

Asparagus!

Worker Shortages and Local Immigration Support

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Torino, 24.03.25

How we think about immigration matters

Immigration is at the center of the political debate:

- In the US, 35% of Americans indicate immigration as the top priority for the next president (Ipsos Oct 2024)
- In Europe, 24% of voters indicate immigration as one of the priorities for the next European Parliament (Eurobarometer Feb/Mar 2024)

How we think about immigration matters

Immigration is at the center of the political debate:

- In the US, 35% of Americans indicate immigration as the top priority for the next president (Ipsos Oct 2024)
- In Europe, 24% of voters indicate immigration as one of the priorities for the next European Parliament (Eurobarometer Feb/Mar 2024)

Narratives:

- As voters, we need to formulate a causal model of how immigration influences what we care about:
 - Economy, Culture, Crime, ...

The fight over narratives

- **Complements**

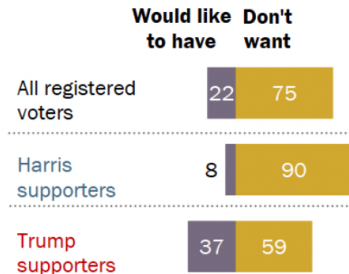
- Immigrants bring skills that complement those of locals
- Fill positions that would remain vacant

- **Substitutes**

- Competition over limited resources, zero-sum
- Take jobs that would go to locals, reduce wages

% of U.S. registered voters who say ...

Undocumented immigrants mostly fill jobs that American citizens ...



PEW research, 10/2024

This Project

Research Question

- Can shortages of foreign workers influence attitudes toward immigration?
- Is this driven by shifts in predominant economic narratives about migration?

Setting: Swiss referendums on immigration restrictions (2014 vs 2020)

- **Natural experiment:** Agricultural labor shortages in Spring 2020
- **Identification:** Exploits seasonal variation in labor demand
- **Evolution of narratives:** Text analysis of survey data

Literature

- Economic vs non-economic determinants of attitudes toward immigration.
 - Hopkins, Sides & Citrin (2019), Alesina, Miano & Stancheva (2023).
 - This paper: attitudes measured using a referendum.
 - This paper: “positive shock” less likely to capture cultural concerns.

Literature

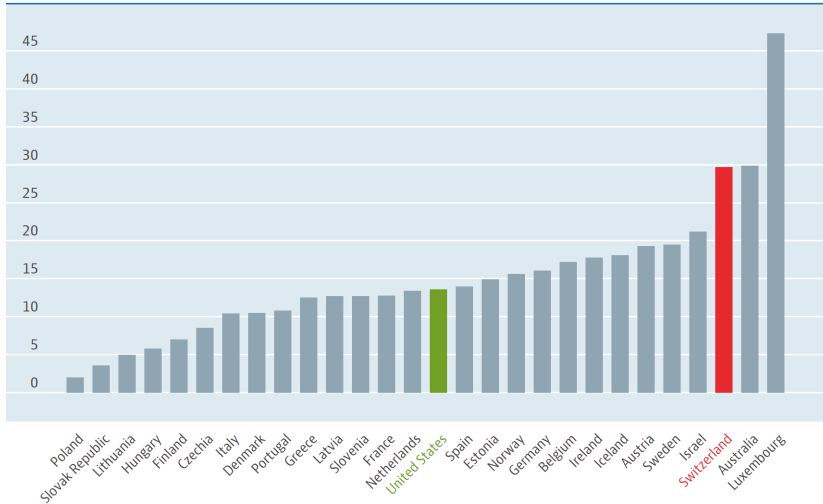
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 - This paper: investigate competing models in shaping specific policy preferences.

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 - This paper: investigate competing models in shaping specific policy preferences.
- Impact of immigration restrictions on labor market outcomes.
 - Abramitzky et al. (2023), Clemens, Lewis & Postel (2018).
 - This paper: transitory shock, firms did not adapt.
 - This paper: expand to political outcomes.

Switzerland

Share of Foreign-born population, OECD



Bilateral Agreements and Referendums

1999 Free Movement of People with European Union

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1999 Free Movement of People with European Union

2014 Referendum “Against Mass Immigration”

- Abandon EU Free Movement of People.
 - Introduce a quota system.
- Won with 50.33% of Yes
... But never implemented.



Bilateral Agreements and Referendums

1999 Free Movement of People with European Union

2014 Referendum “Against Mass Immigration”

2020 Referendum “For Moderate Immigration”

► official text

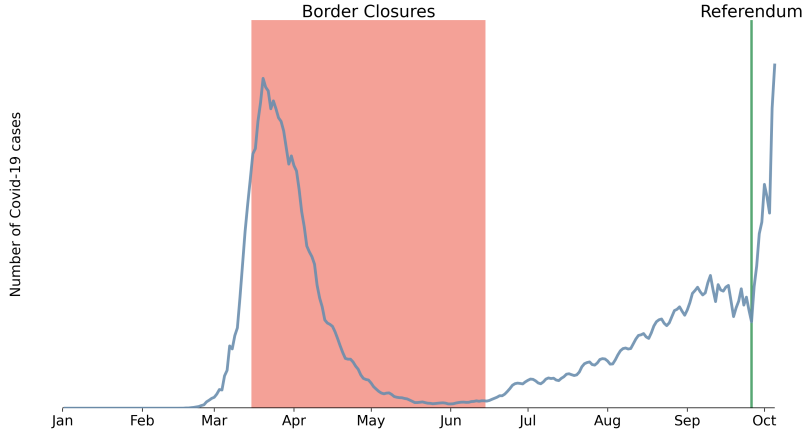
– Abandon EU Free Movement of People.

→ Lost with 38.3% of Yes.



Seasonality and the impact of closing borders

Switzerland, 2020 - Border Closures



Switzerland, 2020 - Save the harvest

SWI swissinfo.ch

#NOTHINGTOHIDE

Workplace Switzerland

Swiss perspectives in 10 languages

When there's plenty of work in the fields, but few workers

Coopération entre les entreprises suisses et les associations agricoles pour assurer la récolte 2020

Mar 24, 2020



▲ Workers cultivating asparagus in the eastern canton of St Gallen on April 1, 2020. Keystone / Gian Ehrenzeller

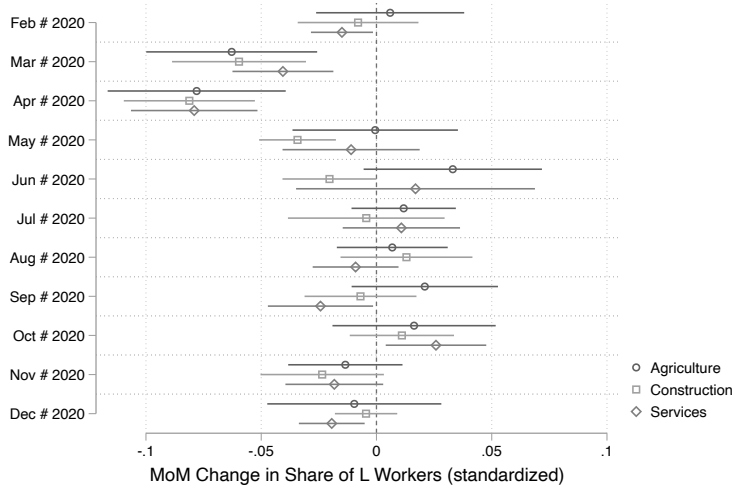
Swiss farmers are having to improvise to find enough labourers during the coronavirus pandemic to help with the harvest, and – as one example illustrates – are finding creative solutions to get their produce to market.

Data Sources

- Social Security + Population + Firm registry:
 - Workers categorized by sector (8 categories), municipality, visa type, and month.
 - Focus on Visa L, which is valid for 3-12 months.
 - Cover years 2012-2020
- Agricultural Data:
 - Number of hectares allocated to each type of crop (32 categories), recorded by municipality and year.
 - Number of animals and farms.

Impact of Border Closure on Seasonal Workers

► math



Measuring Shortage of Workers in Agriculture

- Demand for labor during pandemic in service and construction?
- Relative importance of short-term workers? ▶ L-permits by sector

Measuring Shortage of Workers in Agriculture

- Idea: calculate the difference between observed workers in 2020 and expected number of workers in the absence of border closure.

Measuring Shortage of Workers in Agriculture

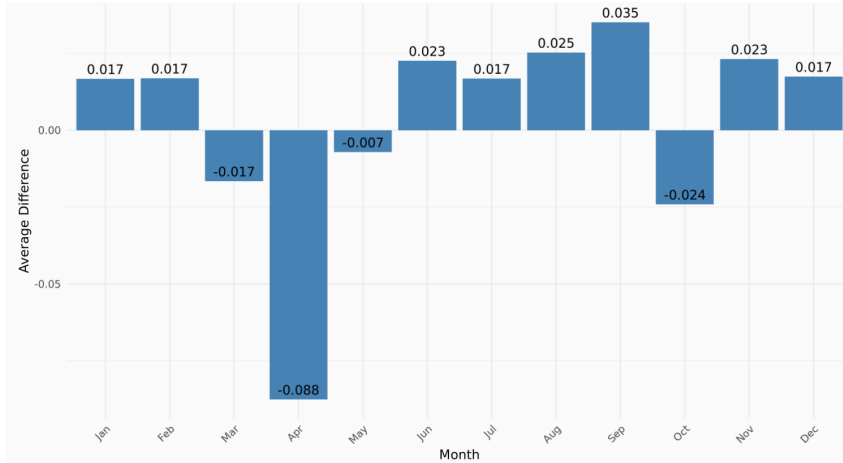
- Idea: calculate the difference between observed workers in 2020 and expected number of workers in the absence of border closure.
- Fit a linear model using data from 2012 to 2019:

$$L_{i,m,y} = \gamma_m + \delta_i + L_{i,m,y-1} + y + \epsilon_{i,m,y}$$

- $L_{i,m,y}$ number of seasonal workers in agriculture in municipality i , month m , year y
- Fixed effects model with linear time trend and year-over-year term
- Use fitted model to predict number of seasonal workers in agriculture in 2020.

→ **Worker shortage** = difference between predicted and observed number of seasonal workers in agriculture.

Wage Bill in Agriculture $\Delta(2012/19 - 2020, \text{std})$



Biased OLS?

Measuring Labor Shortages

- Ideally: Difference between observed seasonal workers and counterfactual hiring in absence of the shock

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Source of Measurement Error

- Discourse surrounding referendum may have influenced farmers' hiring intentions
- **Mechanism:** Right-wing political attitudes could lead to:
 - Reduced willingness to hire foreign workers → higher measured shortages
 - Higher vote share against immigration in the referendum

Agricultural Inputs as IV

Instrumental Variable

Exploit variation in crop-specific seasonal labor demand across municipalities:

- Spring crops (asparagus, ...): peak labor demand during border closure
- Late-season crops (grapes, ...): peak labor demand after borders reopened

Agricultural Inputs as IV

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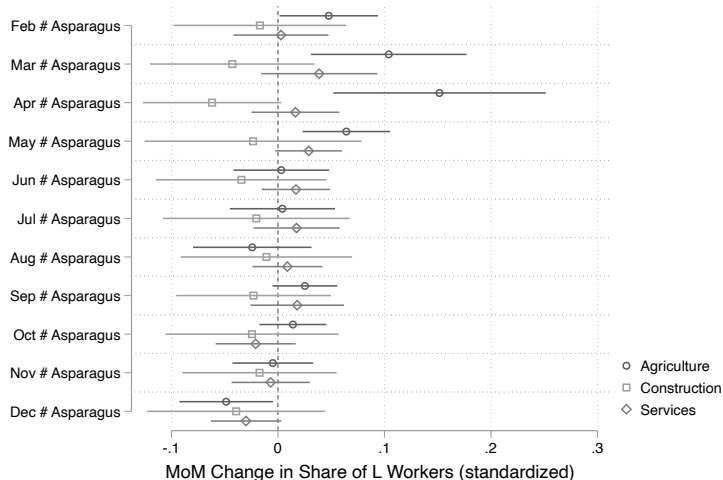
- Spring crops (asparagus, ...): peak labor demand during border closure
- Late-season crops (grapes, ...): peak labor demand after borders reopened

Identification Assumptions

- *Relevance*: Municipality crop composition predicts seasonal labor shortages
- *Exclusion*: Agricultural production affects voting only through labor shortages
- *Independence*: Crop selection predetermined relative to the border closure and change in political attitudes

Seasonal Workers – Asparagus – 2012/19

$$L_{i,m,y} = \sum_m \beta_m \mathbf{I}(\text{month} = m) \times \mathbf{I}(\text{Asparagus}_{i,y} > 0) + \gamma_m + \delta_i + \theta_y + \epsilon_{i,m,y}$$



▸ map

▸ ha interaction

IV: Predicting Seasonal Labor Demand

Machine Learning Model (XGBoost)

- Training period: 2012–2019
- **Inputs:** Municipality-level agricultural data. **Sample:** crops suitability > 0
 - Hectares for each crop type (32 categories)
 - Livestock counts (cattle, horses, pigs, etc.)
 - No municipality fixed effects or identifiers

Prediction Target: Number of seasonal workers in municipality i at month m
 $\Rightarrow$ **Instrumental Variable:** use trained model to predict seasonal workers in agriculture in April 2020

▸ model fit

Predicted Hiring: Balance

Predicted Hiring (inputs based)	Coefficient	Standard Error
Share Foreign Population	0.74	(0.47)
Population Density	-22.72	(27.02)
Population	1048.48	(712.45)
Share Age 20-64	0.14	(0.11)
Share Age 65 plus	-0.16	(0.11)
Share of land used for housing & infrastructure	-0.45	(0.48)
Share of land used for agriculture	1.20*	(0.63)
Share of land covered by forests	-0.78	(0.58)
Share of workers in the primary sector	0.84	(0.74)
Share of workers in the secondary sector	0.04	(0.40)
Total establishments in the primary sector	1.00	(2.20)
Share Yes 2014	-0.16	(0.33)
Observations	1680	

Voting in the 2020 referendum

- 1 Spring 2020: Farmers couldn't hire (cheap) foreign workers,
 - 2 despite typical demand for labor in agriculture. ▶ food prices
- **Did this affect their local immigration attitude?**

First Stage: Instrumenting Labor Shortage

$$\text{Shortage}_i = \alpha_0 + \alpha_1 \text{Predicted Hiring}_i + Y_{ij}^{2014} + \mathbf{X}'_i \boldsymbol{\delta} + \gamma_j + \nu_{ij}$$

Second Stage: Effect on Referendum Votes

$$Y_{ij}^{2020} = \beta_0 + \beta_1 \widehat{\text{Shortage}}_i + Y_{ij}^{2014} + \mathbf{X}'_i \boldsymbol{\gamma} + \gamma_j + \epsilon_{ij}$$

- Y_{ij} : Share of Yes over total votes or eligible population
- γ_j : Canton fixed effects
- $\mathbf{X}_i$: Municipality-level controls

Baseline Results – Share Yes

	OLS	RF	IV	OLS	RF	IV
Shortage (std)	-0.19*** (0.07)		-0.54*** (0.21)	-0.26*** (0.07)		-0.91*** (0.25)
Predicted hiring (inputs based)		-0.11** (0.05)			-0.17*** (0.04)	
Share Yes 2014	0.90*** (0.02)	0.90*** (0.02)	0.89*** (0.02)	0.80*** (0.02)	0.80*** (0.02)	0.79*** (0.02)
Dep. Var. Mean	43.41	43.41	43.41	43.41	43.41	43.41
Dep. Var. Std. Dev.	10	10	10	10	10	10
1st Stage F-Stat	-	-	19.78	-	-	19.43
Municipality Controls	No	No	No	Yes	Yes	Yes
Fixed Effects	Canton	Canton	Canton	Canton	Canton	Canton
Observations	1,680	1,680	1,680	1,680	1,680	1,680

Baseline Results – Yes / Eligible

	OLS	RF	IV	OLS	RF	IV
Shortage (std)	-0.17*** (0.06)		-0.45** (0.19)	-0.21*** (0.06)		-0.63*** (0.25)
Predicted hiring (inputs based)		-0.09*** (0.04)			-0.12*** (0.04)	
Yes/Eligible 2014	0.87*** (0.02)	0.87*** (0.02)	0.87*** (0.02)	0.68*** (0.02)	0.68*** (0.02)	0.67*** (0.02)
Dep. Var. Mean	26.30	26.30	26.30	26.30	26.30	26.30
Dep. Var. Std. Dev.	7	7	7	7	7	7
1st Stage F-Stat	-	-	19.78	-	-	19.43
Municipality Controls	No	No	No	Yes	Yes	Yes
Fixed Effects	Canton	Canton	Canton	Canton	Canton	Canton
Observations	1,680	1,680	1,680	1,680	1,680	1,680

Robustness Checks

- **Alternative sample**

- Full sample of municipalities (including mountain regions)
 - Instead of restricting to crop-suitable areas

- **Alternative instruments**

- Total hectares of spring crops
- Share of spring crops relative to total agricultural land

- **Alternative treatment definition**

- Binary shortage indicator (top quintile)
 - Instead of continuous winsorized measure

Narratives

How Did Voters Explain Their Choice?

Use *VOTO Studies*:

- Post-vote surveys from 2014 and 2020.
- Approximately 1500 respondents per referendum cycle.
- Respondents were asked how they voted and why:
 - Multiple-choice questions on priorities.
 - Open-ended questions about the main two reasons behind their choice.

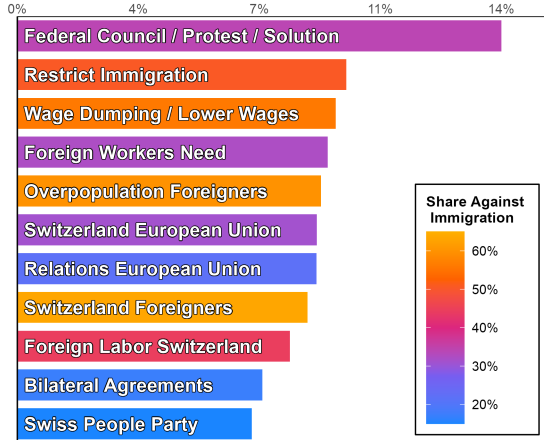
Step 1: Voters' Explanations, Topic Modeling

- 1 Collect all explanations from 2014 and 2020: total 3130
- 2 Translate explanations into English
- 3 Topic Modeling using BERTopic model
 - Obtain 11 topics
 - List of characteristic keywords using KeyBERT

Topics and Referendum Voting

Mean Topic Probabilities

Across all years



Wage Dumping / Lower Wages

Wage Dumping / Lower Wages



Examples

▸ and challenges

Topic: Foreign Workers Need

"As a manager, I see the importance of using individuals from abroad and not just people with degrees."

Topic: Wage Dumping

"Somewhere one must say now it is enough. I have grandchildren, and I do not want them to say that there are no positions available because there are no jobs left. We are a high-wage country, and they are underbidding our wages."

Step 2: From Explanations to Narratives

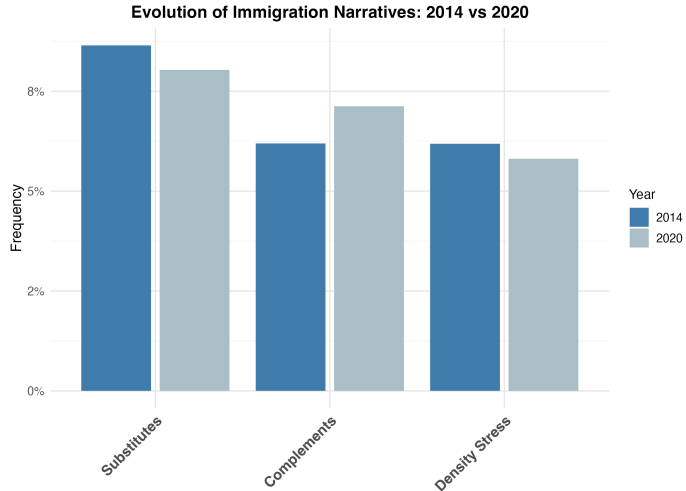
Move **from explanations to narratives** using GPT-4 to detect:

▸ **Complements** *Mentions that foreign workers have a positive causal impact on economic variables or are complements to native workers.*

▸ **Substitutes** *Mentions or implies economic competition between foreign workers and Swiss workers.*

- **Density Stress:** Whether the text *mentions concerns related to overpopulation or density stress due to immigration.* (c.f. Alrababah et al. 2024)
 - Actual prompt is more detailed; asks for explanation.
 - Robustness: fine-tuning starting from examples.

Narratives - 2014 vs 2020



Shortages Foster Complementarity Narrative

Panel A	Narrative - Complements			Vote Yes		
Shortage (inputs based)	0.01** (0.01)	0.01** (0.01)	0.02** (0.01)	-0.03** (0.02)	-0.03** (0.01)	-0.03*** (0.01)
Dep. Var. Mean	0.09	0.09	0.09	0.32	0.32	0.32
Observations	1,093	1,093	1,093	1,132	1,132	1,132
Panel B	Narrative - Substitutes			Narrative - Density Stress		
Shortage (inputs based)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.01 (0.01)	0.00 (0.01)
Dep. Var. Mean	0.10	0.10	0.10	0.08	0.08	0.08
Observations	1,093	1,093	1,093	1,093	1,093	1,093
Demographic Controls	No	Yes	Yes	No	Yes	Yes
Socioeconomic Controls	No	No	Yes	No	No	Yes
Municipality Controls	No	No	Yes	No	No	Yes
Fixed Effects	Canton	Canton	Canton	Canton	Canton	Canton

Conclusion

- We study how shortages of workers in spring 2020 influenced attitudes toward immigration in Switzerland.

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- **Labor shortages reduced support for immigration restrictions**, with effects extending beyond the farming population.

Conclusion

- We study how shortages of workers in spring 2020 influenced attitudes toward immigration in Switzerland.
- **Labor shortages reduced support for immigration restrictions**, with effects extending beyond the farming population.
- Survey evidence suggests that **shifts in economic narratives** drove changes in voting behavior.

Farms, Meat Plants Brace for Trump Immigration Crackdown

Agriculture companies and laborers fear raids; 42% of crop farmhands aren't legally authorized to work in U.S.

WSJ, 21.11.

Thank You!



daniel.auer@carloalberto.org

The statement of the promoting committee

▸ back

*Switzerland is a small country where an **ever-increasing number of people** cannot always squeeze in! Yet this is exactly what has been happening since the full freedom of movement with the European Union (EU) was introduced. [...]*

*The doors of our country have always been open. The labor we need (doctors, healthcare staff, **harvest workers**, etc.) will continue to be able to come to work in Switzerland when necessary. [...]*

*The current unlimited **immigration** (each year the number of arrivals is higher than the inhabitants of the city of St. Gallen or the Canton of Jura) **threatens the economy, security, and environment.***

Impact of Border Closure - Model

▸ back

Capture how 2020 differed from the previous years using fixed-effect regressions:

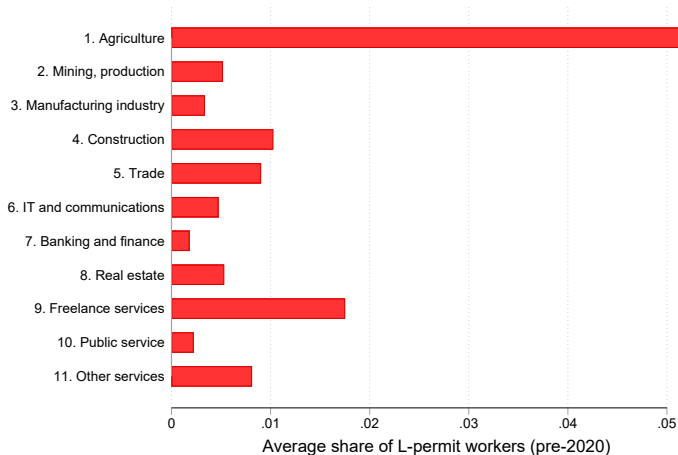
$$L_{i,m,y} = \sum_m \beta_m \text{I}(\text{month} = m) \times \text{I}(\text{year} = 2020) + \gamma_m + \delta_i + \epsilon_{i,m,y},$$

where:

- $L_{i,m,y}$ measures the change in the share of L workers in the sector, in municipality i , in month m in year y .
- $\text{I}(\text{year} = 2020)$ takes value 1 in year 2020.
- Data include years 2012-2020.

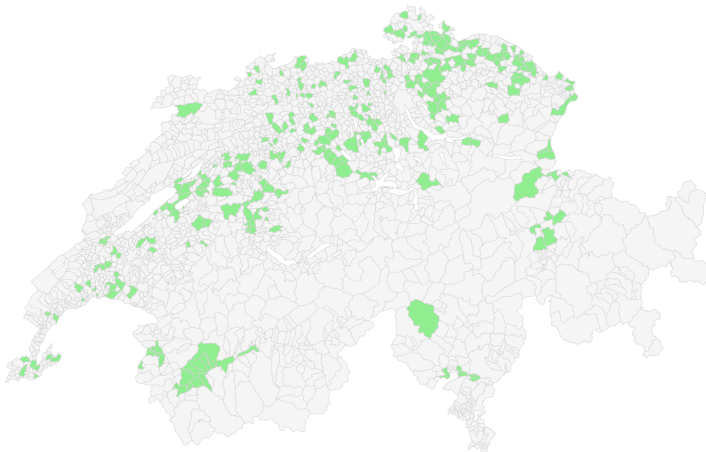
Short-term workers in Switzerland, 2019

[back](#)



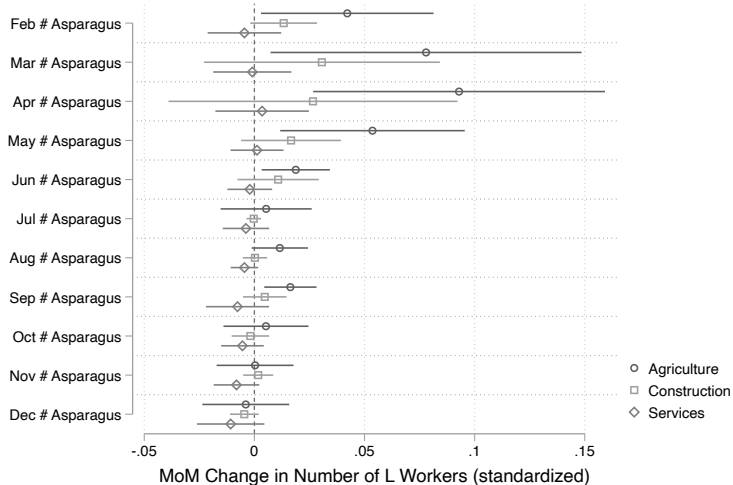
Asparagus by municipality (indicator variable)

▸ back



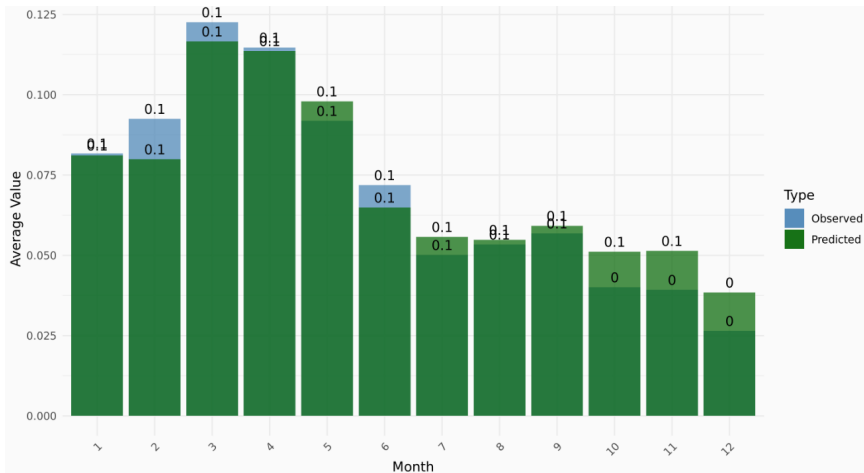
Seasonality - Interaction with number of hectares

▸ back



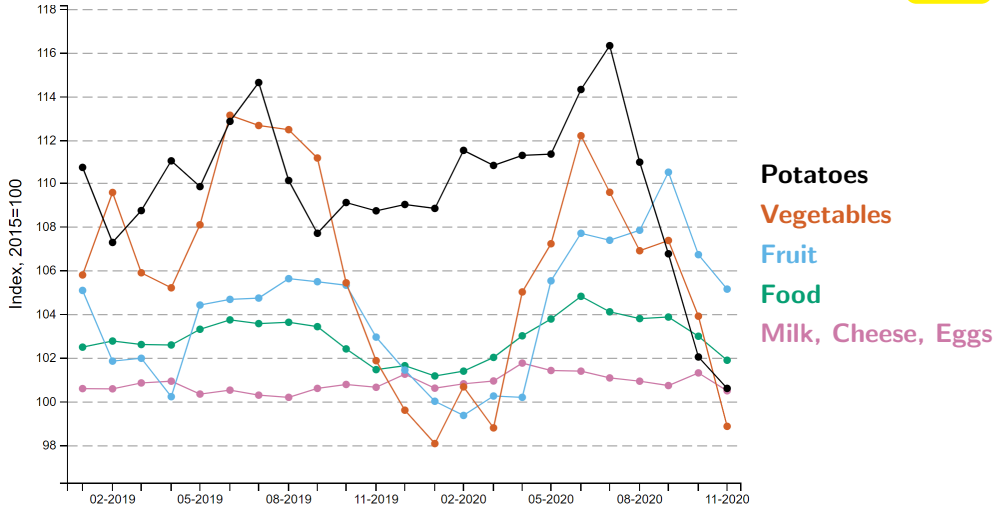
XGBoost model fit - test set (pre-2020)

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Food Prices: 2019-2020

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Examples...and challenges

▸ back

Topic: Foreign Workers Need

"Workers from abroad are not necessarily needed."

Topic: Wage Dumping / Lower Wages

"Young people no longer find work."

Examples – Complements Narrative

▸ back

- I am in favor of opening borders and the need for staff in certain sectors which would not operate without them.
- We are reliant on professionals from abroad.
- I find the initiative unnecessary. The Swiss are continually furthering their education. That's why we need, for example, professions like construction workers from abroad.
- We also need foreign staff. Or even Swiss citizens who can work abroad (freedom of movement).

Examples – Substitutes Narrative

▸ back

- Jobs are primarily taken by foreigners.
- The situation in Ticino is becoming unbearable due to the Italian cross-border workers who are taking our jobs.
- Against foreign dependency to have more job opportunities for us.
- At some point, you have to say enough is enough. I have grandchildren, and I don't want them to one day say there are no positions available, because there are no jobs left. We are a high-wage country and they undercut our wages.