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Pre-analysis plan – Effects of Finland's 2025 Decree on National Labour-Shortage Sectors

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ABSTRACT

This is a pre-analysis plan for a quasi-experimental study evaluating the effects of Finland's 2025 "Decree on National Labour-Shortage Sectors." Typ-ically, recent labor immigrants can only work in the occupation for which their residence permit has been granted. The new shortage list allows immi-grant workers to switch their occupation to those listed in a nationwide list of shortage occupations. There are currently 9 occupations (4-digit level ISCO classification) on the list, and the list will be updated annually. We will study the effects on worker flows and average earnings in the affected occupations. We will use a difference-in-differences strategy, comparing occupations listed on the shortage list to those not on the list. We utilize information from re-gional guidelines about occupations which have already been classified as labor shortage occupations by the regional authorities. In this pre-analysis plan, we show the pre-trends for our main occupation-level analyses, and the estimate for 1 partially treated month, before the data for more post period months becomes available.

JEL Codes: J61, J68

Keywords:
shortage list, immigration, pre-analysis plan

TIIVISTELMÄ

Ennakkoanalyysisuunnitelma – Suomen vuoden 2025 työvoimapula-alojen asetuksen vaikutukset

Tämä on ennakkoanalyysisuunnitelma kvasikokeelliselle tutkimukselle, jossa arvioidaan Suomessa vuonna 2025 esitellyn "asetuksen kansallisista työvoimapula-aloista" vaikutuksia. Usein työperäiset maahanmuuttajat voivat työskennellä vain siinä ammatissa, johon heidän oleskelulupansa on myönnetty. Uusi työvoimapulalista sallii maahanmuuttajatyöntekijöiden siirtyä työskentelemään myös niihin ammatteihin, jotka on sisällytetty valtakunnalliseen työvoimapula-ammattien luetteloon.

Tällä hetkellä listalla on 9 ammattia (ISCO-luokituksen 4-numerotasolla), ja luettelo päivitetään vuosittain. Tutkimme asetuksen vaikutuksia työntekijävirtoihin ja keskimääräisiin ansioihin niissä ammateissa, joita muutos koskee. Käytämme difference-in-differences -menetelmää vertaillaksemme listalla olevia ammatteja niihin, jotka eivät ole listalla. Hyödynnämme myös alueellisia ohjeistuksia, joissa on jo määritelty ammatteja työvoimapula-ammateiksi alueellisella tasolla. Tässä ennakkoanalyysisuunnitelmassa esittelemme pääanalyysiemme ammattitason pre-trendit sekä estimaatin yhdelle osittaiselle post-treatment kuukaudelle ennen kuin myöhempien kuukausien aineisto on saatavilla.

JEL koodit: J61, J68

Avainsanat:
työvoimapulalistaus, maahanmuutto, etukäteissuunnitelma

REFERAT

Förhandsanalysplan – Effekterna av Finlands förordning om nationella bristyrken år 2025

Detta är en förhandsanalysplan för en kvasiexperimentell studie som utvärderar effekterna av Finlands "Förordning om nationella bristyrken" år 2025. Vanligtvis får nyare arbetskraftsinvandrare endast arbeta inom det yrke för vilket deras uppehållstillstånd har beviljats. Den nya listan över bristyrken gör det möjligt för invandrade arbetstagare att byta till yrken som finns på den nationella listan över bristyrken. För närvarande innehåller listan 9 yrken (på fyrsiffrig ISCO-nivå), och listan kommer att uppdateras årligen. Vi kommer att undersöka effekterna på arbetskraftsflöden och genomsnittliga löner inom de berörda yrkena. Vi använder en difference-in-differences-strategi för att jämföra yrken som finns på listan med dem som inte gör det. Vi utnyttjar också information från regionala riktlinjer om yrken som redan har klassificerats som bristyrken av de regionala myndigheterna. I denna förhandsanalysplan visar vi förtrenderna för våra huvudsakliga yrkesnivåanalyser samt skattningen för en delvis behandlad månad, innan data för fler månader efter reformen blir tillgängliga.

JEL-koder: J61, J68

Nyckelord:
bristyrkeslista, invandring, förhandsanalysplan

1 Introduction

The evidence on the causal effects of *shortage lists*, i.e., lists of occupations where looser immigrations are applied because of labor shortages, is relatively scarce (see Nieminen et al. (2024) and Signorelli (2024) for examples studying shortage-based exemptions from labor market testing). While regional exemptions from labor market testing studied in Nieminen et al. (2024) are occupation-region level treatments, this nationwide shortage list creates an occupation-level shock. In this pre-analysis plan, we will introduce our plan to study the effects of a nation-wide shortage list, introduced on 5 June 2025 by the Finnish Government, called "Decree on National Labour-Shortage Sectors." The decree entered into force on 11 June 2025 and will remain in force until 11 June 2026, with a mid-term review six months after entry (although changes are possible). This change broadened the right to work for holders of a residence permit for an employed person to include these shortage sectors without applying for a new permit, provided the existing permit remains valid.

In addition to describing what we will estimate once we have all of the data, we are able to show the pre-trends for our main occupation-level analyses, and the estimate for 1 partially treated month before having data for a larger number of post-treatment months.

2 Institutional context: Finland's 2025 Decree on National Labour-Shortage Sectors

In Finland, there are some limitations to the rights of immigrants to change occupations. The decree introduced in June 2025 made it possible for immigrant workers to apply for work in the "shortage occupations" listed by the government, in addition to applying for jobs in the field they work in (or in the case of unemployed immigrants, used to work in). The decree is set to be updated every year. The occupations included in the first list (published in June 2025) include:

- 2211 General practitioners

- 2212 Chief physicians and medical specialists
- 2266 Audiologists and speech therapists
- 3135 Metal-processing plant operators
- 3221 Nurses
- 3251 Dental hygienists
- 5163 Funeral service workers
- 5321 Practical nurses
- 5411 Firefighters

We will study the effects on these occupations, but we will also broaden the research to include the new list that will be published in June 2026. In addition, we will utilize the fact that there are already *regional exemptions from labor market testing* (studied also in Nieminen et al. (2024)). Changing occupation to these occupation-region cells was already possible before the nationwide shortage list. Section 3 describes the main outcome variables and data sources we will use.

3 Outcomes and data sources

3.1 Outcomes and hypotheses

Our main outcomes are measured at the occupation level, as that is the level of treatment. At the occupation level, our primary outcomes are the employment flows and stocks and average earnings. All of these will be estimated at the monthly level. We will smooth the monthly data by removing seasonal variation.

Second, there are also regional guidelines that can exempt occupations from labor market testing and make it possible for workers from other occupations to apply for work in those occupations. We can, thus, study effects also on the occupation-region level where we consider those occupation-region units treated where the occupation is listed in the nationwide classification, and in addition, the region has not exempted the occupation from LMT.

We will also study effects on incumbent workers (primary outcomes: earnings, employment, and occupation switching). These will be individual-level regressions.

Heterogeneity analyses by region, occupation, industry, and baseline shortage level, will be estimated both for occupation-level and individual-level analyses. Our research questions and hypotheses are listed below.

RQ1: Does the decree increase employment stocks and flows into listed occupations?

- **H1a (flows).** Flows to employment in listed occupations increases.
- **H1b (stocks).** Total employment in listed occupations increases.

RQ2: What are the earnings effects?

- **H2a.** Average earnings (or log average earnings) in listed occupations change (sign ambiguous, +/-)
- **H2b.** Earnings (or log earnings) for incumbent workers in listed occupations change (sign ambiguous, +/-)

RQ3: Heterogeneity by sector, region, and baseline shortage level.

- **H3.** Effects differ across regions, occupations, and industries, and by baseline shortage level.

3.2 Data

We will use administrative data from Statistics Finland to conduct the research. The most important datasets will be TAX INCOME and TAX BENEFIT modules from Statistics Finland which include monthly income and occupational information. We will also use different modules such as immigration information (FOLK immigration module) and basic individual characteritics (FOLK basic module).

The data will be aggregated into occupation-level or occupation-region level in the main analyses. Additional analyses for incumbent workers will be estimated using individual level data.

4 Empirical strategy

4.1 DiD, Occupation cells

Our first set of analyses is conducted at the occupation–month level, exploiting the nationwide introduction of the list of shortage occupations. Let y_{ot} denote the outcome for occupation o in month t. The treatment indicator is defined as

$$\text{Treated}_o = \mathbf{1}\{\text{Listed}_o = 1\},$$

where Listed_o indicates whether occupation o is included in the nationwide classification of shortage occupations. Let $t_0 =$ June 2025 and $\text{Post}_t = \mathbf{1}\{t \geq t_0\}$.

(1) Event study (dynamic DiD). With event time $k = t - t_0$, we estimate

$$y_{ot} = \alpha + \sum_{\substack{k=-6 \\ k\neq -1}}^{+6} \beta_k \Big[\mathbf{1}\{k = t - t_0\} \times \text{Treated}_o\Big] + \mathbf{X}'_{ot}\delta + \gamma_o + \lambda_t + \varepsilon_{ot}, \tag{1}$$

normalizing the $k = -1$ coefficient to zero. To mitigate noise at the tails, we group periods $k \leq -6$ and $k \geq +6$ into endpoint bins. Occupation fixed effects γ_o control for time-invariant differences across occupations, and month fixed effects λ_t absorb aggregate shocks. $\mathbf{X}_{ort}$ has controls (main specification will be estimated without controls). Possible alternative specifications with controls can be estimated by combining matching and DiD methods.

(2) Pooled DiD. Our baseline pooled specification is

$$y_{ot} = \alpha + \beta\big(\text{Treated}_o \times \text{Post}_t\big) + \mathbf{X}'_{ot}\delta + \gamma_o + \lambda_t + \varepsilon_{ot}. \tag{2}$$

Estimand. In (2), β identifies the average treatment effect on treated (ATT) occupations—those listed in the nationwide classification—relative to non-listed controls.

Fixed effects. occupation FE γ_o and month FE λ_t.

Weights. We use unweighted OLS as the baseline. As a robustness check, we re-estimate weighting by occupation employment w_{ot}.

Inference. Standard errors are clustered by occupation. As robustness, we also report two-way clustering by occupation and year–month.

Window and plotting. Event-study coefficients β_k are estimated for $k \in [-6, +6]$ months around t_0 and plotted relative to $k = -1$.

4.2 DiD, occupation–region level

We extend the analysis to the occupation–region level to leverage regional exemptions from labor market testing (LMT). Let y_{ort} denote the outcome for occupation o in region r and month t.

Treatment. Define

$$\text{Treated}_{or} \equiv \mathbf{1}\{\text{Listed}_o = 1 \ \wedge \ \text{NoExempt}_{or} = 1\},$$

where Listed_o indicates that occupation o is on the nationwide list, and NoExempt_{or} indicates that region r has not exempted occupation o from LMT under regional guidelines. Let $t_0 =$ June 2025 and $\text{Post}_t = \mathbf{1}\{t \geq t_0\}$.

(1) Event study (dynamic DiD). With event time $k = t - t_0$, estimate

$$y_{ort} = \alpha + \sum_{\substack{k=-6 \\ k \neq -1}}^{+6} \beta_k \Big[\mathbf{1}\{k = t - t_0\} \times \text{Treated}_{or}\Big] + \mathbf{X}'_{ort}\delta + \gamma_{or} + \lambda_t + \varepsilon_{ort}, \qquad (3)$$

normalizing the $k = -1$ coefficient to zero. γ_{or} are occupation–region fixed effects, and λ_t are month fixed effects. $\mathbf{X}_{ort}$ has controls (main specification will be estimated without controls).

(2) Pooled DiD. Our pooled specification is

$$y_{ort} = \alpha + \beta\big(\text{Treated}_{or} \times \text{Post}_t\big) + \mathbf{X}'_{ort}\delta + \gamma_{or} + \lambda_t + \varepsilon_{ort}, \tag{4}$$

Estimand. In (4), β is the ATT for occupation–region cells that are listed nationally and not exempted locally, relative to cells that are either unlisted or locally exempted.

Fixed effects. occupation–region FE γ_{or} and month FE λ_t.

Weights. OLS as baseline. As a robustness check, re-estimate with employment weights w_{ort} (e.g., cell employment or lagged employment).

Inference. Cluster standard errors at the occupation–region level. As robustness, use multi-way clustering by occupation and region, and/or two-way clustering by occupation–region and year–month.

Window and plotting. Event-study coefficients are estimated for $k \in [-6, +6]$ months around t_0, plotted relative to $k = -1$.

Assumptions and checks. Identification relies on parallel trends between treated and comparison occupation–region cells.

5 Pre-trends for occupation level analyses, basic difference-in-differences without matching

We show below pre-trends (only pre period) for our main analyses. Outcomes here are the number of workers and average earnings (monthly) in an occupation. In these figures, year -1 is May 2025. These are shown as this will be our main specification.

Occupation-region level pre-trends cannot be estimated yet as we have not yet collected the new regional guidelines for year 2025 in computer-readable format. This will be done during the research.

Individual level analyses for incumbent workers will require matching to create a comparable control group, and this will be done during the research.

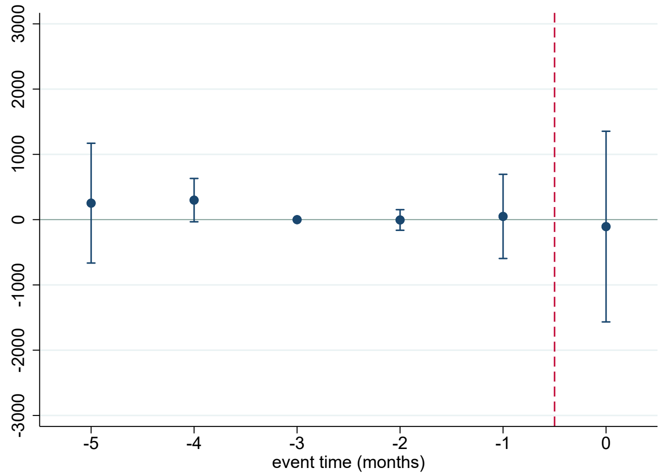


Figure 1: Pre-trends, number of workers (month level), 2025 Jan-May

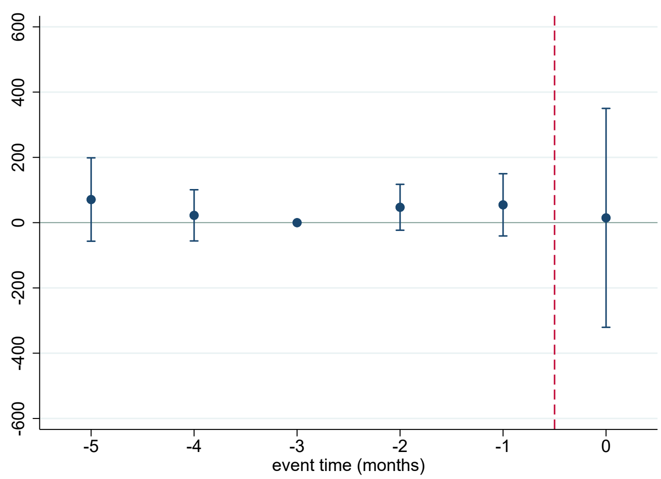


Figure 2: Pre-trends, average earnings (month level), 2025 Jan-May

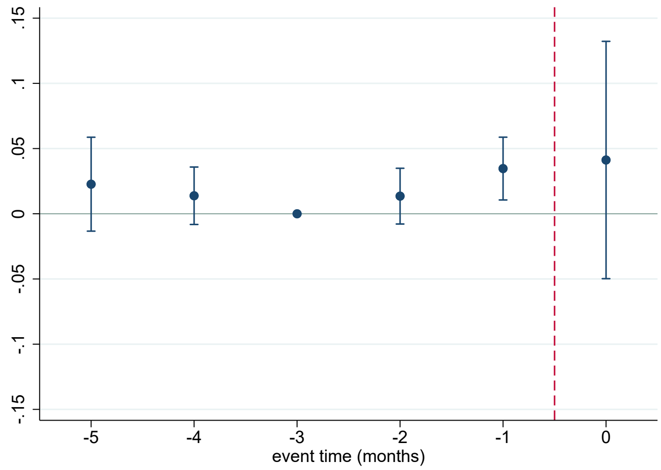


Figure 3: Pre-trends, log average earnings (month level), 2025 Jan-May

6 Timeline

The data on monthly earnings (income register) will update every month with a 45-day delay. Thus, in early 2026, we will have 6 post-treatment months for this first shortage list, and thus, can estimate its short-tem effects. However, depending on if and how the list changes next year, we also want to estimate effects for longer time period, and also include the occupations included in the updated shortage list.

We will also study the long term effects with our setting in a second research paper. Otherwise the paper is similar, except that we will also study the effects on collective bargaining wage raises.

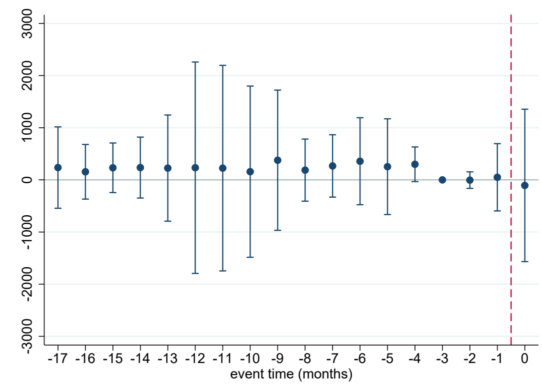
References

Nieminen, J., Kiviholma, S., Kanninen, O., and Karhunen, H. (2024). Regulating Labor Immigration: The Effects of Lifting Labor Market Testing. Labore Working Paper No. 344.

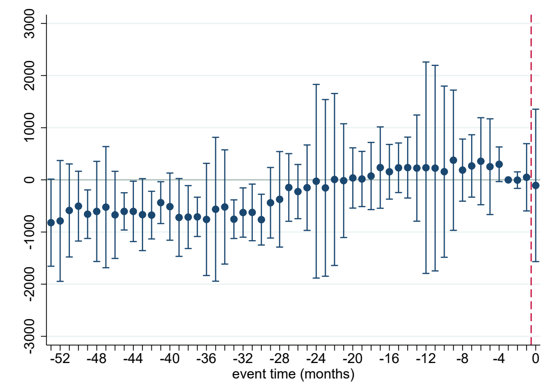
Signorelli, S. (2024). Do skilled migrants compete with native workers? Journal of Human Resources.

Appendix

Longer pre-trends (occupation-level analyses), basic difference-in-differences without matching

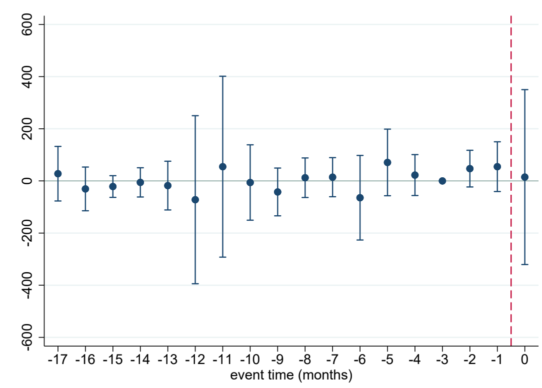


(a) Panel A: Pre trends, 2024–2025

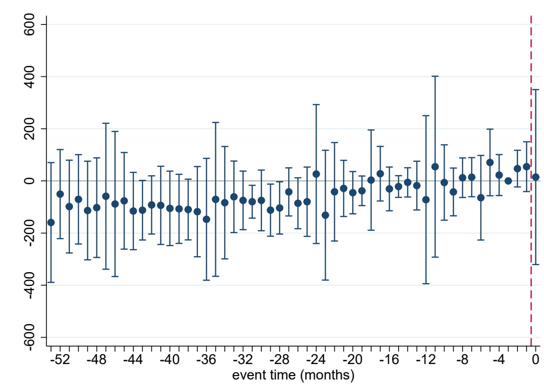


(b) Panel B: Pre trends, 2021–2025

Figure 4: Pre-trends, number of workers (month level)

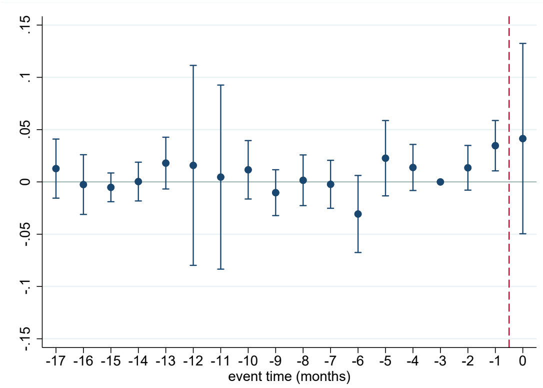


(a) Panel A: Pre trends, 2024–2025

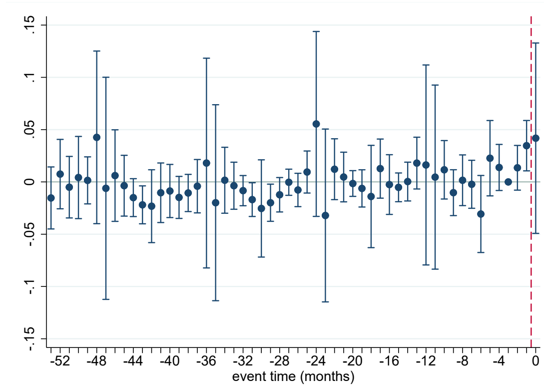


(b) Panel B: Pre trends, 2021–2025

Figure 5: Pre-trends, average earnings (month level)



(a) Panel A: Pre trends, 2024–2025



(b) Panel B: Pre trends, 2021–2025

Figure 6: Pre-trends, log average earnings (month level)

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