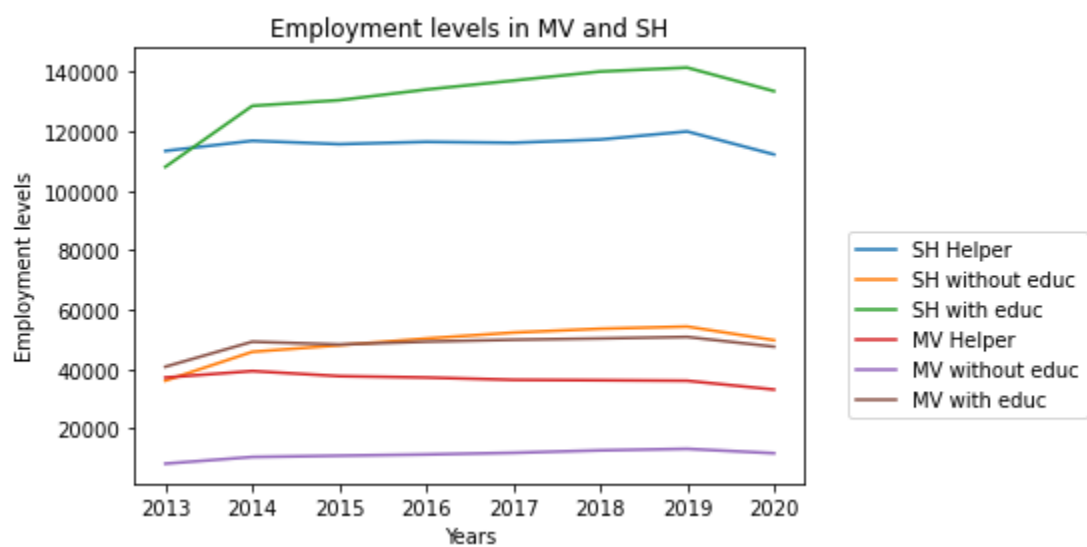


Figure 19: Employment levels MV and SH

As one can see looking at the different graphs, the pre-treatment trends before 2015 are quite similar. Since the two Bundesländer are located next to each other and have a comparable size with similar characteristics, we assume that the common trend assumption for the two Bundesländer can be validated.

Now we look at the common trend assumption for the regional analysis within **Switzerland**. Here we analyzed the canton of Aargau and Solothurn, as well as Vaud and Geneva. At first we look at Aargau and Solothurn.

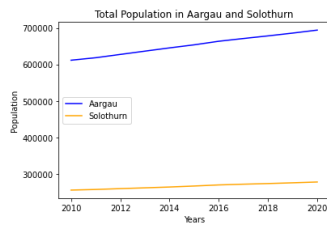


Figure 20: Population AG and SO

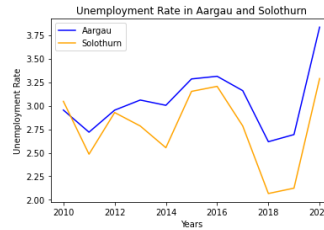


Figure 21: Unemployment Rate AG and SO

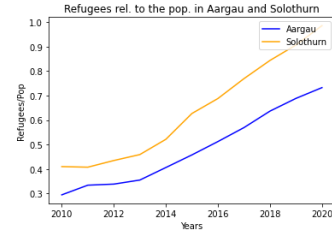


Figure 22: Refugees to Population AG and SO

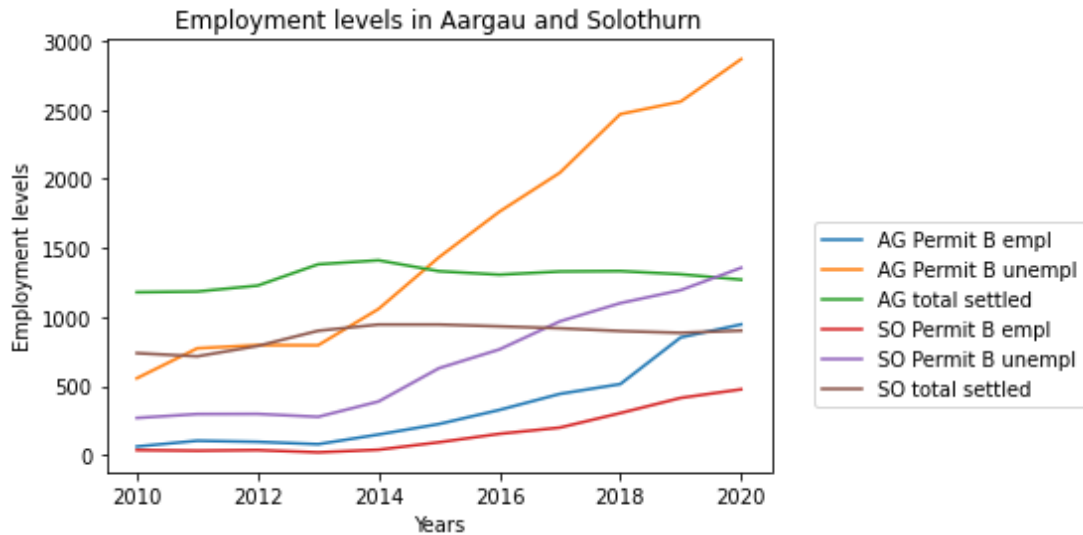


Figure 23: Employment levels AG and SO

We again observe that the pre-treatment trends before 2015 are quite similar in the two cantons. Since the two cantons are located right next to each other and therefore have similar demographics and other characteristics. We assume that the common trend assumption can be validated for Aargau and Solothurn.

Now we look as well at the graphs for Vaud and Geneva and see a similar picture.

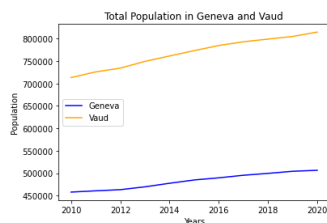


Figure 24: Population GE and VD

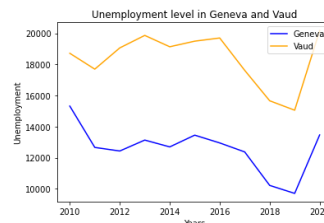


Figure 25: Unemployment GE and VD

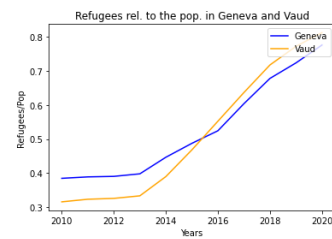


Figure 26: Refugees to Population GE and VD

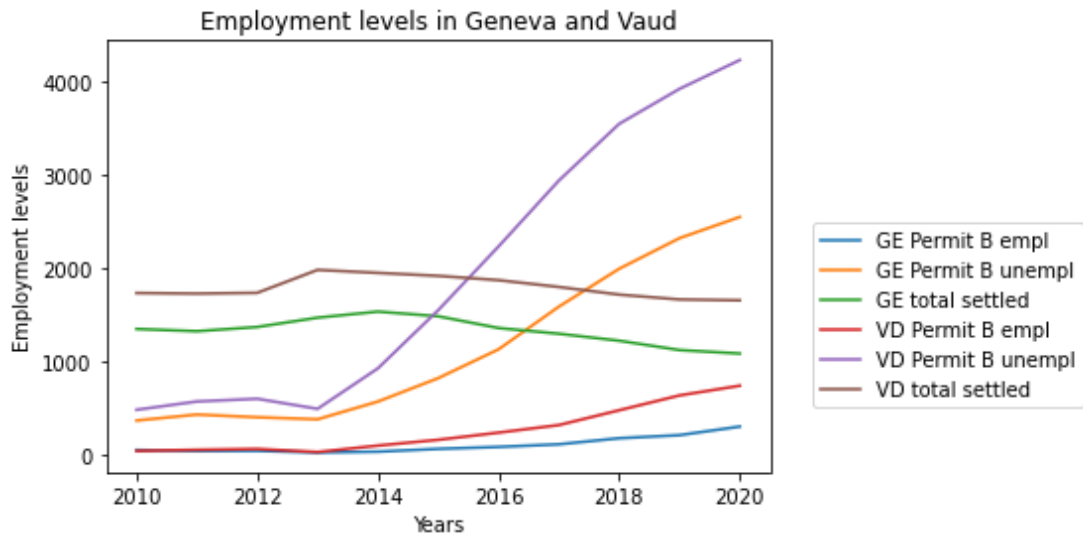


Figure 27: *Employment levels GE and VD*

We observe a similar pattern, and the pre-treatment trends before 2015 are comparable in the two cantons. Vaud and Geneva are also located next to each other, share a language, and have similar characteristics. Therefore, we assume that the common trend assumption can be validated.

- *Common support:* For common support to hold, the probability of belonging to the treatment or the control group has to be as good as random. In the case of the regional data, it has to be mentioned that taking in refugees in a specific canton or Bundesland may not be completely random. Still, it depends on national agreements and regulations and other circumstances and obligations. Therefore, the amount of refugees in a specific country relates to some conditions. To conclude, we assume that there is conditional random assignment of the treatment states, in this case, meaning the assumption of common support can be validated in the case of Bundesländer as well as cantons.
- *Exogeneity of confounders:* Similar to the discussion regarding the national data, we assume that the covariates are not related to the treatment in a way that as well impacts the potential outcome. This means that the used covariates we observe are not associated with the fact that the number of refugees increased in a way that simultaneously affects employment or unemployment levels within a canton or Bundesland. To conclude, we assume that since we do not detect any contradicting information, the exogeneity assumption holds.
- *SUTVA:* Again similar as before, it can be stated that for the SUTVA assumption to hold, receiving treatment in one canton/Bundesland has no impact on the potential outcome for the other canton/Bundesland. According to the data and general observations, there is no clearly visible way in which the admission of

refugees in one canton Bundesland/ canton impacts employment trends in the other one. Therefore, we conclude that since we do not detect any contradicting information, the SUTVA assumption can be validated, and there are no general equilibrium effects.

To conclude, we assume that all the identifying assumptions can be validated for the cantons as well as Bundesländer of interest. Therefore, the analysis should lead to a relevant result.

4. RESULTS

Lastly, let us come to the results and their implications of our estimations.

National Data

First, we will have a look at the results of the ATET estimation on a national level.

The ATET for **Total Employment** is **1'262'062**

The ATET for **Total Employment Foreigners** is **616'629**

The ATET for **Unemployment Rate** is **-1.0**

Assuming that all identifying assumptions hold, we can see that the influx of refugees led to an increase in the total employment level by approximately 1.3 million and an increase in the employment level for foreigners by approximately 0.6 million. Interestingly, the effect is almost twice as large on the total level of employment. This means that as well the employment of natives increased by approximately the same amount as the employment of foreigners. There are multiple possible explanations for these developments. But importantly, one has to consider that the employment of foreigners includes refugees and other foreigners as well. Perhaps the increase in foreign employment is because the refugees took on jobs in industries that were either desperately in need of workers and/or supporting industries to other industries. The increase in total employment could also be because the residence status of previous foreigners changed into natives and are now considered natives. Additionally, the large number of incoming refugees might have increased open positions and jobs in general, since there was a need for people dealing with the refugees and helping them settle down. Therefore some people found jobs due to the refugee crisis, mainly in the social or administrative sector, which boosted total employment. Considering that between 2014 and 2016, there was an influx of 851'250 refugees in Germany (1'597'570 refugees in 2016 - 746'320 refugees in 2014), we can make the assumption that many of them found work since the size of the ATET for the employment of foreigners is 72.4% as large as the increase in refugees. This statement holds if we assume that the rise in employment of foreigners means that *refugees* found employment.

And finally, we can have a look at the effect of the influx of refugees on the employment level of low-wage jobs ("geringfügige Beschäftigungsverhältnisse"). This was estimated with an OLS regression where Total Employment (geringfügig) is the dependent variable. As independent variables, we chose Total Population, Total Refugees, without educ and Year since the low-wage employment level can also be influenced by the development of the total population as well as the number of people without education.

OLS Estimation Results:

Dependent Variable: Total Empl (geringfügig)

	coef	se	t-value	p-value
intercept	1.847465e+08	1.244494e+08	1.48	0.23
Total Population	-2.100000e-01	3.200000e-01	-0.65	0.56
Total Refugees	3.600000e-01	4.600000e-01	0.79	0.49
without educ	1.820000e+00	7.600000e-01	2.38	0.10
Year	-8.084253e+04	6.675112e+04	-1.21	0.31

Figure 28: OLS Results

We can see that the number of refugees has a small (0.36) and not statistically significant effect on the level of low-wage employment. Surprisingly, the effect of the year is much larger (-80'843) and negative. Maybe this is because there have been policies on reducing low-wage employment and instead encouraging and helping people to go into jobs that are subject to social insurance contributions ("sozialversicherungspflichtig"). However, this coefficient is also not statically significant as the p-value is larger than 0.1. The only effect which is statistically significant is the effect of the number of people without education on the level of low-wage employment, yet this is also very small (1.8).

Regional Data

Next, we will have a look at the results on a regional level. First, we decided to compare Mecklenburg-Vorpommern and Schleswig-Holstein in *Germany* where Schleswig-Holstein (SH) is the treatment "variable". The results are the following:

The ATET for **Total Employment** is 3'707

The ATET for **Employment Foreigners** is 1'071

The ATET for **Unemployment Rate** is 1.0

and 36'285 refugees came into SH between 2014 and 2016.

Here we can see that the employment effect is much smaller than it was on the national level. This implies that most of the refugees who came into SH did not find any employment. This is also in line with the ATET for the Unemployment Rate, which increased by 1.0 due to the refugee influx.

Following, we will have a look at the regional results for *Switzerland*. First, we compared the cantons Geneva and Vaud. Since there was no data available on the regional employment levels for the Swiss cantons, we could only conduct the ATET estimation on the unemployment levels. Additionally, we checked the effect on the number of B permits to see how much of the refugee influx translated into an increase of the

permits B, which allow foreigners to work in Switzerland.

The ATET for **Unemployment** is 309

The ATET for **Unemployment Rate** is 0.0

The ATET for **Residents Permit B Total** is 834

and **1'367 refugees** came into Vaud between 2014 and 2016.

Here, the effect on the labour market was very small or even negligible since the effect on the Unemployment Rate was zero. More specifically, the incoming of 1'367 refugees translated into an effect on the amount of B permits of 834. Since we have a positive effect on the level of unemployment, this implies that most of the refugees with a permit B stayed unemployed.

And finally, let's move to the results of our estimation using Aargau as the control and Solothurn as the treatment.

The ATET for **Unemployment** is -171

The ATET for **Unemployment Rate** is 0.0

The ATET for **Residents Permit B Total** is -390

and **479 refugees** came into Solothurn between 2014 and 2016.

Again, we have a rather small effect on the labour market with an ATET for the Unemployment Rate of zero. Interestingly, we have a negative effect on the B permits which would imply that the incoming refugees had the effect of less inhabitants possessing a permit B.

5. CONCLUSION

Overall, the results suggest that the refugee crisis positively affected employment levels, both generally and only considering foreigners. To answer the research question; *To what extent did the refugee crisis in 2015 impact employment outcomes on a national and regional level comparing Switzerland and Germany?*, we conclude that the refugee crisis led to a positive effect on the employment levels on a regional and national level. The effect on unemployment is more ambiguous. On a national level, we find that the large influx of refugees decreased the unemployment rate by 1.0, while on a regional level, we find that it depends on the region we look at. However, the labor market effects on a regional level in Switzerland are relatively small or even almost non-existent. The ambiguity lets us question the experimental setup and especially the assumptions we made for the analysis. It may be that, especially on a regional level, the number of refugees who arrived in the region was too small to affect the labor market (for example, in Solothurn, there was only an increase of 479 people). Additionally, there may have been other labor market effects that we didn't consider, such as policies trying to affect the un-/employment levels. However, to summarize, it can be said that the refugee crisis most likely raised employment levels in the countries affected; thus, many refugees were able to find employment and start a new life.