



SCHOOL OF  
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Is a combination of language and vocational training an effective  
labour market policy for immigrants?  
- a quantitative study of Swedish municipalities

*Key words:* Combination education, Swedish for Immigrants (SFI), Vocational training, Labour market policy, Diff-in-Diff.

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## **Abstract**

In recent years, Swedish municipalities have introduced programs that combine Swedish language education with vocational training. However, due to the novelty and lack of an established framework, data and research on their effectiveness in improving immigrant labour market performance is limited. This essay addresses this gap by estimating the causal effect of vocational training combined with Swedish for immigrants (SFI) on employment among newly arrived immigrants. We employ a staggered Difference-in-Difference method using a self-collected and unique dataset covering 174 out of 290 municipalities, identifying which municipalities offer vocational SFI and when these programs were implemented. Additionally, we utilise municipality-level employment data for foreign-born individuals from Statistics Sweden (SCB). The results show a positive treatment effect of vocational SFI on employment rates. Among foreign-born individuals residing for 2-3 years, a positive effect is observed at the 10% significance level, while residents of 4-9 years experience a slightly higher treatment effect, significant at the 1% level.

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## 1. Introduction

Immigrants' integration into the labour market have long been subject to research focused on investigating their income and employment rates. Sweden, in comparison with other OECD countries, has one of the largest disparities in employment rates between native-born and foreign-born individuals (OECD, 2021). This discrepancy can be attributed to factors such as immigrants' language skills and education levels. In order to address this issue, it is crucial to assess labour market policies to identify the most effective approaches for improving immigrants' performance in the labour market.

In recent years, Swedish municipalities have implemented programs that combine Swedish language education with vocational training. This combined education approach holds potential for enhancing both language proficiency and job-specific skills among immigrants. However, there is currently no established national framework for this type of combination education, and existing research on its effectiveness in improving immigrants' labour market outcomes is limited. Additionally, there is a lack of complete data on the availability of vocational Swedish for immigrants (SFI) programs across municipalities, as well as the participants involved in which specialisation of these programs.

The aim of this essay is to estimate the causal effect of Swedish for immigrants (SFI) with vocational training on employment amongst newly arrived immigrants. The hypothesis is that vocational SFI has a positive effect on employment of this group. Hence, the research question addresses whether vocational training combined with Swedish for immigrants (SFI) have a positive effect on employment rates for newly arrived immigrants. To measure the treatment effect of a municipality offering vocational SFI on employment rates, a staggered difference-in-difference method is employed using panel data at the municipality and yearly aggregate levels for registered foreign-born Swedish residents who have resided in the country for 2-3 years 4-9 years respectively.

To conduct this study, a unique dataset covering 174 out of 290 municipalities was collected, a response rate of 60 percent, identifying which municipalities offer vocational SFI and when these programs were implemented. Additionally, municipality-level employment data for foreign-born individuals between 1997 and 2021 from Statistics Sweden (SCB) was utilised.

The results reveal a positive effect of vocational SFI on employment rates. After controlling for factors such as the proportion of foreign-born individuals in the municipality and the natural logarithm of population size in 2021, the analysis demonstrates a treatment effect of a 1.3 percentage point increase in employment rates (significant at the 10% level) for foreign-born individuals residing in Sweden for 2-3 years. For those residing in Sweden for 4-9 years, the treatment effect is slightly higher at 1.86 percentage points.

This essay is organised as follows: Chapter 2 provides background information on the functioning of vocational SFI programs in municipalities. Chapter 3 reviews previous research on immigrants' labour market integration and the impact of language education and vocational training. Chapter 4 describes the data collection process and the available data. The empirical evaluation method is outlined in Chapter 5. Chapter 6 presents and interprets the estimation results, while Chapter 7 discusses the implications of these findings. Finally, Chapter 8 presents the conclusions drawn from the study.

## 2. Background

In recent years it has become increasingly common for municipalities to offer programmes for immigrants that combine education in the Swedish language with vocational training.

However, this kind of combination education is not established nationally as its own form of learning and has no formally defined definition. There is a great variety between

municipalities in what terms are used for the combination of language and vocational training.

In this essay we use the term vocational SFI. There is also a great variety between

municipalities in educational planning, admissions process, language level, content, study and vocational guidance, the relationship between language and vocational teaching, work-place based learning (APL), and supporting measures such as orientation courses for this kind of education between municipalities. (Skolverket, 2023b, p.9)

### 2.1 The right and responsibility to SFI

According to Swedish law, individuals who are considered residents of Sweden from the second half of the year they turn 16 and are lacking basic Swedish language skills are eligible for the Swedish for Immigrants (SFI) program. Certain categories of people are considered residents even if they're not registered, including those covered by EU law, the EEA agreement, and the agreement between the EU, its member states, and Switzerland. A resident is eligible for SFI even if they do not have a personal identification number. However, asylum seekers, undocumented individuals, and those from Ukraine with temporary protection, while technically considered residents, are not eligible for SFI. (Skolverket, 2023c)

The municipalities are responsible for providing education in Swedish for immigrants (SFI). The home municipality is responsible for an individual's education, which is defined as the municipality where they are registered or permanently residing, or in the absence of a permanent residence, where they are currently staying. Municipalities are obliged to actively engage with and motivate eligible residents to participate in SFI, including offering study and vocational guidance. (Skolverket, 2023a)

A municipality can provide SFI under its own management or by procuring services from a supplier, where in both cases the municipality is considered the organiser of the education. However, some municipalities can not provide SFI for their residents by organising SFI themselves, and instead purchase services from another municipality through inter-municipal

compensation (IKE). When collecting the data on vocational SFI we have noticed that IKE is often used by small municipalities with a lack of resources. There also exist different forms of collaborations between municipalities in providing SFI. One type of collaboration is having a joint municipal association as organiser. The participating municipalities both have representatives in the political board of the municipal association that provides SFI for eligible residents in all participating municipalities.

## 2.2 What is vocational SFI?

Vocational SFI is a type of Swedish for immigrants (SFI) education tailored for a specific job. Like previously mentioned there is a wide variety in these types of programmes between the municipalities since there is no national structure.

In this essay we have chosen to focus on two different types of combinations of language and job training: 1. vocational training in combination with SFI, and 2. SFI tailored for participants with previous higher education/professional background from their country of origin. The first type is vocational training at upper secondary school level for a specific job with integrated SFI. This could for example include health care services, construction, restaurant, and other social services. Health and social care are the most common education specialisation, while child recreation is second most common, followed by restaurant and food. (Skolverket, 2023b, p.14) The second type is SFI adapted to the profession that the immigrant already has previous education or work experience from. This includes a wide range of professions like engineering, medicine, programming, law and others (SFX, 2023).

To give an example as to how a vocational programme can look like, Stockholm City describes it as an intensive full-time course with varying duration as a way to learn Swedish adapted to the language used in the vocation you're studying for. Including practical training known as workplace-based learning (APL) with an assisting supervisor. Eligible applicants will be invited to an interview before selecting participants (Stockholms stad, 2023).

## 2.3 Language levels

SFI consists of four different courses, A, B, C and D, and three different study paths which have different entry courses. Study path 2 consists of courses B, C and D. Study path 1 is primarily aimed at people with a very short study background, while study path 3 is aimed at

individuals who are used to studying. A passing grade in course C requires a competent knowledge in Swedish, while course D requires proficient knowledge in both informal and formal situations across daily life and being proficient in understanding and producing detailed and varied speech and text (Skolverket, 2022a).

Most vocational SFI programmes have requirements on which language levels that need to be completed in order to start the education. The most common language requirements are courses C and D and study path 2. Because of the absence of a national framework, it is possible that different organisers have different prerequisite requirements for vocational SFI programmes with the same education specialisation, for example SFI combined with vocational training in health and social care. (Skolverket, 2023b, p.23-24)

#### 2.4 Grants for vocational SFI

The municipalities can apply for state grants to develop their vocational SFI activities via the Swedish National Agency for Education. Within the framework of municipal adult education (komvux), the municipality can apply for state grants to finance vocational training at upper secondary school level combined with SFI. The state grant requires cooperation between at least three municipalities, which we have noticed when collecting our data since several municipalities apply for grants together. The purpose of the grant is to increase the offer of SFI or SVA with vocational training and to meet the needs of the labour markets in the municipalities. (Skolverket, 2022b)

In recent years, there have been several changes in the governance of komvux that affect vocational SFI. The definition of combination education has been expanded, and the requirement for co-financing does not apply if the combination program includes support measures like additional adaptations and special support for individuals with disabilities. Additionally, municipalities are now required to collaborate in the planning, dimensioning, and provision of upper secondary level education in komvux. (Skolverket, 2023b, p.9)

The Swedish National Agency for Education also led the national project “Combination education SFI” from December 2020 to April 2023, which was financed by the European Social Fund. The project compiled lessons learned about combined education and mapped the current situation of vocational training at upper secondary level combined with SFI, or SVA at primary secondary level at komvux. (Skolverket, 2023b, p.5)



### 3. Previous research

The previous research on policies for labour market integration has found a correlation between language knowledge and its impact on immigrant wages and employment. However, there is a gap in previous research regarding the effect of a combination of language and vocational training policies on employment among newly arrived immigrants (Skolverket, 2023b, p.5). Moreover, there is a lack of evaluation of municipal interventions due to a scarcity of statistics (Engdahl et al., 2023).

Pioneering work in the study of labour market integration of immigrants was undertaken by Chiswick (1978) and Borjas (1985). Chiswick laid the groundwork with the development of the immigrant assimilation model, suggesting that immigrants initially earn less than native-born individuals due to barriers such as language and unfamiliarity with the local labor market. Overcoming these barriers, immigrants' earnings tend to increase at a faster rate, eventually surpassing those of their native-born counterparts. Borjas extended the research by introducing the concept of cohort effects, arguing that the relative skills and economic performance of immigrants are affected by the specific cohort or time of immigration they belong to. This implies that variations in economic conditions and immigration policies at the time of immigration impact the earnings capacity and assimilation process of immigrants.

Regarding the effect of language skills on improving labour market performance for immigrants, a report by Kennerberg & Åslund from IFAU (2010) examines the difference in employment and earned income between participants and non-participants in SFI (Swedish for Immigrants) in Sweden. The study demonstrates that SFI participants, who initially have a low position in the labour market, experience a strengthening of employment and qualification for higher professions over time. Additionally, a significant study from Denmark analyses how policy measures, particularly for immigrants from linguistically distant countries, substantially contribute to labour market assimilation (Foged et al., 2022). Specifically, the expansion of language training policies has strong and persistent positive effects in the long run. Insights from these studies confirm the potential value of language training embedded in vocational SFI, suggesting its potential to effectively influence labour market assimilation for immigrants. These findings provide an inspiring foundation for further investigations into the role of vocational language training in enhancing labour market outcomes for immigrants.

Despite the lack of data and research on the effectiveness of vocational SFI at the municipal level, there are some evidence suggesting that language and vocational combinations yield better results than pure language training, as indicated by the review conducted by Karlsdóttir et al. (2017). An early example of this is the Sesam pilot project in Stockholm County from 2001 to 2003, which combined language training with work experience. Delander et al. (2005) found that program participation accelerated the transition to employment or further education. Another study from IFAU evaluates a program in Sweden for newly arrived immigrants aimed at enhancing integration. The program combines intensive language training with work placement and job search assistance, effectively doubling employment rates from an average of 15% in the control group to 30% in the treatment group within the first year after completion (Dahlberg et al., 2020). A more recent example is the introduction of combination courses such as vocational SFI in the city of Stockholm. Although these initiatives have not been evaluated for impact, the results presented in a couple of reports on vocational SFI (Oxford Research, 2019; Strategirådet Stockholms stad, 2019) appear promising.

## 4. Data

### 4.1 Data collection

There is no complete data of how many municipalities offer vocational SFI and in which education specialisations, or on which students participate in which vocational SFI programs. (Skolverket, 2023b, p.9) With this background we have decided to collect data ourselves on which municipalities in Sweden that offer SFI with vocational training and what year they started offering them.

The main question when dividing the municipalities into treatment- and control groups has been if they offer vocational SFI within the municipality. We have contacted all 290 municipalities in Sweden by email asking them to answer whether they offer vocational SFI, and if so which year they started to offer their residents to participate in vocational SFI education. Table 1 shows that 174 municipalities responded which resulted in a response rate of 60 percent, of which around half responded that they do offer vocational SFI. Nine municipalities that do offer vocational SFI could not tell us what year and are therefore excluded from the coming analysis.

Table 1. Distribution of responses

Variable	Obs	Mean
Vocational SFI	174	.517
Vocational SFI = YES	90	
Vocational SFI = NO	84	
Treatment Year	81	2018.901

We have downloaded data from Statistics Sweden (SCB, 2023a) on the percentage of employment amongst foreign-born men and women that have been registered residents in Sweden within 2-3 years and 4-9 years respectively for every municipality. Also data on total population and foreign-born population for every municipality have been used. (SCB, 2023b)

Individual level data and sufficiently detailed aggregated data to measure employment amongst individuals who have participated in vocational SFI is not available to us. Therefore, we have chosen employment amongst the two groups registered foreign-born Swedish residents that had been residents in Sweden for 2-3 years and 4-9 years (at the year employment was measured) respectively as our outcome variables. These are relevant employment rate variables since most foreign-born residents are offered vocational SFI, and we want to measure the effect on newly arrived immigrants.

## 4.2 Scope and Constraints

In this study, we employ the term 'vocational SFI' to describe an integrated program that combines Swedish for Immigrants (SFI) language instruction with vocational training at the upper secondary school level, tailored to specific occupations. There also exists education combining vocational training with Swedish as a Second Language (SVA, SVAS, SAS), which is sometimes confused with Swedish for immigrants (SFI). However, we want to explicitly clarify that our focus remains solely on vocational SFI.

We identify a municipality as offering vocational SFI if the municipality is the organiser. This means that the education is offered to the municipality's residents either by in-house provision or procurement from a supplier:

- a. In-house Provision: The education is provided within the municipality's institutions or facilities. In other words, the municipality makes use of its own resources, such as school buildings and municipal staff, to conduct the vocational SFI training. This does not involve any external parties or resources for the delivery of the education.
- b. Procurement from Supplier: The municipality arranges for the vocational SFI to be delivered through a third-party supplier. This means the municipality contracts or commissions an external provider, such as a private institution or organisation, to conduct the vocational SFI training on its behalf.

Under these conditions, we argue that the municipality is actively involved in facilitating vocational SFI to its residents, which serves as the criteria for our analysis.

A municipality is not classified as a provider of vocational SFI in our dataset if its residents are allowed to pursue vocational SFI in other municipalities via inter-municipal compensation

(IKE), but does not organise such courses itself under any of the aforementioned conditions. Furthermore, municipalities that have sporadically executed vocational SFI projects locally, without maintaining them as a consistent or ongoing offering, are also not regarded as providers of vocational SFI in our analysis.

In certain instances, we discovered that while a municipality might not offer vocational SFI internally, it participates in collaborative arrangements with other municipalities, enabling residents to partake in vocational SFI. Here, the responses from municipalities were often inconclusive, necessitating case-by-case evaluations to determine if the educational offerings were sufficiently accessible to residents. To mitigate potential ambiguity, we engaged in further dialogue with the municipalities in question, soliciting additional information to comprehensively understand their specific arrangements. Where responses were unclear, we promptly corresponded with the relevant municipality, seeking clarifications to ensure that our dataset remained unambiguous and categorizable. Our approach is designed to maintain the integrity of our research data, ensuring the validity of our conclusions.

The responses elicited from these municipalities typically coalesce into three primary categories:

1. The municipality does not offer the program as an organiser but participates in a regional cooperative agreement wherein the involved municipalities jointly apply for government grants - Categorized as NO.
2. There exists a partnership between a limited number of municipalities (for instance, a pair of municipalities), where services are procured from other municipalities through intermunicipal compensation - Categorized as NO.
3. A joint municipal association or centre is in place, providing vocational SFI - Categorized as YES.

Above listed delimitations have been difficult to make, as one could potentially argue that regional cooperation agreements should count as a yes (included in treatment) for every municipality involved. However, we are interested in studying vocational SFI that is accessible to the recipients in the specific municipality that they reside in and have thus decided to be coherently strict in this case.

We do not account for the fact that the availability of vocational SFI can fluctuate annually, both in regard to the number of study slots and the diversity of educational specialisations on offer. For the purpose of this research, we classify a municipality as 'treated' starting from the year it initially began delivering vocational SFI as a regular or permanent activity. However, if the municipality's offering of vocational SFI was strictly for a limited duration, such as a project, we do not categorise it as 'treated'.

#### 4.3 Descriptive statistics

Table 2. Summary statistics

	Mean	Median	SD	Min	Max
Vocational SFI	.51	1	0.500	0	1
Treatment Year	2018.901	2019	2.766	2007	2023
Treatment period	.124	0	0.330	0	1
Employment (2-3 years)	40.604	40	12.607	7	85.6
Employment (4-9 years)	55.047	55.7	10.910	19.7	92
Foreign-born	.116	.102	0.062	.02	.434
Population	32893.9	15502.5	65988.688	0	978770
Population (2021)	36042.503	16310	74936.012	2395	978770

In table 2 the relevant variables are described. In the appendix a more detailed summary is given, with all of all the variables. Around half of the municipalities that answered us offer vocational SFI and the average year of starting to offer the education was around 2019. The municipality that first offered vocational SFI was Göteborg City in 2007. Certain municipalities have reported the implementation of vocational SFI in 2022 or 2023. However, given that our dataset for employment only extends up until 2021, we do not incorporate these municipalities into the treatment sample. Rather, they are categorised within the control sample. This ensures that our Difference-in-Difference analysis, in which we have relevant employment data from 1997 to 2021, accurately represents the observable impact of vocational SFI on employment within the specified time frame." Naturally, the group of

immigrants that have resided in Sweden 4-9 years on average have higher employment rate than immigrants with a 2-3 year resident, a difference with on average 14 percentage points.

Table 3 shows the highest, lowest, and mean of the outcome, control and weight variables over the time period studied. The summary statistics are shown by treatment status (control or treated). It tells us that the employment amongst immigrants is around the same in both the treatment- and control group over time. The share of the population that is foreign-born is around 3 percentage points higher in municipalities that do offer vocational SFI than in those that do not.

Table 3. Summary statistics by treatment status

<b>Vocational SFI = NO</b>			
	Mean	Min	Max
Employment (2-3 years)	40.09	9.6	85.600
Employment (4-9 years)	54.756	21.1	92.000
Foreign-born	.103	.026	0.424
Population	19595.839	2459	156838.000
Population (2021)	21073.345	2459	156838.000
<b>Vocational SFI = YES</b>			
Employment (2-3 years)	40.503	7.3	82.800
Employment (4-9 years)	55.182	22.1	87.500
Foreign-born	.13	.02	0.362
Population	53699.005	2442	978770.000
Population (2021)	59677.344	2460	978770.000

Figure 1 and 2 shows the employment rate amongst immigrants with 2-3 years and 4-9 years of residence in Sweden respectively. In both figures the control group starts from having a lower mean employment rate, but catches up with the treatment group over time, making the employment gap smaller. Note that the treatment group all have implemented vocational SFI

in different years, and that the figures therefore do not show a clear before and after treatment period. With that said the intersection seems to be around 2010-2013. There seems to be parallel trends before the first municipality started offering vocational SFI in 2007.

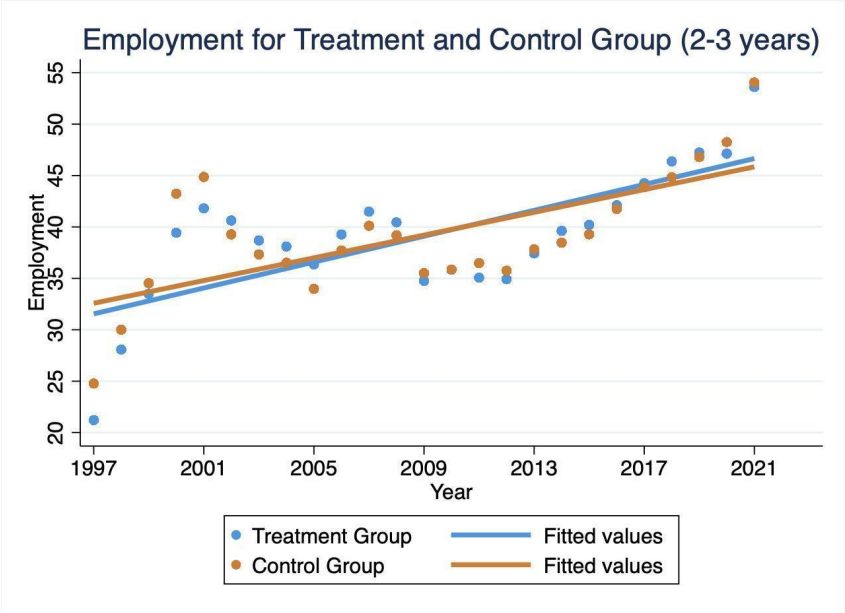


Figure 1. Employment for immigrants 2-3 years since arrival by treatment and control group

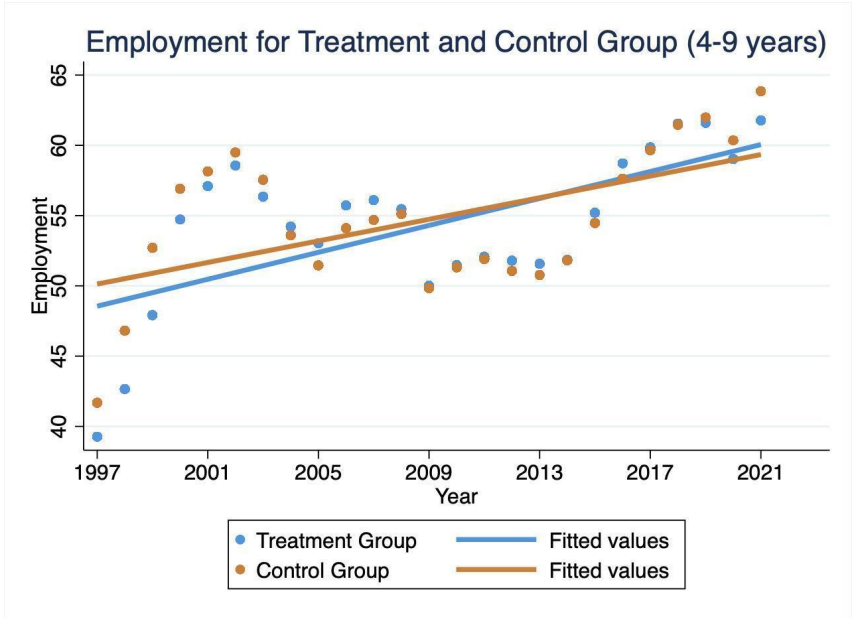


Figure 2. Employment for immigrants 4-9 years since arrival by treatment and control group



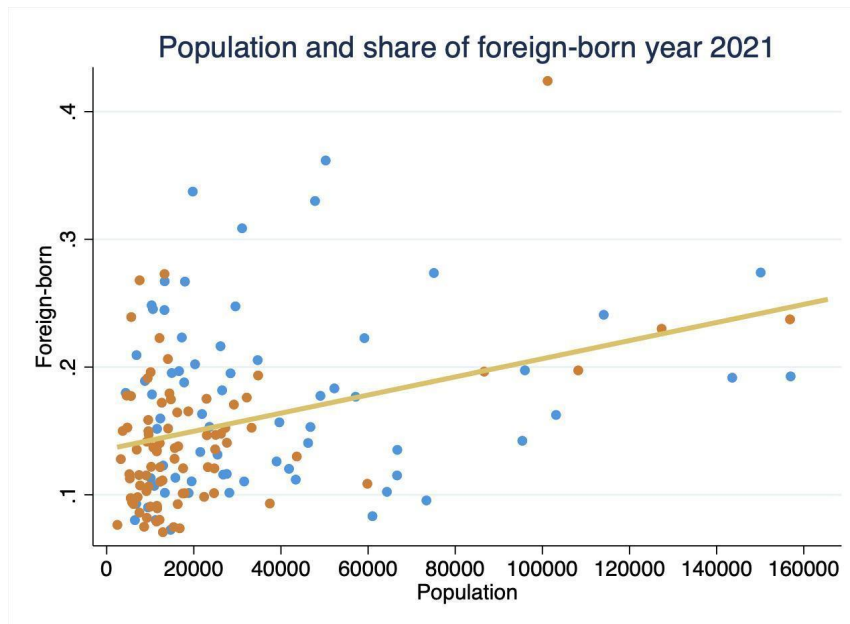


Figure 3. Share of foreign-born by population size in 2021 (without outliers)

Figure 3 and table 4 shows the relationship between the share of foreign-born within the municipalities populations and their total population sizes in 2021. The orange dots stand for municipalities that do not offer vocational SFI. The linear fit shows a slight positive relationship between share of foreign-born and population size. Figure 3 also shows a tendency towards municipalities with larger population size and higher share of foreign-born being more prone to offer vocational SFI, where the blue plots represent municipalities that offer vocational SFI. The metropolitan areas, the four municipalities with the largest population sizes, are not shown in figure 3 but instead in table 4. They all offer vocational SFI and have a varying share of foreign-born. Malmö City has the highest share of foreign-born amongst the metropolitan areas and also the lowest employment amongst foreign-born that had been residents in Sweden for 4-9 years in 2021.

Table 4. Outliers by population size: descriptive statistics in 2021

	Population (2021)	Foreign-born	Employment (4-9 years residents)	Vocational SFI
Stockholms stad	978770	.258	66.7	YES
Göteborgs stad	587549	.283	63.3	YES
Malmö stad	351749	.351	51.4	YES
Uppsala kommun	237596	.225	59.4	YES

## 5. Methodology

### 5.1 Difference-in-Differences and Fixed effects

In our investigation, we utilise a Difference-in-Difference (DiD) model to gauge the effect of vocational SFI on employment among immigrants. The DiD approach is particularly well-suited for studies like ours where the policy of interest, in this case the introduction of vocational SFI, is applied at an aggregate level, such as a municipality.

The central premise of the DiD model is to compare changes in employment outcomes between the treatment and the control groups (those municipalities implementing vocational SFI and those not) and the pre-treatment and post-treatment periods to estimate the effect of the policy. An important assumption for the DiD model is that there are parallel trends for the two groups, meaning employment trends would be the same in both groups in the absence of vocational SFI. However, this can not be estimated or proven since we can not measure the employment rates in a scenario where vocational SFI was never implemented in the treatment group. To support the parallel trends assumption we instead check if there are parallel trends in the pre-treatment period.

The DiD model is a form of fixed effects (FE) that control for both time-specific and group-specific effects that might otherwise confound the relationship between vocational SFI and employment. This accounts for time-invariant, unobserved municipality-level characteristics. By subtracting the average for each municipality from each observation, the model can control for these time-invariant characteristics, such as geographical barriers or budget constraints, that persist within each municipality. This is a unique strength of the FE aspect of the model.

However, it's essential to note that while the FE model, embedded within our DiD approach, controls for unobserved variables that are constant over time, it cannot account for time-varying unobserved factors. This limitation means if there are unseen variables that fluctuate over time, they may introduce bias into our estimates. It's thus important to be mindful of potential time-varying confounding factors in interpreting our findings.

Our use of the DiD model, with its FE component, offers us a framework to estimate the causal impact of vocational SFI on immigrant employment. By exploiting the variation in treatment timing across municipalities, our staggered DiD design enhances the causal

inference, providing a comprehensive picture of the vocational SFI's impact on the employment of immigrants.

## 5.2 Difference-in-Difference Regressions

### 5.2.1 Baseline equation

Equation (1) shows the baseline equation used for the staggered difference-in-difference model in this essay, where  $y$  is the outcome variable referring to the employment rate amongst immigrants in municipality  $i$  at time  $t$ .

$$(1) y_{it} = \alpha + \beta PostTreatment_{it} + \mu_i + \lambda_t + \tau X_{it} + \varepsilon_{it}$$

In the equation above  $\alpha$  is the intercept representing the average employment rate before a municipality is treated when all other variables are constant/zero. In other words  $\alpha$  shows the baseline level of employment rate amongst immigrants when the treatment vocational SFI and other factors are not present or have no impact.

$\mu$  is a fixed effect by municipality,  $\lambda$  is a temporal (year) fixed effect. (Municipality fixed effects help to isolate the treatment effect of vocational SFI by ensuring that the comparisons are made within municipalities over time, rather than between municipalities, thus reducing the impact of unobserved heterogeneity on the estimated treatment effect.)

*PostTreatment* is a dummy variable that takes the value of 1 following the introduction of offering vocational SFI,  $PostTreatment = 1[t \geq TreatmentYear]$ . Specifically, *PostTreatment* is equal to 1 for treated municipalities after they have started offering vocational SFI, and 0 for control municipalities that do not offer vocational SFI or for treated municipalities before offering vocational SFI.

$X_{it}$  represent time-varying control variables and include the share of foreign-born (vs. native-born in the municipality population). When we control for the share of foreign-born, we are essentially estimating the effect of offering vocational SFI on the employment amongst immigrants, while holding the share of foreign-born constant. This allows us to assess the

effect of vocational SFI on the outcome variable while accounting for the potential influence of the share of foreign-born in the population.

$\epsilon$  is a stochastic error.

$\beta$  is the treatment effect, the parameter which captures the average impact of offering vocational SFI on employment rate amongst immigrants.

A weight variable for population size is also included in the regression. This gives more importance to larger municipalities in the analysis, as they may have a greater impact on the overall results. The natural logarithm of population size is a variation of the weight variable included to see if the weight is not too heavy and overestimates the effect.

### 5.2.2 Regression models

In our analysis we look at 12 different models all based on the baseline equation shown in the previous section. For models 1 to 6 employment amongst foreign-born 2-3 years since arrival are used as the outcome variable, while employment amongst foreign-born 4-9 years since arrival are used. Table 5 shows the content of the models.

Table 5. Regression models

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Years	1997-2021	2000-2021	2000-2021	2000-2021	2000-2021	2000-2021
Population 2021 (Weight variable)	NO	NO	YES	NO	YES	NO
Foreign-born (Control variable)	NO	NO	NO	YES	YES	YES
Natural logarithm of population 2021 (Weight variable)	NO	NO	NO	NO	NO	YES

### 5.2.3 Lags, leads and event study

By extending the baseline equation with the leads and lags, dummy variables for the pre- and post treatment effects, we can make an event study plot to study the effects change over time and see if the parallel assumption can be made. We use the command `eventdd` by Clarke & T. Schythe (2020) to make a difference-in-difference event study graph (see chapter 6, figure 4) in Stata.

Leads and lags are dummy variables indicating that the given municipality was a given number of years away from the introduction of vocational SFI in the respective time period. Lag 0 is the year that the municipality started offering vocational SFI. For example lag 2 has the value of 1 for all treated municipalities two years after the year they started offering vocational SFI, while the municipalities that do not offer vocational SFI have the value 0 for lag 2. The leads and lags are always 0 for the control group. Therefore the lead and lag variables capture the difference between municipalities where vocational SFI is offered and not. The leads are the time periods before starting to offer vocational SFI, the pre-treatment effect, while the lags are the time periods after catching the post-treatment effects.

Equation (2) and (3) displays the baseline equation including lags and leads.

$$(2) \ y_{it} = \alpha + \sum_{j=24}^J \beta_j (Lag\ j)_{it} + \sum_{k=14}^K \gamma_k (Lead\ k)_{it} + \mu_i + \lambda_t + \tau X_{it} + \varepsilon_{it}$$

In equation (2), lags and leads to the introduction of vocational SFI are defined as:

$$(A) \ (Lag\ J)_{it} = 1[t \leq TreatmentYear_i - J],$$

$$(B) \ (Lag\ j)_{it} = 1[t = TreatmentYear_i - j] \text{ for } j \in \{1, \dots, J - 1\},$$

$$(C) \ (Lead\ k)_{it} = 1[t = TreatmentYear_i + k] \text{ for } k \in \{1, \dots, K - 1\},$$

$$(D) \ (Lead\ K)_{it} = 1[t \geq TreatmentYear_i + K].$$

$$(3) \ y_{it} = \alpha + \beta_{24} (Lag\ 24)_{it} + \dots + \beta_2 (Lag\ 2)_{it} + \gamma_0 (Lead\ 0)_{it} + \dots + \gamma_{14} (Lead\ 14)_{it} + \mu_i + \lambda_t + \tau X_{it}$$

## 6. Results

The results for the standard staggered difference-in-difference model are shown in table 6 and 7. The complete tables with time fixed effects are displayed in table B and C in the appendix. Figure 4 and figure 5 plots the event study lag and lead coefficients and their confidence intervals for model 6 and model 12, which includes the control variable and logarithmic weight variable for population with the different employment variables. The event study plots for the remaining models are shown in appendix figures A-J, table D and E in the appendix shows the coefficients for every lag and lead.

Table 6. The standard Diff-in-Diff  
(Employment Foreign-born 2-3 years since arrival)

Diff-in-Diff Estimate (Employment Foreign-born 2-3 years since arrival)						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Model 1 (1997-2021)	Model 2 (2000-2021)	Model 3 (weight)	Model 4	Model 5 (weight)	Model 6 (ln_weight)
Vocational SFI	1.738** (0.726)	1.384* (0.727)	1.171** (0.475)	1.245* (0.716)	0.936* (0.479)	1.300* (0.701)
Foreign-born				-93.11*** (13.02)	-40.54*** (12.61)	-89.66*** (12.96)
Constant	21.26*** (0.890)	39.14*** (0.887)	35.54*** (0.578)	48.03*** (1.519)	41.22*** (1.858)	47.60*** (1.527)
Observations	1,803	1,636	1,636	1,636	1,636	1,636
R-squared	0.472	0.349	0.671	0.370	0.673	0.387

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 7. The standard Diff-in-Diff  
(Employment Foreign-born 4-9 years since arrival)

Diff-in-Diff Estimate (Employment Foreign-born 4-9 years since arrival)						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Model 7 (1997-2021)	Model 8 (2000-2021)	Model 9 (weight)	Model 10	Model 11 (weight)	Model 12 (ln_weight)
Vocational SFI	2.461*** (0.591)	1.835*** (0.571)	2.129*** (0.371)	1.791*** (0.567)	1.882*** (0.373)	1.855*** (0.552)
Foreign-born				-47.57*** (10.10)	-43.84*** (9.743)	-47.29*** (10.02)
Constant	39.96*** (0.641)	55.41*** (0.615)	49.75*** (0.443)	59.86*** (1.126)	55.86*** (1.428)	59.61*** (1.133)
Observations	1,992	1,755	1,755	1,755	1,755	1,755
R-squared	0.470	0.280	0.586	0.290	0.591	0.305

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The coefficient for foreign-born that had been residents in Sweden for 2-3 years depicted in model 6 in table 6 is at 1.300\*, but significant only on the 10%-level, when we include the share of foreign-born as control variable and weight for the natural logarithm of population size. When looking at model 12 in table 7, which includes the same variables except for the outcome variable measuring employment for the 4-9 years of residence group, the result shows a slightly bigger and more significant (at the 1%-level) treatment effect at 1.855\*\*\*. This would mean that a municipality on average will get 1.86 percentage points higher employment rate amongst foreign-born with 4-9 years of residence if they start offering vocational SFI. Overall, all models in table 7 have higher treatment effects than their



corresponding ones in table 6. Meaning vocational SFI has a higher effect on employment amongst foreign-born that had been residents in Sweden for 4-9 years compared to 2-3 years.

In both table 6 and 7, there is a negative change in treatment effect of around 20% when we exclude the years 1997-1999, comparing 1.738\*\* in model 1 with 1.384\* in model 2 and 2.461\*\*\* in model 7 with 1.835\*\*\* in model 8. This indicates that employment rates were low 1997-1999 and makes the effect appear larger, which is consistent with what is shown in figure 1 and 2 in section 4.2.

When the control variable for share of foreign-born in a municipality is included in the regression for the 2-3 years of residence group in table 6, there is a 10%-20% smaller treatment effect. This means that the effect of offering vocational SFI on the employment amongst immigrants is smaller if the share of foreign-born is held constant. There is also a smaller effect when including the control for the 4-9 year group, especially for model 11 (35% smaller effect) that includes the weight variable. The coefficient for the foreign-born variable itself is negative and significant on the 1%-level in all models. For example, in model 12 in table 7, the coefficient is -47.29\*\*\* which indicates that an increase in the share of foreign-born by one unit (100 percentage points) is associated with a decrease in employment at roughly 47 percentage points if all else is equal. Model 4 and model 6 stand out with their high foreign-born coefficients at -93.11\*\*\* and -89.66\*\*\*, while the other models have the corresponding values around negative 40 to 47.

If population size is added as weight, giving more importance to municipalities with larger populations, there is a slightly lower positive outcome in table 6 (15% smaller without control and 25% smaller with). However, for foreign-born that had been residents in Sweden for 4-9 years in table 7 the effect of vocational SFI on employment instead becomes bigger when including the weight variable (16% bigger without control and 5% bigger with). This information indicates that in municipalities with a larger population the effect of vocational SFI on employment is smaller amongst 2-3 year residents and bigger amongst 4-9 years residents.

The constants are all significant at the 1%-level and indicate the average employment rate for the municipalities before treatment. For model 12 the constant 59.61\*\*\* indicates that the employment rate is on average 60% when the treatment vocational SFI and other factors are

not present or have no impact. When excluding the years 1997-1999 and weighting for population size the constants are smaller, but larger when including the share of foreign-born.

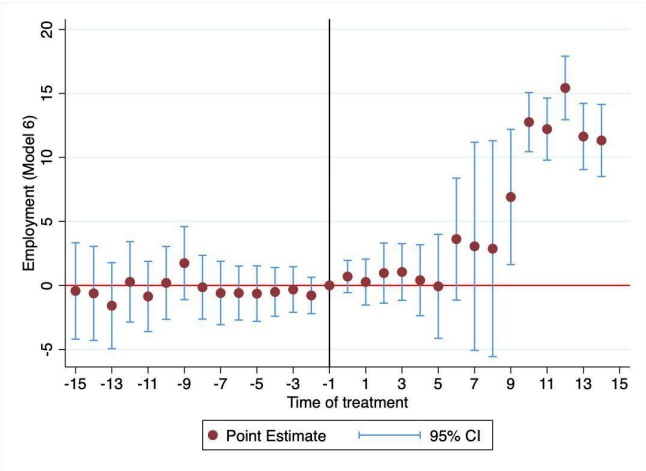


Figure 4. Event study graph for Diff-in-Diff Model 6 (Employment Foreign-born 2-3 years since arrival)

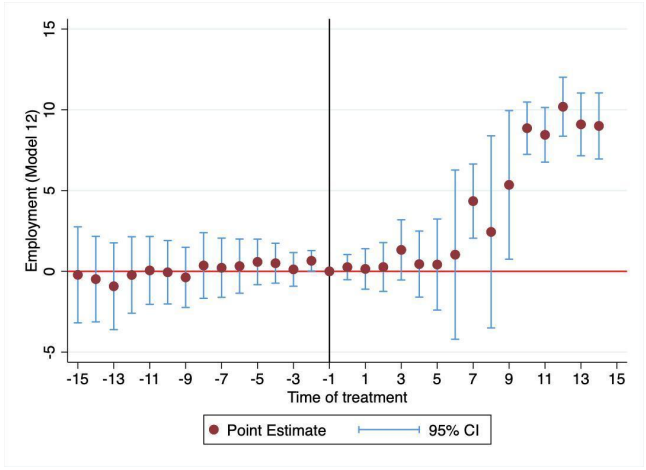


Figure 5. Event study graph for Diff-in-Diff Model 12 (Employment Foreign-born 4-9 years since arrival)

The event study plot in figure 4 and figure 5 depicts the cumulative estimated effects of offering vocational SFI on employment in treated municipalities, relative to non-treatment, for the lags and leads. Lead 1, one year before a municipality started offering vocational SFI, is used as a reference period. Both figures exhibit a positive change in employment starting around 5 years after beginning to offer vocational SFI. An example of how to interpret the plots is that the coefficient for lag 9 in figure 5 shows that the change in employment was 5

percentage points in treated municipalities, relative to non-treatment, between one year before and 9 years after a municipality started offering vocational SFI.

Parallel trends are shown in the event study graphs (figure 4 and 5). The pre-treatment effects on employment for foreign-born both 2-3 and 4-9 years after arrival are around zero. A lead or lag with a coefficient at zero means that there is zero change in employment in treated compared to non-treated municipalities at that time period. Therefore if all leads, time periods before introduction of vocational SFI, are around zero there is close no difference in trends between control group and treatment group before treatment which supports the parallel trends assumption. However, as mentioned in section 5.1 we can not know if the trends would be parallel after the treatment and therefore not prove the assumption.

## 7. Discussion

As our results indicate, offering vocational Swedish for Immigrants (SFI) programs has a positive effect on employment and can provide a significant opportunity for integrating newly arrived immigrants into the Swedish labour market.

Our findings indicate that the impact of vocational SFI on employment outcomes becomes more pronounced with a longer duration of stay, specifically in the 4-9 years range, compared to the initial 2-3 years. This is not entirely surprising, as learning Swedish to the language level required for vocational proficiency is a long-term process that varies between individuals. Immigrants that have been residents for 4-9 years are more likely to have the language skills required to be eligible for vocational SFI. The fact that we see significant results on the 1%-level in every regression we run for 4-9 year residents provides evidence for the positive impact of vocational SFI for this group. In the initial 2-3 years, some immigrants may still be in the early stages of their Swedish language learning and may not have reached the SFI C/D level yet. They may also be adjusting to the new culture and navigating the complexities of the immigration process that could affect their employment outcomes. Different groups of immigrants depending on factors like their previous education, native language, commitment to language learning, and accessibility to learning resources, age, and gender, could further explain the delay in observable impact.

Another interesting perspective which we have not included in this essay, is that the suitability and effectiveness of these programs can vary greatly across different sectors in the labour market. Factors contributing to these variations include the specific language demands of the sector, the intensity and complexity of the work. As some of the municipalities that we have been in contact with have also speculated, vocational SFI programs might be better suited to sectors where the language demands are less stringent or where communication errors carry less serious implications. For instance, in the manufacturing or logistics sectors, employees might be able to perform their jobs effectively with a more limited command of Swedish, provided they understand key terms and instructions related to their work. In such cases, a vocational SFI program can be an effective way to provide immigrants with the specific language skills they need for their jobs while also helping them to integrate more quickly into the Swedish labour market. Even within the same sector, the appropriateness of a vocational SFI program can vary depending on the specific job role. For example, in the hospitality sector, a cook might be able to work effectively with a limited command of Swedish, while a

front-desk receptionist at a hotel would likely require a more comprehensive understanding of the language to interact effectively with guests.

In the context of vocational Swedish for Immigrants (SFI) programs, it is crucial to prioritise the integration of the low-employment group into the workforce. Comparative studies consistently indicate that, despite the challenges faced by highly educated immigrants compared to native Swedes, their employability still surpasses that of their less educated counterparts (Bevelander, P., & Pendakur, R., 2014). Unfortunately, given the limitations in the granularity of data available to us from Statistics Sweden (SCB), it is currently unfeasible to conduct an analysis stratified by these individual groups. Thus, an inclusive approach targeting both low-educated and high-educated individuals is advocated for in this study. For even further granularity, one could potentially study the male versus female employment levels in these groups, which is not something that we have done in this pilot-study research paper.

From a research perspective, this study has focused on both vocational SFI for immigrants with lower education levels and those with previous work experience in a profession. (See section 2.2 for definitions.) A potential limitation in the current scope of study could be that there was a lesser representation of type 2 vocational SFI programs in our responses. At the same time, previous research shows that immigrants with lower education levels are the ones with the lowest employment rates. This raises the question for which type is relevant to study. Differentiating between these two in the study could offer a more comprehensive understanding of the impact of different types of SFI programs and their effectiveness on employment rates. Moreover, further studies could explore why municipalities predominantly offer type 1 programs, and the potential implications this has on integration outcomes. This could provide policy-relevant evidence to guide the development and implementation of SFI programs that cater to diverse immigrant profiles.

## **8. Conclusion**

The aim of this thesis was to estimate the causal effect of vocational training combined with Swedish for immigrants (SFI) on employment among newly arrived immigrants. Our staggered DiD analysis based on self-collected data, shows a positive effect of vocational SFI on employment rates. Among foreign-born individuals residing for 2-3 years, a positive effect is observed at the 10% significance level, while a slightly higher treatment effect is estimated for residents of 4-9 years, significant at the 1% level. This suggests that vocational SFI is an effective policy to improve integration into the labour market for newly arrived immigrants, which adds to the limited but promising previous research on combined language and vocational training. For future research it would be interesting to estimate the outcomes for different immigrant groups like gender and previous education levels, or for different education specialisations of the vocational SFI programmes, which has not been done in this study due to data limitations.

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## Appendix

Table A. Summary statistics

Descriptive Statistics					
Variable	Obs	Mean	Std. Dev.	Min	Max
Municipality code	7477	1382.146	714.713	114	2584
Year	7268	2009.032	7.232	1997	2023
Vocational SFI	4461	.51	.5	0	1
Treatment Year	2025	2018.901	2.766	2007	2023
Treatment period	2025	.124	.33	0	1
Employment (2-3 years)	5926	40.604	12.607	7	85.6
Employment (4-9 years)	7035	55.047	10.91	19.7	92
Foreign-born	6378	.116	.062	.02	.434
Population	6380	32893.9	65988.688	0	978770
Population (2021)	6380	36042.503	74936.012	2395	978770

Table B. The standard Diff-in-Diff with time fixed effects  
(Employment Foreign-born 2-3 years since arrival)

<b>Diff-in-Diff Estimate (Employment Foreign-born 2-3 years since arrival)</b>						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Model 1 (1997-2021)	Model 2 (2000-2021)	Model 3 (weight)	Model4	Model 5 (weight)	Model 6 (ln_weight)
Vocational SFI	1.738** (0.726)	1.384* (0.727)	1.171** (0.475)	1.245* (0.716)	0.936* (0.479)	1.300* (0.701)
year = 1998	6.971*** (1.303)					
year = 1999	12.05*** (1.303)					
year = 2000	17.98*** (1.261)					
year = 2001	20.60*** (1.236)	2.593** (1.226)	3.153*** (0.814)	2.711** (1.207)	3.255*** (0.813)	2.832** (1.172)
year = 2002	19.69*** (1.242)	1.672 (1.231)	2.487*** (0.816)	2.021* (1.213)	2.701*** (0.817)	2.111* (1.178)
year = 2003	17.58*** (1.246)	-0.443 (1.235)	0.840 (0.816)	0.119 (1.218)	1.147 (0.819)	0.221 (1.183)
year = 2004	16.68*** (1.227)	-1.308 (1.218)	0.486 (0.813)	-0.556 (1.203)	0.883 (0.820)	-0.397 (1.170)
year = 2005	15.07*** (1.223)	-2.887** (1.213)	-0.451 (0.813)	-1.983* (1.201)	0.0425 (0.825)	-1.743 (1.168)
year = 2006	19.06***	1.106	3.541***	2.359**	4.230***	2.576**

	(1.211)	(1.202)	(0.812)	(1.196)	(0.837)	(1.165)
year = 2007	21.20***	3.261***	5.868***	4.921***	6.783***	5.094***
	(1.208)	(1.198)	(0.814)	(1.202)	(0.860)	(1.172)
year = 2008	20.47***	2.531**	5.095***	4.648***	6.200***	4.754***
	(1.197)	(1.188)	(0.813)	(1.206)	(0.880)	(1.178)
year = 2009	15.20***	-2.753**	-0.0391	-0.311	1.256	-0.215
	(1.198)	(1.189)	(0.813)	(1.218)	(0.905)	(1.191)
year = 2010	15.36***	-2.581**	0.727	0.210	2.175**	0.420
	(1.194)	(1.185)	(0.813)	(1.230)	(0.927)	(1.203)
year = 2011	14.49***	-3.453***	1.178	-0.298	2.761***	-0.0481
	(1.188)	(1.179)	(0.812)	(1.242)	(0.947)	(1.215)
year = 2012	14.76***	-3.181***	2.828***	0.322	4.547***	0.637
	(1.185)	(1.177)	(0.813)	(1.257)	(0.971)	(1.231)
year = 2013	17.61***	-0.320	5.925***	3.679***	7.812***	3.968***
	(1.180)	(1.171)	(0.813)	(1.281)	(1.000)	(1.256)
year = 2014	19.41***	1.479	9.515***	6.042***	11.60***	6.496***
	(1.186)	(1.177)	(0.814)	(1.323)	(1.038)	(1.296)
year = 2015	19.99***	2.067*	10.71***	7.361***	13.01***	7.828***
	(1.187)	(1.178)	(0.814)	(1.375)	(1.081)	(1.348)
year = 2016	21.91***	4.032***	12.14***	10.30***	14.81***	10.68***
	(1.191)	(1.183)	(0.835)	(1.457)	(1.175)	(1.429)
year = 2017	23.30***	5.455***	13.88***	12.33***	16.87***	12.75***
	(1.200)	(1.191)	(0.848)	(1.516)	(1.255)	(1.490)
year = 2018	25.34***	7.542***	14.40***	14.87***	17.65***	15.10***
	(1.219)	(1.211)	(0.859)	(1.572)	(1.326)	(1.549)

year = 2019	25.88***	8.122***	16.41***	15.77***	19.88***	16.08***
	(1.246)	(1.238)	(0.875)	(1.621)	(1.387)	(1.600)
year = 2020	26.11***	8.411***	16.40***	16.13***	19.97***	16.44***
	(1.287)	(1.279)	(0.901)	(1.658)	(1.428)	(1.638)
year = 2021	32.15***	14.48***	21.73***	22.40***	25.45***	22.67***
	(1.314)	(1.306)	(0.911)	(1.696)	(1.471)	(1.677)
Foreign-born				-93.11***	-40.54***	-89.66***
				(13.02)	(12.61)	(12.96)
Constant	21.26***	39.14***	35.54***	48.03***	41.22***	47.60***
	(0.890)	(0.887)	(0.578)	(1.519)	(1.858)	(1.527)
Observations	1,803	1,636	1,636	1,636	1,636	1,636
R-squared	0.472	0.349	0.671	0.370	0.673	0.387

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Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table C. The standard Diff-in-Diff with time fixed effects  
(Employment Foreign-born 4-9 years since arrival)

<b>Diff-in-Diff Estimate (Employment Foreign-born 4-9 years since arrival)</b>						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Model 7 (1997-2021)	Model 8 (2000-2021)	Model 9 (weight)	Model 10	Model 11 (weight)	Model 12 (ln_weight)
Vocational SFI	2.461*** (0.591)	1.835*** (0.571)	2.129*** (0.371)	1.791*** (0.567)	1.882*** (0.373)	1.855*** (0.552)
year = 1998	3.273*** (0.909)					
year = 1999	8.424*** (0.912)					
year = 2000	15.47*** (0.912)					
year = 2001	17.61*** (0.912)	2.140** (0.870)	2.699*** (0.627)	2.230*** (0.865)	2.813*** (0.624)	2.296*** (0.846)
year = 2002	19.37*** (0.909)	3.899*** (0.867)	3.870*** (0.627)	4.085*** (0.863)	4.099*** (0.625)	4.081*** (0.844)
year = 2003	17.00*** (0.912)	1.538* (0.870)	1.784*** (0.627)	1.812** (0.867)	2.114*** (0.628)	1.812** (0.848)
year = 2004	14.90*** (0.915)	-0.575 (0.873)	-0.765 (0.627)	-0.214 (0.871)	-0.342 (0.631)	-0.283 (0.851)

year = 2005	14.22*** (0.915)	-1.241 (0.873)	-1.126* (0.627)	-0.802 (0.873)	-0.600 (0.634)	-0.851 (0.853)
year = 2006	16.05*** (0.915)	0.567 (0.873)	1.653*** (0.627)	1.192 (0.878)	2.393*** (0.645)	1.238 (0.858)
year = 2007	16.46*** (0.912)	1.021 (0.870)	3.656*** (0.628)	1.851** (0.882)	4.639*** (0.662)	2.029** (0.864)
year = 2008	15.92*** (0.906)	0.487 (0.864)	4.154*** (0.628)	1.523* (0.887)	5.337*** (0.678)	1.801** (0.869)
year = 2009	10.82*** (0.903)	-4.618*** (0.862)	-0.234 (0.628)	-3.400*** (0.895)	1.158* (0.697)	-3.087*** (0.878)
year = 2010	12.78*** (0.903)	-2.652*** (0.862)	0.922 (0.628)	-1.255 (0.906)	2.479*** (0.714)	-1.063 (0.890)
year = 2011	12.82*** (0.903)	-2.619*** (0.862)	1.137* (0.628)	-1.066 (0.918)	2.836*** (0.730)	-0.851 (0.901)
year = 2012	12.55*** (0.903)	-2.879*** (0.862)	1.562** (0.629)	-1.153 (0.932)	3.408*** (0.748)	-0.890 (0.915)
year = 2013	12.25*** (0.903)	-3.167*** (0.862)	1.444** (0.629)	-1.187 (0.954)	3.472*** (0.771)	-0.927 (0.938)
year = 2014	12.94*** (0.904)	-2.472*** (0.862)	2.634*** (0.630)	-0.189 (0.985)	4.876*** (0.800)	0.0929 (0.968)
year = 2015	15.55*** (0.904)	0.155 (0.863)	5.927*** (0.630)	2.806*** (1.026)	8.399*** (0.833)	3.180*** (1.008)
year = 2016	18.65***	3.323***	8.365***	6.459***	11.23***	6.758***

	(0.910)	(0.869)	(0.647)	(1.090)	(0.905)	(1.072)
year = 2017	19.57***	4.301***	9.804***	7.741***	13.02***	8.062***
	(0.919)	(0.877)	(0.656)	(1.138)	(0.967)	(1.120)
year = 2018	20.50***	5.308***	10.93***	8.980***	14.43***	9.337***
	(0.935)	(0.893)	(0.665)	(1.182)	(1.022)	(1.165)
year = 2019	20.43***	5.316***	11.31***	9.142***	15.05***	9.479***
	(0.954)	(0.912)	(0.677)	(1.217)	(1.069)	(1.203)
year = 2020	17.41***	2.399**	8.120***	6.261***	11.96***	6.585***
	(0.992)	(0.949)	(0.698)	(1.250)	(1.100)	(1.236)
year = 2021	19.95***	4.997***	11.08***	8.958***	15.09***	9.341***
	(1.014)	(0.971)	(0.706)	(1.280)	(1.134)	(1.266)
Foreign-born				-47.57***	-43.84***	-47.29***
				(10.10)	(9.743)	(10.02)
Constant	39.96***	55.41***	49.75***	59.86***	55.86***	59.61***
	(0.641)	(0.615)	(0.443)	(1.126)	(1.428)	(1.133)
Observations	1,992	1,755	1,755	1,755	1,755	1,755
R-squared	0.470	0.280	0.586	0.290	0.591	0.305

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Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



Table D. Event study with leads and lags  
(Employment Foreign-born 2-3 years since arrival)

Event study with leads and lags (Employment Foreign-born 2-3 years since arrival)						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Model 1 (1997-2021)	Model 2 (2000-2021)	Model 3 (weight)	Model4	Model 5 (weight)	Model 6 (ln_weight)
lead24	0.629 (6.746)					
lead23	1.068 (3.208)					
lead22	-0.468 (2.307)					
lead21	-2.179 (2.360)	2.239 (6.153)	-4.706 (5.787)	1.135 (6.424)	-5.071 (5.971)	0.814 (6.560)
lead20	0.639 (2.353)	1.631 (3.238)	-4.111 (3.746)	0.592 (3.451)	-4.501 (3.967)	0.447 (3.508)
lead19	-0.240 (2.216)	3.194 (3.177)	-3.622 (3.101)	1.798 (3.249)	-3.958 (3.231)	1.455 (3.213)
lead18	-1.355 (2.016)	0.132 (2.385)	-4.153* (2.453)	-1.141 (2.424)	-4.387* (2.540)	-1.264 (2.392)
lead17	-1.878 (2.075)	-0.248 (2.211)	-4.625** (2.143)	-1.292 (2.210)	-4.781** (2.205)	-1.459 (2.197)
lead16	-2.398 (1.913)	-1.671 (2.012)	-5.971*** (2.153)	-2.590 (2.000)	-6.075*** (2.175)	-2.728 (1.968)
lead15	0.0172 (1.818)	0.696 (1.908)	-4.791** (2.126)	-0.187 (1.944)	-4.848** (2.135)	-0.428 (1.908)

lead14	-0.352	0.307	-4.152**	-0.479	-4.178**	-0.620
	(1.804)	(1.848)	(1.860)	(1.898)	(1.864)	(1.860)
lead13	-1.130	-0.782	-5.098***	-1.413	-5.091***	-1.580
	(1.716)	(1.744)	(1.780)	(1.746)	(1.772)	(1.701)
lead12	0.782	1.033	-4.103*	0.474	-4.086*	0.278
	(1.622)	(1.622)	(2.168)	(1.628)	(2.150)	(1.593)
lead11	-0.394	-0.203	-4.772**	-0.679	-4.738**	-0.862
	(1.444)	(1.448)	(2.134)	(1.422)	(2.109)	(1.390)
lead10	0.767	0.976	-4.425**	0.546	-4.385**	0.198
	(1.501)	(1.520)	(1.758)	(1.496)	(1.730)	(1.441)
lead9	2.215	2.404	-2.557	2.063	-2.516	1.741
	(1.489)	(1.508)	(1.752)	(1.500)	(1.727)	(1.445)
lead8	0.0202	0.182	-2.265	-0.0932	-2.230	-0.142
	(1.326)	(1.338)	(1.562)	(1.324)	(1.545)	(1.262)
lead7	-0.398	-0.308	-2.783**	-0.603	-2.777**	-0.591
	(1.302)	(1.305)	(1.372)	(1.307)	(1.368)	(1.255)
lead6	-0.467	-0.391	-2.626**	-0.620	-2.614*	-0.593
	(1.096)	(1.097)	(1.328)	(1.090)	(1.328)	(1.068)
lead5	-0.557	-0.496	-1.986*	-0.679	-1.966*	-0.640
	(1.179)	(1.180)	(1.071)	(1.142)	(1.063)	(1.099)
lead4	-0.524	-0.477	-1.094	-0.607	-1.062	-0.504
	(1.030)	(1.030)	(0.808)	(1.009)	(0.811)	(0.964)
lead3	-0.301	-0.268	-0.438	-0.352	-0.414	-0.316
	(0.975)	(0.973)	(0.660)	(0.962)	(0.657)	(0.903)
lead2	-0.834	-0.816	-0.449	-0.816	-0.430	-0.781
	(0.760)	(0.759)	(0.516)	(0.762)	(0.521)	(0.718)

lag0	0.652	0.631	0.526	0.644	0.508	0.694
	(0.672)	(0.671)	(0.340)	(0.669)	(0.348)	(0.637)
lag1	0.260	0.159	0.238	0.204	0.198	0.265
	(0.972)	(0.969)	(0.475)	(0.978)	(0.493)	(0.908)
lag2	1.084	0.910	-0.251	0.941	-0.314	0.963
	(1.277)	(1.273)	(0.843)	(1.253)	(0.861)	(1.190)
lag3	1.564	1.230	-0.194	1.066	-0.293	1.051
	(1.171)	(1.152)	(0.788)	(1.173)	(0.797)	(1.121)
lag4	0.955	0.543	0.417	0.224	0.291	0.408
	(1.492)	(1.471)	(0.917)	(1.489)	(0.971)	(1.403)
lag5	0.264	-0.280	1.045	-0.475	0.886	-0.0691
	(2.213)	(2.166)	(1.776)	(2.118)	(1.884)	(2.056)
lag6	4.455*	3.653	5.196***	3.089	5.162***	3.617
	(2.490)	(2.445)	(0.963)	(2.608)	(0.997)	(2.413)
lag7	3.481	2.557	5.235***	2.417	5.261***	3.056
	(3.950)	(4.023)	(1.536)	(4.450)	(1.563)	(4.118)
lag8	3.585	2.573	5.627***	2.153	5.617***	2.871
	(3.971)	(4.027)	(1.844)	(4.437)	(1.864)	(4.272)
lag9	7.599**	6.609**	7.275***	6.705**	7.267***	6.907**
	(3.009)	(2.951)	(1.733)	(2.688)	(1.725)	(2.675)
lag10	13.97***	12.83***	11.47***	12.75***	11.48***	12.76***
	(1.097)	(1.170)	(0.851)	(1.221)	(0.881)	(1.167)
lag11	13.09***	11.92***	11.37***	12.16***	11.44***	12.21***
	(1.126)	(1.215)	(0.950)	(1.274)	(1.020)	(1.230)

lag12	16.10***	14.92***	13.64***	15.45***	13.76***	15.42***
	(1.158)	(1.219)	(0.976)	(1.298)	(1.076)	(1.257)
lag13	12.06***	10.85***	10.31***	11.56***	10.46***	11.63***
	(1.212)	(1.267)	(1.056)	(1.345)	(1.169)	(1.309)
lag14	11.55***	10.30***	10.46***	11.24***	10.63***	11.32***
	(1.280)	(1.356)	(1.113)	(1.474)	(1.247)	(1.428)
Foreign-born				-75.44***	-25.75	-71.70***
				(24.39)	(30.56)	(25.09)
Constant	23.23***	40.62***	39.59***	47.52***	43.00***	47.12***
	(1.206)	(1.475)	(1.220)	(2.902)	(4.308)	(2.969)
Observations	3,580	3,300	3,300	3,300	3,300	3,300
R-squared	0.423	0.337	0.624	0.349	0.626	0.361

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Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

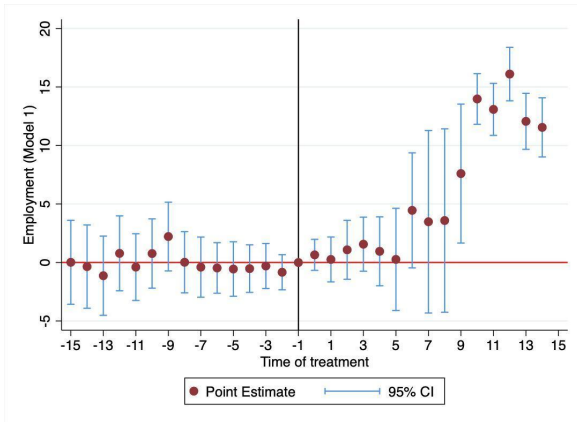


Figure A. Event study graph Model 1

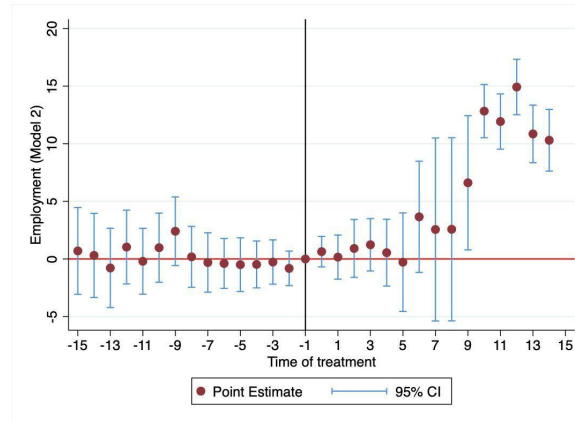


Figure B. Event study graph Model 2

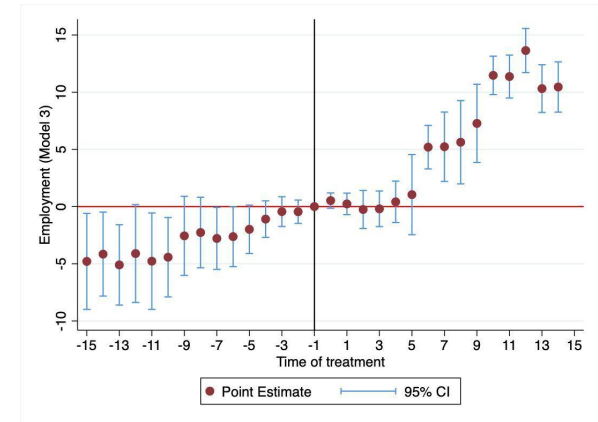


Figure C. Event study graph Model 3

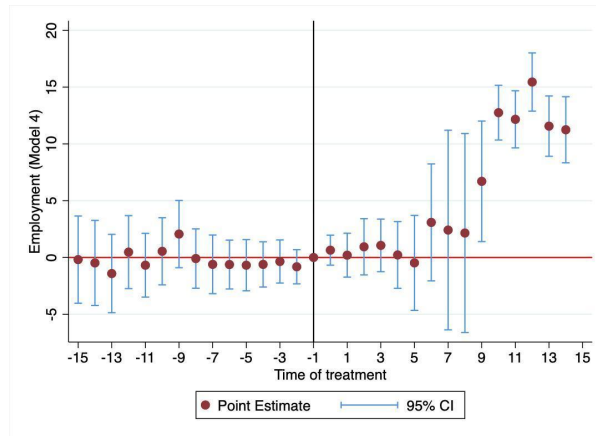


Figure D. Event study graph Model 4

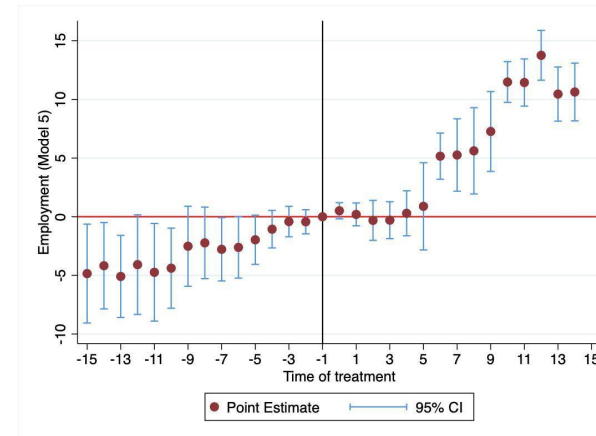


Figure E. Event study graph Model 5

Table E. Event study with leads and lags  
(Employment Foreign-born 4-9 years since arrival)

Event study with leads and lags (Employment Foreign-born 4-9 years since arrival)						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Model 7 (1997-2021)	Model 8 (2000-2021)	Model 9 (weight)	Model 10	Model 11 (weight)	Model 12 (ln_weight)
lead24	0.126 (4.275)					
lead23	-0.316 (1.839)					
lead22	-0.661 (1.924)					
lead21	-2.390 (1.817)	-1.645 (3.631)	-3.573 (4.344)	-2.050 (3.565)	-3.974 (4.531)	-1.821 (3.706)
lead20	-2.507 (1.672)	-0.990 (2.222)	-3.136 (2.128)	-1.544 (2.193)	-3.585 (2.360)	-1.458 (2.178)
lead19	-3.235** (1.638)	1.207 (2.038)	-1.628 (1.975)	0.488 (1.972)	-2.025 (2.079)	0.399 (1.979)
lead18	-3.068* (1.586)	-0.650 (1.722)	-2.352 (1.609)	-1.368 (1.687)	-2.648 (1.659)	-1.403 (1.676)
lead17	-1.515 (1.627)	-0.103 (1.702)	-2.270 (1.432)	-0.680 (1.716)	-2.474* (1.462)	-0.823 (1.683)
lead16	-0.595 (1.559)	-0.0308 (1.507)	-3.355* (1.763)	-0.574 (1.524)	-3.507** (1.776)	-0.704 (1.512)

lead15	-0.420	0.459	-3.537*	-0.0301	-3.631*	-0.216
	(1.525)	(1.543)	(1.869)	(1.535)	(1.859)	(1.506)
lead14	-0.410	0.181	-4.349**	-0.272	-4.409**	-0.482
	(1.349)	(1.371)	(2.156)	(1.370)	(2.140)	(1.341)
lead13	-0.813	-0.426	-4.395*	-0.813	-4.417**	-0.922
	(1.414)	(1.426)	(2.243)	(1.422)	(2.225)	(1.360)
lead12	0.0181	0.266	-3.800*	-0.0807	-3.806*	-0.226
	(1.244)	(1.242)	(2.070)	(1.229)	(2.049)	(1.199)
lead11	0.350	0.560	-3.902**	0.255	-3.887**	0.0565
	(1.094)	(1.088)	(1.940)	(1.077)	(1.915)	(1.065)
lead10	0.167	0.429	-4.026**	0.162	-4.000**	-0.0572
	(1.023)	(1.025)	(1.858)	(1.023)	(1.827)	(0.995)
lead9	-0.256	0.0274	-3.467***	-0.202	-3.437***	-0.374
	(0.990)	(0.980)	(1.319)	(0.988)	(1.294)	(0.944)
lead8	0.419	0.705	-2.595**	0.520	-2.569**	0.362
	(1.089)	(1.079)	(1.212)	(1.090)	(1.191)	(1.029)
lead7	0.435	0.537	-2.095***	0.359	-2.099***	0.222
	(0.972)	(0.967)	(0.732)	(0.983)	(0.729)	(0.929)
lead6	0.473	0.562	-1.693***	0.416	-1.688***	0.323
	(0.900)	(0.895)	(0.631)	(0.905)	(0.623)	(0.850)
lead5	0.733	0.806	-1.351**	0.684	-1.335**	0.585
	(0.748)	(0.744)	(0.608)	(0.754)	(0.590)	(0.714)
lead4	0.608	0.664	-1.007**	0.577	-0.975*	0.503
	(0.667)	(0.664)	(0.486)	(0.665)	(0.495)	(0.627)

lead3	0.138	0.178	-0.613*	0.121	-0.588*	0.121
	(0.573)	(0.571)	(0.329)	(0.566)	(0.349)	(0.529)
lead2	0.695**	0.716**	0.0946	0.704**	0.114	0.654**
	(0.333)	(0.333)	(0.319)	(0.336)	(0.334)	(0.319)
lag0	0.251	0.224	0.352	0.235	0.334	0.262
	(0.424)	(0.424)	(0.440)	(0.419)	(0.458)	(0.395)
lag1	0.119	0.0324	0.685	0.0800	0.646	0.148
	(0.683)	(0.681)	(0.655)	(0.673)	(0.680)	(0.635)
lag2	0.372	0.109	0.699	0.149	0.635	0.268
	(0.854)	(0.827)	(0.637)	(0.808)	(0.672)	(0.765)
lag3	1.851*	1.350	0.893	1.271	0.792	1.327
	(1.051)	(1.015)	(0.760)	(0.990)	(0.783)	(0.944)
lag4	1.046	0.462	0.891	0.296	0.761	0.448
	(1.168)	(1.105)	(0.798)	(1.092)	(0.849)	(1.036)
lag5	0.851	0.180	1.817	0.106	1.654	0.421
	(1.563)	(1.478)	(1.184)	(1.489)	(1.300)	(1.427)
lag6	1.516	0.697	3.935***	0.398	3.916***	1.034
	(3.247)	(2.805)	(1.184)	(2.886)	(1.236)	(2.654)
lag7	5.779***	4.261***	4.215***	4.217***	4.265***	4.348***
	(1.127)	(1.028)	(1.003)	(1.179)	(1.023)	(1.164)
lag8	3.744	2.169	4.837***	1.962	4.849***	2.442
	(2.958)	(2.822)	(1.828)	(3.027)	(1.845)	(3.012)
lag9	6.840***	5.076**	6.076***	5.185**	6.093***	5.352**
	(2.605)	(2.507)	(1.743)	(2.337)	(1.730)	(2.330)



lag10	10.80***	8.850***	8.323***	8.854***	8.362***	8.861***
	(0.798)	(0.827)	(0.773)	(0.839)	(0.796)	(0.820)
lag11	10.20***	8.225***	8.065***	8.425***	8.175***	8.451***
	(0.818)	(0.854)	(0.790)	(0.872)	(0.831)	(0.856)
lag12	11.81***	9.801***	9.495***	10.18***	9.654***	10.19***
	(0.887)	(0.920)	(0.873)	(0.940)	(0.927)	(0.924)
lag13	10.57***	8.522***	8.907***	9.014***	9.096***	9.098***
	(0.945)	(0.974)	(0.935)	(0.995)	(0.998)	(0.984)
lag14	10.36***	8.271***	8.861***	8.906***	9.090***	9.001***
	(0.989)	(1.007)	(1.055)	(1.047)	(1.131)	(1.036)
Foreign-born				-45.45***	-28.99	-44.36**
				(17.03)	(18.55)	(17.09)
Constant	41.64***	56.50***	52.82***	60.54***	56.63***	60.26***
	(0.901)	(0.831)	(0.835)	(1.667)	(2.753)	(1.721)
Observations	4,261	3,754	3,754	3,754	3,754	3,754
R-squared	0.408	0.298	0.552	0.305	0.555	0.315

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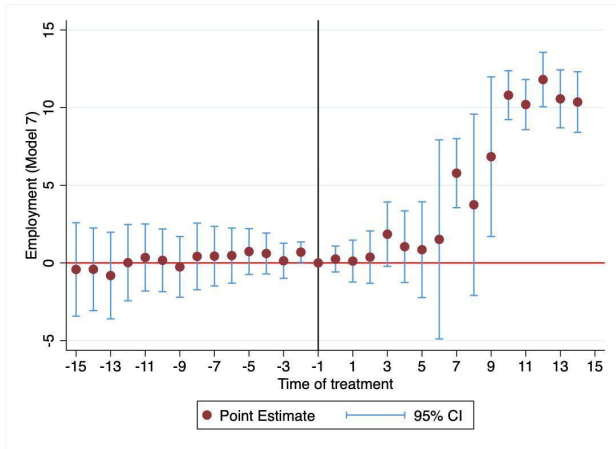


Figure F. Event study graph Model 7

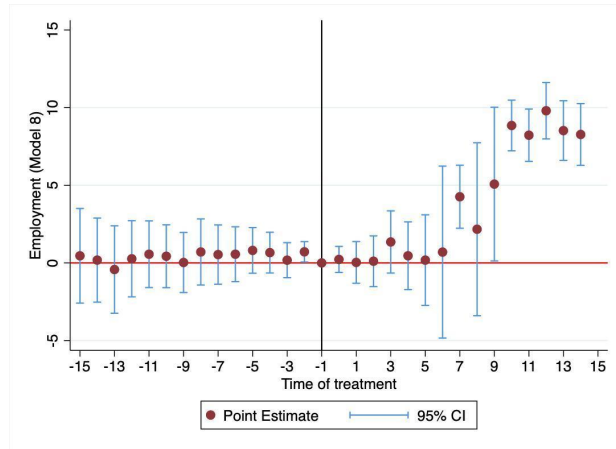


Figure G. Event study graph Model 8

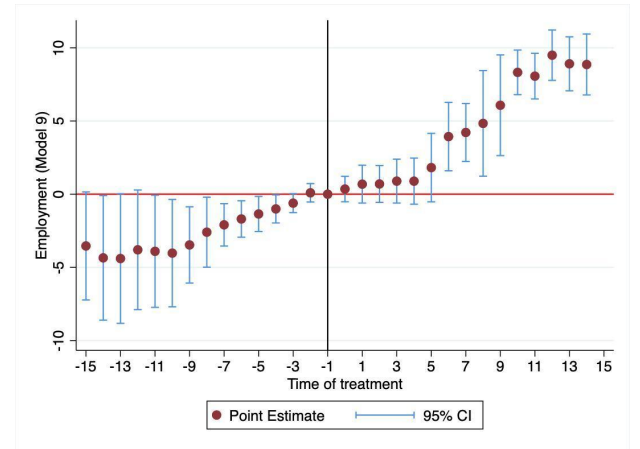


Figure H. Event study graph Model 9

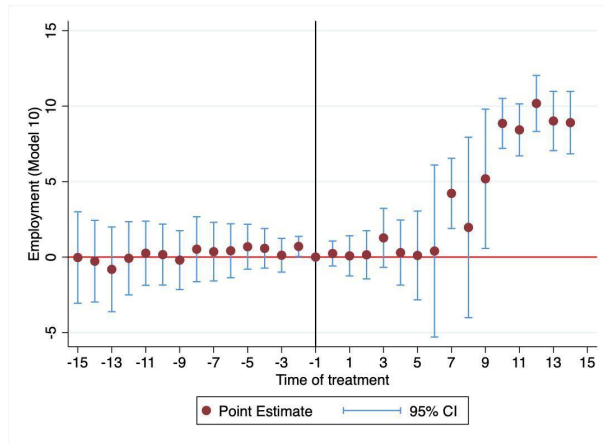


Figure I. Event study graph Model 10

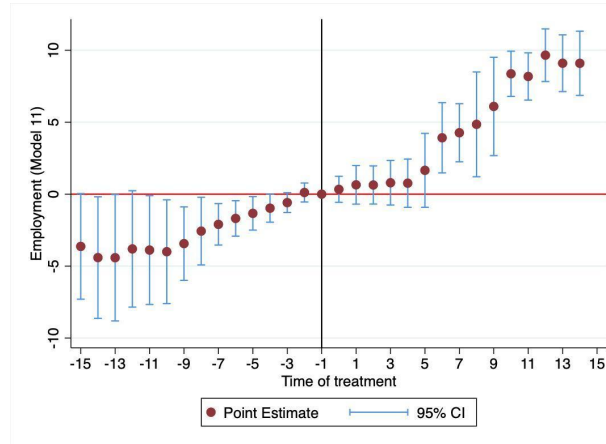


Figure J. Event study graph Model 11