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Relaxing Immigration Restrictions in a Peripheral Region: Evidence from Finnish North Karelia

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ABSTRACT

Several countries use immigration liberalization as a place-based policy tool, but evidence on its regional effects remains almost entirely descriptive. We examine the causal impact of removing labor market testing (LMT) regulations for labor immigrants in all occupations in the remote Finnish region of North Karelia. The reform allowed firms to hire non-EU foreign workers in all occupations without first advertising jobs to domestic applicants, resulting in a 14% rise in the stock of immigrant workers. Using synthetic control and difference-in-differences methods, we estimate causal effects of the reform at the regional, municipal, firm establishment, and individual levels. The reform caused immigrant inflows to increase primarily in cities and in specific types of occupations, i.e., low-paying occupations and ISCO groups 5, 7, 8, and 9. Across the firm size distribution, the increases concentrate around the median and the top. We find little evidence that the policy had meaningful effects on other regional or municipal outcomes: immigration liberalization boosted labor supply without generating transformative medium-term regional effects.

JEL Codes: R11, R58, J20, J38, J61, J68

Keywords:
immigration, labor supply, aging population, regional economy, labor market testing, synthetic control, difference-in-differences

TIIVISTELMÄ

Maahanmuuttorajoitusten lieventäminen syrjäisemmällä alueella: tutkimusnäyttöä saatavuusharkinnan poistosta Pohjois-Karjalassa

Tarkastelemme saatavuusharkinnan poistamisen kausaalivaikutuksia Pohjois-Karjalan maakunnassa, jossa saatavuusharkinnasta hetkellisesti luovuttiin kaikissa ammateissa. Uudistuksen myötä yritykset Pohjois-Karjalassa saattoivat palkata EU:n ulkopuolisia työntekijöitä kaikkiin ammatteihin ilman, että työpaikkoja tarvitsi ensin tarjota kotimaisille työnhakijoille. Uudistus kasvatti ulkomaalaistaustaisten työntekijöiden määrää 14 prosentilla. Arvioimme uudistuksen kausaalivaikutuksia maakunta-, kunta-, toimipaikka- ja yksilötasolla synteettisen kontrollin ja difference-in-differences-menetelmien avulla. Uudistus lisäsi maahanmuuttoa ennen kaikkea kaupunkeihin ja tiettyihin ammatteihin eli matalapalkkaisiin ammatteihin ja ammattiluokkiin (ISCO) 5, 7, 8 ja 9. Toimipaikkojen kokojakaumassa kasvu keskittyy mediaanin tuntumaan ja jakauman yläpäähän. Löydämme vain vähän näyttöä siitä, että uudistuksella olisi ollut merkittäviä vaikutuksia muihin maakunta- tai kuntatason tulemiin. Tulostemme perusteella maahanmuuton rajoitusten keventäminen syrjäisillä alueilla lisää maahanmuuttoa ja vähentää hallinnollista taakkaa, mutta ei välttämättä synnytä keskipitkällä aikavälillä laajempia alueellisia vaikutuksia.

JEL-koodit: R11, R58, J20, J38, J61, J68

Avainsanat:
maahanmuutto, työvoiman tarjonta, väestön ikääntyminen, aluetalous, saatavuusharkinta, synteettinen kontrolli, erot-eroissa

1 Introduction

Peripheral regions face a demographic challenge that conventional regional policy is poorly equipped to address: shrinking working-age populations. Governments have traditionally relied on place-based policies—such as regional subsidies, enterprise zones, and infrastructure investments—but evidence on their effectiveness remains mixed (e.g., Ehrlich and Seidel, 2018; Siegloch et al., 2025). These policies primarily target labor demand. Domestic migration offers a limited supply-side response, as interregional mobility is low and has declined in many countries (e.g., McCann, 2023; Grover et al., 2022; Bartik, 2020). This leaves a largely unexplored policy margin: relaxing restrictions on foreign workers' access to regional labor markets.

This paper evaluates such a policy. Beginning in 2019, the Finnish region of North Karelia exempted a growing share of occupations from labor market testing, the requirement to advertise vacancies to domestic and EU workers before hiring a non-EU worker, and by 2021 extended the exemption to all occupations. The reform provides an unusually clean setting: treatment was defined by region rather than occupation, eventually covered the entire economy, and differentiated immigration policy across space without restricting EU free movement. Using administrative registers for 2011–2023, we estimate effects at the regional, municipal, establishment, and worker levels using synthetic-control and difference-in-differences designs.

We use this reform to ask three related questions. First, does removing immigration restrictions actually bring more workers to a remote region, or is peripherality itself the binding constraint? Second, if immigrants do arrive, where within the region do they go—and does liberalization diffuse regional development, or do gains concentrate in existing urban centers? Third, can immigration deregulation serve as a lower-cost substitute for the subsidies and infrastructure investments that governments typically deploy in lagging regions, a comparison that requires accounting for potential wage effects on incumbent workers?

The reform succeeded in raising immigration to the region. Relative to its synthetic control, North Karelia's stock of non-EU workers rose by around 14 percent and the annual inflow of new immigrants by around 30 percent. At the municipal level, the inflow of new non-EU immigrants into urban municipalities rose by roughly 40–80 percent and their share of the working-age population by 15–20 percent. Peripherality, in other words, is not by itself a binding constraint at the regional level. When the legal barrier was removed, workers came.

Notably, the geographic response is sharply concentrated within the region. The increase occurs almost entirely in urban municipalities, with no detectable effect in rural areas. Thus, while the reform increased labor supply in a peripheral region, it also reinforced its internal urban–rural divide, consistent with evidence that place-based interventions depend on existing

agglomeration (Braun et al., 2021; Chen et al., 2025). When looking at industries and firms, the inflow concentrated in lower-paying occupations and, across the firm size distribution, around the median and the top.

Turning to regional economic outcomes, we find little evidence of broader effects. Region-level estimates for the wage sum, value added per worker, and the working-age population are statistically insignificant, as are establishment-level outcomes other than foreign employment. Municipal estimates for the urban municipalities where the entrants actually arrived point to possible reductions in average annual earnings and in productivity, but these are not robust across specifications and we do not read them as established. Incumbent workers were not measurably harmed; neither was the region measurably transformed.

This paper makes three main contributions. First, it contributes to the literature on place-based policy and regional development, which studies whether policy interventions can stimulate economic activity in lagging regions and how such policies compare with adjustment through labor mobility (Neumark and Simpson, 2015; Austin et al., 2018; Ehrlich and Seidel, 2018; Siegloch et al., 2025). Existing work has examined instruments ranging from subsidies and infrastructure to regional connectivity, access to finance, and European Cohesion Policy (Rattsø and Sheard, 2025; Lee and Brown, 2017; Amendolagine et al., 2024; Ferrara et al., 2022). We study a different instrument: a geographically targeted relaxation of immigration restrictions. To our knowledge, this is the first causal evaluation of such a policy. Because the reform reduces administrative barriers rather than requiring direct public expenditure, it also provides a useful comparison with conventional place-based tools aimed at stimulating regional economies.

Second, the paper contributes to the emerging literature on labor market testing and employer-driven labor immigration policy. Previous studies examine occupation-specific relaxations of labor market testing requirements (Nieminen et al., 2024; Signorelli, 2024). In contrast, the North Karelian reform eventually covered all occupations within a region, allowing us to study effects on the regional economy rather than only within particular occupation–region cells. This also connects our study to the broader literature on the labor-market effects of immigration (Card, 2001; Dustmann et al., 2005). Unlike much of that literature, however, we exploit a policy-induced change in the ability of firms to hire foreign workers rather than variation generated by migrants' location choices.

Third, our results contribute to work on the spatial allocation of migrants and the role of immigration in regional development (Viñuela, 2022; Ozgen et al., 2011; Rodríguez-Pose and von Berlepsch, 2015), in which the relevant geography has increasingly proved to be finer than the region (Lee, 2015; Kemeny and Cooke, 2018). We show that the geography of the response can operate at a finer scale than the geography of the policy: although the reform

applied to an entire peripheral region, the resulting inflows were concentrated in its urban municipalities. A regional-level analysis alone would therefore have reached a materially different conclusion. More broadly, the results suggest that relaxing immigration restrictions can bring workers to lagging regions without harming incumbents, but need not generate broader regional transformation. In this sense, geographically differentiated immigration policy appears to be a complement to, rather than a substitute for, regional development policy. This conclusion speaks to the broader literature on persistent interregional inequality (Bathelt et al., 2024) and to the emerging question of immigration policy as an instrument of regional economic policy.

The remainder of the paper is organized as follows. Section 2 situates the reform in the literatures on place-based policy and on immigration restrictions. Section 3 describes the institutional setting. Section 4 presents the data and the estimation strategy. Section 5 reports the results, and Section 6 concludes.

2 Literature review

This paper connects two mature but largely separate literatures: place-based policies and immigration restrictions. Several countries relax immigration restrictions selectively across regions to promote regional development, effectively using immigration policy as a place-based instrument. Yet we are not aware of causal evidence on how such geographically targeted relaxations affect receiving regions.

2.1 Place-based policy and the mobility premise

Place-based policies target economic activity in particular locations (Neumark and Simpson, 2015; Austin et al., 2018; Bartik, 2020), reflecting a broader debate over whether policy should support places or instead help people move to more productive regions (Glaeser and Gottlieb, 2008; World Bank, 2009; Barca, 2009). A key premise of the latter view is that workers move to opportunity. In practice, however, interregional mobility is low and has declined in many countries (McCann, 2023; Grover et al., 2022; Bartik, 2020).

This creates a role for immigration policy as a place-based instrument. If domestic workers are reluctant to move to lagging regions, local labor supply can instead be expanded through international migration, a margin directly controlled by policy. Regionally differentiated work-permit rules therefore constitute a form of place-based policy. Finland has previously differentiated national policies geographically, including experimental reductions in employer social security contributions in northern municipalities (Korkeamäki and Uusitalo, 2009;

Benzarti and Harju, 2021). The reform we study applies this logic to immigration policy.

2.2 Immigration policy as a place-based instrument

Table 1 maps the main instruments studied in the place-based policy literature. These operate primarily through labor demand, investment, amenities, or market access. Even regional payroll tax cuts, one of the closest analogues to our setting, reduce employers' labor costs directly rather than expand the pool of workers available to them. Regionally differentiated immigration policy instead operates directly on local labor supply, a margin largely absent from the place-based literature.

Table 1: Types of place-based policy and representative evidence

Type of policy	Instruments and examples	Representative studies and what they estimate
Broad regional development programmes	EU Structural and Cohesion Funds, national regional aid schemes, large multi-purpose development authorities	Kline and Moretti (2014) find that the Tennessee Valley Authority raised manufacturing employment persistently through agglomeration economies, while agricultural gains reversed once the subsidies ended. Becker et al. (2010) exploit the 75 percent of EU average GDP eligibility threshold to estimate the growth effects of Objective 1 transfers. Ehrlich and Seidel (2018) document effects of West German *Zonenrandgebiet* support that persisted long after the programme ended. Amendolagine et al. (2024) assess Cohesion Policy allowing for spatial spillovers.
Firm investment and location subsidies	Capital grants and investment subsidies, firm-specific incentive packages, geographically differentiated corporate taxation	Criscuolo et al. (2019) instrument eligibility for UK Regional Selective Assistance with changes in EU rules and find employment gains concentrated in small firms. Siegloch et al. (2025) evaluate German regional firm subsidies and quantify spillover, efficiency, and equity effects. Slattery and Zidar (2020) review US state and local incentives and find little evidence of broader growth effects. Greenstone et al. (2010) use runner-up counties to identify productivity spillovers from large plant openings. Einiö and Overman (2020) exploit the deprivation-rank eligibility cutoff of the UK Local Enterprise Growth Initiative and find no net employment effect in treated areas but substantial displacement from neighbouring untreated areas.
Enterprise zones and special economic zones	Geographically targeted tax and hiring credits, Empowerment Zones, Opportunity Zones, SEZs	Busso et al. (2013) find that US Empowerment Zones raised local employment and wages at modest efficiency cost. Neumark and Kolko (2010) find no employment effect of California's enterprise zones. Wang (2013) finds that Chinese SEZs raised foreign direct investment without crowding out domestic investment. Chen et al. (2023) find no detectable effect of US Opportunity Zones on housing prices.

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Table 1, continued

Type of policy	Instruments and examples	Representative studies and what they estimate
Transport and infrastructure	Highways, railways, airports, broadband, economic corridors	Duranton and Venables (2021) treat transport improvements and economic corridors as central place-based development instruments and set out how their social value should be assessed. Donaldson (2018) estimates the real income effects of colonial Indian railroads operating through trade costs. Rattsø and Sheard (2025) study the regional development effects of the expansion of the Norwegian air network. Hjort and Poulsen (2019) find large employment gains from the arrival of fast internet in Africa.
Cluster, innovation and R&D policies	Cluster programmes, science parks, R&D tax credits, public research infrastructure	Falck et al. (2010) find that the Bavarian cluster policy raised the probability of innovating, mainly among large firms. Moretti and Wilson (2014) find that state biotech incentives attract star scientists and jobs. Einiö (2014) uses the population-density rule governing ERDF allocations in Finland to identify the effect of R&D subsidies, and finds gains in R&D investment, employment, and sales, with productivity effects emerging only in the long run. Moretti and Wilson (2017) quantify the mobility of top earners in response to state tax differentials, and thus a key leakage channel for such incentives.
Universities, education and human capital	New universities and university expansions, vocational institutions, geographically targeted training	Toivanen and Väänänen (2016) use distance to newly founded Finnish technical universities to show that engineering education raises invention. Kantor and Whalley (2014) use endowment value shocks to identify local spillovers from research university spending. Valero and Van Reenen (2019) document the association between university presence and subsequent regional GDP across a large set of countries.
Public-sector location policies	Relocation of government agencies, public employment, military bases, public research institutes	Faggio and Overman (2014) find that public sector employment shifts private employment towards non-tradables without raising it overall. Faggio (2019) evaluates the UK relocation of civil service jobs out of London and finds gains in receiving areas. Becker et al. (2021) use the move of the German federal government to Bonn and find only modest private sector multipliers.
Urban and neighbourhood policies	Regeneration programmes, housing investment, local amenities, distressed-neighbourhood initiatives	Gibbons et al. (2021) evaluate the UK Single Regeneration Budget and find limited local economic impacts. Rossi-Hansberg et al. (2010) estimate spatially decaying housing externalities generated by concentrated urban revitalization. Collins and Shester (2013) instrument US urban renewal activity and find positive city-level effects on income and property values.

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Table 1, continued

Type of policy	Instruments and examples	Representative studies and what they estimate
Regional payroll and labor tax reductions	Geographically differentiated employer social security contributions, regional payroll tax exemptions and cuts	Korkeamäki and Uusitalo (2009) evaluate a payroll tax experiment in northern Finland and find no employment effect and limited pass-through to wages; Bennmarker et al. (2009) reach a similar conclusion for Sweden. Stokke (2021) finds that around 30 percent of the Norwegian labor cost reduction was shifted to wages, and considerably more in high-productivity firms. Ku et al. (2020) exploit the abolition of Norway's geographically differentiated payroll taxes and find a significant decline in local employment, implying that such incentives can work where wages are rigid. Benzarti and Harju (2021) use two Finnish regional payroll tax cuts and find that the effects are stronger during downturns.

Notes. The classification follows the categories used in surveys of place-based policy (Neumark and Simpson, 2015; Austin et al., 2018; Duranton and Venables, 2021). Following Neumark and Simpson (2015), the table covers policies that seek to raise economic activity in a place directly, and excludes policies that improve outcomes indirectly by helping people move towards opportunity, such as mobility vouchers of the Moving to Opportunity type. The studies listed are illustrative of each category rather than exhaustive.

Research on immigration restrictions exploits a wide range of quasi-experimental variation, but treatment is typically defined by nationality, skill, occupation, or time rather than place (Clemens et al., 2018; Mayda et al., 2018; Beerli et al., 2021; Abramitzky et al., 2023; Signorelli, 2024; Nieminen et al., 2024). The closest antecedent is Beerli et al. (2021), who study Switzerland's opening to cross-border workers, but without a regional-development focus; An et al. (2022) study internal rather than international migration.

Several countries nevertheless operate geographically targeted immigration schemes motivated by regional development (Table 2). Existing evidence is largely descriptive and migrant-centered, focusing on whether targeted immigrants arrive, stay, and earn (Pandey and Townsend, 2011, 2013; Laukova et al., 2026). We are not aware of causal evidence on their effects on receiving regional economies. Korea's programme targets depopulating districts and requires five years of residence (Ministry of Justice, Republic of Korea, 2022), while New Zealand abolished regional bonus points in 2023 after concluding that they had not improved regional retention, without a regional counterfactual (New Zealand Ministry of Business, Innovation and Employment, 2023). Within the EU, Spain comes closest to regional targeting: its province-specific shortage lists exempt listed occupations from the domestic-supply test, closely resembling the mechanism of the Finnish reform (Servicio Público de Empleo Estatal, 2025).

Table 2: Geographically targeted labor immigration policies and what the existing evidence estimates

Country and programme	In force	Geographic targeting	Existing evidence
Canada: Provincial Nominee Program	1998–	Provinces nominate according to their own economic needs	Inflows and retention in nominating provinces; nominee earnings (Pandey and Townsend, 2011, 2013)
Canada: Atlantic Immigration Program	2017–	Four Atlantic provinces; employer and community endorsement	Retention statistics only
Canada: Rural and Northern Immigration Pilot	2019–24	Designated rural and northern communities opt in	Retention statistics only; successor pilots from 2025
Australia: Regional Migration Program (Subclasses 491, 494, 191)	2019–	Designated non-metropolitan residence and work required for permanent residence	Retention outside metropolitan areas (Laukova et al., 2026)
South Korea: Region-specific visa (F-2-R, E-7-4R, F-4-R)	2022–	Depopulating districts; local government recommends; five-year residence requirement	None (Ministry of Justice, Republic of Korea, 2022)
Spain: Provincial catalogue of hard-to-fill occupations	Quarterly	Compiled province by province; listing waives the domestic-supply test	None (Servicio Público de Empleo Estatal, 2025)
New Zealand: Skilled Migrant Category regional points	Until 2023	Bonus points for skilled employment outside Auckland	Abolished 2023; ministry cited no gain in regional retention (New Zealand Ministry of Business, Innovation and Employment, 2023)
United States: Heartland Visa	Proposed 2024	Economically distressed counties opt in	None; proposal only (Lettieri et al., 2024)

Notes. Programme descriptions follow Heimann (2026), Lettieri et al. (2024), and the official sources cited in the table. "Retention statistics only" refers to programme monitoring reported by the responsible authorities rather than to published causal evaluations. The Australian framework replaced earlier subclasses (475, 487, 489) operating 2007–2019. Sector-specific schemes are excluded even when motivated by regional labour shortages: E.g. Japan's Specified Skilled Worker visa is national in scope and defined by industry, with regional retention pursued through prefectural support programmes rather than the visa itself.

3 Institutional setting

3.1 North Karelia as a peripheral region

North Karelia is a Finnish region characterized by low population density, lower GDP per capita than most Finnish regions as well as an aging and declining population. It is a peripheral region, and to capture the degree of its peripherality compared to other European regions, we construct an index at the NUTS3 level across Europe. The index combines three standardized components: geographic remoteness (distance from each region's centroid to Brussels), economic disadvantage (GDP per capita at purchasing power parity), and demographic sparsity (population density).[1]

Each component is standardized using z-scores prior to aggregation. The final index is calculated as the arithmetic mean of the three standardized components, with GDP per capita and population density reverse-coded so that higher values of the peripherality index indicate more peripheral regions. The index is constructed as follows:

$$\text{Peripherality}_i = \frac{1}{3}\left(z_{\text{DistanceToBrussels},i} - z_{\text{GDPpc},i} - z_{\text{PopDensity},i}\right)$$

Table 3 shows both the characteristics of Finnish NUTS3 regions (GDP per capita, population density, distance to Brussels) and the index constructed from these three values. North Karelia is the third most peripheral region in Finland, and 49th most peripheral NUTS3 region in the European Union (of the 1,037 regions for which we have data).

Figure 1 shows the values of the peripherality index in NUTS3 regions in different EU countries. Areas in purple (negative values of the index) are considered to have better accessibility to markets. North Karelia is outlined in black.

[1] GDP per capita and population density data are from Eurostat.

Region	Code	Rank (EU)	GDP (PPS)	Pop. density	Dist. to Brussels (km)	Peripherality
Kainuu	FI1D8	#43 / 1037	25,800	3.5	2073.3	1.11
Lapland	FI1D7	#44 / 1037	30,100	1.9	2221.2	1.11
North Karelia	FI1DC	#49 / 1037	26,300	8.3	2024.9	1.07
Northern Ostrobothnia	FI1D9	#54 / 1037	28,300	11.3	2020.8	1.02
Southern Savonia	FI1DA	#60 / 1037	25,900	11.8	1874.0	0.97
Northern Savonia	FI1DB	#67 / 1037	28,400	13.9	1936.7	0.96
Päijät-Häme	FI1C6	#88 / 1037	25,900	32.4	1745.5	0.88
Central Finland	FI198	#89 / 1037	28,200	17.8	1815.8	0.88
Central Ostrobothnia	FI1D5	#97 / 1037	29,600	13.5	1834.7	0.86
Southern Ostrobothnia	FI199	#99 / 1037	26,700	14.0	1732.5	0.86
South Karelia	FI1C5	#102 / 1037	30,600	23.5	1867.7	0.85
Kanta-Häme	FI1C2	#128 / 1037	27,300	32.6	1664.7	0.79
Kymenlaakso	FI1C7	#142 / 1037	32,500	40.6	1781.1	0.74
Satakunta	FI196	#151 / 1037	28,800	27.1	1610.3	0.72
Ostrobothnia	FI19A	#156 / 1037	32,400	25.8	1723.3	0.71
Pirkanmaa	FI19B	#160 / 1037	31,400	38.7	1688.7	0.71
Southwest Finland	FI1C1	#200 / 1037	31,800	45.8	1560.8	0.61
Åland	FI200	#266 / 1037	35,500	19.6	1434.5	0.44
Uusimaa	FI1B1	#320 / 1037	44,700	192	1650.4	0.32

Table 3: Finnish NUTS3 regions (NUTS 2021) ranked by peripherality in Europe

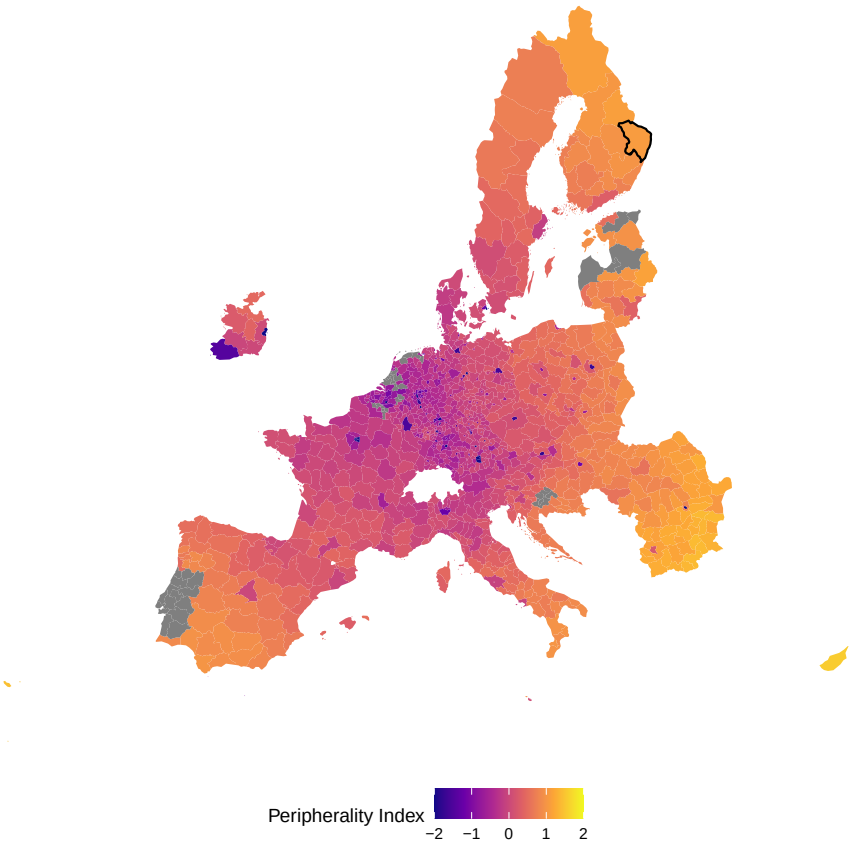


Figure 1: Peripherality index (NUTS3 regions in the EU) based on GDP per capita, population density, and distance to Brussels.

Notes. Figure produced by the authors using R and data from Eurostat.

3.2 Immigration policy in Finland

Immigration policy in Finland is different for EU immigrants and non-EU immigrants, because the EU has free movement of labor. While EU citizens can move to Finland and seek work without limitations, non-EU workers face more obstacles, including the labor market testing (LMT) requirement studied in this paper.

For non-EU workers the procedure to gain a work residence permit entails several steps. The process starts with the individuals having to receive a job offer, after which the LMT procedure is conducted, i.e., the firm needs to advertise the position for local job seekers before hiring the non-EU worker. This requirement does not apply to professionals (ISCO 2) who have earnings higher than €3,000/month. After the LMT is conducted, the Finnish Immigration Service (Migri) makes the final decision regarding the work permit.

3.3 LMT policy in Finland, LMT exemptions, and the North Karelian reform

Figure 2 describes our policy quasi-experiment. In short, North Karelia exempted almost 100 (25%) occupations in 2019, and all occupations in 2021. Occupations are defined at the 4-digit level (ISCO classification). Although the LMT exemptions are supposed to be targeted at labor shortage occupations, it is not likely that all occupations suffered from labor shortages with North Karelia simultaneously having the highest unemployment rate out of all Finnish regions. Thus, we argue that the reform was relatively exogenous, in that it was not determined by, e.g., North Karelia having a pre-existing high labor market tightness.

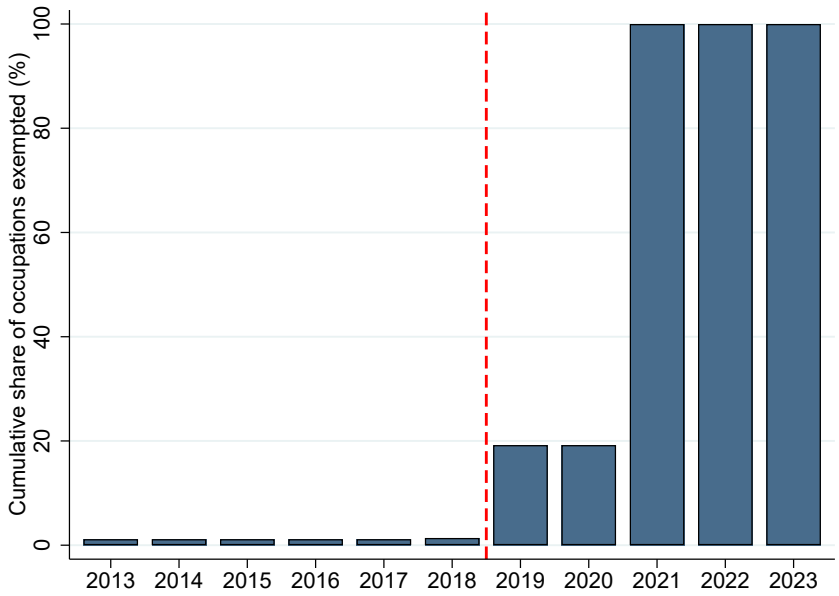


Figure 2: Increase in LMT exemptions in North Karelia

Notes. Figure shows the number of exempted occupations in the North Karelia region by year. Regional guidelines (decisions to change the exemption list) were made in 2013, 2014, 2018, 2019 and 2021. These are years when the decisions were made, but in the case of 2013 and 2014 the rule changes came into force in 2014 and 2015, respectively. We consider 2019 to be the treatment year because during that year exemptions expanded considerably. In years before 2019, around 5 exemptions were usually exempted. In 2021, all occupations (more than 400 occupation codes) were exempted.

4 Data and methods

4.1 Data

We use individual and firm level administrative datasets from Statistics Finland and Ministry of Economic Affairs and Employment (TEM) in our analyses. The used data modules include FOLK basic, FOLK employment, FOLK income, TEM modules (työnhaku, työpaikka, työnhakija), and FIRM modules (FIRM enter, FIRM FSS). When we study regional and municipal level outcomes, we aggregate these data to region and municipality levels. Firm analyses are conducted at the firm establishment level. The data cover years 2011 to 2023.

4.2 Methods

4.2.1 Synthetic control estimates at the region level

Because the treatment, the removal of LMT, is determined at the region level and there is only one treated region, North Karelia, the synthetic control method (Abadie et al., 2010) is a natural starting point for assessing region-wide effects, including the impact of LMT removal on immigration flows to the region. Let Y_{it} denote the outcome for region i at time t. The goal is to estimate the counterfactual outcome Y_{1t}^N for the treated unit in the absence of treatment. The synthetic control is constructed as:

$$\hat{Y}_{1t}^N = \sum_{j=2}^{J+1} w_j Y_{jt}, \quad \text{for } t \geq T_0, \tag{1}$$

where w_j are non-negative weights that sum to one:

$$\sum_{j=2}^{J+1} w_j = 1, \quad w_j \geq 0 \text{ for all } j. \tag{2}$$

These weights are chosen to minimize the pre-treatment difference between the treated unit and the synthetic control in terms of observed covariates and pre-treatment outcomes.

The estimated treatment effect is then given by:

$$\tau_{1t} = Y_{1t} - \hat{Y}_{1t}^N, \quad \text{for } t \geq T_0. \tag{3}$$

P-values for synthetic control estimates are calculated using placebos. This means that we calculate synthetic control estimates for each non-treated region, and after that, measure how extreme the actual synthetic control estimate for North Karelia is relative to these placebos. The p-values for each estimate are thus calculated as the share of placebo estimates that are more extreme than the actual treatment effect, as is a standard practice in papers utilizing synthetic control methods. We use a Stata package *synth_runner* to estimate the placebos and p-values.

The composition of the synthetic control, separately for different outcomes, is shown in Online Appendix Table A2.

4.2.2 Difference-in-difference estimates at the municipality level

Even though the policy shock of relaxing immigration shocks happens at the region level, the effects can in principle also be estimated using municipality level data. The challenge with the municipality level analysis is, however, that it is not possible to cluster standard errors at the region level when there is just one treated region. Despite this issue, we still estimate municipality level analyses because it enables us, e.g., study whether the impacts are different in urban and rural municipalities. Similarly to the region level analyses, also the municipality level estimates could be biased if there was any other North Karelia specific shock happening at the same when LMT was relaxed.

At the municipality and firm establishment levels, we use the difference-in-differences (event study) approach and estimate regressions of the following form:

$$Y_{it} = \gamma_i + \lambda_t + \sum_{\substack{k=2011 \\ k \neq 2018}}^{2023} \theta_k \cdot D_i \cdot \mathbb{1}\{year = k\} + \epsilon_{it} \tag{4}$$

γ_i and λ_t are panel unit and year fixed effects, respectively, and D_i is the treatment indicator. The treatment group at the municipality level includes municipalities in North Karelia, and the control group consists of matched control municipalities in the rest of the country and similarly at the firm level (see Section 4.3 for balance tables). Treatment year is 2019 in the specification, but the treatment was fully implemented only in 2021.

We also estimate pooled models across the full post-period.

At the firm establishment level we compare establishments located in North Karelia in 2018 to establishments elsewhere in Finland. The specification is a two-way fixed-effects DiD with establishment and year fixed effects; no matching is applied at the firm level. Identification at that level therefore rests on the parallel-trends assumption, which we examine with the event-study estimates shown below.

In addition to the DiD designs, we estimate two triple-difference (DDD) specifications at the individual level in Section 5.3.2. The third dimension is either urban vs. rural residence of the worker or the wage bracket of the worker's 2018 occupation. Both DDD designs are estimated on the matched incumbent sample described in Section 4.3.

North Karelia has 13 municipalities. We classify seven of them (the municipalities in and around the Joensuu urban commuting zone) as urban. The remaining six municipalities are classified as rural.

4.2.3 Synthetic difference-in-differences

To complement the standard difference-in-differences (DiD) approach, we also estimate treatment effects using the synthetic difference-in-differences (SDID) method, as proposed by Arkhangelsky et al. (2021). The SDID estimator combines the strengths of both DiD and synthetic control by using outcome modeling across both time and units: it constructs a weighted average of control units that closely matches the treated group's pre-treatment outcome trajectory, and it additionally re-weights the pre-treatment periods so that the matched trajectory coincides with the treated units' average.

4.3 Identification

Our empirical strategy relies on the assumption that the removal of LMT in North Karelia is plausibly exogenous with respect to other concurrent regional developments, and that our constructed counterfactuals, a synthetic North Karelia at the regional level, CEM-matched municipalities at the municipal level, and PSM-matched individuals at the individual level, capture the relevant counterfactual trajectory. North Karelia is not the only Finnish region where LMT has been relaxed during our sample window: regional exemption lists are updated periodically, and several other ELY areas have lifted restrictions on individual occupations. North Karelia differs from these cases in two key respects, however: the breadth of its reform (essentially all occupations from 2021 onwards, versus single shortage occupations elsewhere), and its unexpectedness given the regional labor market: North Karelia had the highest unemployment rate in Finland at the time of the reform, making it implausible that the exemption was a response to pre-existing tightness. The synthetic control donor pool includes all other NUTS3 regions regardless of their smaller local exemptions, which means our estimates likely understate the true effect, since some controls are mildly treated themselves.

The treatment year 2019 falls immediately before the COVID-19 pandemic, and the reform's full implementation in 2021 coincides with its later phase. The pandemic affected immigration to Finland through border closures, restrictions on free movement, and broader economic uncertainty. Three considerations mitigate the concern that our estimates are confounded by COVID-19. First, the synthetic control is constructed to match North Karelia's pre-reform trajectory and therefore implicitly captures the structural characteristics such as industry composition, unemployment rate, and demographics, that shape pandemic exposure. Second, pandemic effects should bite hardest in 2020, whereas our estimated immigration effects grow visibly only from 2021 onwards, after the acute mobility restrictions had eased and the reform was fully in force. Third, our triple-difference designs (urban vs. rural and

ISCO 5, 7, 8, 9 vs. ISCO 1–4) absorb any region-wide shock that affected North Karelia in this period, including any asymmetric pandemic impact, provided that such shocks do not load differentially on urban versus rural municipalities or on treated versus control occupations within the region.

5 Results

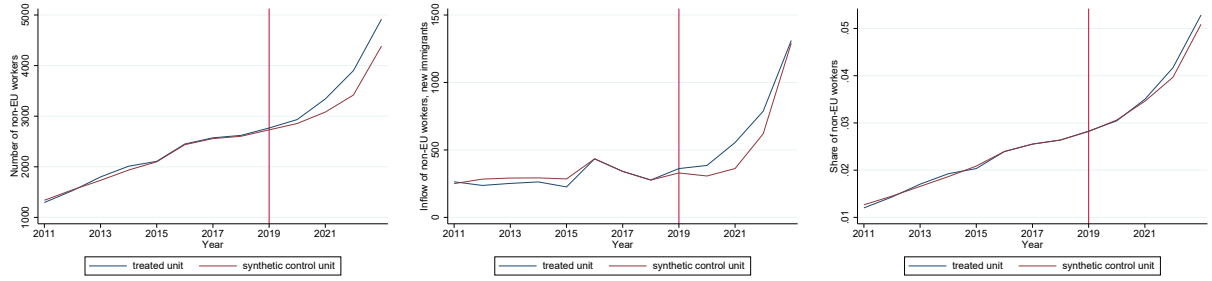
5.1 Does removing immigration restrictions bring more workers to a peripheral region?

Figure 3 shows region-level synthetic control estimates for the stock and inflow of non-EU immigrant workers. Panel A shows that once the LMT requirements are lifted, the stock of non-EU immigrants increases by around 500 individuals in year three, or around 14% relative to the synthetic counterfactual level in that year. The inflow of non-EU immigrants (Panel B) increases by almost 200 more individuals (30% relative to the counterfactual) in year three. Inference for synthetic control estimates is based on placebo tests, with p-values calculated as the share of placebo estimates more extreme than the treatment effect (Online Appendix Figure A1). The stock effect is significant at the 5% level in years 3 and 4, and the inflow effect at the 10% level in year 3.

These patterns are summarised in Appendix Table A1, which reports pooled DiD and synthetic DiD estimates across the full post-period. The DiD coefficient for the urban stock of non-EU workers is positive (96.4 individuals per municipality-year) but noisy; the synthetic DiD point estimates are smaller in magnitude but are statistically significant at the 10% level for the share and at the 5% level for the inflow of new non-EU workers in the urban subsample. In the overall sample (Panel A) none of the pooled estimates are significant, consistent with the event-study pattern showing that the reform mostly affected urban municipalities shown in Section 5.2.1.

It is possible that abolishing LMT in North Karelia would allow some workers to use North Karelia as a gateway to circumvent immigration restrictions. Such workers could migrate to North Karelia under the relaxed LMT rules and then move elsewhere in Finland, as this is allowed to some extent. To examine this, we estimate an event study (Online Appendix Figure A5) where the outcome variable is the movement of new immigrants from North Karelia to other Finnish regions. The estimate is close to zero in the pre-period and only slightly positive in 2021, and its magnitude is small relative to the overall inflow documented above. We conclude that the bulk of the migration response remains in the region rather than transiting through it, so the observed increase in non-EU stock and inflow reflects a

genuine increase in the immigrant population of North Karelia. Having established that the reform increased immigration to North Karelia as a whole, we next examine where within the region those gains were concentrated by geography, occupation and firm size.



(a) Stock of non-EU workers (b) Inflow, new non-EU immigrants (c) Share of non-EU workers

Figure 3: Effect on the number of non-EU immigrants, aggregated individual-level data

Notes. These figures present synthetic control estimates. P-values can be calculated by estimating placebos and determining the p-value as the proportion of placebos that are more extreme than the estimate. These are shown in Online Appendix Figure A1. Estimates for the count of non-EU immigrants are significant at the 0.05 level in years 3 and 4. Estimate for inflow is significant at the 0.1 level in year 3. Pre-treatment outcome means (for whole pre-treatment period) in treatment group: 2,024 (stock of non-EU workers), 393 (inflow), 0.02 (share).

5.2 Where in the region do immigrants go?

5.2.1 Urban vs rural

Figure 4 shows the effect on the inflow of new non-EU migrants at the *municipality* level for urban and rural municipalities. The post-treatment trajectories of urban and rural municipalities diverge. For urban municipalities, the effect is significant in 2020 and 2021, with an increasing trend, yet insignificant yearly estimates for 2022 and 2023. However, the municipality level estimates clearly suggest that any effect on immigration observed at the region level in North Karelia seems to be driven by increased immigration to urban areas and not to rural areas.

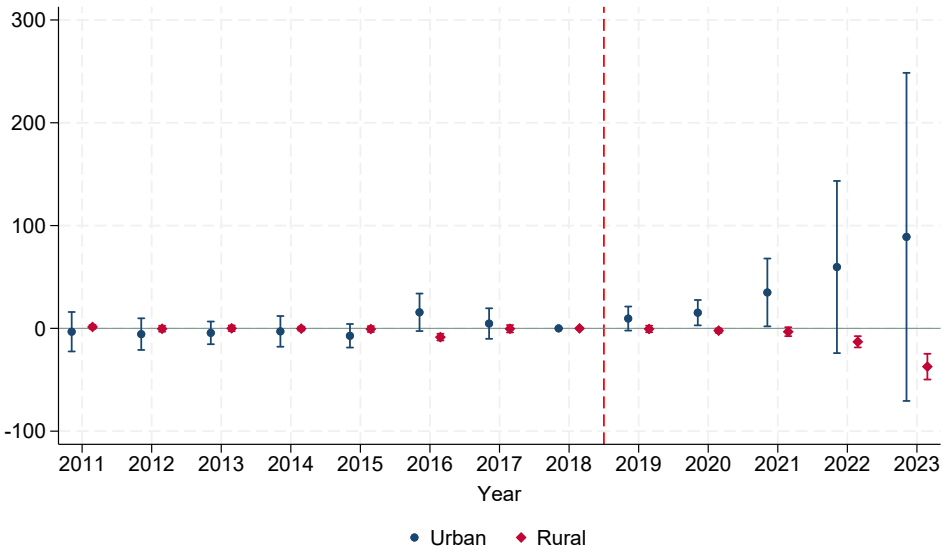


Figure 4: Inflow of new immigrants: urban vs. rural

Notes. Figure shows municipality-level DiD estimates where the outcome is the inflow of new non-EU immigrants, estimated separately for urban and rural municipalities. Urban municipalities include also rural municipalities in the Joensuu region (Joensuu is the largest city in the region). Pre-treatment outcome means: 37.20 (urban), 3.3 (rural).

To understand more thoroughly the heterogeneity between cities and countryside inside the remote region of North Karelia, we plot the effects on the *share* of non-EU immigrants out of the working population in the municipality (Figure 5). In cities, the share of non-EU workers increases by roughly 0.75 percentage points, or 37.5%, on average 3 to 5 years after the reform. However, no effect is observed in non-cities. Loosening immigration regulation in a remote region boosts immigrant inflows, but all the new arrivals crowd in cities.

The previous figures show the dynamic estimates, but we also report pooled estimates in Appendix Table A1. Because the reform was phased in over three years and had its full bite only from 2021, the pooled estimates across the full post-period mostly sit inside their confidence intervals, especially for the basic DiD specification. Taken together, the event studies and pooled estimates tell a consistent story: the reform moved non-EU immigration into North Karelia, and the bulk of that movement was concentrated in urban municipalities and in the last two to three years of our sample window.

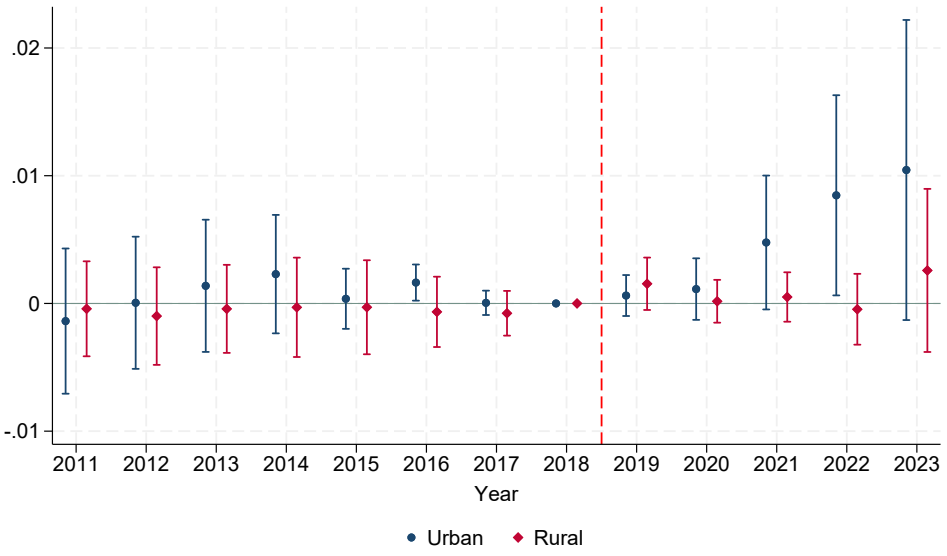


Figure 5: Share of non-EU workers: urban vs. rural

Notes. Figure shows municipality-level DiD estimates where the outcome is the share of non-EU workers out of the working-age population, estimated separately for urban and rural municipalities. Urban municipalities include also rural municipalities in the Joensuu region (Joensuu is the largest city in the region). Outcome means: 0.013 (rural) and 0.020 (urban).

5.2.2 Occupations of the entrant workers

Above we showed that the incoming workers move to cities. In this section, we study the occupational selection in cities. Figure 6 shows the effect of the reform on the share of non-EU workers by ISCO 1-digit code in years 3 to 5. (see Online Appendix Figure A4 for event studies). Corresponding estimates for rural municipalities are shown in Online Appendix Figure A7. The analyses are conducted at the municipality level. We include ISCO groups 1 (managers) and 2 (professionals) for completeness, although LMT rules are generally not applied to these occupations.

We find a positive effect on ISCO groups 7 (craft and related trades workers), 8 (plant and machine operators, and assemblers), and 9 (other workers, including cleaners), roughly doubling the share of non-EU workers in these groups, which can be characterized as manual labor. For group 6 we find a negative estimate, which is surprising and not straightforward to interpret. However, for group 6, there is a negative pre-trend, which puts the estimate in some doubt (Online Appendix Figure A4). The estimate could thus reflect a unique compositional trend in the agricultural sector of North Karelia and not a reform effect. ISCO 6 accounts for only 2.4% of the North Karelian working-age population (vs. 1.5 % in the rest of Finland).

Online Appendix Figure A11 additionally reports municipality-level event studies in cities for earnings and immigration flows separately for ISCO groups 5, 8, and 9 versus the other groups.

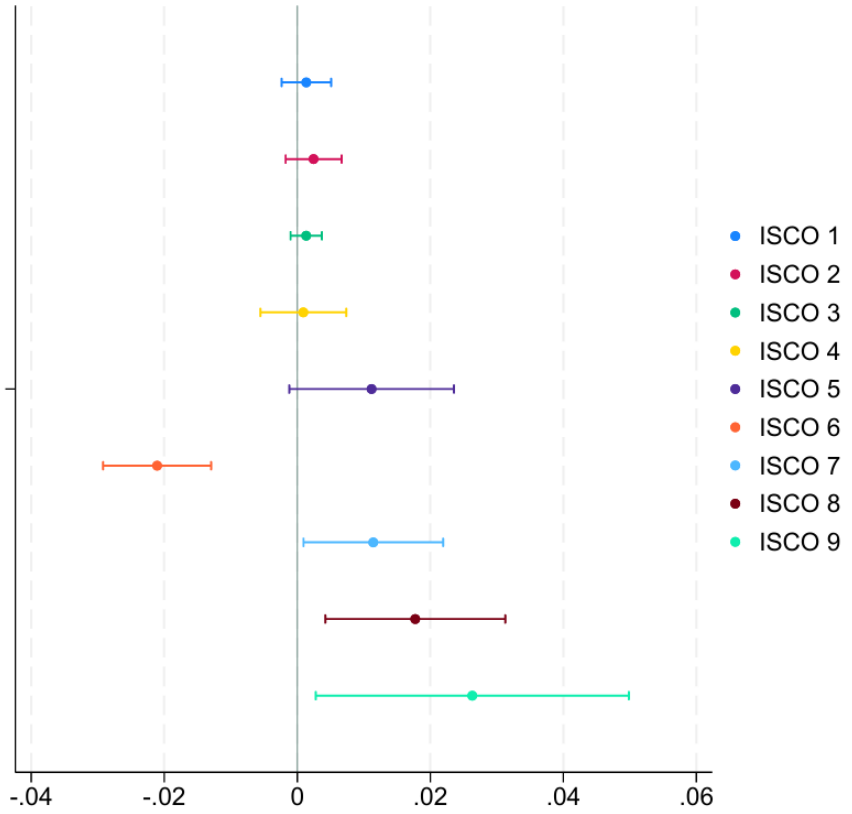


Figure 6: Effect on the share of non-EU workers in cities, results by ISCO 1-digit group

Notes. Figure shows municipality-level DiD estimates pooled for years from +3 to +5 after treatment, where the outcome is the share of non-EU workers in cities. Cities include also non-city municipalities in the Joensuu region (Joensuu is the largest city in the region). Pre-treatment outcome means for different ISCO groups: 0.002 (ISCO 1), 0.008 (ISCO 2), 0.003 (ISCO 3), 0.005 (ISCO 4), 0.01 (ISCO 5), 0.01 (ISCO 6), 0.007 (ISCO 7), 0.01 (ISCO 8), 0.02 (ISCO 9). This analysis does not include non-EU individuals with missing occupation (or those who are not employed), and thus, the means are lower than the overall share of non-EU workers out of the working-age population.

ISCO occupation groups 7 to 9 are generally lower-wage occupations. Next, we analyze where in the occupational earnings distribution the new workers arrive (Figure 7). The figure moves a 10-percentage point window and shows estimated effects of LMT removal on the share of immigrant workers at the municipality-occupation level, limiting the sample to

occupations in that particular 10-percentage point window. The figure shows that there are significant effects in the lowest-paying 10 percentiles, and also between 35. and 40. percentiles. The latter could be a spurious significance. We infer that there seems to be a significant concentration of new entrants in the occupations in the lowest 10 to 15 earnings percentiles. The concentration of the new entrants in lower end of the earnings distribution could have implications for the labor market especially for the low-income earners.

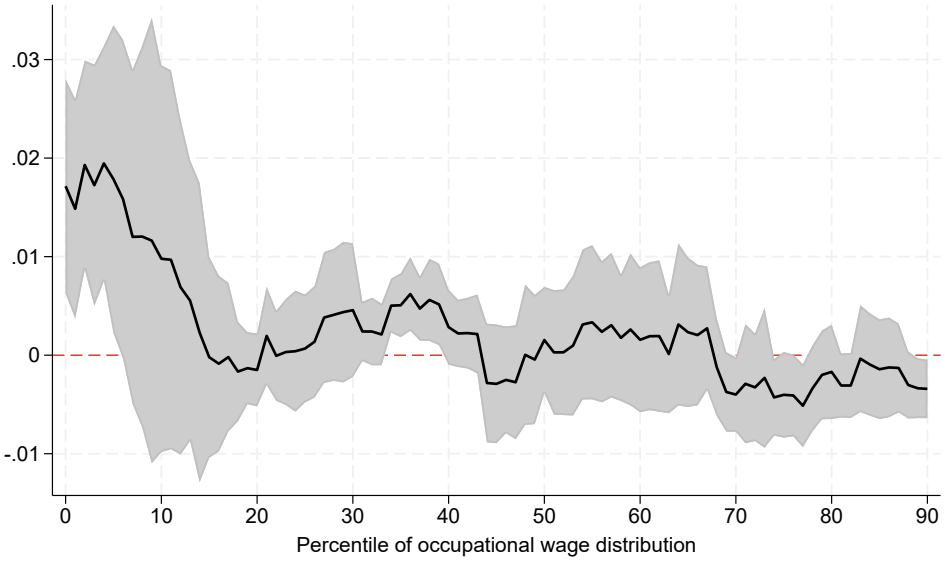


Figure 7: Effect on the share of immigrant workers in different parts of the earnings distribution in cities, a moving 10-percentile wide window

Notes. The figure shows the effect of LMT removal on the share of immigrant workers using municipality-occupation level data, and moving a 10-percentile wide window in the occupational earnings distribution. The x-axis shows the lower bound of the estimation window. The pre-treatment outcome mean in North Karelian cities for the share of non-EU workers is 0.02.

5.2.3 Firm size

Next we study what types of firms hire the newcomers. To do that, we estimate effects on firm establishment level by comparing firm establishments in North Karelia to establishments in other regions. As above with occupations, we run a set of regressions with a 10-percentage point moving window of firm establishment size (Figure 8). We observe that the increases are concentrated at two points of the firm size distribution, the median (∼14 workers) and the top. At both significant parts of the distribution, the effect size is at its largest around 2 percentage points. We do not draw strong conclusions from this graph.

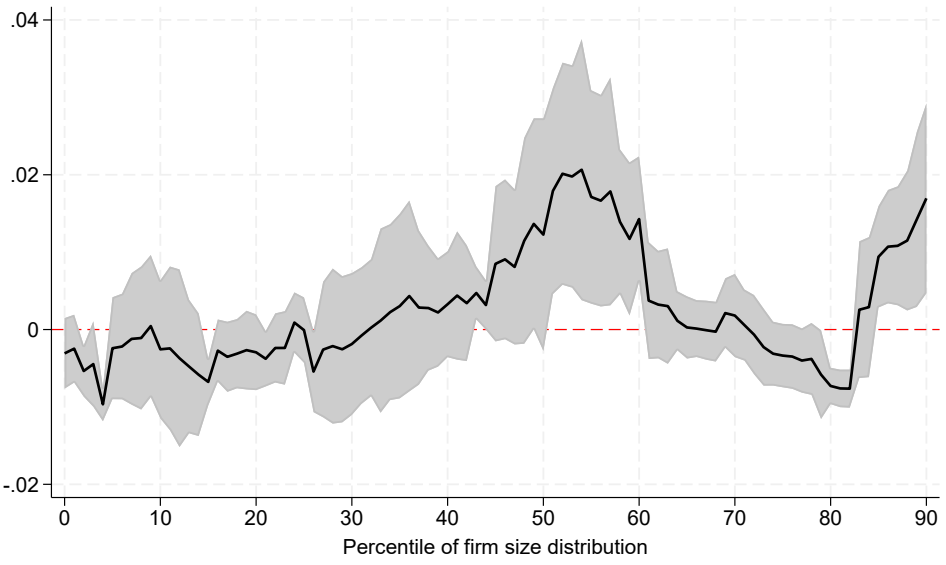


Figure 8: Percentile figure, effect on firm size distribution at the establishment level

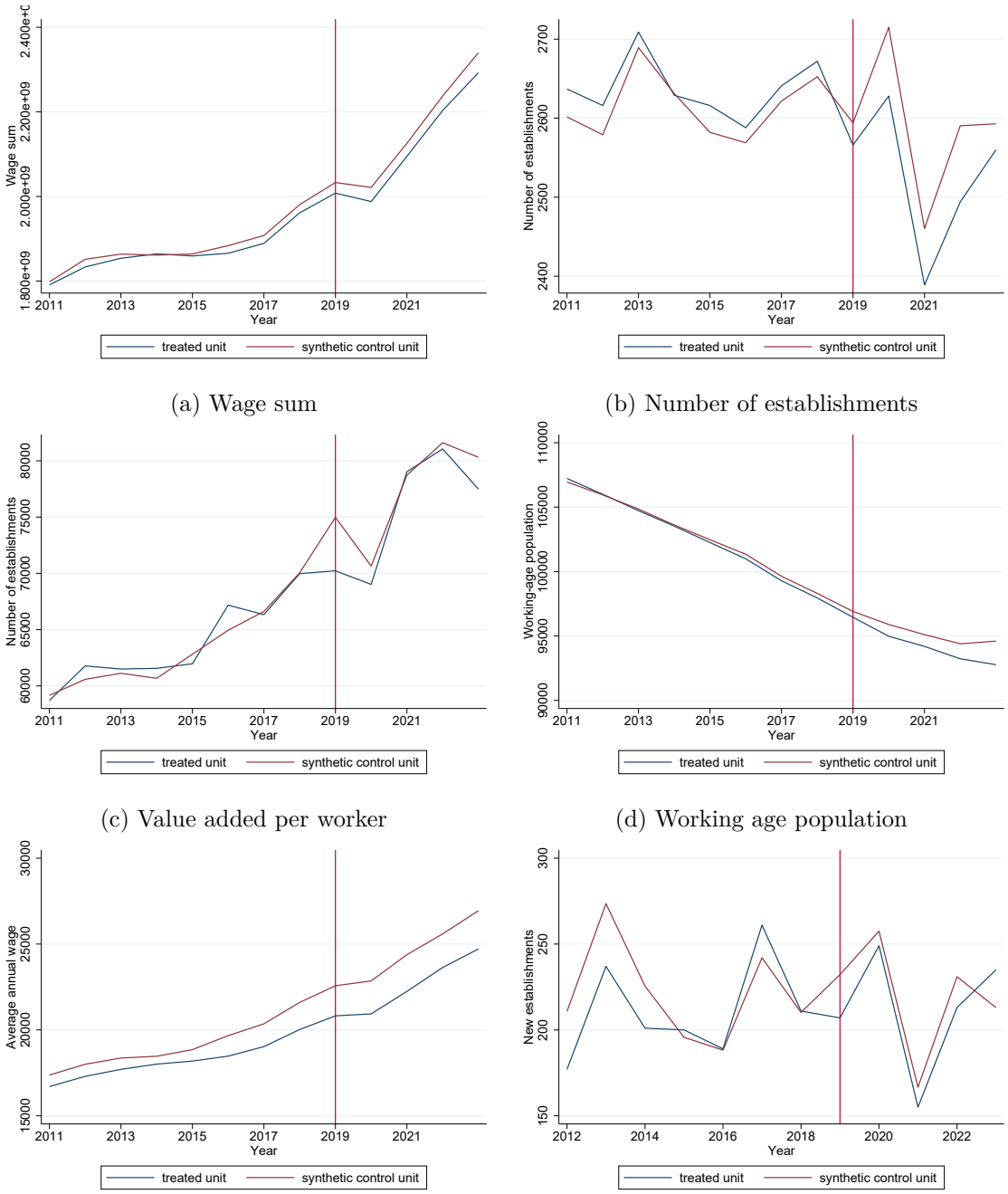
Notes. Figure shows the effect at the establishment level in different 10-percentage point windows of the firm size distribution. The 50th percentile is around 14 workers, the 60th percentile 22 workers, and the 70th percentile 42 workers.

5.3 Can immigration deregulation substitute for broader place-based policies?

In Section 5.2, we found that the new entrants concentrate in manual, low-wage occupations in cities. In this section, we explore our third question on whether immigration deregulation could be a valid substitute for more expensive place-based policies.

5.3.1 Region-level synthetic control estimates

We next examine whether the liberalization of non-EU immigration and the subsequent increase in immigration has a noticeable impact on other measurable economic outcomes, such as wage sum, number of firm establishments, value added per worker, working age population, average annual wage, and the number of new establishments. Figure 9 shows the synthetic control estimates with p-values in Online Appendix Figure A1. Estimates for wage sum, value added per worker, and working population are not statistically significant. The estimate for the number of firm establishments is significant.



(a) Wage sum

(b) Number of establishments

(c) Value added per worker

(d) Working age population

(e) Average annual wage

(f) New establishments

Figure 9: Region level economic outcomes

Notes. Figure shows the evolution of the outcomes in treated unit (North Karelia) and control unit (synthetic North Karelia). P-values using placebos are calculated in Online Appendix Figure A1. The pre-treatment (whole pre-period) outcome means in North Karelia are: 1.8 billion (wage sum), 2638 (nr establishments), 63,000 (value added per worker), 102,000 (working age population). The new-establishments panel drops 2011 because the underlying variable is problematic in that year.

We also run our municipality-level regressions for economic outcomes. We employ both differences-in-differences with matching and synthetic differences-in-differences to ensure our findings are robust. As we showed in Section 5.2, only cities and the Joensuu region were affected by the reform, i.e., only those municipalities saw increases in immigration. We now focus solely on those municipalities for more precise estimation of potential effects. The results are shown in Table 4. Most of the estimates are not significant in either specification. However, the estimates in Panel A could suggest that there is a possibility of a negative impact on average annual earnings (-€570 (-2.2%)) and productivity (-€3020 (-5%)) in the municipality. These results suggest that there might be some negative wage pressures in the region. However, these estimates are not significant in the synthetic DiD specification shown in Panel B, although the point estimates are negative and for productivity even larger than in the DiD specification. In addition, the event studies, collected in Online Appendix Figure A10, suggest issues with pre-trends for the ordinary DiD specification. Thus, we interpret the findings related to earnings and productivity in Table 4 with caution due to varying statistical significance. Since we do not find any hint of significant changes in the new firm establishments or the number of establishments, we conclude that the region-level estimate of a positive effect on the number of firm establishments is not robust.

Table 4: Municipality-level economic outcomes, urban municipalities

	(1) Average Earnings	(2) Wage Sum	(3) Working Age Population	(4) New Establishments	(5) Nr Establishments	(6) Productivity (Value Added)
Panel A: Difference-in-differences + matching on population size						
Treatment effect	-573.329**	1.75e+07	-143.813	0.520	3.122	-3020.174**
	(241.855)	(2.21e+07)	(214.373)	(0.877)	(5.953)	(1349.551)
N	3809	3809	3809	3800	3800	3800
Panel B: Synthetic difference-in-differences						
Treatment effect	-92.642	2.94e+06	72.738	-1.907	-5.610	-4055.357
	(132.387)	(3.77e+06)	(170.601)	(2.995)	(6.046)	(2512.209)
N	3636	3636	3636	3636	3636	3636

Notes. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Pre-treatment outcome means for urban North Karelian municipalities (Panel B): 25,605 (average annual earnings), 232 million (municipal level wage sum), 12,406 (working age population), 17 (new establishments during year), 322 (nr establishments), 58,301 (value added per worker). Corresponding whole-sample (all 13 P-Karjala municipalities) means for Panel A are given in the whole-municipality balance table (Panel B of Table A6): 26,002 (annual wage), 149 million (wage sum), 7,449 (working-age population), 10 (new establishments), 204 (number of establishments), 65,610 (value added per worker).

5.3.2 DDD results for incumbent workers

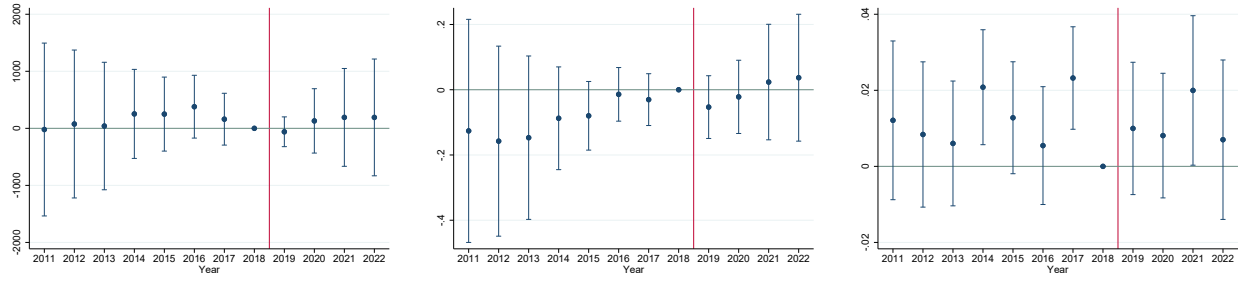
In Section 5.2, we found that urban municipalities saw an influx of immigrants, whereas rural communities saw no such increase. Also, we observed that the increases were concentrated in ISCO groups 7, 8 and 9. We exploit these observations to create a triple differences design. In the first design, we add a third difference of whether the municipality of residence is rural or urban. In the second design, the third difference is ISCO groups 5, 7, 8, and 9 vs. ISCO groups 1 to 4. We drop group 6. Assuming no spillover effects, the triple difference designs have the benefit of controlling for any potential region-wide shocks that North Karelia might have faced concurrently with the introduction of immigration deregulation. We run the triple difference regressions at the individual level to study the effects of the reform on earnings, employment months and occupation switching for incumbent workers. We define incumbent workers as individuals who had been continuously resident in Finland as working-age adults (aged 16–64 in every year) since 2011, who lived in either North Karelia or one of four neighbouring NUTS3 regions (Etelä-Karjala, Etelä-Savo, Pohjois-Savo, Kainuu) in 2018, and who are matched 1:1 via propensity-score matching on pre-treatment earnings, months worked, lagged earnings, lagged months worked, and age. New immigrants arriving during the study window are therefore excluded from the individual-level sample by construction.

Figure 10 shows that there are no discernible effects on any of the three outcomes for incumbent workers. Figure 11 repeats the design with occupation group (ISCO 5, 7, 8, 9 vs. 1–4) as the third dimension, and delivers the same message: year-by-year triple-interaction coefficients are noisy and centred around zero both in the pre-period and the post-period, with no statistically significant departures from zero. This is consistent with the view that the reform increased the total *flow* of non-EU workers into affected occupations in North Karelia (Section 5.2.2) without measurably pushing incumbent workers out of those occupations, reducing their wages, or lowering their employment months.

Pooled estimates complement this picture. In Appendix Table A4, the pooled DDD coefficients for earnings, months worked, and outflow to non-employment are small and statistically insignificant, while the probability of switching to another profession shows a small but statistically significant *decline* of 1.3 percentage points: if anything, incumbent workers in the affected occupations became slightly less likely to leave them after the reform, which speaks against displacement. At the municipality level, the pooled number of occupation switches (Appendix Table A3) increases in treated municipalities, driven by urban areas, but the estimates are significant only at the 10% level; given their marginal significance and the contrast with the individual-level evidence, we do not interpret them as evidence of reform-induced displacement of incumbents. Event-study versions of the outflow-to-non-employment outcome and of the occupation-switch counts are shown in Online Appendix Figures A3 and

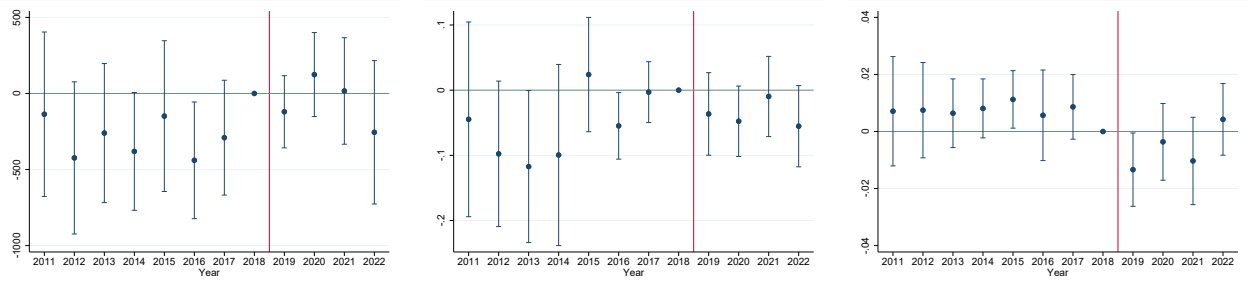
A2.

Figure 12 complements these results by moving a 10-percentile window along the 2018 occupational wage distribution and re-estimating the DDD at each position. For each of the four outcomes, the triple-interaction coefficient (the y-axis) captures how much *more* the treatment affects incumbent workers whose 2018 occupation falls in the window, relative to workers outside it. For earnings (Panel a), the curve hovers near zero across most of the distribution and the 95% confidence interval straddles zero throughout. At the very low-wage end (0–10th percentile) the point estimate is even slightly positive, not negative, so we find no evidence that the immigrant inflow into low-wage occupations depressed the wages of incumbent low-wage workers in North Karelia. The other three panels tell the same story: no discernible effect at any point along the wage distribution on employment months, occupation switching, or outflow to not working.



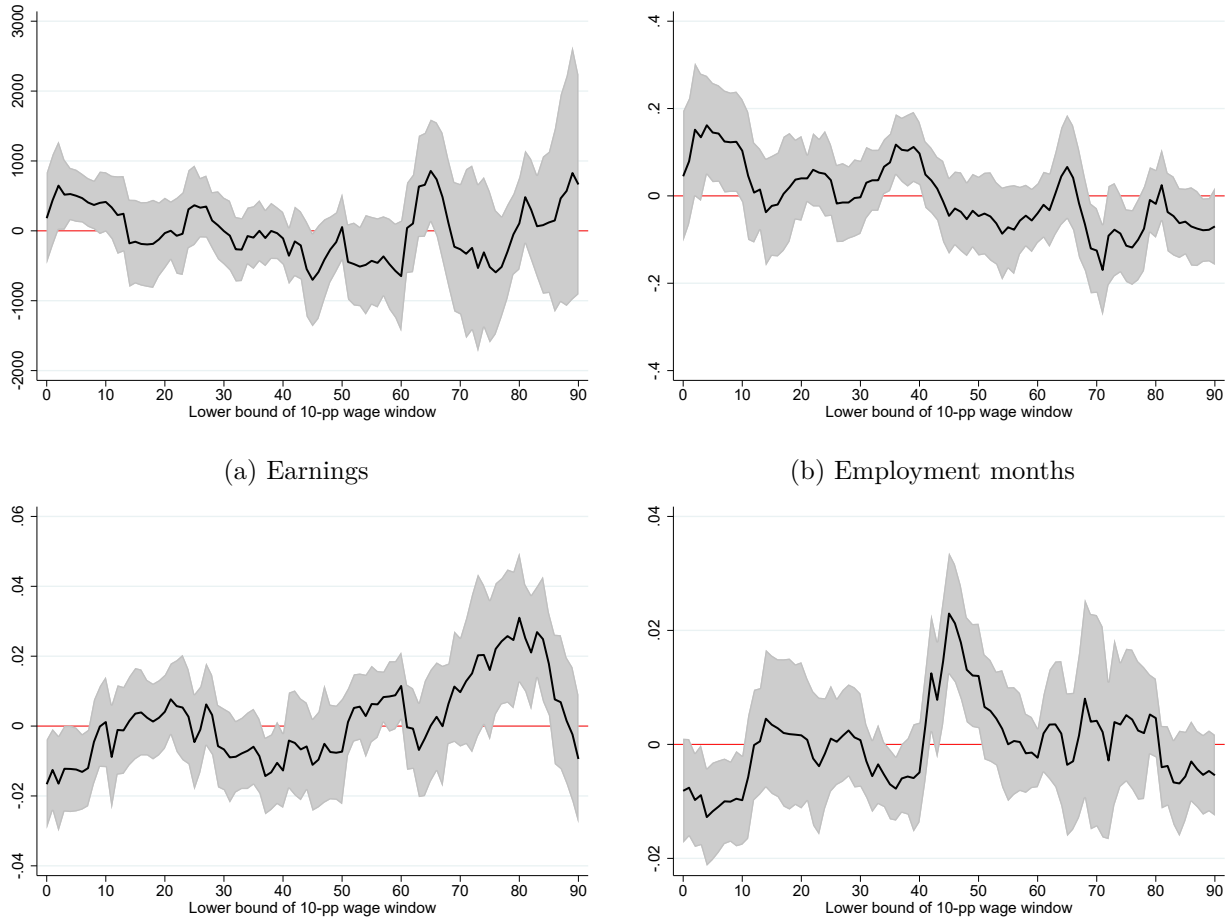
(a) Earnings (b) Employment months (c) Changing occupation

Figure 10: Effects on main individual-level outcomes, triple differences (urban vs. rural)



(a) Earnings (b) Employment months (c) Changing occupation

Figure 11: Effects on main individual-level outcomes. DDD with ISCO groups 5, 7, 8, 9 as the treated-occupation cell and ISCO 1–4 as the control-occupation cell; ISCO 6 excluded.



(a) Earnings

(b) Employment months

(c) Changing occupation

(d) Outflow to not working

Figure 12: Sliding 10-percentile wage-window DDD for incumbent workers. For each 10-pp window on the 2018 occupational wage distribution (x-axis: lower bound of the window), the y-axis shows the triple interaction coefficient post $\times$ treatment $\times$ $\mathbf{1}$[occupation's 2018 wage bracket in the window] with 95% CI shaded. Same incumbent sample as Figure 11.

Finally, to understand whether immigration liberalization could lead to a demographic revival in the medium-term, we estimate the effects on the number of non-EU background urban children. We do not find an effect, as can perhaps be expected for our medium-term analysis (see pooled DiD and synthetic DiD estimates in Online Appendix Table A5).

6 Conclusion

This paper examined whether relaxing labor market testing regulations in a peripheral region — Finnish North Karelia — can bring more immigrant workers to the area, and if so, whether those workers generate broader regional economic effects.

We find that the reform did meaningfully increase non-EU immigration to North Karelia. By the third year after the reform's introduction, the stock of non-EU workers had grown by around 14% and the annual inflow by around 30%, relative to a synthetic control. Those gains, however, were not spread evenly across the region. Immigrant inflows concentrated almost entirely in urban municipalities, with no discernible effect in rural areas. Within cities, new entrants arrived predominantly in manual, lower-wage occupations — ISCO groups 5, 7, 8, and 9 — and were concentrated in the lowest earnings percentiles of the occupational wage distribution. Across the firm size distribution, the increases concentrated around the median and the top.

Despite this increase in immigration, we find little evidence that the reform generated broader regional transformation. Region-level estimates for wage sum, value added per worker, and working-age population are all statistically insignificant. Municipality-level estimates point to possible negative effects on average annual earnings and productivity in urban areas, but these are not robust across specifications. Incumbent workers — those already employed in the affected occupations and municipalities before the reform — show no discernible effects on earnings or employment months. The reform also did not produce a detectable demographic revival: we find no effect on the number of non-EU background children in urban municipalities over our medium-term window.

Our findings differ from Nieminen et al. (2024), who find negative earnings effects for incumbent workers following occupation-specific relaxations of labor market testing across Finland. In North Karelia, by contrast, we find no detectable adverse earnings effects on incumbent workers, even though the increase in immigrant employment is concentrated in relatively low-paying occupations. One possible interpretation is that the labor-market effects of immigration deregulation depend importantly on regional context. North Karelia is a genuinely peripheral labor market, characterized by low population density, economic disadvantage, and population decline. In such a setting, additional immigrant labor may primarily relax labor-supply constraints or fill otherwise difficult-to-fill jobs, generating less direct wage competition with incumbent workers than in larger, denser, or tighter labor markets. Our design does not allow us to identify peripherality itself as the mechanism, but the contrast with previous evidence suggests that the effects of immigration deregulation may differ systematically between peripheral and more central labor markets.

Taken together, our findings carry a clear message for regional policy. Removing labor market testing is a relatively low-cost instrument that does succeed in attracting immigrant workers even to genuinely peripheral regions, i.e., it is not the case that peripherality alone is the binding constraint. However, the resulting immigration concentrates in existing urban centers and in lower-wage occupations, and does not appear to translate into the kind of broad economic revival — higher wages, new firms, population stabilization — that place-based policies typically aim to achieve, at least in the medium term. Immigration deregulation can therefore be a useful complement to traditional place-based interventions, reducing administrative burden on firms and easing acute labor supply constraints, but the evidence does not support treating it as a substitute for more direct regional development instruments. Whether longer time horizons, or contexts with deeper labor shortages, would produce stronger regional multiplier effects remains an open question for future research.

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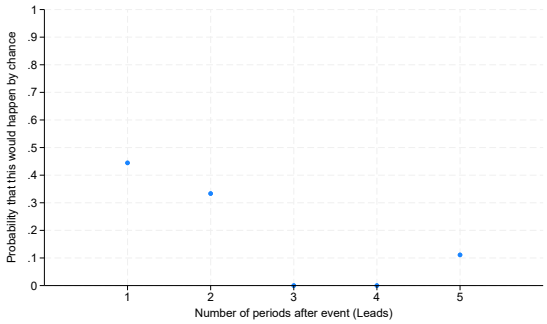
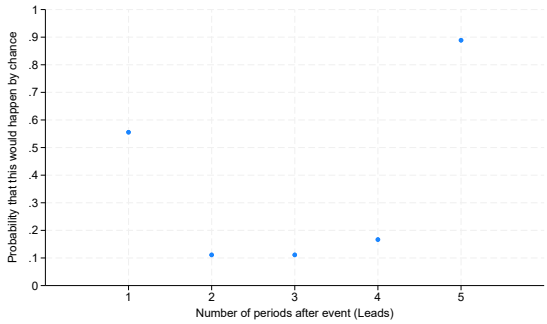
Online Appendix

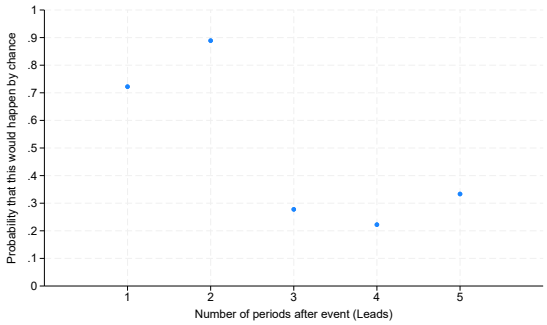
Online Appendix A: P-values using placebos for synthetic control graphs



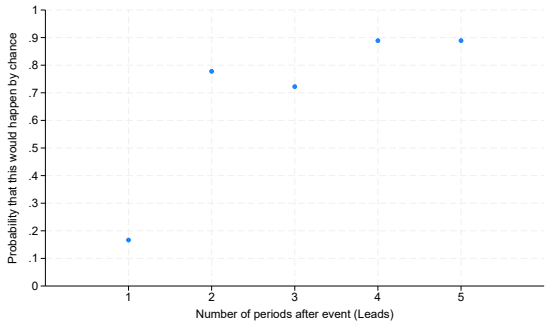
(a) P-value, Stock of non-EU workers



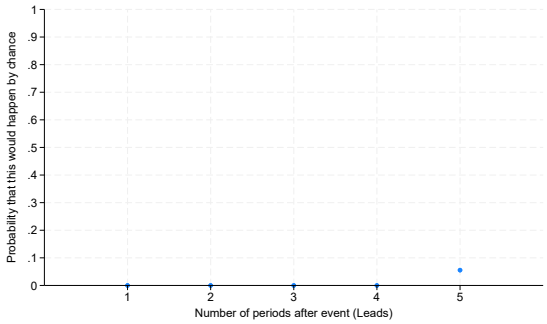
(b) P-value, inflow of non-EU workers



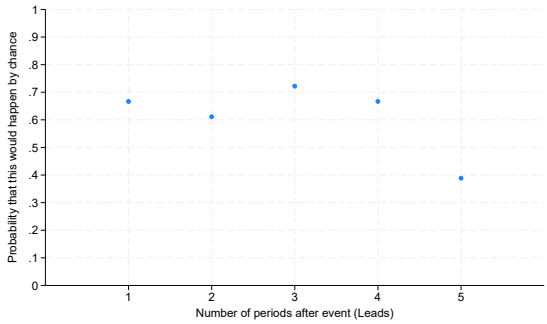
(c) P-value, share of non-EU workers



(d) P-value, wage sum

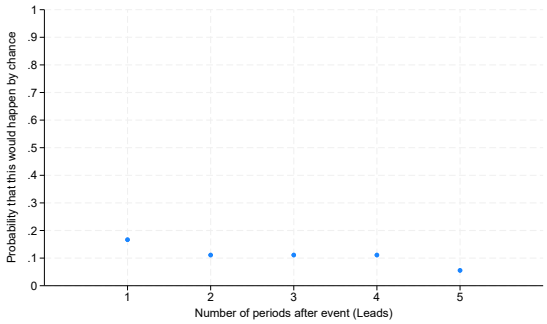


(e) P-value, number of establishments

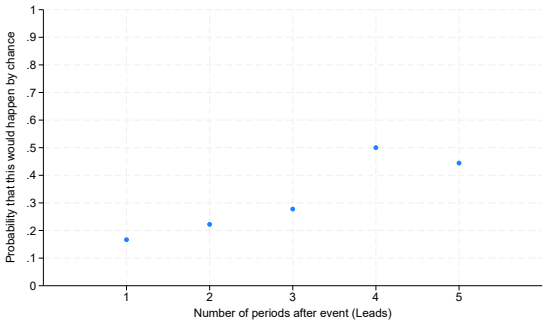


(f) P-value, value added per worker

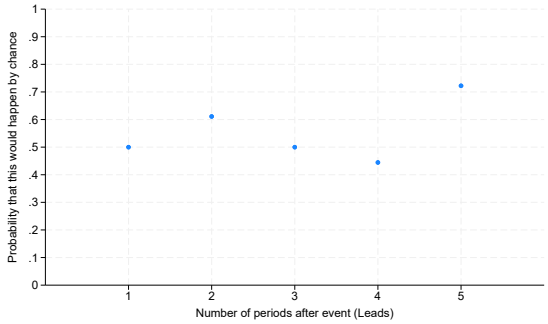
Figure A1: P-values using placebo estimates for synthetic control analyses in Figures 3 (Panels a to c) and 9 (all panels of the regional economic-outcomes figure). (Continued on next page.)



(g) P-value, working population



(h) P-value, average annual wage



(i) P-value, new establishments

Figure A1: (Continued.) P-values using placebo estimates for synthetic control analyses.

Table A1: Pooled estimates: effects on the stock and inflow of immigrants, difference-in-differences and synthetic DiD estimates

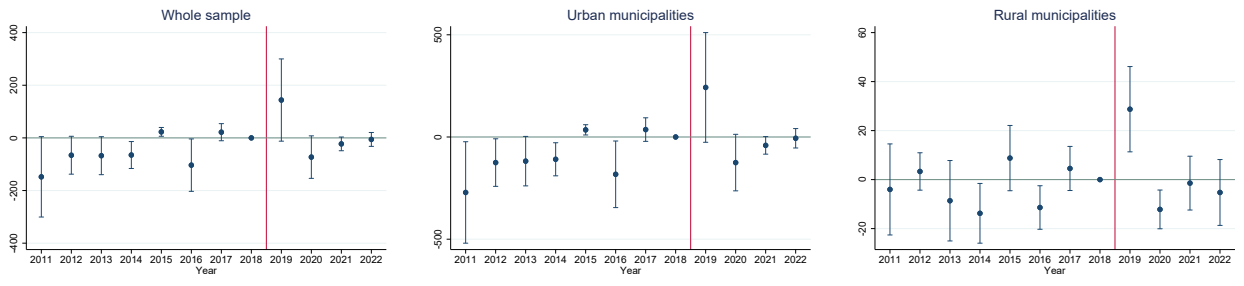
	Diff-in-diff + matching			Synthetic diff-in-diff		
	(1)	(2)	(3)	(4)	(5)	(6)
	Stock non-EU	Share non-EU	Inflow new non-EU	Stock non-EU	Share non-EU	Inflow new non-EU
Panel A: Overall						
Treatment effect	27.806	0.002	14.358	7.211	0.002	7.147
	(64.987)	(0.002)	(11.380)	(9.219)	(0.001)	(4.813)
N				3708	3708	3708
Panel B: Urban municipalities						
Treatment effect	96.414	0.003	29.840	11.986	0.004*	14.281**
	(113.774)	(0.003)	(19.235)	(16.954)	(0.002)	(7.248)
N	3516	3516	3516	3636	3636	3636

Notes. Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table A2: Donor-region weights for the regional-level synthetic control analyses

mkunta	arvonlisapertt	inflow_ulkom_mk_newim	palkkasumma	share_ulkom	toimipaik_maara	tyoik_vaesto	ulkomaalaistaustainen	uusitoimipaikka
1	0.000	0.010	0.003	0.016	0.004	0.001	0.001	0.030
2	0.000	0.028	0.011	0.023	0.145	0.002	0.004	0.000
4	0.000	0.041	0.012	0.021	0.010	0.004	0.005	0.000
5	0.435	0.369	0.013	0.032	0.012	0.005	0.015	0.000
6	0.000	0.025	0.024	0.025	0.012	0.002	0.004	0.000
7	0.000	0.026	0.021	0.024	0.012	0.008	0.005	0.000
8	0.000	0.017	0.088	0.111	0.013	0.512	0.235	0.000
9	0.000	0.028	0.033	0.024	0.013	0.004	0.006	0.000
10	0.565	0.019	0.093	0.025	0.013	0.000	0.011	0.000
11	0.000	0.030	0.020	0.019	0.017	0.005	0.004	0.000
13	0.000	0.024	0.011	0.038	0.020	0.003	0.306	0.000
14	0.000	0.051	0.020	0.009	0.018	0.005	0.004	0.000
15	0.000	0.056	0.146	0.056	0.013	0.357	0.006	0.208
16	0.000	0.026	0.068	0.218	0.116	0.004	0.001	0.762
17	0.000	0.022	0.013	0.021	0.015	0.004	0.004	0.000
18	0.000	0.030	0.383	0.313	0.029	0.076	0.379	0.000
19	0.000	0.030	0.018	0.000	0.021	0.009	0.005	0.000
21	0.000	0.166	0.025	0.025	0.515	0.000	0.005	0.000

Notes. Each column reports the weights $e(W\_weights)$ that synthetic control assigns to each donor NUTS3 region (rows) when targeting the outcome named at the top, using 2016, 2017, and 2018 lags of the outcome as predictors. Empty cells indicate zero weight. Weights sum to 1 per column.



(a) Whole sample (b) Urban municipalities (c) Rural municipalities

Figure A2: Municipality-level event study: number of workers whose 4-digit ISCO code in year t differs from year $t-1$, conditional on staying in the same NUTS3 region between $t-1$ and t. DiD with municipality and year fixed effects, weighted by CEM weights from the pooled municipality-level match.

Table A3: Occupational switching (ISCO-4 change within same NUTS3), pooled DiD

	(1) Whole sample	(2) Urban	(3) Rural
Treatment effect	61.248*	109.359*	5.113
	(33.624)	(56.040)	(6.117)
N	3605	3533	3521

Standard errors in parentheses

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

Table A4: ISCO-group DDD (ISCO 5, 7, 8, 9 vs. 1–4; ISCO 6 excluded), pooled across the post-period

	(1) Earnings	(2) Months worked	(3) Outflow: other profession	(4) Outflow: not working
DDD coefficient	201.071	0.010	-0.013***	0.003
	(242.968)	(0.038)	(0.003)	(0.002)
N	1054656	1083559	953686	953686

Standard errors in parentheses

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

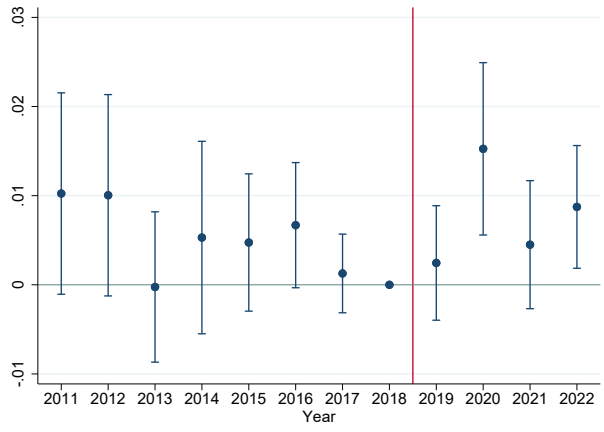
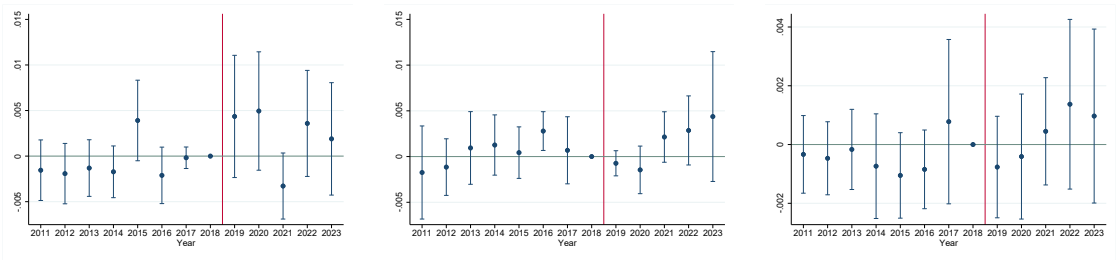


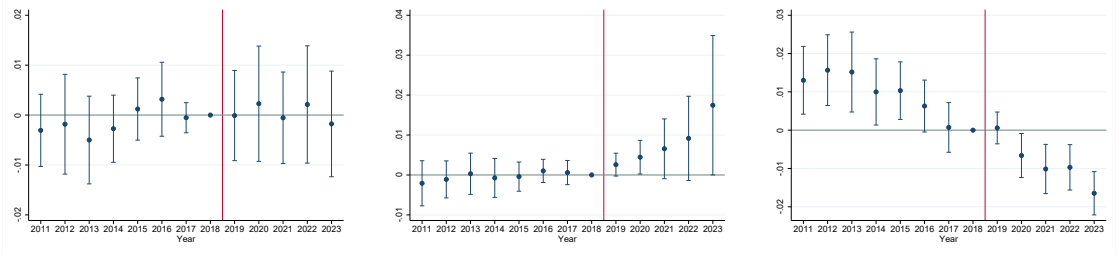
Figure A3: ISCO-group DDD, supplementary fourth outcome: outflow to not working (leaving the labor force).



(a) ISCO 1: Managers

(b) ISCO 2: Professionals

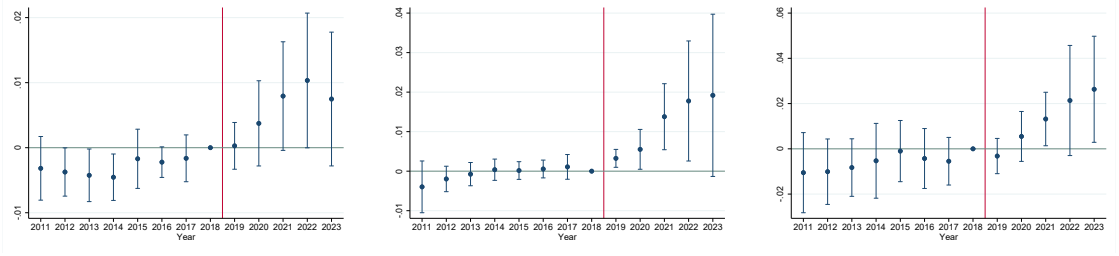
(c) ISCO 3: Technicians and associate professionals



(d) ISCO 4: Clerical support workers

(e) ISCO 5: Service and sales workers

(f) ISCO 6: Skilled agricultural, forestry and fishery workers



(g) ISCO 7: Craft and related trades workers

(h) ISCO 8: Plant and machine operators, and assemblers

(i) ISCO 9: Elementary occupations

Figure A4: Share of foreign workers by ISCO 1-digit group

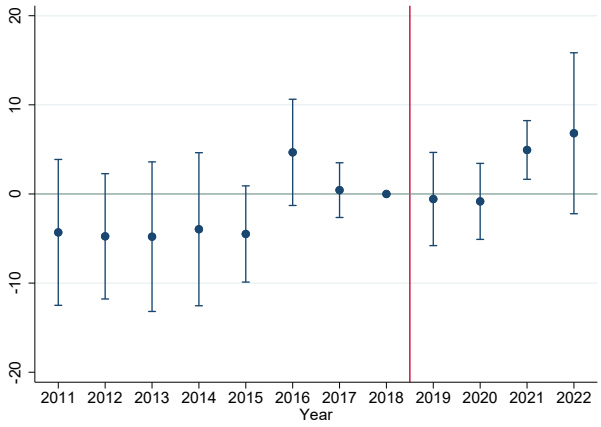
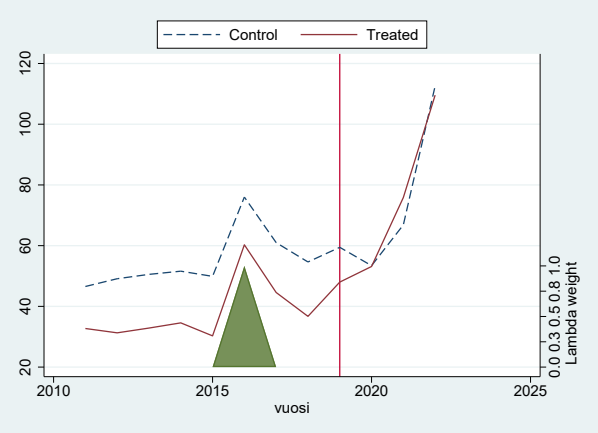


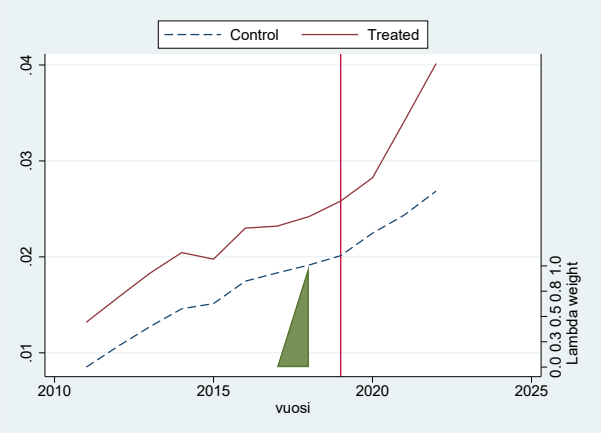
Figure A5: Number of immigrants who moved to North Karelia in the previous year but now live in another region

Online Appendix B: Additional municipality level results

Synthetic DiD figures, first stage (municipality level)



(a) Count of new immigrants



(b) Share of immigrants

Figure A6: Synthetic DiD (Urban municipalities), trend figures

Online Appendix C: Additional figures and tables

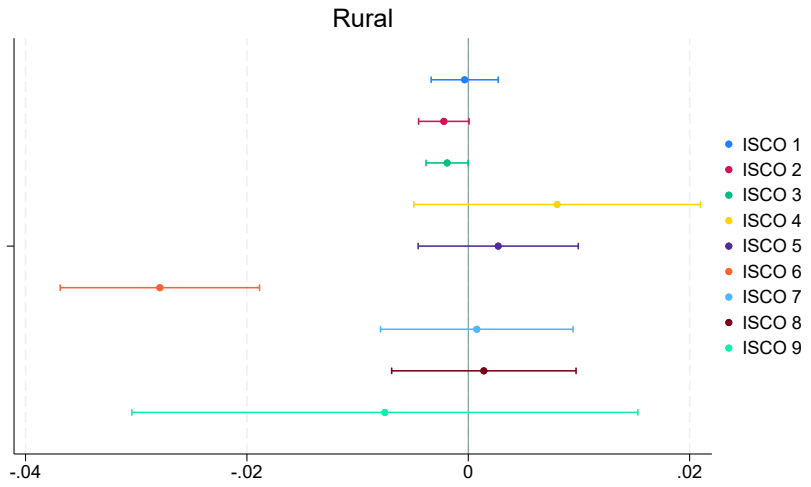


Figure A7: Effect on the share of non-EU workers in rural municipalities, by ISCO 1-digit group

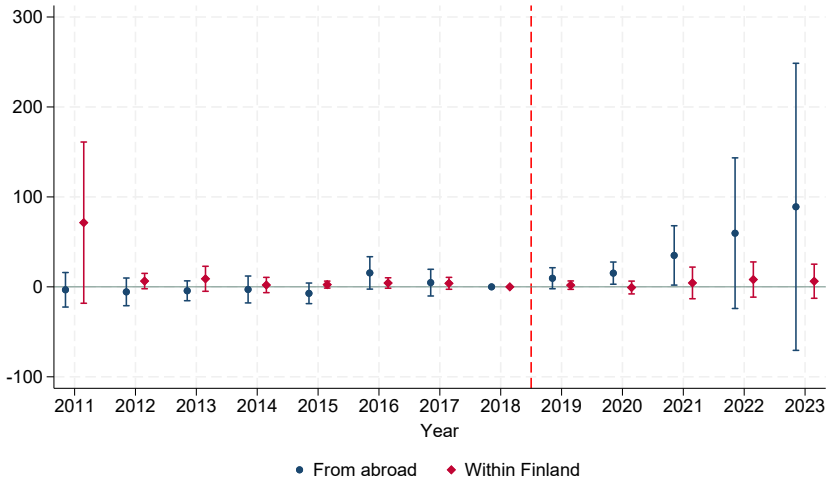


Figure A8: Distribution of country of origin among non-EU immigrants in North Karelia

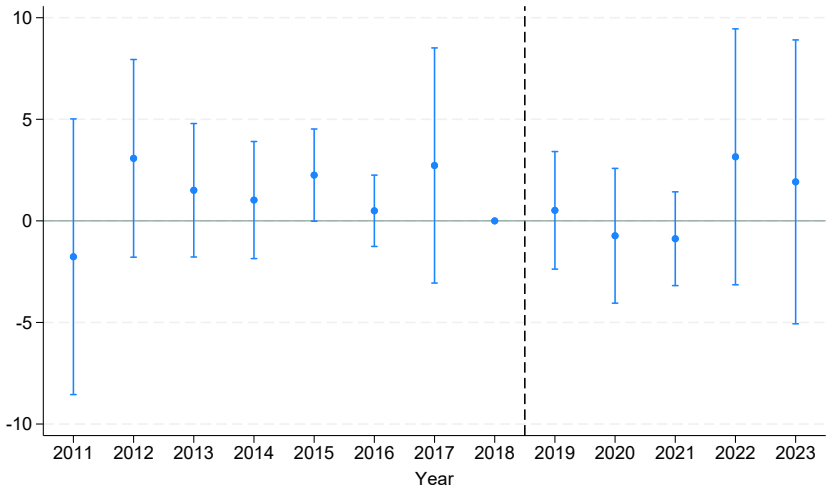
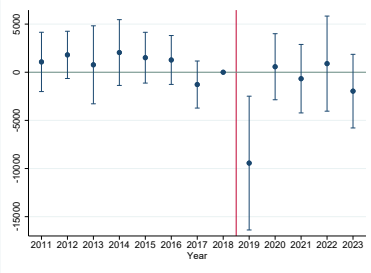
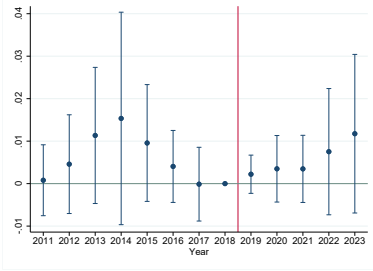


Figure A9: Internal migration within North Karelia (between urban and rural municipalities)

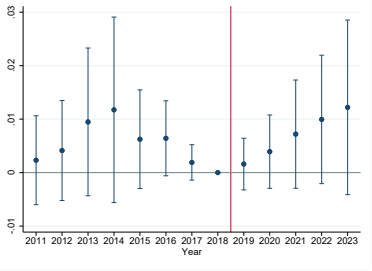
Municipality level event studies, whole sample



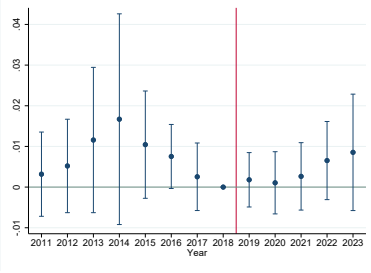
(a) Value added per worker



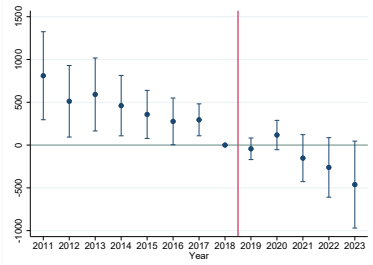
(b) Share of non-EU children in cohort (<= 6 yo)



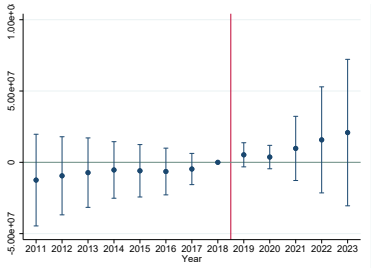
(c) Share of non-EU children in cohort (<= 18yo)



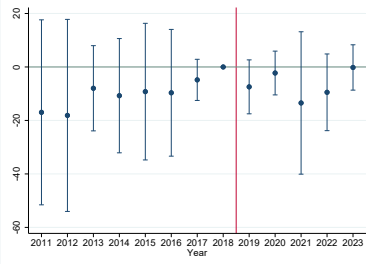
(d) Share of non-EU children in school-age cohort (6-18yo)



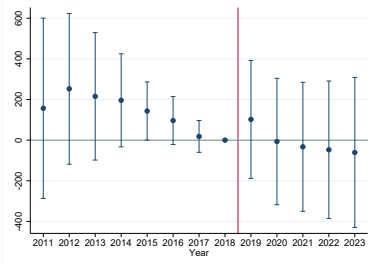
(e) Earnings



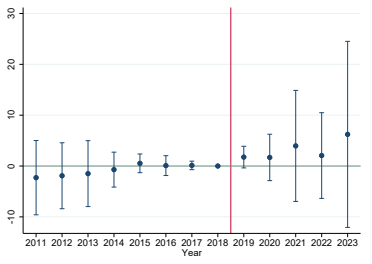
(f) Wage sum



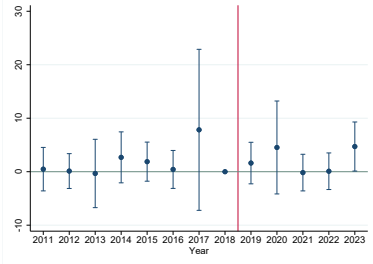
(g) Nr establishments



(h) Working age population



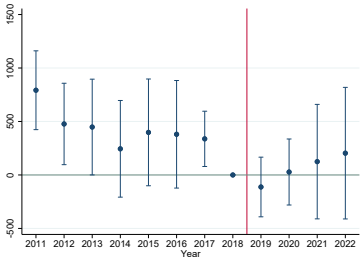
(i) Non-EU entrepreneurs



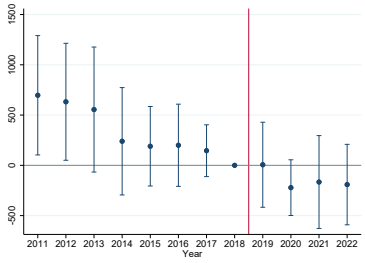
(j) New establishments

Figure A10: Event DiD estimates for cities

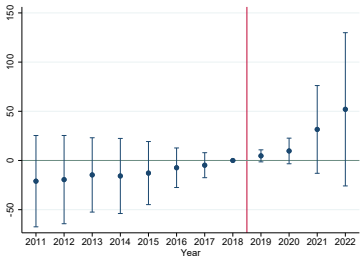
Municipality level event studies for earnings and immigration flows, separately for groups ISCO 5,8,9 vs. other groups



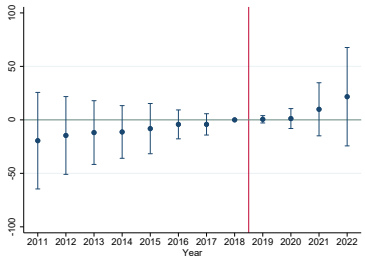
(a) Groups 5, 8, 9: earnings



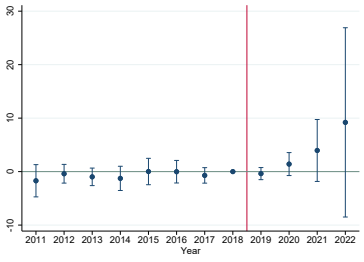
(b) Other groups: earnings



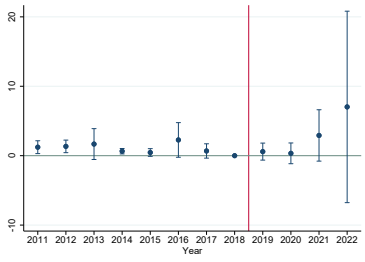
(c) Groups 5, 8, 9: nr non-EU workers



(d) Other groups: nr non-EU workers



(e) Groups 5, 8, 9: inflow of new non-EU workers



(f) Other groups: inflow of new non-EU workers

Figure A11: Event study (cities) estimates, split by group (ISCO 5, 8, 9 vs. other ISCO groups)

Table A5: Demographics: Effect on number of Non-EU children

	(1) Non-EU <18yo	(2) Non-EU <10yo	(3) Non-EU <5yo
Panel A: Difference-in-differences + matching			
Treatment effect	7.767	5.171	2.660
	(20.303)	(9.010)	(2.476)
N	3516	3516	3516
Panel B: Synthetic difference-in-differences			
Treatment effect	16.580	9.628	3.363
	(10.755)	(7.637)	(3.289)
N	3636	3636	3636

Notes. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A6: Descriptive statistics

	Pre-matching (raw)			Post-matching (CEM/PSM weighted)		
	Treatment	Control	Difference	Treatment	Control	Difference
Panel A: Regional level (North Karelia vs. other NUTS3 regions; no matching)						
Non-EU immigrants (stock)	2584.00	6686.67	-4102.67			
			(3526.25)			
Share of non-EU workers	0.03	0.03	-0.00			
			(0.00)			
Total wage sum	1.96e+09	4.72e+09	-2.76e+09			
			(1.79e+09)			
Working-age population	97952.00	181869.61	-83917.61			
			(58127.31)			
Number of establishments	2672.00	5361.78	-2689.78			
			(1698.84)			
Value added per worker	69973.90	72279.21	-2305.31**			
			(963.80)			
N	1	18				
Panel B: All municipalities (pooled CEM match on working-age population)						
Working-age population	7448.92	11025.99	-3577.07	7448.92	6257.75	1191.18
			(3889.54)			(3416.18)
Non-EU immigrants (stock)	198.46	405.25	-206.79	198.46	130.71	67.75
			(169.43)			(114.17)

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(continued)

	Pre-matching (raw)			Post-matching (CEM/PSM weighted)		
	Treatment	Control	Difference	Treatment	Control	Difference
Share of non-EU workers	0.02	0.02	0.01	0.02	0.02	0.01*
			(0.00)			(0.00)
Inflow of new non-EU	21.23	36.69	-15.46	21.23	12.43	8.80
			(17.37)			(13.72)
Average annual wage	26002.25	29280.14	-3277.89***	26002.25	29161.43	-3159.18***
			(624.70)			(625.03)
Total wage sum	1.49e+08	2.86e+08	-1.37e+08	1.49e+08	1.55e+08	-5.34e+06
			(8.91e+07)			(7.05e+07)
Employed	5540.69	8672.31	-3131.62	5540.69	4933.24	607.46
			(2959.91)			(2570.28)
New establishments	9.92	20.42	-10.50	9.92	10.08	-0.16
			(6.42)			(4.93)
Number of establishments	204.15	325.02	-120.86	204.15	183.38	20.77
			(114.27)			(98.81)
Value added per worker	65609.67	66109.72	-500.04	65609.67	65836.10	-226.42
			(1833.56)			(1840.05)
N (treated / matched controls)	13	297		13	287	
Panel C: All firm establishments (no matching)						
Non-EU employees	0.26	0.43	-0.17***			
			(0.05)			
Share of non-EU employees	0.01	0.02	-0.00			
			(0.00)			
Employees (firm)	16.73	20.24	-3.51***			
			(1.26)			
Revenue	4.00e+06	7.25e+06	-3.26e+06***			
			(631750.33)			
Profit	4.84e+06	4.08e+06	762915.94			
			(1.05e+06)			
Value added per worker	72643.64	78872.52	-6228.87**			
			(3119.43)			
Personnel (business register)	304.92	298.97	5.95			
			(34.18)			
N	910	30396				
Panel D: Small firm establishments, <30 employees (no matching)						
Non-EU employees	0.15	0.15	0.01			
			(0.02)			
Share of non-EU employees	0.02	0.02	0.00			

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(continued)

	Pre-matching (raw)			Post-matching (CEM/PSM weighted)		
	Treatment	Control	Difference	Treatment	Control	Difference
			(0.00)			
Employees (firm)	8.61	8.63	-0.02			
			(0.24)			
Revenue	1.67e+06	2.03e+06	-3.59e+05**			
			(162333.32)			
Profit	132401.43	113242.43	19159.01			
			(24700.38)			
Value added per worker	70345.12	76864.84	-6519.72			
			(4350.17)			
Personnel (business register)	9.84	9.75	0.09			
			(0.27)			
N	607	20029				
Panel E: Individual level (PSM on pre-treatment wages, months worked, and age)						
Months worked	11.40	11.50	-0.10***	11.41	11.40	0.01
			(0.01)			(0.01)
Annual earnings	31694.85	33635.97	-1941.13***	31695.48	31707.49	-12.01
			(98.87)			(122.21)
Annual earnings (t-1)	29525.85	31485.24	-1959.38***	29526.45	29517.70	8.75
			(98.87)			(122.43)
Months worked (t-1)	10.89	11.04	-0.15***	10.89	10.89	-0.00
			(0.01)			(0.02)
Age	42.25	42.60	-0.35***	42.25	42.30	-0.05
			(0.05)			(0.07)
Non-EU background	0.01	0.01	0.00	0.01	0.01	0.00
			(0.00)			(0.00)
N (treated / matched controls)	49430	183118		49429	49429	

Notes. Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. All statistics are for 2018. "Pre-matching" columns compare the treated units to the full pool of control units without weighting. "Post-matching" columns compare the same treated units to the control pool weighted by matching weights. For Panel B, coarsened exact matching (CEM) on working-age population is applied once to all 13 P-Karjala municipalities pooled against non-P-Karjala municipalities; the resulting weights are the same ones used in the municipality-level DiD analyses in the main text. For Panel E, propensity-score matching (PSM) with logit on pre-treatment wages, months worked, and age is applied at the individual level. Panels A, C, D involve no matching step; the corresponding post-matching columns are left empty.

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