# Mass Refugee Inflow & Human Capital Investments: Evidence from Greek Refugees in Greece

Elie Murard*
Seyhun Orcan Sakalli**

*IZA; PSE
**HEC – University of Lausanne, PSE

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# Motivation & Research Question

- The relief and settlement of refugees has become one of the biggest challenges in the world
  - 59.5 m forcibly displaced people with 13.5 m displaced only in 2014 (UNHCR, 2015)

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  - Short-term effects: labor market, food/housing prices, land use

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**How does inflow of refugees affect the human capital investment of natives in the mid- and long-run?**

## What we do

- This paper focuses on Greco-Turkish compulsory exchange of population in 1922–1923

  - Greece, a rural country with 5 million inhabitants in 1920, received an refugee inflow of 20 % of its population within 2 years

  - The first case of mass refugee settlement under the aegis of an international organization – the League of Nations

## What we do

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- We examine the effect of the mass inflow of Greek refugees on the human capital formation of the host native population in Greece:

  - A novel dataset combining historical and modern censuses in 1920, 1928, and 1971

  - Difference-in-differences: Variation in exposure to refugee inflow across provinces and birth cohorts

## Related Literature & Contribution

- Effects of immigrant children on natives' education:
    - Hoxby (1998), Betts (1998), and Borjas (2004): drop in schooling quality and negative peer effects in the US
    - Gould, Lavy, and Paserman (2009): In Israel in the 1990s, school resources crowding-out effects in Israel in the 1990s
    - Hunt (2012): positive effects on high school completion of natives in the US through raising returns to education by increasing the skill wage premium

- Virtually no study exists on how the inflow of displaced refugees affects human capital in the host regions in the medium or long run
    - Baez (2011) examines the effects of the massive wave of refugees from Burundi/Rwanda on host children in Tanzania: reduction in height in early adulthood and in schooling

## Preview of results

- The inflow of refugees has a positive impact on the literacy and primary school completion rates of natives

    - The effect is larger for males

- The number of schools built between 1920 and 1927 and the number of refugee teachers per school age children in 1928 can almost totally account for the estimated impact

- The inflow of refugees shifted the labor supply of natives to non-agricultural occupations

- However, there is no statistically significant difference between the educational attainment of second-generation refugees and natives

# Roadmap

# Historical background

- After the Greco-Turkish War of 1919–1922, almost a million Greeks fled Turkey in a few months time

- Turkey and Greece signed an agreement on a population exchange at the Peace Conference of Lausanne in 1923:

  - The exchange involved almost 500,000 Turks and 1.5 million Greeks in total.

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- Due to the limited resources of the Greek State, the League of Nations intervened and formed the Refugee Settlement Comission (RSC) in 1923:
    - In addition to distributing land and houses to refugees, the RSC constructed roads, bridges, dispensaries, and schools.

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- The institutional framework severely restricted the choice of refugees over the place of their final settlement:
  - The principal determinant of the place of settlement was the availability of cultivable and unoccupied land, in part abandoned by Muslim Turks.
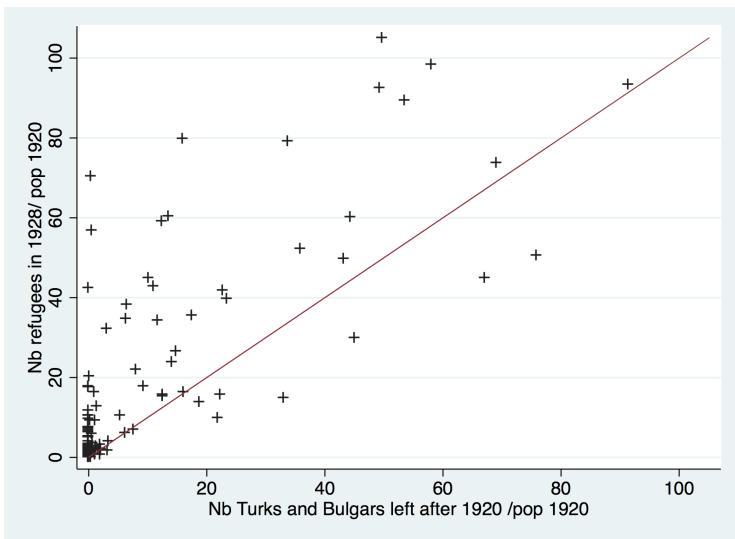
# Distribution of refugees in 1928
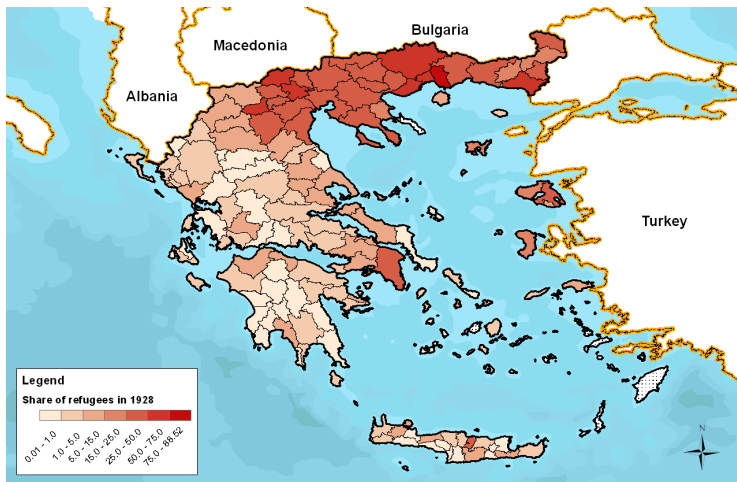
# Distribution of Turks left between 1920 and 1928
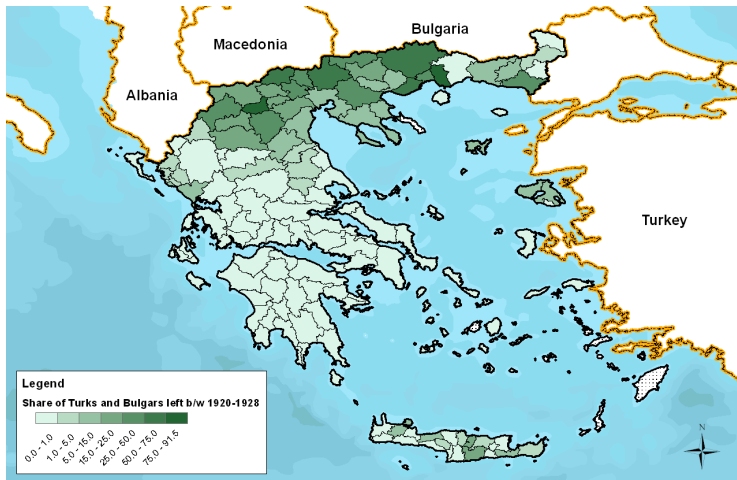
# Correlation between the share of refugees and share of Turks left

# Roadmap

# Estimation Strategy: Difference-in-differences

$$Education_{c,p,1971} = \alpha + \beta.RefugeShare_{p,1928} \times (Born > 1917)_c$$
$$+ \gamma.RefugeShare_{p,1928} \times (Born\ 1909 - 1916)_c$$
$$+ \mu_c + \eta_p + \varepsilon_{c,p}$$

- We assume that the literacy and primary education of individuals older than 12 years old when refugees arrived remain unaffected.

- Most of the refugees arrived in 1922-1923, thus we form three groups:

  - Unexposed cohorts = born before 1909
  - Partially exposed cohorts, at school-age (6-12) when refugees arrived = born 1909–1916
  - Exposed cohorts, below 6 when refugees arrived = born after 1917

# Pre-trends: Literacy rate of natives in 1928
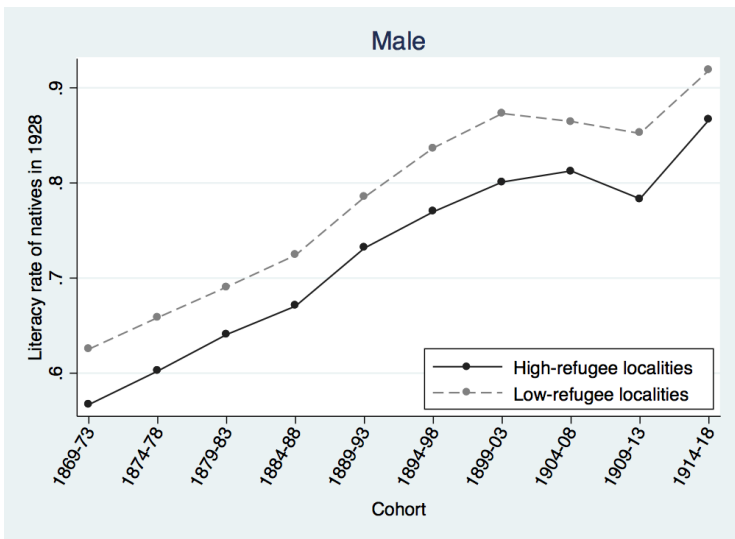
# Identification problem: composition effect
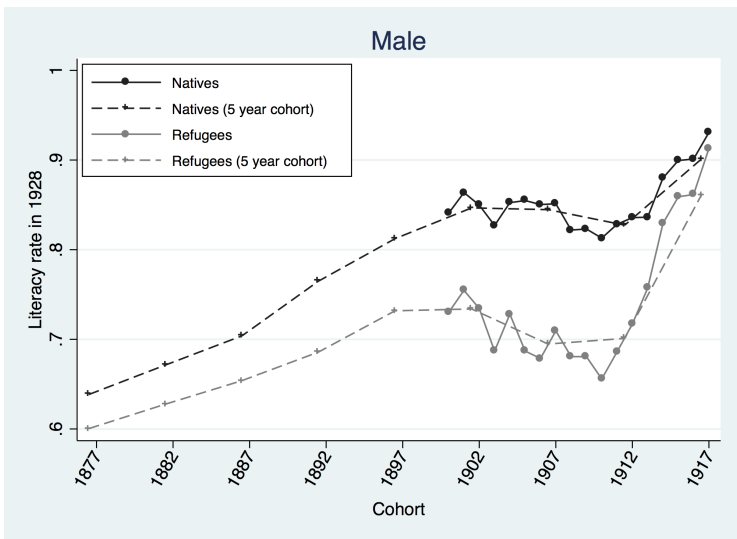
# Primary school completion rate of total population in 1971
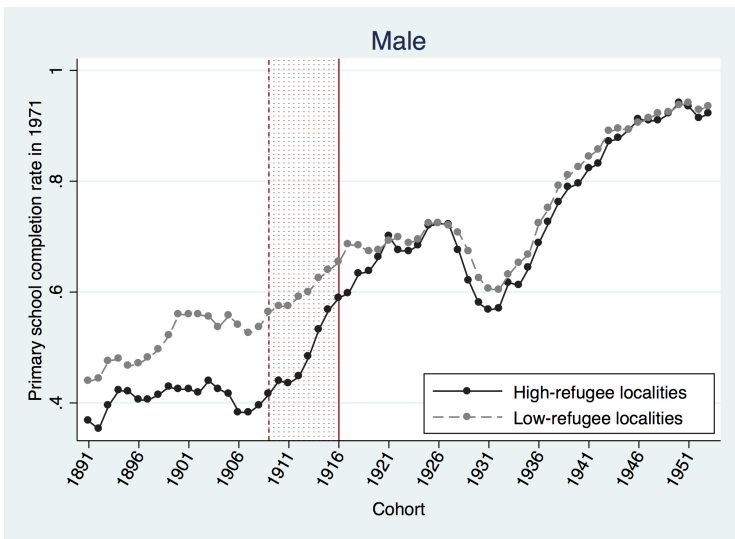
# Counterfactual native cohort analysis

We construct the counterfactual literacy and primary school completion rates of natives in 1971:

1. The 1928 census provides the literacy of each birth-year cohort born between 1899 and 1918 (10–30-year old in 1928)

2. Using the 1971 data, we observe the literacy of the same cohorts

3. We assume that the rate of mortality and net emigration out of a province is similar between refugees and Greek natives, for a given literacy status

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   province is similar between refugees and Greek natives, for a given
   literacy status

4. We do not observe the primary school completion rate in 1928, but we
   do observe that all primary school graduate are literate in 1971

5. We assume that the literacy rate among individuals without primary
   education is similar refugees cohort and native cohort

# Estimated primary school completion rate of natives in 1971
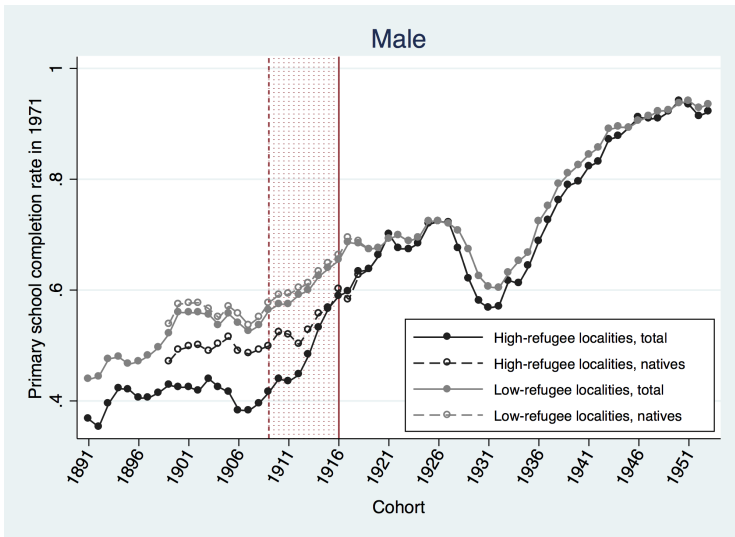
## Impact of refugees on education in 1971 (born b/w 1891–1953)

|  | Literacy rate | | Primary school completion | |
|---|---|---|---|---|
|  | All population | Estimated Natives | All population | Estimated Natives |
| **Panel A: Male** | | | | |
| $RefugeeShare_{p,1928} \times (Born > 1917)$ | 0.208*** | 0.162*** | 0.326*** | 0.142*** |
|  | (0.041) | (0.034) | (0.035) | (0.043) |
| $RefugeeShare_{p,1928} \times (Born\ 1909-1916)$ | 0.087** | 0.063** | -0.033 | -0.080 |
|  | (0.034) | (0.032) | (0.026) | (0.059) |
| Observations | 8,650 | 7,536 | 8,650 | 7,205 |
| R-squared | 0.48 | 0.45 | 0.69 | 0.68 |
| **Panel B: Female** | | | | |
| $RefugeeShare_{p,1928} \times (Born > 1917)$ | 0.113*** | 0.104** | 0.070** | 0.008 |
|  | (0.041) | (0.052) | (0.031) | (0.037) |
| $RefugeeShare_{p,1928} \times (Born\ 1909-1916)$ | -0.033 | 0.014 | -0.092*** | -0.056 |
|  | (0.030) | (0.052) | (0.026) | (0.050) |
| Observations | 8,654 | 7,563 | 8,654 | 7,518 |
| R-squared | 0.85 | 0.83 | 0.85 | 0.84 |

# Robustness checks

Our findings are robust to:

- We restrict the sample to cohorts born between 1900 and 1930

- We include province-specific linear trend across cohorts

- We include region $\times$ cohorts fixed effects to control for time-variant region-specific factors

# Roadmap

# Mechanisms

1. Population increase through net immigration

   - Market size effects
   - Agglomeration effects

2. Increase in schooling supply

   - The RSC built more schools to provide enough seats in the classrooms for the new refugee children
   - The arrival of refugee teachers

3. Occupational upgrading among natives

   - The inflow of refugees generated an increase in the supply of low-skilled manual/agricultural labor

4. Human capital externalities

   - Male refugees are less literate and more likely to work in agriculture

## The impact of net immigration and increase in education supply

| **Dependent variable: Estimated literacy rate of native males in 1971** | | | | | |
|---|---|---|---|---|---|
| $RefugeeShare_{p,1928} \times (Born > 1917)$ | 0.162*** | 0.132*** | | -0.004 | -0.030 |
| | (0.034) | (0.031) | | (0.056) | (0.059) |
| $Net\ Immigration_{p,1920-28} \times (Born > 1917)$ | | 0.062 | | | 0.058* |
| | | (0.039) | | | (0.033) |
| $School\ built_{p,1920-27} \times (Born > 1917)$ | | | 0.864** | 0.878** | 0.928** |
| | | | (0.348) | (0.414) | (0.403) |
| $Refugee\ teacher_{p,1928} \times (Born > 1917)$ | | | 0.920*** | 0.935*** | 0.880** |
| | | | (0.244) | (0.355) | (0.354) |
| Observations | 7,536 | 7,536 | 7,536 | 7,536 | 7,536 |

| **Dependent variable: Estimated primary school completion rate of native males in 1971** | | | | | |
|---|---|---|---|---|---|
| $RefugeeShare_{p,1928} \times (Born > 1917)$ | 0.142*** | 0.135*** | | -0.302*** | -0.305*** |
| | (0.043) | (0.047) | | (0.110) | (0.112) |
| $Net\ Immigration_{p,1920-28} \times (Born > 1917)$ | | 0.015 | | | 0.006 |
| | | (0.078) | | | (0.060) |
| $School\ built_{p,1920-27} \times (Born > 1917)$ | | | 1.461*** | 2.547*** | 2.552*** |
| | | | (0.504) | (0.647) | (0.656) |
| $Refugee\ teacher_{p,1928} \times (Born > 1917)$ | | | 1.206*** | 2.384*** | 2.378*** |
| | | | (0.435) | (0.755) | (0.753) |
| Observations | 7,205 | 7,205 | 7,205 | 7,205 | 7,205 |

## The impact of refugee inflow on occupational decisions

| Change between 1920 and 1928: | Employment rate | | Non-agricultural occupation share | |
|---|---|---|---|---|
| **Panel A: Male Natives** | | | | |
| Share of refugees in 1928 | -0.017 | -0.000 | 0.325*** | 0.217** |
| | (0.036) | (0.059) | (0.096) | (0.101) |
| Share of Turks left between 1920 and 1928 | | -0.019 | | 0.123 |
| | | (0.064) | | (0.087) |
| Observations | 136 | 136 | 136 | 136 |
| R-squared | 0.26 | 0.26 | 0.46 | 0.48 |
| **Panel B: Male Total** | | | | |
| Share of refugees in 1928 | -0.053 | -0.033 | 0.095** | 0.099 |
| | (0.032) | (0.056) | (0.041) | (0.077) |
| Share of Turks left between 1920 and 1928 | | -0.024 | | -0.005 |
| | | (0.057) | | (0.063) |
| Observations | 136 | 136 | 136 | 136 |
| R-squared | 0.27 | 0.27 | 0.21 | 0.21 |

# Second-generation refugees are similar to natives in terms of human capital (ESS)

|  | Completed junior high school | | | Completed primary school | | |
|---|---|---|---|---|---|---|
|  | All rounds | | | 2010 | | |
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| Parents born in Turkey | 0.047* | 0.039 | 0.037 | 0.036 | 0.028 | 0.023 |
|  | (0.027) | (0.027) | (0.025) | (0.048) | (0.048) | (0.048) |
| Observations | 2,629 | 2,629 | 715 | 715 | 715 | 715 |
| R-squared | 0.247 | 0.326 | 0.302 | 0.395 | 0.206 | 0.217 |
| Birth year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Region FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Parental characteristics | No | Yes | Yes | No | Yes | Yes |
| Parental education | No | No | Yes | No | No | Yes |

## Conclusion

Main findings:

- Estimates suggest that the inflow of refugees increased the literacy and primary school completion of natives

- The construction of new schools between 1920—27 and the arrival of refugee teachers are important mechanisms through which the inflow of refugees increased schooling

- The inflow of refugees shifted the labor supply of natives to non-agricultural occupations to education

- There is no differential education attainment of the second generation refugees and natives

Policy lesson:

- Early intervention and investments in schooling at the time of arrival of refugees can even generate positive externalities on human capital formation of the natives

# Roadmap

## The estimated literacy rate of natives in 1971

$$\widehat{Lit_{c,p}^{N}}(1971) = \frac{Lit_{c,p}^{N}(1928) * (1 - m_{cd}^{lit})}{(1 - m_{cd}^{illi}) * (1 - Lit_{c,p}^{N}(1928)) + (1 - m_{cd}^{lit}) * Lit_{c,p}^{N}(1928)}$$

- $Lit_{c,p}^{N}(1928)$ = literacy rate of natives in 1928

- $1 - m_{cd}^{lit}$ = survival rate of the literate pop

- $1 - m_{cd}^{illi}$ = survival rate of the illiterate pop

The estimated primary education completion rate of natives in 1971

$$\widehat{P_{cd}^N}(1971) = \frac{\widehat{Lit_{cd}^N}(1971) - \alpha_{cp}(1971)}{1 - \alpha_{cp}(1971)}$$

- $\widehat{Lit_{c,p}^N}(1971)$ = estimated literacy rate of natives in 1971

- $\alpha_{cp}(1971)$ = literacy rate among individuals without primary education degree
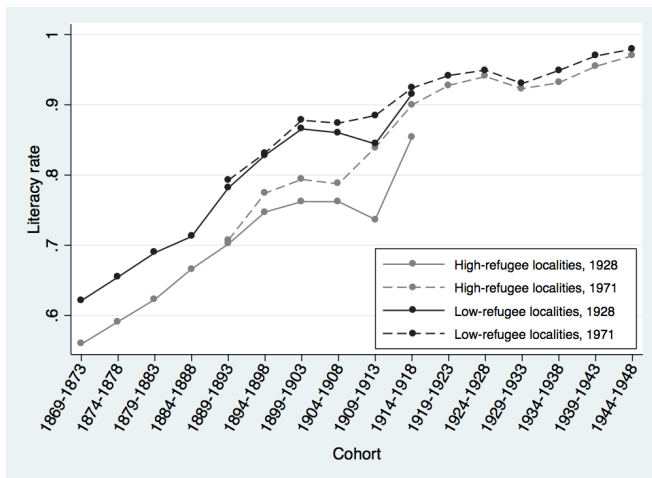
## The impact of net immigration and increase in education supply

**Dependent variable: Literacy rate of males in 1971**

| | | | | | |
|---|---|---|---|---|---|
| $RefugeeShare_{p,1928} \times (Born > 1917)$ | 0.208*** | 0.173*** | | 0.075 | 0.045 |
| | (0.041) | (0.045) | | (0.069) | (0.072) |
| $Net\ Immigration_{p,1920-28} \times (Born > 1917)$ | | 0.071** | | | 0.067** |
| | | (0.035) | | | (0.033) |
| $School\ built_{p,1920-27} \times (Born > 1917)$ | | | 0.831** | 0.637 | 0.694* |
| | | | (0.377) | (0.449) | (0.407) |
| $Refugee\ teacher_{p,1928} \times (Born > 1917)$ | | | 0.995*** | 0.787** | 0.723* |
| | | | (0.220) | (0.367) | (0.368) |
| Observations | 8,650 | 8,650 | 8,650 | 8,650 | 8,650 |

**Dependent variable: Primary school completion rate of males in 1971**

| | | | | | |
|---|---|---|---|---|---|
| $RefugeeShare_{p,1928} \times (Born > 1917)$ | 0.326*** | 0.331*** | | 0.101 | 0.104 |
| | (0.035) | (0.040) | | (0.099) | (0.099) |
| $Net\ Immigration_{p,1920-28} \times (Born > 1917)$ | | -0.010 | | | -0.007 |
| | | (0.049) | | | (0.047) |
| $School\ built_{p,1920-27} \times (Born > 1917)$ | | | 2.138*** | 1.689*** | 1.684*** |
| | | | (0.400) | (0.508) | (0.502) |
| $Refugee\ teacher_{p,1928} \times (Born > 1917)$ | | | 1.452*** | 0.972 | 0.979 |
| | | | (0.303) | (0.605) | (0.609) |
| Observations | 8,650 | 8,650 | 8,650 | 8,650 | 8,650 |