Organizational Practices and Technology Adoption:
Evidence from Jewish Immigration and the Tailoring Industry in England

Yannis Kastis
(UCL & EIT Oxford)

Hillary Vipond
(LSE & CSH Vienna)

Conference on Research on Economic Theory and Econometrics
11 July 2026

Motivation

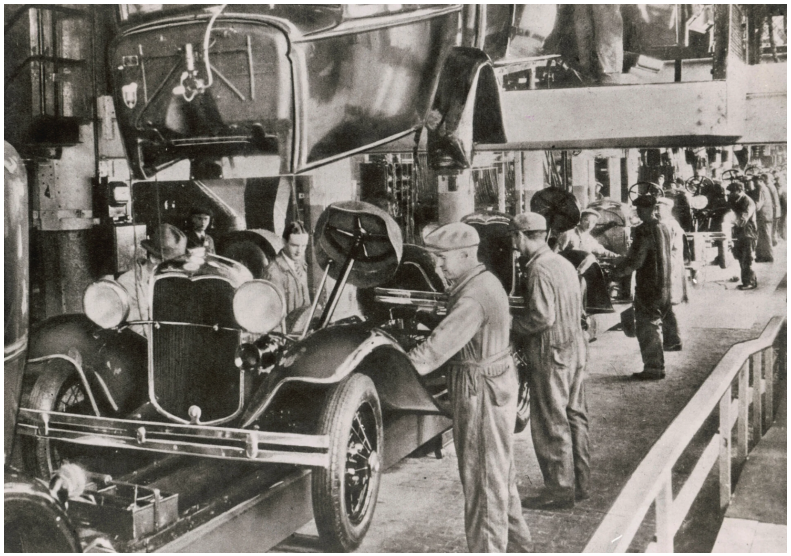
- Adoption of **new technologies**: key for productivity growth in the long run.

Motivation

- Adoption of **new technologies**: key for productivity growth in the long run.
- **New complementary organizations of production**:
  - Required for the adoption of new technologies.

Motivation

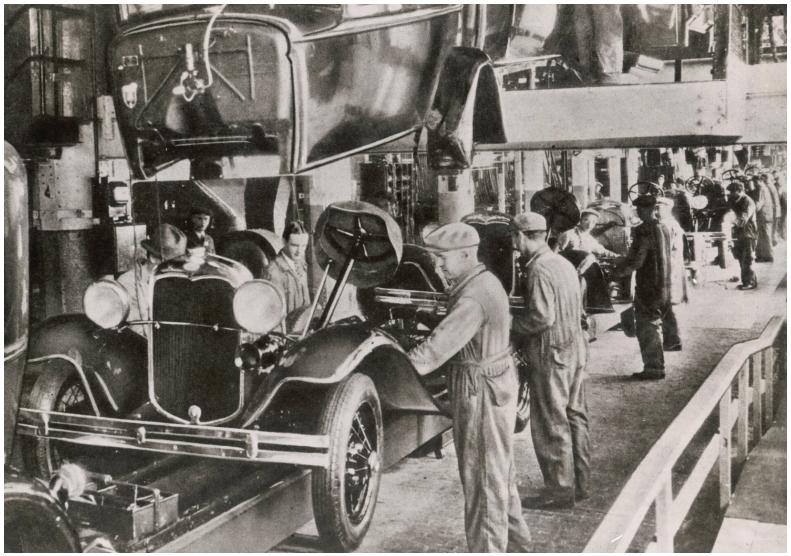
- Adoption of **new technologies**: key for productivity growth in the long run.
- **New complementary organizations of production**:
  - Required for the adoption of new technologies.



Assembly line and division of labor

Motivation

- Adoption of **new technologies**: key for productivity growth in the long run.
- **New complementary organizations of production**:
  - Required for the adoption of new technologies.



Assembly line and division of labor



ICT and digital collaboration

Motivation

- Adoption of **new technologies**: key for productivity growth in the long run.
- **New complementary organizations of production**:
  - Required for the adoption of new technologies.
- Economic literature:
  - Gains in organizing production efficiently: Adam Smith's ***division of labor***.
  - Little evidence on the organization of production as prerequisite for adoption.

Motivation

- Adoption of **new technologies**: key for productivity growth in the long run.
- **New complementary organizations of production**:
  - Required for the adoption of new technologies.
- Economic literature:
  - Gains in organizing production efficiently: Adam Smith's ***division of labor***.
  - Little evidence on the organization of production as prerequisite for adoption.
- Key to understand the factors shaping a firm's capacity to modernize production.

Challenges

Challenges

- Standard **data** sources rarely identify:
  - which specific technology is used in production.
  - how production is organized.

Challenges

- Standard **data** sources rarely identify:
  - which specific technology is used in production.
  - how production is organized.

- **Endogeneity problem:**
  - New technologies and organizations of production often emerge together.
  - Hard to establish a **causal link**.

This paper

- **Addresses the endogeneity problem** using a unique historical episode:
  - Arrival of Jewish tailors in England fleeing Russian pogroms (1881-1905).

This paper

- **Addresses the endogeneity problem** using a unique historical episode:
  - Arrival of Jewish tailors in England fleeing Russian pogroms (1881-1905).

Native tailors in England

- Bespoke/home production
- Sewing machine: late 1860s
- Improve individual work

This paper

- **Addresses the endogeneity problem** using a unique historical episode:
  - Arrival of Jewish tailors in England fleeing Russian pogroms (1881-1905).

Native tailors in England

- Bespoke/home production
- Sewing machine: late 1860s
- Improve individual work

Jewish tailors in Russian Empire

- Ready-to-wear (RTW)
- Machine: not yet available
- Division of labor

This paper

- **Addresses the endogeneity problem** using a unique historical episode:
  - Arrival of Jewish tailors in England fleeing Russian pogroms (1881-1905).

Native tailors in England
- Bespoke/home production
- Sewing machine: late 1860s
- Improve individual work

Jewish tailors in Russian Empire
- Ready-to-wear (RTW)
- Machine: not yet available
- Division of labor

  - Used available machines with division of labor in England to scale-up RTW.

This paper

- **Addresses the endogeneity problem** using a unique historical episode:
  - Arrival of Jewish tailors in England fleeing Russian pogroms (1881-1905).

Native tailors in England
- Bespoke/home production
- Sewing machine: late 1860s
- Improve individual work

Jewish tailors in Russian Empire
- Ready-to-wear (RTW)
- Machine: not yet available
- Division of labor

  - Used available machines with division of labor in England to scale-up RTW.
  - Relative to bespoke, increased supply of affordable quality clothing. Shops

This paper

- **Addresses the endogeneity problem** using a unique historical episode:
  - Arrival of Jewish tailors in England fleeing Russian pogroms (1881-1905).

Native tailors in England
- Bespoke/home production
- Sewing machine: late 1860s
- Improve individual work

Jewish tailors in Russian Empire
- Ready-to-wear (RTW)
- Machine: not yet available
- Division of labor

  - Used available machines with division of labor in England to scale-up RTW.
  - Relative to bespoke, increased supply of affordable quality clothing. Shops

- Outcome: Adoption of sewing machine and new organization by native tailors.

This paper

- **Addresses the endogeneity problem** using a unique historical episode:
  - Arrival of Jewish tailors in England fleeing Russian pogroms (1881-1905).

Native tailors in England	**Jewish tailors in Russian Empire**
• Bespoke/home production	• Ready-to-wear (RTW)
• Sewing machine: late 1860s	• Machine: not yet available
• Improve individual work	• Division of labor

  - Used available machines with division of labor in England to scale-up RTW.
  - Relative to bespoke, increased supply of affordable quality clothing. Shops

- Outcome: Adoption of sewing machine and new organization by native tailors.

- Identification: Variation in inflows of Russian tailors across districts
  - IV: settlement patterns of Russian tailors in 1851 (machine not introduced).

This paper

- **Addresses the endogeneity problem** using a unique historical episode:
  - Arrival of Jewish tailors in England fleeing Russian pogroms (1881-1905).

Native tailors in England	**Jewish tailors in Russian Empire**
• Bespoke/home production	• Ready-to-wear (RTW)
• Sewing machine: late 1860s	• Machine: not yet available
• Improve individual work	• Division of labor

  - Used available machines with division of labor in England to scale-up RTW.
  - Relative to bespoke, increased supply of affordable quality clothing. Shops

- Outcome: Adoption of sewing machine and new organization by native tailors.

- Identification: Variation in inflows of Russian tailors across districts
  - IV: settlement patterns of Russian tailors in 1851 (machine not introduced).

- **Newly constructed data** on production tasks from the English census.

Preview of Results

- Compared to native tailors, Russian tailors **upon arrival** in England:

Preview of Results

- Compared to native tailors, Russian tailors **upon arrival** in England:
  - Adopted the sewing machine more widely.

Preview of Results

- Compared to native tailors, Russian tailors **upon arrival** in England:
  - Adopted the sewing machine more widely.
  - Specialized in new ready-to-wear production rather than bespoke/home.
  - Set up larger workshops: **division of labor** and **worker specialization**.



Workshop of native tailor



Workshop of Russian tailor

Preview of Results

- Their arrival caused:



Workshop of native tailor



Workshop of Russian tailor

Preview of Results

- Their arrival caused:
  - **Natives adopting** the new organization and the machine more broadly.



Workshop of native tailor



Workshop of Russian tailor

Preview of Results

- Their arrival caused:
  - **Natives adopting** the new organization and the machine more broadly.
  - Increase in worker specialization and the size of the native tailoring firm.



Workshop of native tailor



Workshop of Russian tailor

Preview of Results

- Their arrival caused:
  - **Natives adopting** the new organization and the machine more broadly.
  - Increase in worker specialization and the size of the native tailoring firm.
  - Accelerated England's **transition to mass-production** of clothes.



Workshop of native tailor



Workshop of Russian tailor

- Their arrival caused:
  - **Natives adopting** the new organization and the machine more broadly.
  - Increase in worker specialization and the size of the native tailoring firm.
  - Accelerated England's **transition to mass-production** of clothes.
  - Displacement of self-employed native tailors. New jobs in specialized roles.



Workshop of native tailor



Workshop of Russian tailor

Contribution and Related Literature

- New technologies and complementary practices: David (1990), Brynjolfsson (1993), Brynjolfsson and Hitt (2000), Hall and Khan (2003), Brynjolfsson et al. (2021), Feigenbaum and Gross (2024), Juhasz et al. (2024).
  $\Rightarrow$ Causal evidence on organization of production driving technology adoption.
  $\Rightarrow$ Novel data allowing us to open the "black-box" of production.

Contribution and Related Literature

- New technologies and complementary practices: David (1990), Brynjolfsson (1993), Brynjolfsson and Hitt (2000), Hall and Khan (2003), Brynjolfsson et al. (2021), Feigenbaum and Gross (2024), Juhasz et al. (2024).
  ⇒ Causal evidence on organization of production driving technology adoption.
  ⇒ Novel data allowing us to open the "black-box" of production.

- Immigration and technology adoption: Andersson et al. (2022), Coluccia and Spadavecchia (2024), Doran et al. (2024), Hornbeck and Naidu (2014), Lewis (2011), San (2023).
  ⇒ Impact on content of work (Acemoglu & Restrepo (2018), Autor et al. (2024)).
  ⇒ Native employment in long run: specialized jobs emerged with new process.

Contribution and Related Literature

- New technologies and complementary practices: David (1990), Brynjolfsson (1993), Brynjolfsson and Hitt (2000), Hall and Khan (2003), Brynjolfsson et al. (2021), Feigenbaum and Gross (2024), Juhasz et al. (2024).
  ⇒ Causal evidence on organization of production driving technology adoption.
  ⇒ Novel data allowing us to open the "black-box" of production.

- Immigration and technology adoption: Andersson et al. (2022), Coluccia and Spadavecchia (2024), Doran et al. (2024), Hornbeck and Naidu (2014), Lewis (2011), San (2023).
  ⇒ Impact on content of work (Acemoglu & Restrepo (2018), Autor et al. (2024)).
  ⇒ Native employment in long run: specialized jobs emerged with new process.

- Immigration and knowledge diffusion across countries: Kerr (2008), Hornung (2014), Moser et al. (2014), Bahar et al. (2022,24), Prato (2022), Moser and San (2023), Coluccia and Dossi (2024).
  ⇒ Local conditions key for applying knowledge: Russian tailors scaled-up production only in England where sewing machines were available.

Outline of talk

- Historical background
- Data and descriptive statistics
- Identification and empirical strategy
- Results
  - Adoption of sewing machine and organization
  - Size of native tailoring firm
  - Employment effects on native tailors
  - Gender composition
- Conclusions

Outline of talk

- Historical background
- Data and descriptive statistics
- Identification and empirical strategy
- Results
  - Adoption of sewing machine and organization
  - Size of native tailoring firm
  - Employment effects on native tailors
  - Gender composition
- Conclusions

Historical Background

- Jewish population in the Russian Empire
  - Largest Jewish community in the world (5.2M - 1897 Russian Census).
  - Tailoring: most common source of employment.

Historical Background

- Jewish population in the Russian Empire
  - Largest Jewish community in the world (5.2M - 1897 Russian Census).
  - Tailoring: most common source of employment.
- Emigration from the Russian Empire
  - Large wave of pogroms in 1881-1882.
  - Introduction of May Laws in 1882.

Historical Background

- Jewish population in the Russian Empire
  - Largest Jewish community in the world (5.2M - 1897 Russian Census).
  - Tailoring: most common source of employment.
- Emigration from the Russian Empire
  - Large wave of pogroms in 1881-1882.
  - Introduction of May Laws in 1882.
- Russian immigrants arriving in England
  - 140,000 migrated to England. 70% settled in East London.
  - Inflows restricted by the Aliens Act of 1905.

The tailoring industry and the sewing machine

- The tailoring industry in England
  - Occupied 4.8% of the native labor force in 1881.
  - Absorbed 27% of Russian arrivals. 5% of its 1881 workforce. Clothing

The tailoring industry and the sewing machine

- The tailoring industry in England
  - Occupied 4.8% of the native labor force in 1881.
  - Absorbed 27% of Russian arrivals. 5% of its 1881 workforce. Clothing

- Cost of the sewing machine
  - Patented in 1846. Sales rise from late 1860's (Singer era).
  - Cost to rent in 1890's: 2 shillings and 6 pence per week (Pilzer, 1979).
  - Less successful Russian tailors earned 9 times as much (Feldman, 1994).

Tailoring process: natives vs. Russian immigrants

Native (bespoke)

Cutter: cuts on measures of customers

↓

Tailor: basting, sewing, pressing, felling, button hole making

Russian (ready-to-wear)

Cutter: cuts on fixed measures

↓

Basters: stitch pieces of garment together

↓

Sewing machinists: work on machines

↓

Fellers: final sewing (linings, sleeves).

↓

Button hole makers: cut button holes in fabric

↓

Pressers: iron completed garments

Source: Dictionary of Occupational Terms in GB, 1921.

Booth interview

Outline of talk

- Historical background
- Data and descriptive statistics
- Identification and empirical strategy
- Results
  - Adoption of sewing machine and organization
  - Size of native tailoring firm
  - Employment effects on native tailors
  - Gender composition
- Conclusions

Data

- Full-count decennial English Census data 1851-1911 (excl. 1871)
- British Business Census of Entrepreneurs (1851-1911) to study firm size.
  - Identifies employers, employees and self-employed in the English Census.
  - Direct information on number of employees until 1881.
- Poor Jews' Temporary Shelter in London Database.
  - Information on immigrant work experience before arrival in England.

Data

- **Full-count decennial English Census data 1851-1911 (excl. 1871)**
- British Business Census of Entrepreneurs (1851-1911) to study firm size.
  - Identifies employers, employees and self-employed in the English Census.
  - Direct information on number of employees until 1881.
- Poor Jews' Temporary Shelter in London Database.
  - Information on immigrant work experience before arrival in England.

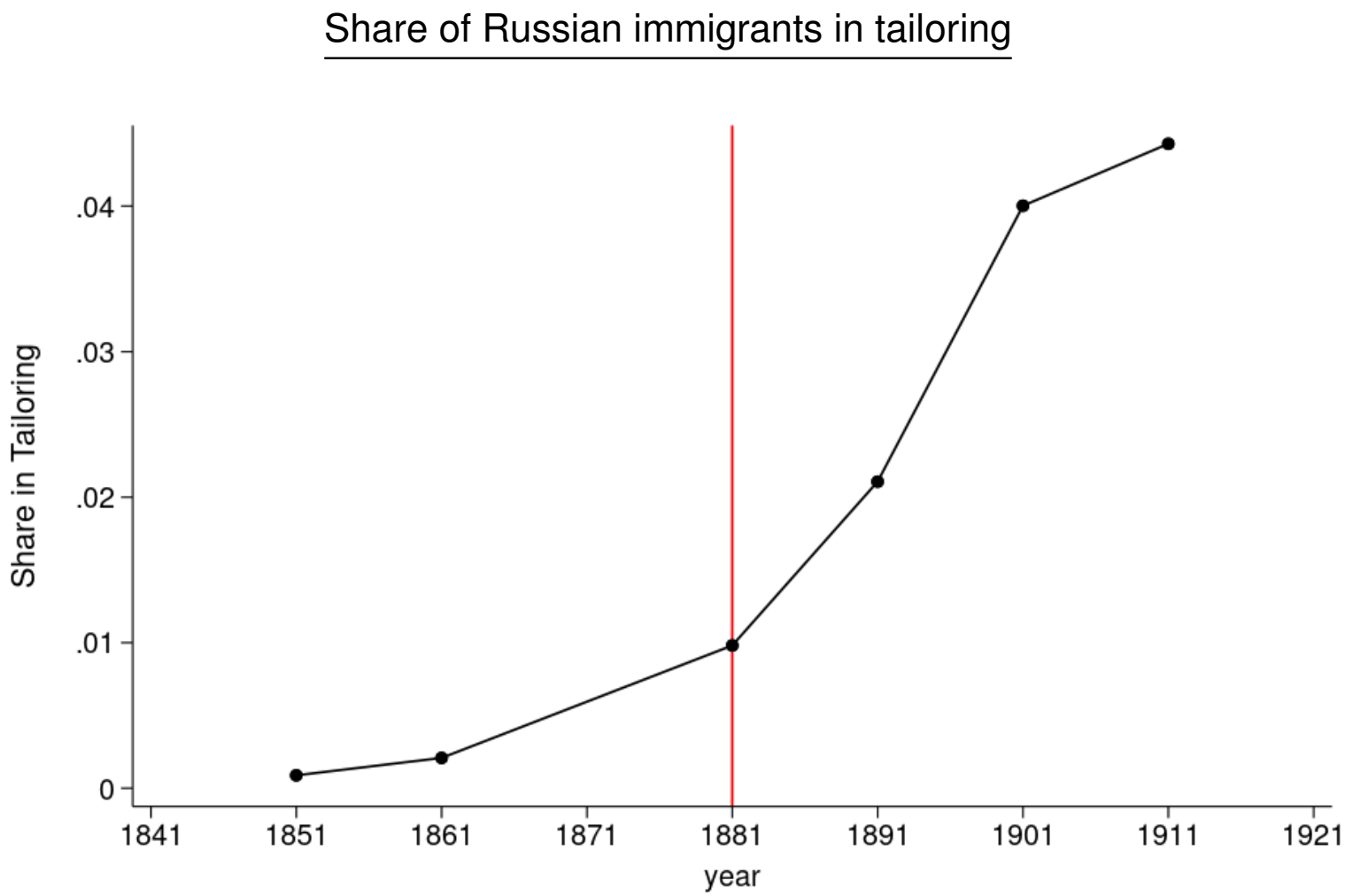
Data

- Full-count decennial English Census data 1851-1911 (excl. 1871)
- **British Business Census of Entrepreneurs (1851-1911) to study firm size.**
  - Identifies employers, employees and self-employed in the English Census.
  - Direct information on number of employees until 1881.
- Poor Jews' Temporary Shelter in London Database.
  - Information on immigrant work experience before arrival in England.

Data

- Full-count decennial English Census data 1851-1911 (excl. 1871)
- British Business Census of Entrepreneurs (1851-1911) to study firm size.
  - Identifies employers, employees and self-employed in the English Census.
  - Direct information on number of employees until 1881.
- **Poor Jews' Temporary Shelter in London Database.**
  - Information on immigrant work experience before arrival in England.

The immigration shock in the English tailoring industry

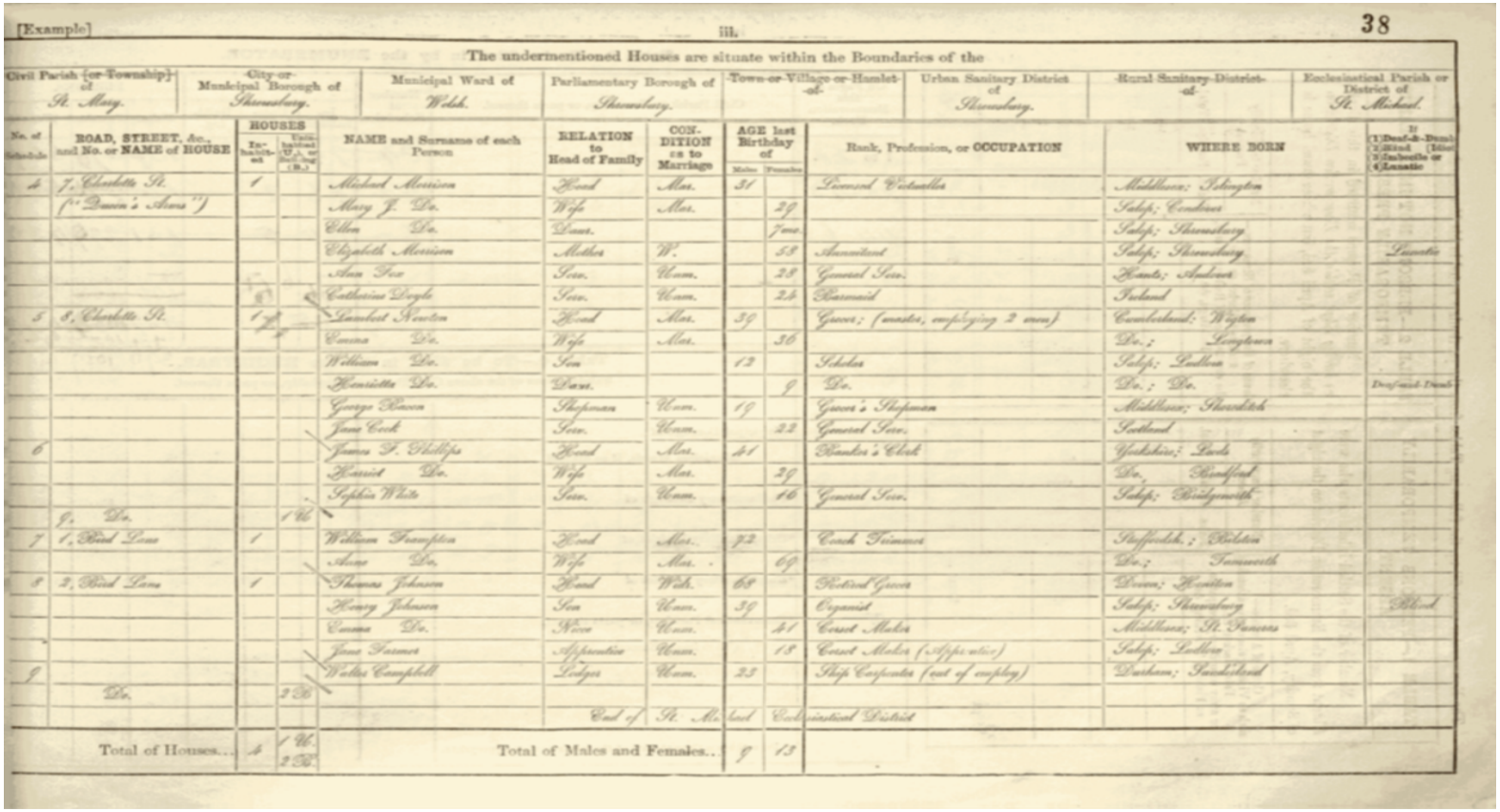


Source: ICeM data (1851-1911)

Net inflow Top-3 shares

Data: The Integrated Census Microdata Project (ICeM)

- Full-count decennial English Census data 1851-1911 (excl. 1871)
  - 160 million individual level census records digitized.
  - 5.6 million observations in the clothing sector.
  - Occupation only at industry level (e.g. tailors).



[Example] iii. 38

The undermentioned Houses are situate within the Boundaries of the

Civil Parish (or Township) of	City or Municipal Borough of	Municipal Ward of	Parliamentary Borough of	Town or Village or Hamlet of	Urban Sanitary District of	Rural Sanitary District of	Ecclesiastical Parish or District of
St. Mary.	Shrewsbury.	Welsh.	Shrewsbury.		Shrewsbury.		St. Michael.

No. of Schedule	ROAD, STREET, &c., and No. or NAME of HOUSE	HOUSES Inhabited	HOUSES Uninhabited (U.) or Building (B.)	NAME and Surname of each Person	RELATION to Head of Family	CONDITION as to Marriage	AGE last Birthday of Males	AGE last Birthday of Females	Rank, Profession, or OCCUPATION	WHERE BORN	If (1) Deaf-&-Dumb (2) Blind (3) Imbecile or (4) Lunatic
4	7, Charlotte St.	1		Michael Morrison	Head	Mar.	51		Licensed Victualler	Middlesex; Islington	
	("Queen's Arms")			Mary J. Do.	Wife	Mar.		39		Salop; Condover	
				Ellen Do.	Daur.			7 mo.		Salop; Shrewsbury	
				Elizabeth Morrison	Mother	W.		58	Annuitant	Salop; Shrewsbury	Lunatic
				Ann Fox	Serv.	Unm.		28	General Serv.	Hants; Andover	
				Catherine Doyle	Serv.	Unm.		24	Barmaid	Ireland	
5	8, Charlotte St.	1		Lambert Newton	Head	Mar.	39		Grocer; (master, employing 2 men)	Cumberland; Wigton	
				Emma Do.	Wife	Mar.		36		Do.; Longtown	
				William Do.	Son		12		Scholar	Salop; Ludlow	
				Henriette Do.	Daur.			9	Do.	Do.; Do.	Deaf-and-Dumb
				George Bacon	Shopman	Unm.	19		Grocer's Shopman	Middlesex; Shoreditch	
				Jane Cook	Serv.	Unm.		23	General Serv.	Scotland	
6				James P. Phillips	Head	Mar.	41		Bleacher's Clerk	Yorkshire; Leeds	
				Harriet Do.	Wife	Mar.		39		Do. Bradford	
				Sophia White	Serv.	Unm.		16	General Serv.	Salop; Whitchurch	
	9, Do.		1 (B.)								
7	1, Third Lane	1		William Trumpton	Head	Mar.	32		Coach Painter	Staffordsh.; Bilston	
				Anne Do.	Wife	Mar.		29		Do.; Tamworth	
8	2, Third Lane	1		Thomas Johnson	Head	Wdr.	68		Retired Grocer	Devon; Honiton	
				Henry Johnson	Son	Unm.	39		Organist	Salop; Shrewsbury	Blind
				Emma Do.	Niece	Unm.		21	Corset Maker	Middlesex; St. Pancras	
				Jane Fairest	Assistant	Unm.		18	Corset Maker (Apprentice)	Salop; Ludlow	
9				Walter Campbell	Lodger	Unm.	23		Ship Carpenter (out of employ)	Durham; Sunderland	
	Do.		2 (B.)								
					End of	St. Mi	hael	Ecclesiastical District			
	Total of Houses...	8	1 (U.) 2 (B.)	Total of Males and Females..			9	13			

Data Construction: New Variable for Occupation - "Task"

- Individuals were asked to provide **descriptions of their occupations**.
  - General Register Office used them to track occupation at industry level.
  - Perform textual analysis to acquire **tasks** from descriptions.

Data Construction: New Variable for Occupation - "Task"

- Individuals were asked to provide **descriptions of their occupations**.
  - General Register Office used them to track occupation at industry level.
  - Perform textual analysis to acquire **tasks** from descriptions.

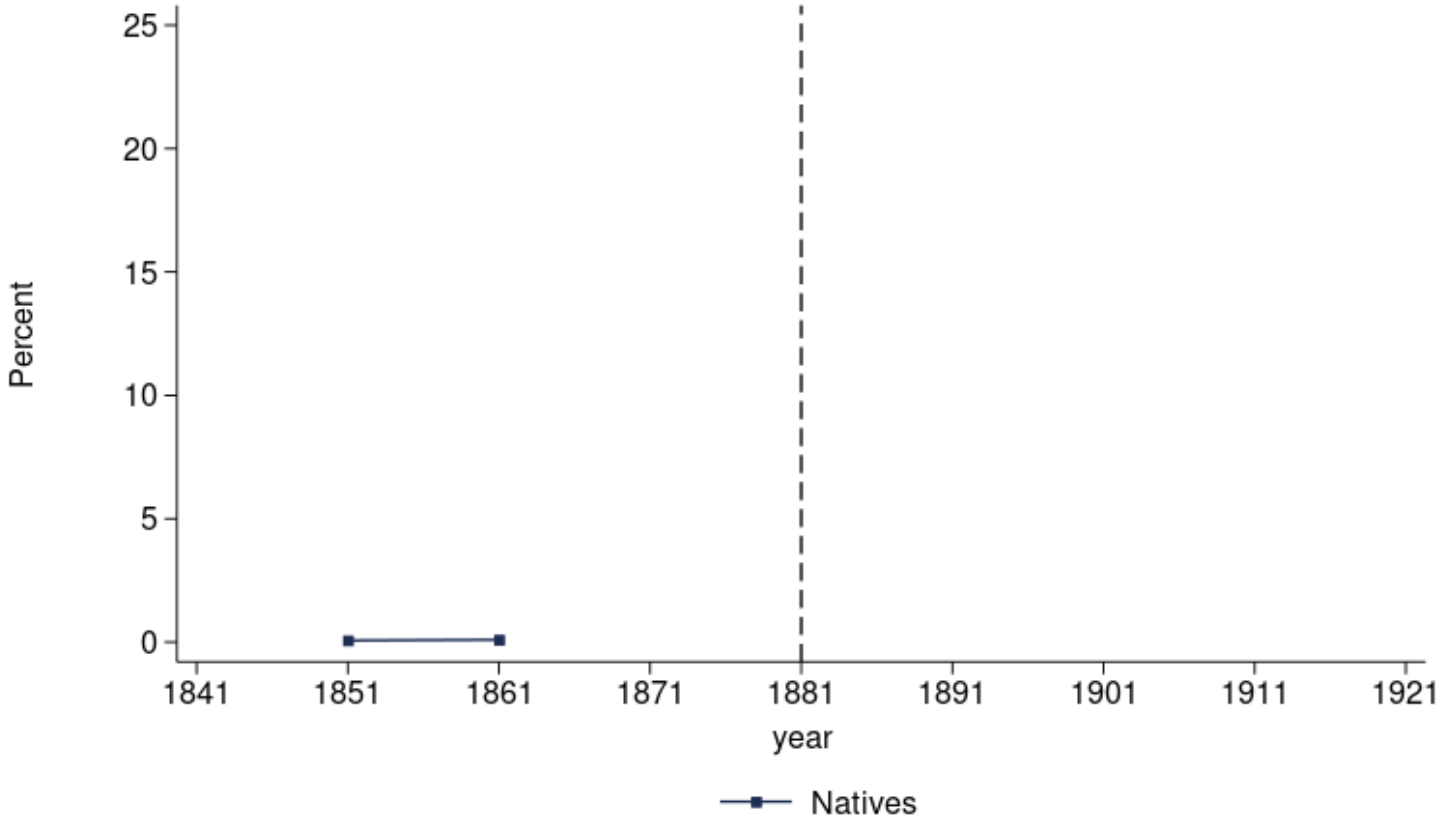
Example Data			
Industry Code	**Original Census Response**	**New Variable**	**Reclassify**
653 (tailor)	tailoring sewing machinist	machinist	machinist
653 (tailor)	tailoring presser	presser	specialist
653 (tailor)	tailoring button hole	button holer	specialist
653 (tailor)	tailor's baster	baster	specialist
653 (tailor)	tailoring	tailor	generalist

Data Construction: New Variable for Occupation - "Task"

- Individuals were asked to provide **descriptions of their occupations**.
  - General Register Office used them to track occupation at industry level.
  - Perform textual analysis to acquire **tasks** from descriptions.

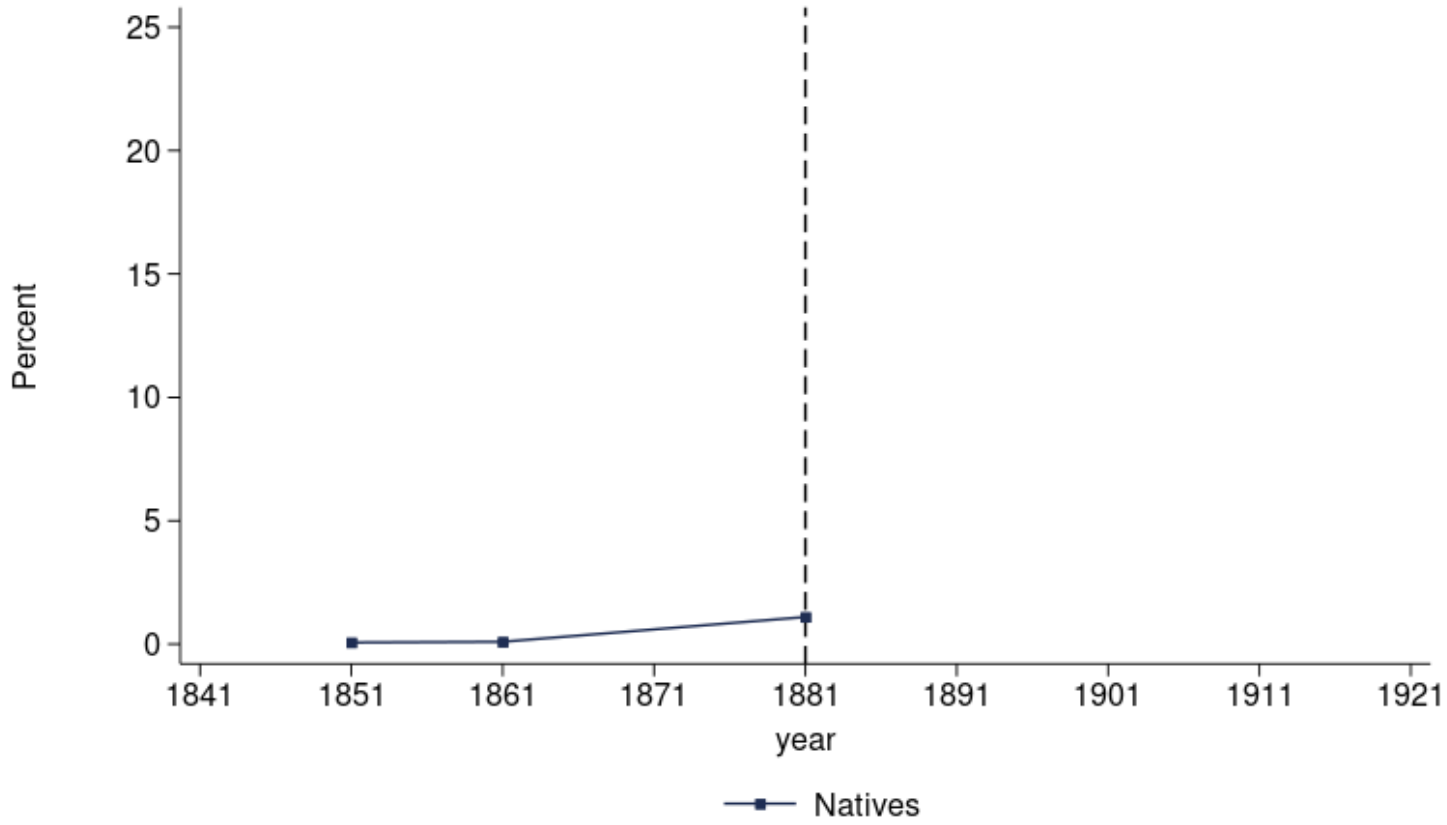
Example Data			
Industry Code	**Original Census Response**	**New Variable**	**Country of Birth**
653 (tailor)	tailoring sewing machinist	machinist	Russian Empire
653 (tailor)	tailoring presser	presser	Russian Empire
653 (tailor)	tailoring button hole	button holer	England
653 (tailor)	tailor's baster	baster	Russian Empire
653 (tailor)	tailoring	tailor	England

Share of machinists among tailoring workers



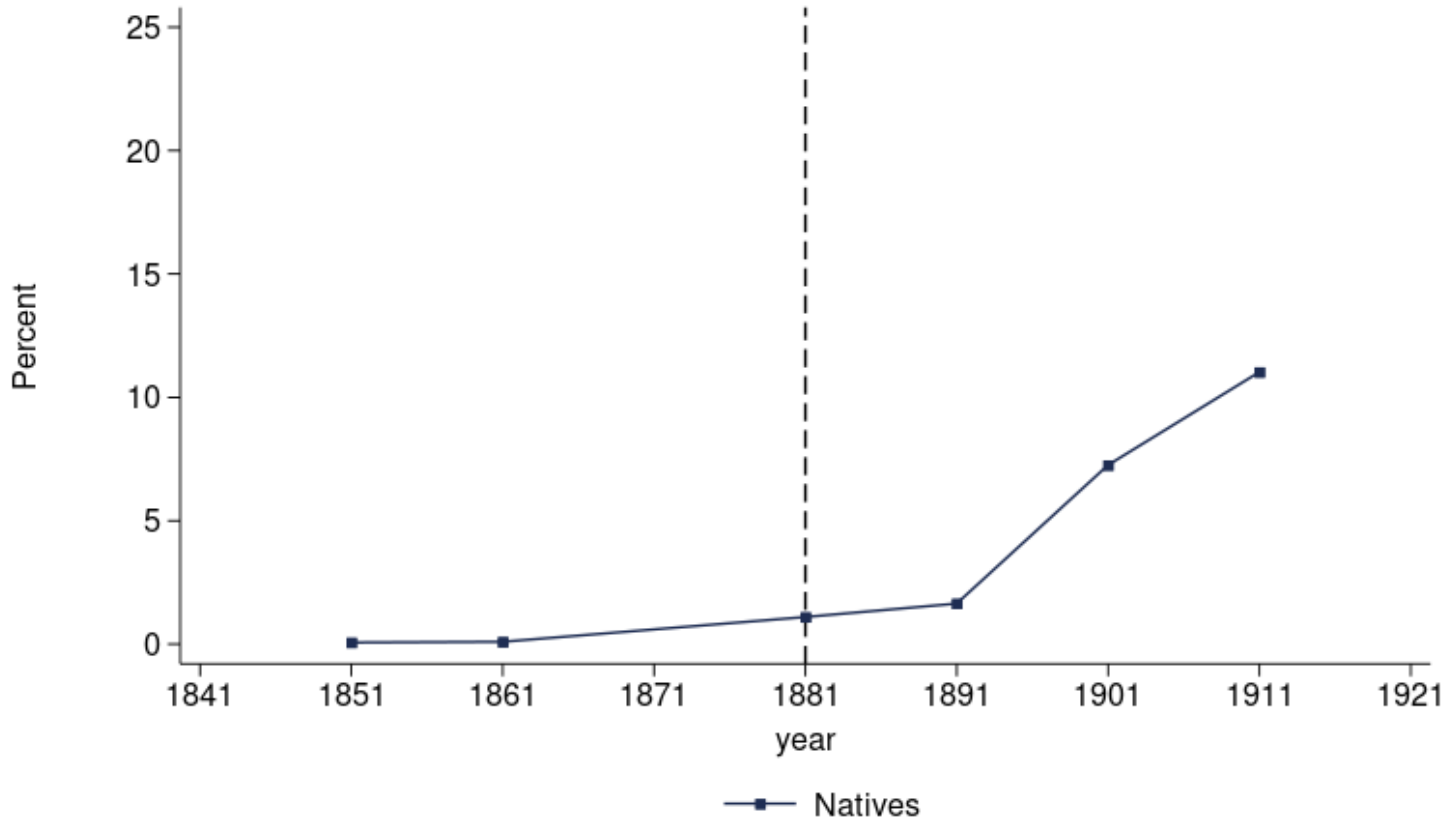
Source: ICeM data (1851-1911)

Share of machinists among tailoring workers



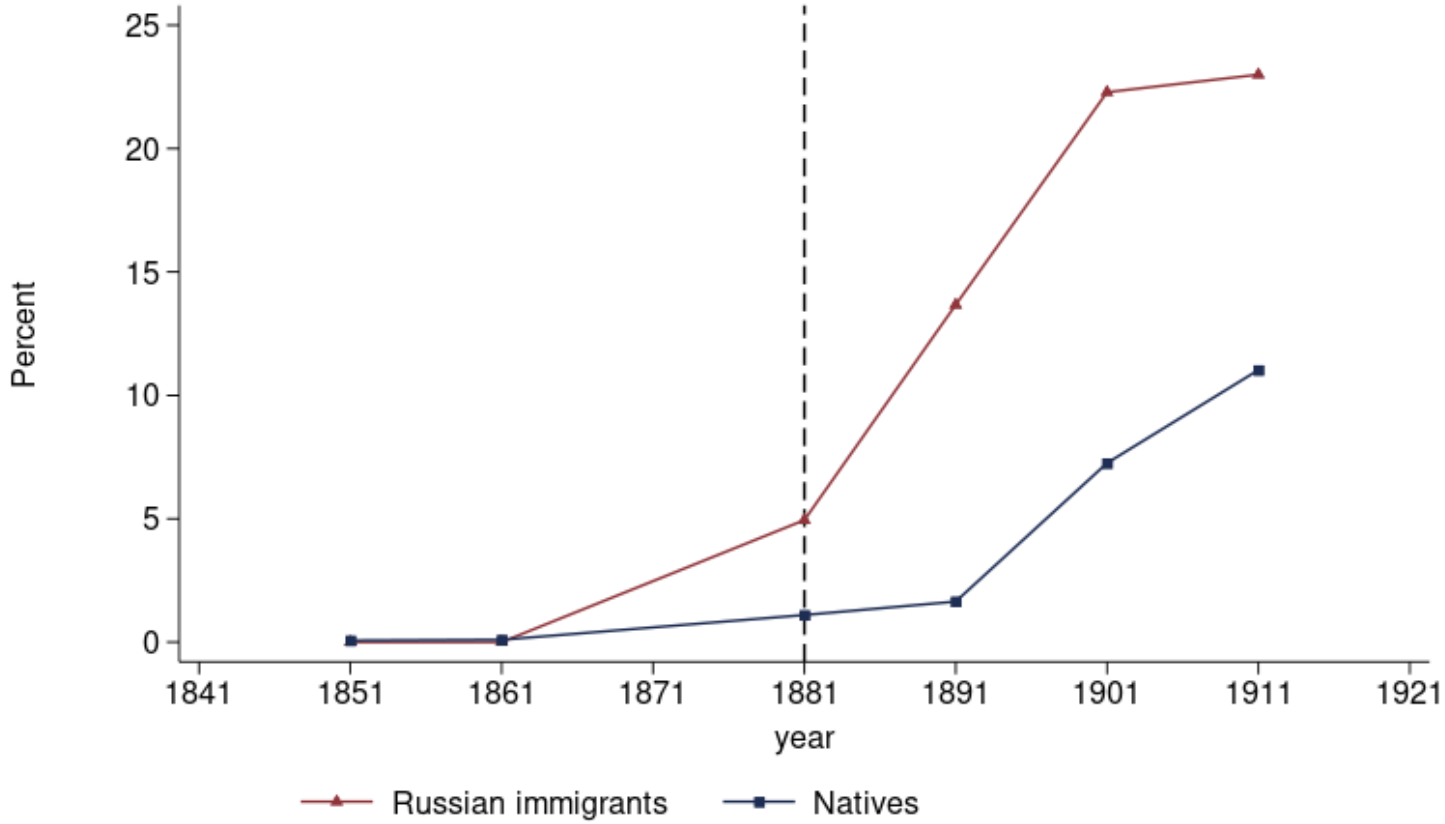
Source: ICeM data (1851-1911)

Share of machinists among tailoring workers



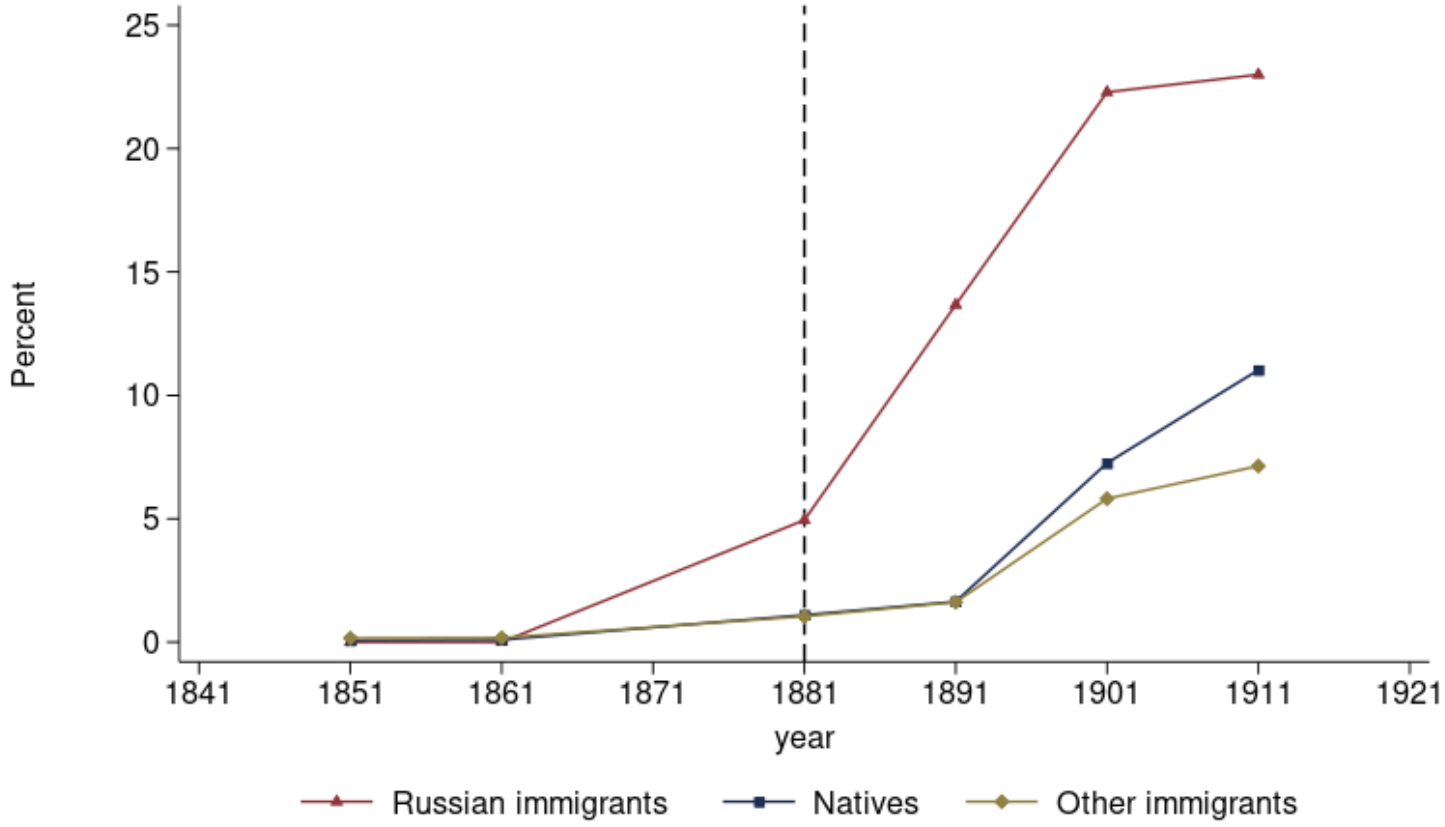
Source: ICeM data (1851-1911)

Share of machinists among tailoring workers



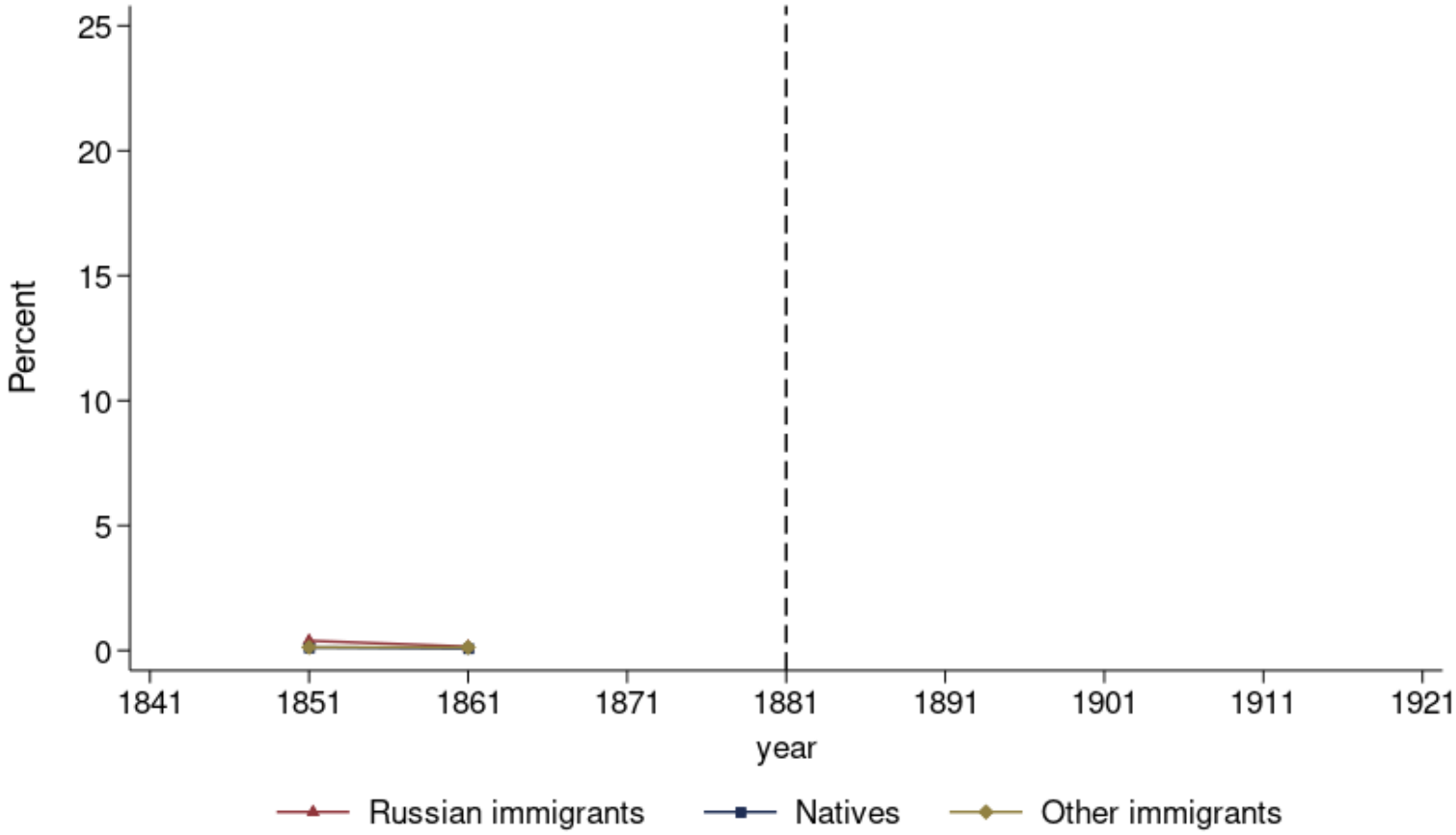
Source: ICeM data (1851-1911)

Share of machinists among tailoring workers

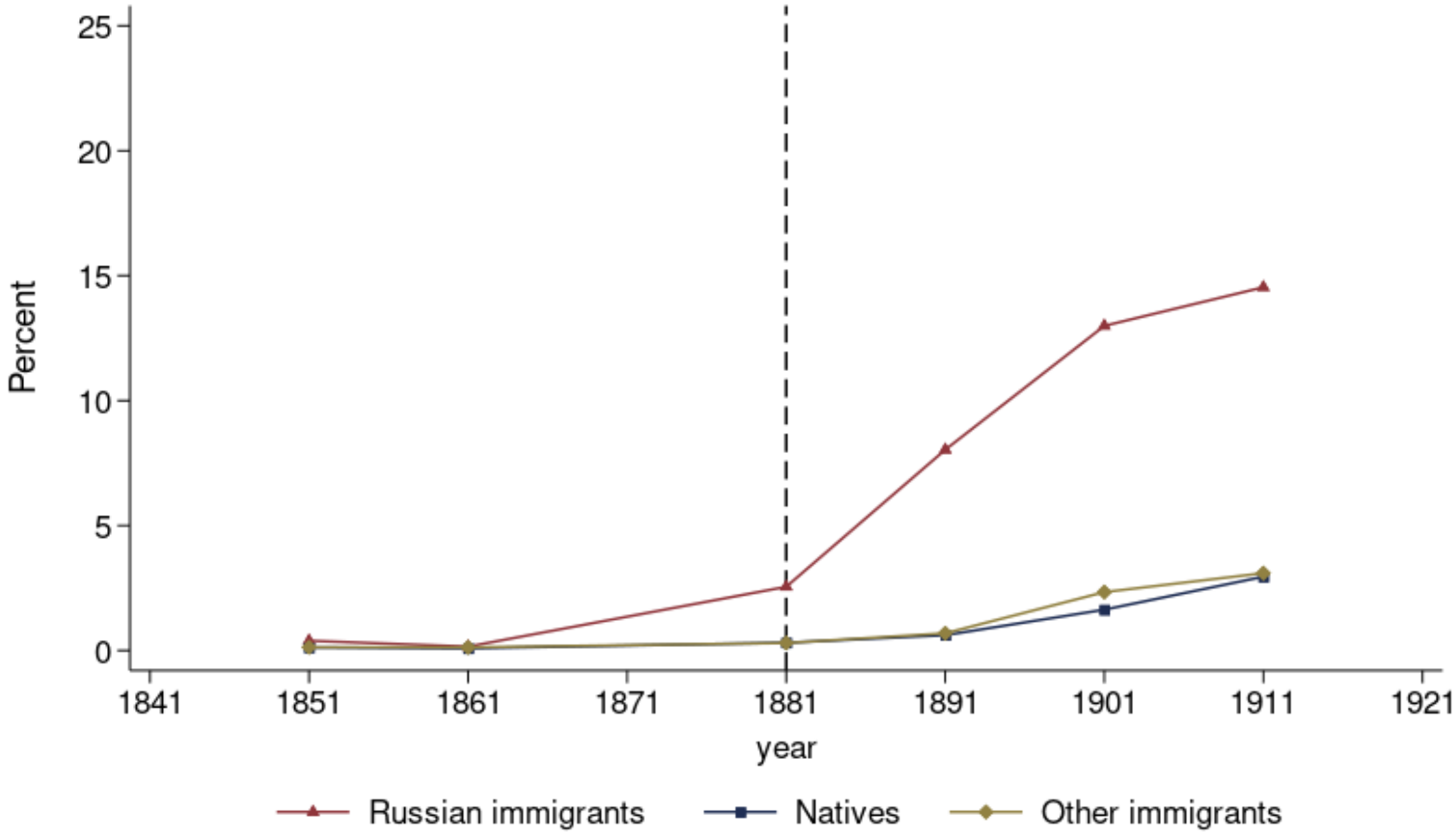


Source: ICeM data (1851-1911)

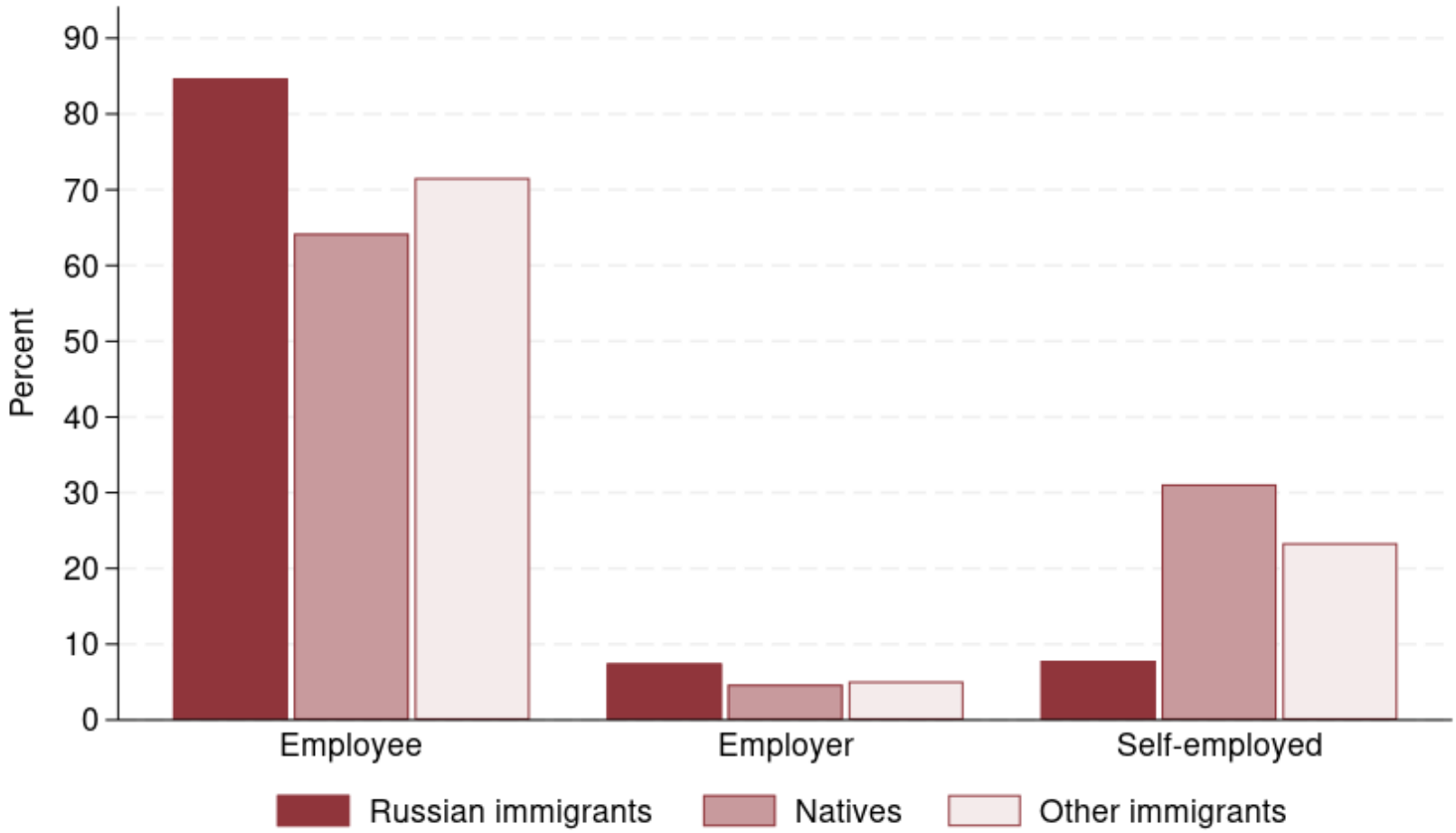
Share of specialists among tailoring workers



Share of specialists among tailoring workers

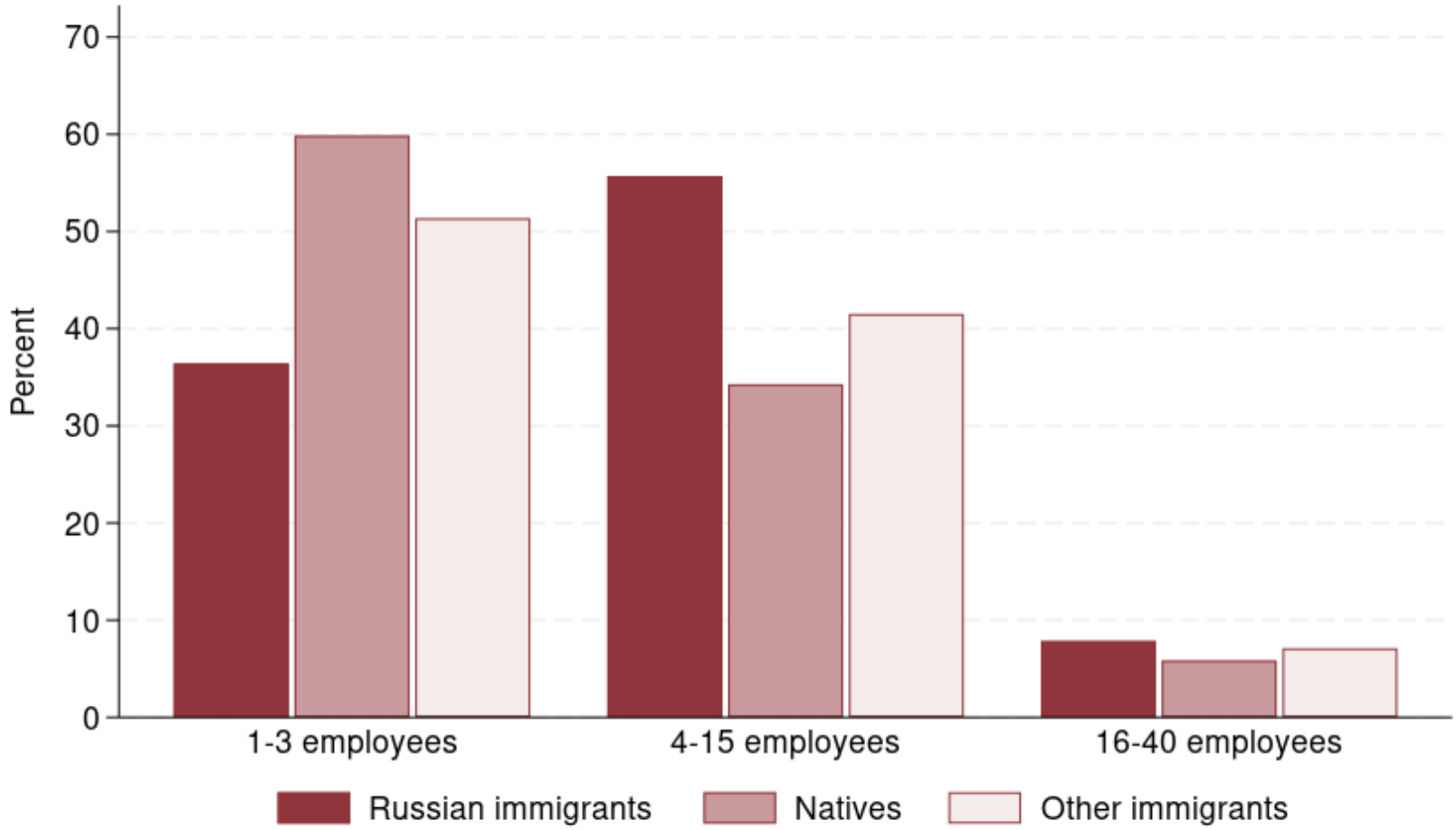


New organization of production upon arrival: Employment Status



Source: BBCE data (1881) Workshop owners Employees

New organization of production upon arrival: Workshop Size



Source: BBCE data (1881)

Outline of talk

- Historical background
- Data and descriptive statistics
- Identification and empirical strategy
- Results
  - Adoption of sewing machine and organization
  - Size of native tailoring firm
  - Employment effects on native tailors
  - Gender composition
- Conclusions

Estimation strategy - Adoption of the sewing machine and organization

- Compare decennial changes, in shares of machinists, specialists and generalists among tailors across districts *s*, relative to the district inflows of Russian tailors:

$$\Delta\left(\frac{Y_{st}}{N_{st}}\right) = \alpha + \beta * \Delta\left(\frac{R_{st}}{N_{st}}\right) + \gamma * \Delta X_{st} + \Delta\varepsilon_{st}$$

Y_{st} : number of machinists/specialists/generalists among tailors

N_{st} : number of native tailors

R_{st} : number of Russian tailors

X_{st} : average age in the district

ε_{st} : error term

Estimation strategy - Adoption of the sewing machine and organization

- Compare decennial changes, in shares of machinists, specialists and generalists among tailors across districts *s*, relative to the district inflows of Russian tailors:

$$\Delta\left(\frac{Y_{st}}{N_{st}}\right) = \alpha + \beta * \Delta\left(\frac{R_{st}}{N_{st}}\right) + \gamma * \Delta X_{st} + \Delta\varepsilon_{st}$$

Y_{st} : number of machinists/specialists/generalists among tailors

N_{st} : number of native tailors

R_{st} : number of Russian tailors

X_{st} : average age in the district

ε_{st} : error term

Estimation strategy - Adoption of the sewing machine and organization

- Compare decennial changes, in shares of machinists, specialists and generalists among tailors across districts *s*, relative to the district inflows of Russian tailors:

$$\Delta\left(\frac{Y_{st}}{N_{st}}\right) = \alpha + \beta * \Delta\left(\frac{R_{st}}{N_{st}}\right) + \gamma * \Delta X_{st} + \Delta\varepsilon_{st}$$

Y_{st} : number of machinists/specialists/generalists among tailors

N_{st} : number of native tailors

R_{st} : number of Russian tailors

X_{st} : average age in the district

ε_{st} : error term

Estimation strategy - Adoption of the sewing machine and organization

- Compare decennial changes, in shares of machinists, specialists and generalists among tailors across districts *s*, relative to the district inflows of Russian tailors:

$$\Delta\left(\frac{Y_{st}}{N_{st}}\right) = \alpha + \beta * \Delta\left(\frac{R_{st}}{N_{st}}\right) + \gamma * \Delta X_{st} + \Delta\varepsilon_{st}$$

Y_{st} : number of machinists/specialists/generalists among tailors

N_{st} : number of native tailors

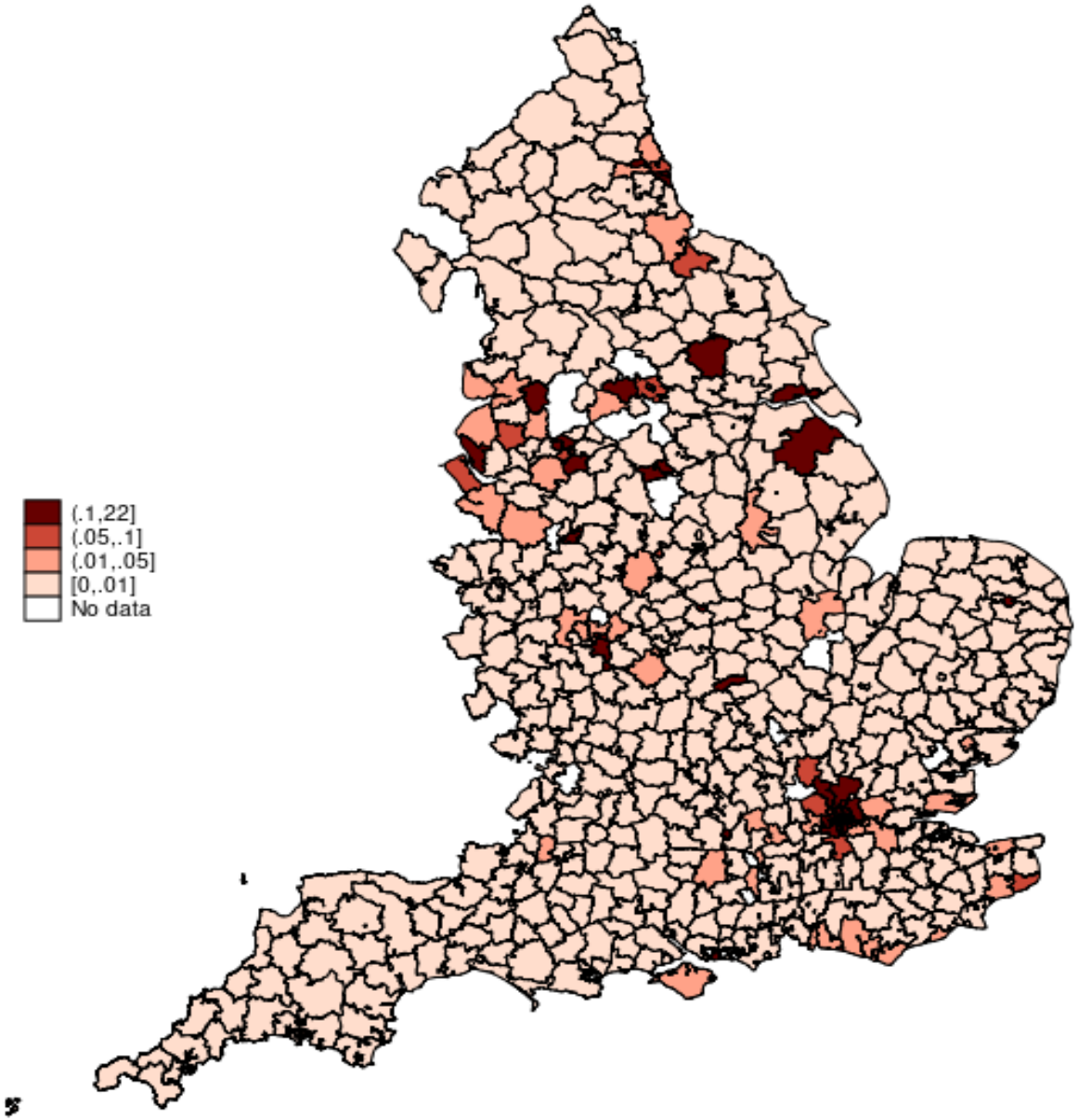
R_{st} : number of Russian tailors

X_{st} : average age in the district

ε_{st} : error term

We estimate separately for decades 1881-1891 and 1891-1901.

Map of the immigration shock in tailoring (districts)



Whitechapel	20%
St. George East	17%
Stepney	16%
Leeds	12%
Manchester	7%
Westminster	4%
Bethnal Green	3%
Liverpool	3%
Kensington	1%
Birmingham	1%

Source: ICeM data 1881-1901

Estimation strategy - First stage

- To deal with **immigrant's endogenous location choice**, we predict district inflows in tailoring with district shares of Russian tailoring workers in 1851.

Estimation strategy - First stage

- To deal with **immigrant's endogenous location choice**, we predict district inflows in tailoring with district shares of Russian tailoring workers in 1851.

$$\Delta\left(\frac{R_{st}}{N_{st}}\right) = \beta_0 + \beta_1 * \frac{\lambda_{s,1851} * (\Delta R_t)}{N_{s,1851}} + \beta_2 * \Delta X_{st} + \zeta_s$$

ΔR_t : inflow of Russian tailors in England

$\lambda_{s,1851}$: 1851 district shares of Russian tailors

$N_{s,1851}$: number of native tailors in district s in 1851

Estimation strategy - First stage

- To deal with **immigrant's endogenous location choice**, we predict district inflows in tailoring with district shares of Russian tailoring workers in 1851.

$$\Delta\left(\frac{R_{st}}{N_{st}}\right) = \beta_0 + \beta_1 * \frac{\lambda_{s,1851} * (\Delta R_t)}{N_{s,1851}} + \beta_2 * \Delta X_{st} + \Delta\zeta_s$$

ΔR_t : inflow of Russian tailors in England

$\lambda_{s,1851}$: 1851 district shares of Russian tailors

$N_{s,1851}$: number of native tailors in district s in 1851

Estimation strategy - First stage

- To deal with **immigrant's endogenous location choice**, we predict district inflows in tailoring with district shares of Russian tailoring workers in 1851.

$$\Delta\left(\frac{R_{st}}{N_{st}}\right) = \beta_0 + \beta_1 * \frac{\lambda_{s,1851} * (\Delta R_t)}{N_{s,1851}} + \beta_2 * \Delta X_{st} + \zeta_s$$

ΔR_t : inflow of Russian tailors in England

$\lambda_{s,1851}$: 1851 district shares of Russian tailors

$N_{s,1851}$: number of native tailors in district s in 1851

First stage

First stage results

	1881-1891 (1)	1891-1901 (2)
Shift-share, 1851 shares	0.529***	0.583***
	(0.021)	(0.024)
Observations	554	554
R^2	0.4365	0.3410
F-stat	379.28	435.95

Source: ICeM data (1851-1911)

Robustness: Native tailors Robustness: Wealth

Outline of talk

- Historical background
- Data and descriptive statistics
- Identification and empirical strategy
- Results
  - Adoption of sewing machine and organization
  - Size of native tailoring firm
  - Employment effects on native tailors
  - Gender composition
- Conclusions

The effect on the adoption of the sewing machine

Panel A. Dependent variable: ΔShare of machinists in tailoring				
	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
ΔShare of Russian in tailoring	0.158***	0.214***	0.248***	0.249***
	(0.036)	(0.006)	(0.015)	(0.012)

The effect on the adoption of the sewing machine

Panel A. Dependent variable: ΔShare of machinists in tailoring				
	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
ΔShare of Russian in tailoring	0.158***	0.214***	0.248***	0.249***
	(0.036)	(0.006)	(0.015)	(0.012)
Panel B. Dependent variable: ΔShare of Russian machinists in tailoring				
ΔShare of Russian in tailoring	0.124***	0.166***	0.196***	0.197***
	(0.028)	(0.007)	(0.009)	(0.009)

The effect on the adoption of the sewing machine

Panel A. Dependent variable: ΔShare of machinists in tailoring				
	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
ΔShare of Russian in tailoring	0.158***	0.214***	0.248***	0.249***
	(0.036)	(0.006)	(0.015)	(0.012)
Panel B. Dependent variable: ΔShare of Russian machinists in tailoring				
ΔShare of Russian in tailoring	0.124***	0.166***	0.196***	0.197***
	(0.028)	(0.007)	(0.009)	(0.009)
Panel C. Dependent variable: ΔShare of native machinists in tailoring				
ΔShare of Russian in tailoring	0.034***	0.048***	0.051***	0.053***
	(0.009)	(0.004)	(0.018)	(0.016)

Source: ICeM data (1851-1911)

Inflows of Russian specialists and generalists relative to natives

Panel A. Dependent variable: ΔShare of Russian specialists in tailoring				
	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
ΔShare of Russian in tailoring	0.120***	0.172***	0.224***	0.221***
	(0.034)	(0.006)	(0.011)	(0.007)
Share of native specialists 1881				0.005

Inflows of Russian specialists and generalists relative to natives

	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
Panel A. Dependent variable: ΔShare of Russian specialists in tailoring				
ΔShare of Russian in tailoring	0.120***	0.172***	0.224***	0.221***
	(0.034)	(0.006)	(0.011)	(0.007)
Share of native specialists 1881				0.005
Panel B. Dependent variable: ΔShare of Russian generalists in tailoring				
ΔShare of Russian in tailoring	0.753***	0.656***	0.577***	0.581***
	(0.063)	(0.014)	(0.020)	(0.015)
Share of native generalists 1881				0.988

Source: ICeM data (1851-1911)

The effect on the adoption of production organization by natives

Panel A. Dependent variable: ΔShare of native specialists in tailoring				
	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
ΔShare of Russian in tailoring	0.045***	0.054***	0.042***	0.050***
	(0.008)	(0.004)	(0.011)	(0.004)

The effect on the adoption of production organization by natives

	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
Panel A. Dependent variable: ΔShare of native specialists in tailoring				
ΔShare of Russian in tailoring	0.045***	0.054***	0.042***	0.050***
	(0.008)	(0.004)	(0.011)	(0.004)
Panel B. Dependent variable: ΔShare of native generalists in tailoring				
ΔShare of Russian in tailoring	−0.091***	−0.105***	−0.093***	−0.109***
	(0.016)	(0.007)	(0.030)	(0.020)

Source: ICeM data (1851-1911)

Outline of talk

- Historical background
- Data and descriptive statistics
- Identification and empirical strategy
- Results
  - Adoption of sewing machine and organization
  - Size of native tailoring firm
  - Employment effects on native tailors
  - Gender composition
- Conclusions

Estimation strategy - Impact on the size of native tailoring firm

- BBCE data: identifier for employer, employee and self-employed.

Estimation strategy - Impact on the size of native tailoring firm

- BBCE data: identifier for employer, employee and self-employed.
- Estimate the same regression with the shares of native employees, employers and self-employed as outcome variables:

$$\Delta\left(\frac{Y_{st}}{N_{st}}\right) = \alpha + \beta * \Delta\left(\frac{R_{st}}{N_{st}}\right) + \gamma * \Delta X_{st} + \Delta\varepsilon_{st}$$

Estimation strategy - Impact on the size of native tailoring firm

- BBCE data: identifier for employer, employee and self-employed.
- Estimate the same regression with the shares of native employees, employers and self-employed as outcome variables:

$$\Delta\left(\frac{Y_{st}}{N_{st}}\right) = \alpha + \beta * \Delta\left(\frac{R_{st}}{N_{st}}\right) + \gamma * \Delta X_{st} + \Delta\varepsilon_{st}$$

Y_{st} : number of employees/employers/self-employed among tailors

Inflows Russian tailors: Employment status relative to natives

Panel A. Dependent variable: ΔShare of Russian employees in tailoring				
	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
ΔShare of Russian in tailoring	0.868***	0.854***	0.884***	0.866***
	(0.010)	(0.007)	(0.014)	(0.013)
Share of native employees 1881				0.561

Inflows Russian tailors: Employment status relative to natives

	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
Panel A. Dependent variable: ΔShare of Russian employees in tailoring				
ΔShare of Russian in tailoring	0.868***	0.854***	0.884***	0.866***
	(0.010)	(0.007)	(0.014)	(0.013)
Share of native employees 1881				0.561
Panel B. Dependent variable: ΔShare of Russian employers in tailoring				
ΔShare of Russian in tailoring	0.042***	0.041***	0.108***	0.139***
	(0.002)	(0.003)	(0.016)	(0.004)
Share of native employers 1881				0.054

Inflows Russian tailors: Employment status relative to natives

	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
Panel A. Dependent variable: ΔShare of Russian employees in tailoring				
ΔShare of Russian in tailoring	0.868***	0.854***	0.884***	0.866***
	(0.010)	(0.007)	(0.014)	(0.013)
Share of native employees 1881				0.561
Panel B. Dependent variable: ΔShare of Russian employers in tailoring				
ΔShare of Russian in tailoring	0.042***	0.041***	0.108***	0.139***
	(0.002)	(0.003)	(0.016)	(0.004)
Share of native employers 1881				0.054
Panel C. Dependent variable: ΔShare of Russian self-employed in tailoring				
ΔShare of Russian in tailoring	0.090***	0.105***	−0.007	−0.005
	(0.030)	(0.005)	(0.008)	(0.009)
Share of native self-employed 1881				0.385

Source: ICeM data (1851-1911)

The impact on the size of native tailoring firm

Panel A. Dependent variable: ΔShare of native employees in tailoring				
	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
ΔShare of Russian in tailoring	0.153***	0.149***	0.101***	0.145**
	(0.032)	(0.055)	(0.030)	(0.058)

The impact on the size of native tailoring firm

Panel A. Dependent variable: ΔShare of native employees in tailoring				
	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
ΔShare of Russian in tailoring	0.153***	0.149***	0.101***	0.145**
	(0.032)	(0.055)	(0.030)	(0.058)
Panel B. Dependent variable: ΔShare of native employers in tailoring				
ΔShare of Russian in tailoring	0.003	0.024*	0.016*	0.011
	(0.007)	(0.013)	(0.006)	(0.010)

The impact on the size of native tailoring firm

	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
Panel A. Dependent variable: ΔShare of native employees in tailoring				
ΔShare of Russian in tailoring	0.153***	0.149***	0.101***	0.145**
	(0.032)	(0.055)	(0.030)	(0.058)
Panel B. Dependent variable: ΔShare of native employers in tailoring				
ΔShare of Russian in tailoring	0.003	0.024*	0.016*	0.011
	(0.007)	(0.013)	(0.006)	(0.010)
Panel C. Dependent variable: ΔShare of native self-employed in tailoring				
ΔShare of Russian in tailoring	−0.156***	−0.174***	−0.117***	−0.156***
	(0.030)	(0.063)	(0.033)	(0.066)

Source: ICeM data (1851-1911)

Conclusion Alternative Link

Outline of talk

- Historical background
- Data and descriptive statistics
- Identification and empirical strategy
- Results
  - Adoption of sewing machine and organization
  - Size of native tailoring firm
  - Employment effects on native tailors
  - Gender composition
- Conclusions

Estimation strategy - Employment effects on native tailors

- Compare changes in numbers of native tailors across districts relative to Russian tailor inflows, adjusting for native tailors at the start of decade:

$$\frac{\Delta Y_{st}}{N_{s,t-1}} = \alpha + \beta * \frac{\Delta R_{st}}{N_{s,t-1}} + \gamma * \Delta X_{st} + \Delta \varepsilon_{st}$$

Y_{st} : number of native tailors/machinists/specialists/generalists

$N_{s,t-1}$: number of native tailors at the start of decade

R_{st} : number of Russian tailors

X_{st} : average age in the district

ε_{st} : error term

We estimate separately for decades 1881-1891 and 1891-1901.

Employment effects on native tailors - granular occupations

	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
Panel A. Dependent variable: ΔEmployment of native machinists				
ΔRussians in tailoring	0.047***	0.041***	0.070*	0.049**
	(0.015)	(0.003)	(0.036)	(0.021)
Panel B. Dependent variable: ΔEmployment of native specialists				
ΔRussians in tailoring	0.070**	0.046***	0.049**	0.041***
	(0.030)	(0.003)	(0.020)	(0.007)
Panel C. Dependent variable: ΔEmployment of native generalists				
ΔRussians in tailoring	0.250	−0.041	−0.193**	−0.522**
	(0.270)	(0.114)	(0.080)	(0.253)

Source: ICeM data (1851-1911)

Overall

Outline of talk

- Historical background
- Data and descriptive statistics
- Identification and empirical strategy
- Results
  - Adoption of sewing machine and organization
  - Size of native tailoring firm
  - Employment effects on native tailors
  - Gender composition
- Conclusions

Female shares among inflows of Russian tailors

Dependent variable: Δshare of Russian female workers in tailoring				
	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
ΔShare of Russian in tailoring	0.231***	0.232***	0.244***	0.249***
	(0.003)	(0.003)	(0.004)	(0.005)
Female share of native tailors 1881				0.808

Source: ICeM data (1851-1911)

Granular

Employment effects on native tailors - by gender

Panel A. Dependent variable: ΔEmployment of male native tailors				
	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
ΔRussians in tailoring	0.182***	0.136***	0.052**	−0.005
	(0.047)	(0.032)	(0.021)	(0.061)
Panel B. Dependent variable: ΔEmployment of female native tailors				
ΔRussians in tailoring	0.198	−0.088	−0.127**	−0.423**
	(0.271)	(0.090)	(0.064)	(0.192)

Source: ICeM data (1851-1911)

Granular Employment status

Outline of talk

- Historical background
- Data and descriptive statistics
- Identification and empirical strategy
- Results
  - Adoption of sewing machine and organization
  - Size of native tailoring firm
  - Employment effects on native tailors
  - Gender composition
- Conclusions

Conclusions

- Organization of production shapes firm capacity to adopt new technology.
  - Arrival of Russian tailors: exogenous shift in production organization.
  - Accelerated adoption of sewing machine and transition to mass production.
  - **Policies improving internal firm practices** (e.g. management training programs) are essential to **facilitate adoption**.

Conclusions

- Organization of production shapes firm capacity to adopt new technology.
  - Arrival of Russian tailors: exogenous shift in production organization.
  - Accelerated adoption of sewing machine and transition to mass production.
  - **Policies improving internal firm practices** (e.g. management training programs) are essential to **facilitate adoption**.

- Immigration affects technological change and the creation of new jobs
  - New opportunities for native employment in the long-term.
  - **Immigration policy** based on demand for immigrant labor in host country.
  - Important to analyze **how immigrant expertise can boost labor demand**.

Thank you!

www.yanniskastis.com

Retail shops

Number of clothing retail shops in England from *Retail Trading in Britain 1850 - 1950*

Table 1. Growth of Ready-to-Wear Clothing Outlets, 1880–1915

A Numbers Type	1880	1885	1890	1895	1900	1905	1910	1915
Men's and boys' wear	44	119	211	349	570	854	1,085	1,259
Women's and girls' wear	—	20	77	153	245	342	472	543
Footwear	500	757	1,231	1,967	2,589	2,962	3,544	3,879
Total	544	896	1,519	2,469	3,404	4,158	5,101	5,681

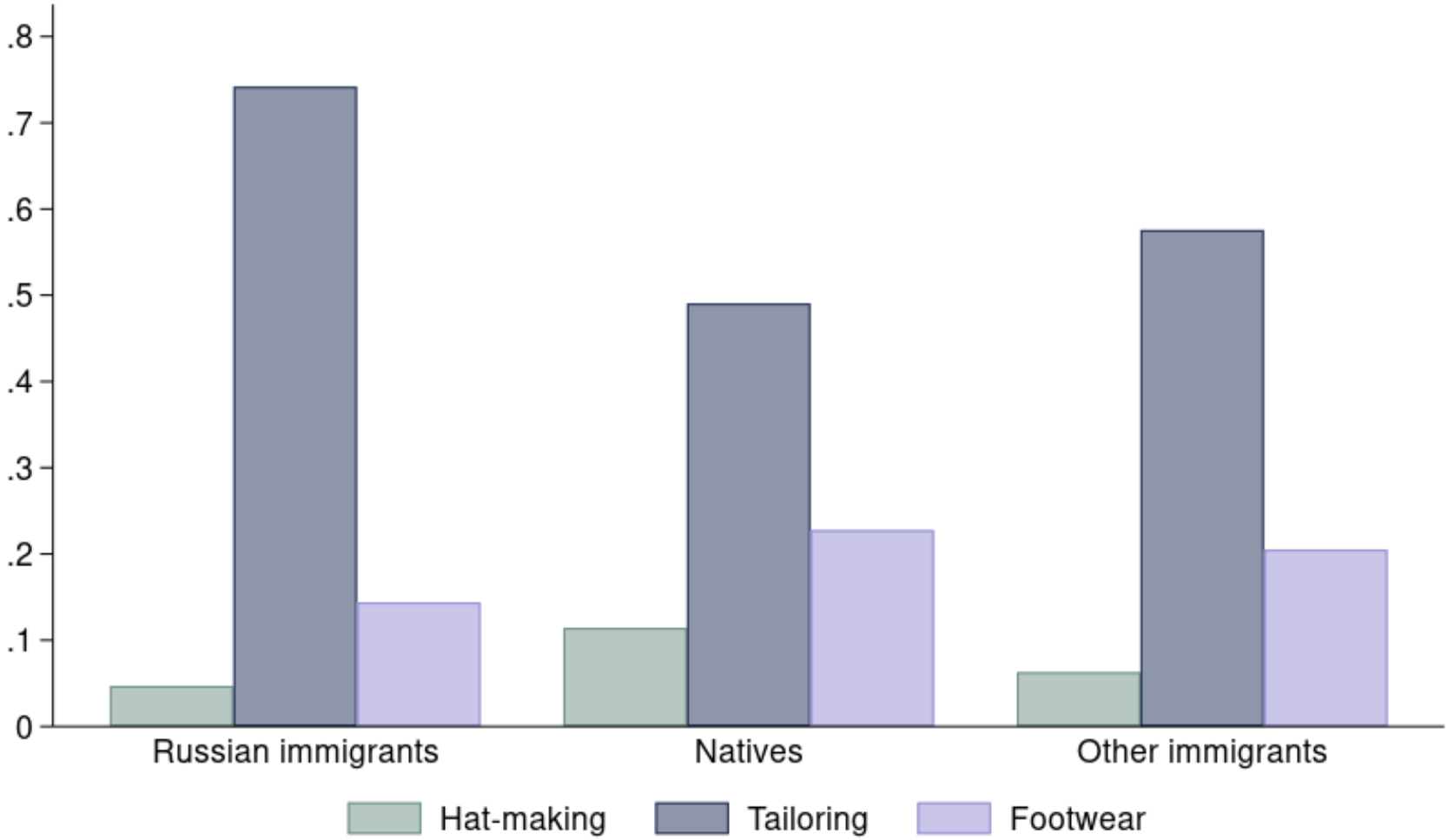
B Percentage Increase Type	1880–85	1885–90	1890–95	1895–1900	1900–1905	1905–10	1910–15
Men's and boys' wear	170.4	77.3	65.4	63.3	49.8	27.0	16.0
Women's and girls' wear	—	285.0	98.7	60.1	39.6	38.0	15.0
Footwear	51.4	62.6	59.8	31.6	14.4	19.6	9.4
Total	64.7	69.5	62.5	37.8	22.1	22.6	11.4

Source: Calculated from James B. Jefferys, *Retail Trading in Britain, 1850–1950* (Cambridge, 1954), Table 85

Growth in ready-to-wear clothing outlets over the 19th century

Back

Russian immigrants and natives: industries in the clothing sector

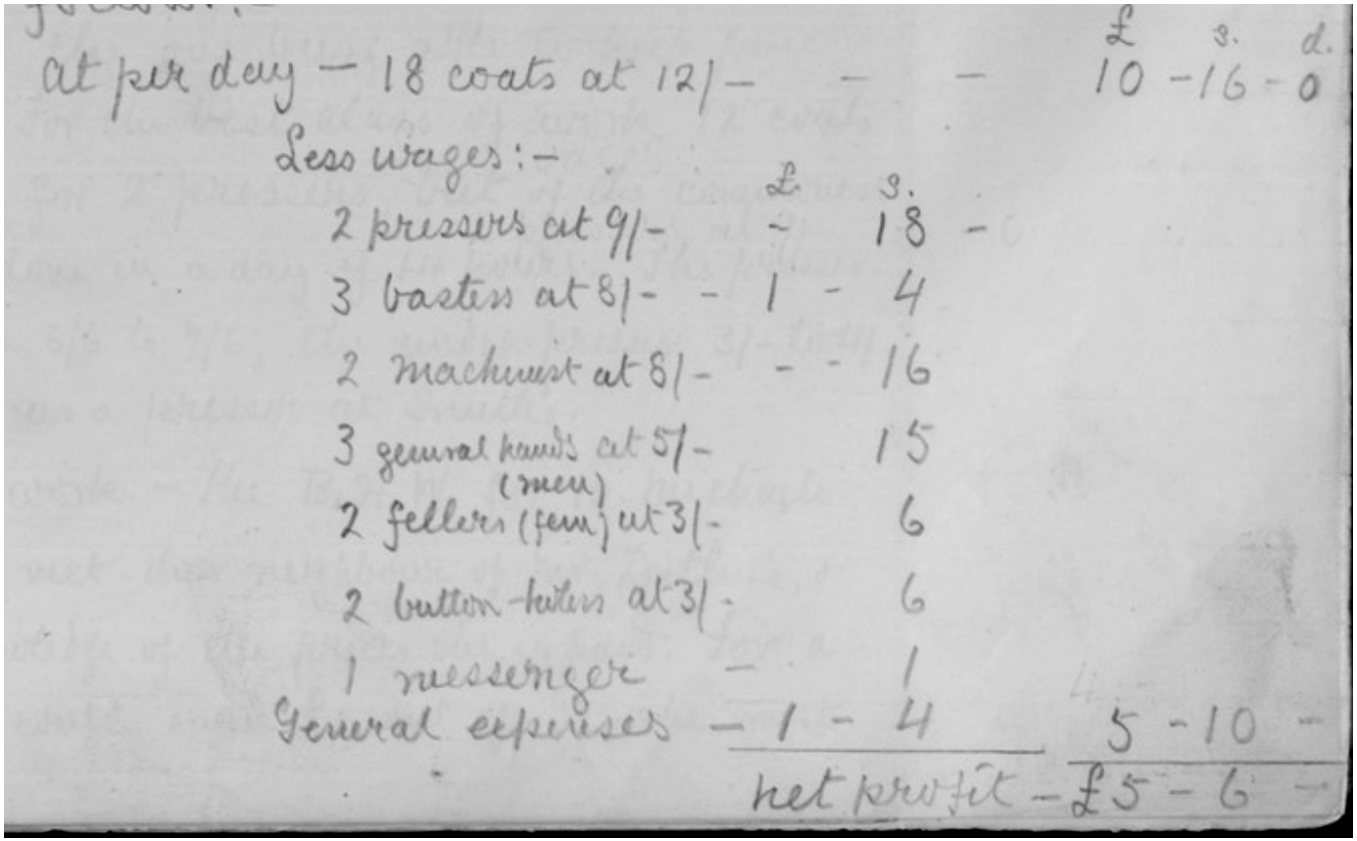


Source: ICeM data 1881

Back to clothing

Booth interviews: Tasks

From Charles Booth's Inquiry into Life and Labour in London Notebooks. An interview with the Jewish tailor, Mr. Zetlin, Dec 9th, 1887.



	£	s.	d.
at per day – 18 coats at 12/–			
	10	16	0
Less wages:–			
2 pressers at 9/–	–	18	–
3 basters at 8/–	1	4	
2 machinist at 8/–	–	16	
3 general hands at 5/–		15	
2 fellers (men) (fem) at 3/–		6	
2 button-holers at 3/–		6	
1 messenger	–	1	
General expenses	1	4	
	5	10	–
net profit	£5	6	–

Back

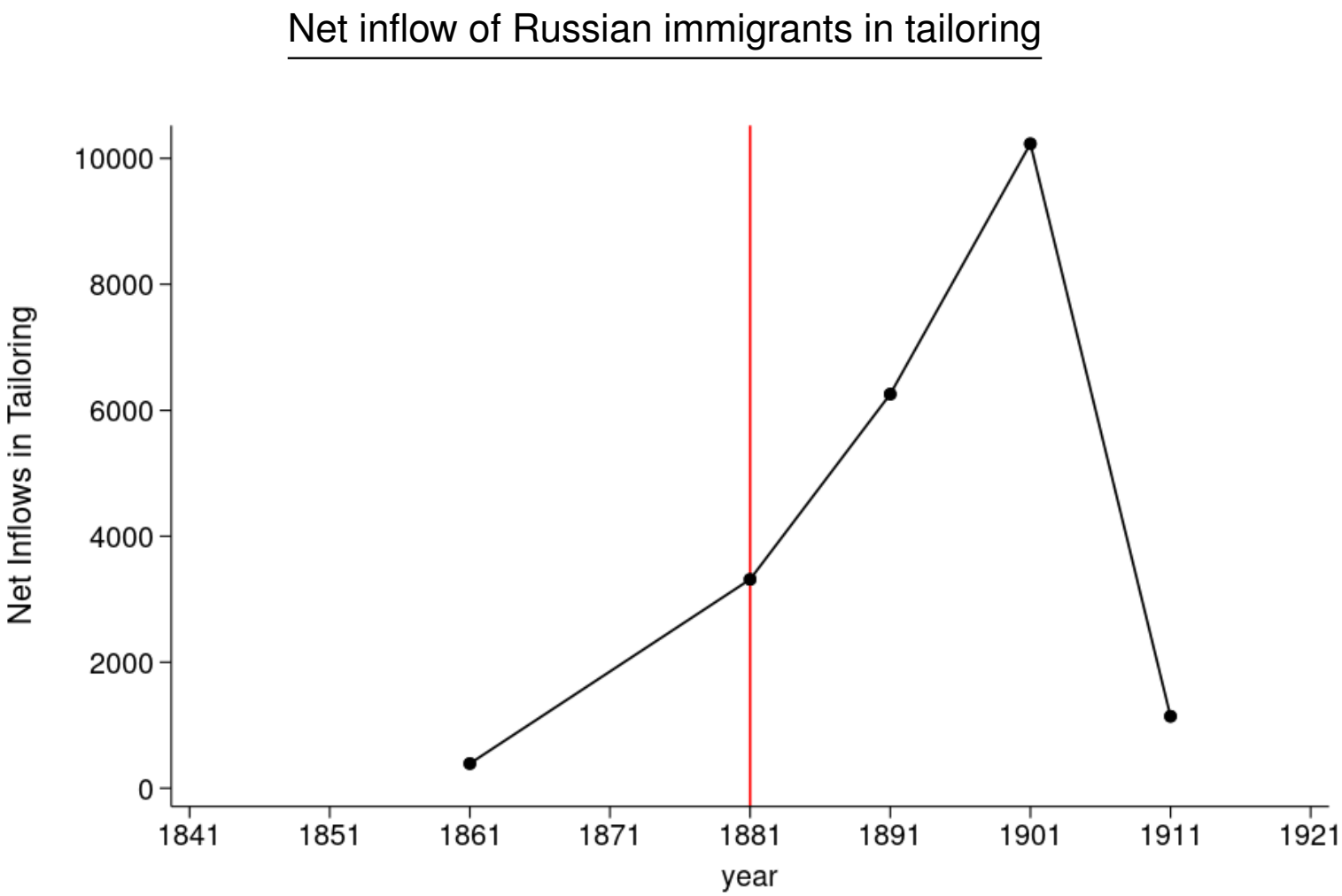
The immigration shock in the English tailoring industry (top-3 districts)



Source: ICeM data (1851-1911)

Back to share

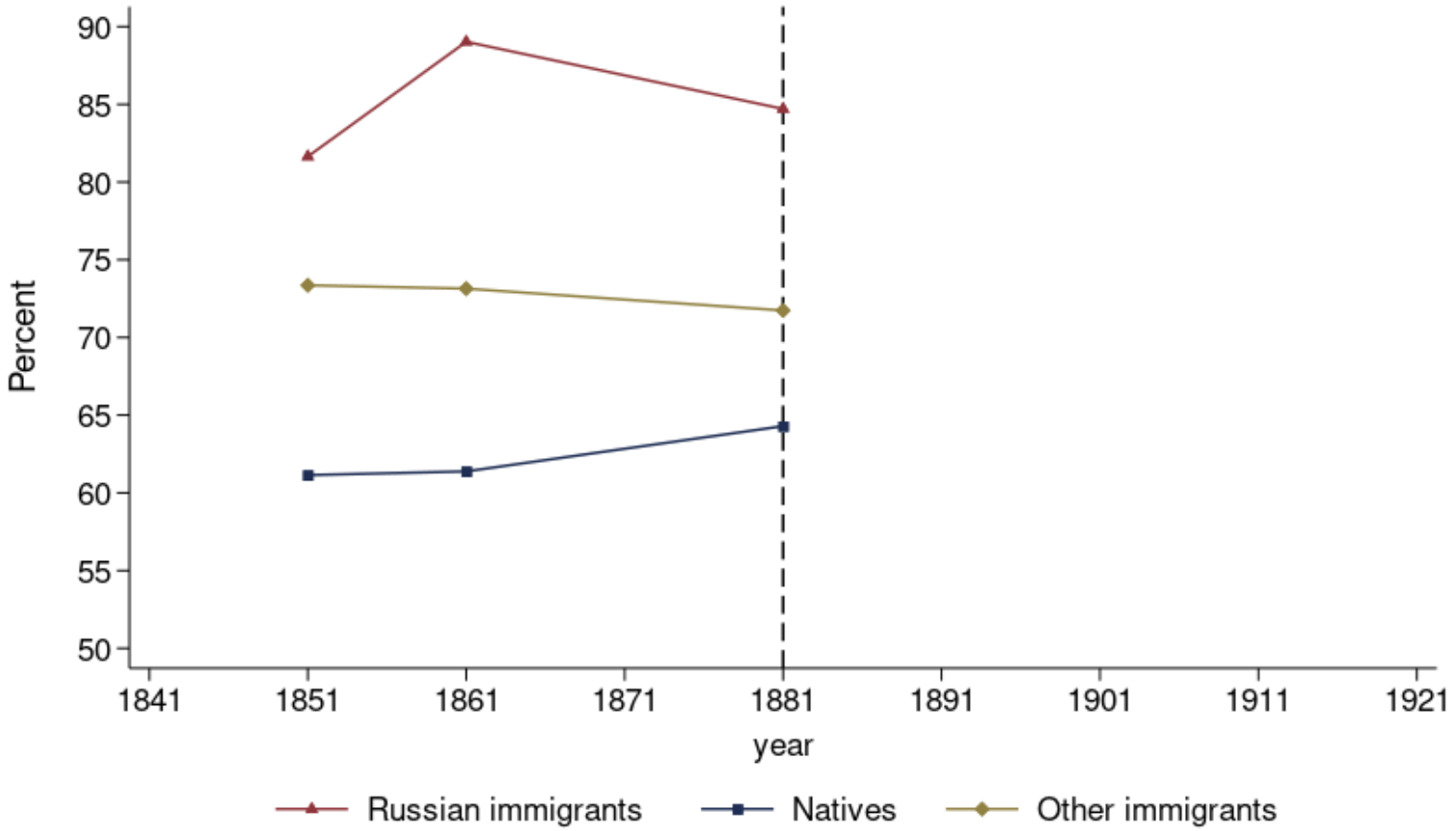
The immigration shock in the English tailoring industry (net inflows)



Source: ICeM data (1851-1911)

Back to share

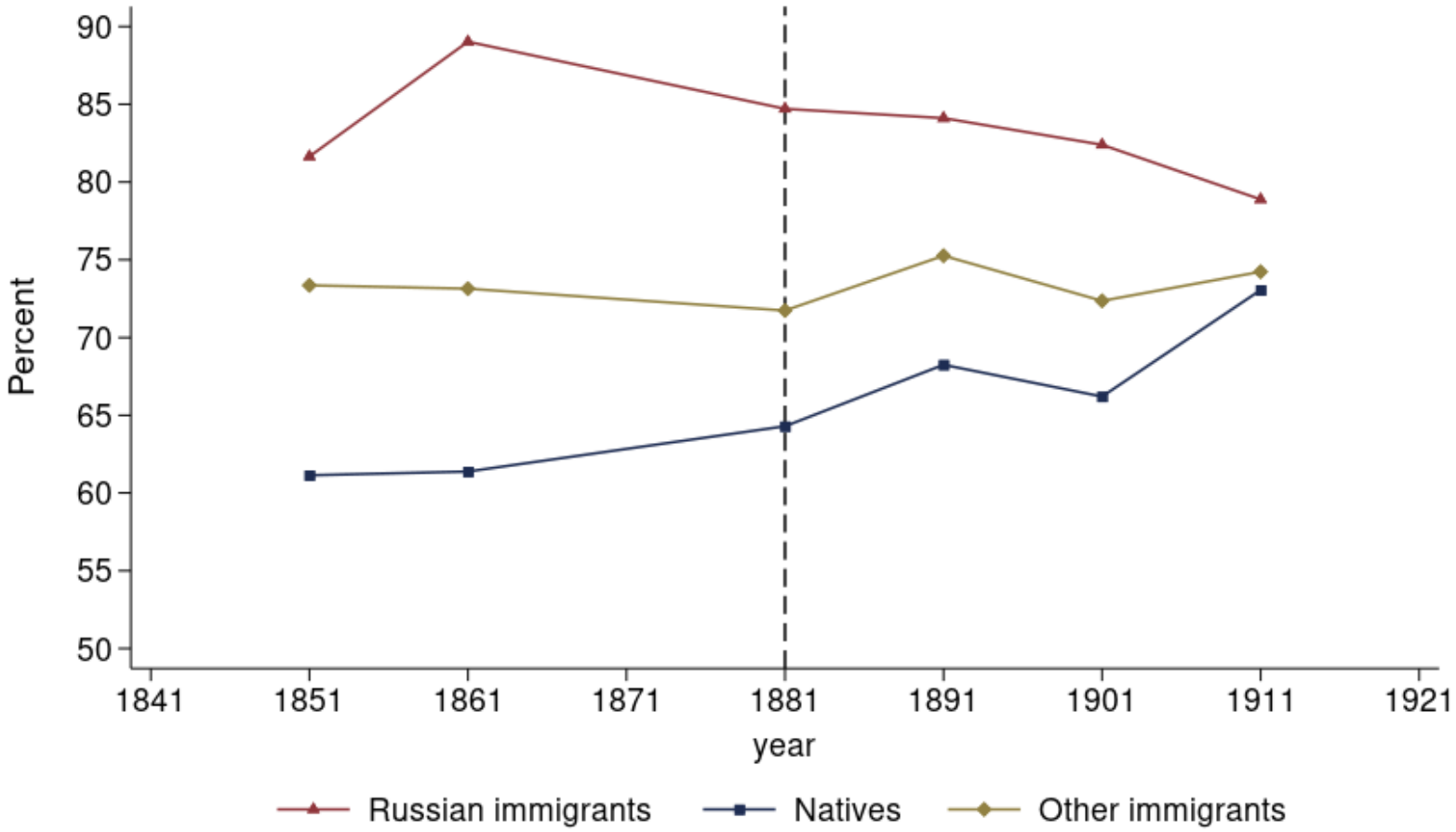
Share of employees among tailors



Source: BBCE data (1851-1911)

Back Firm

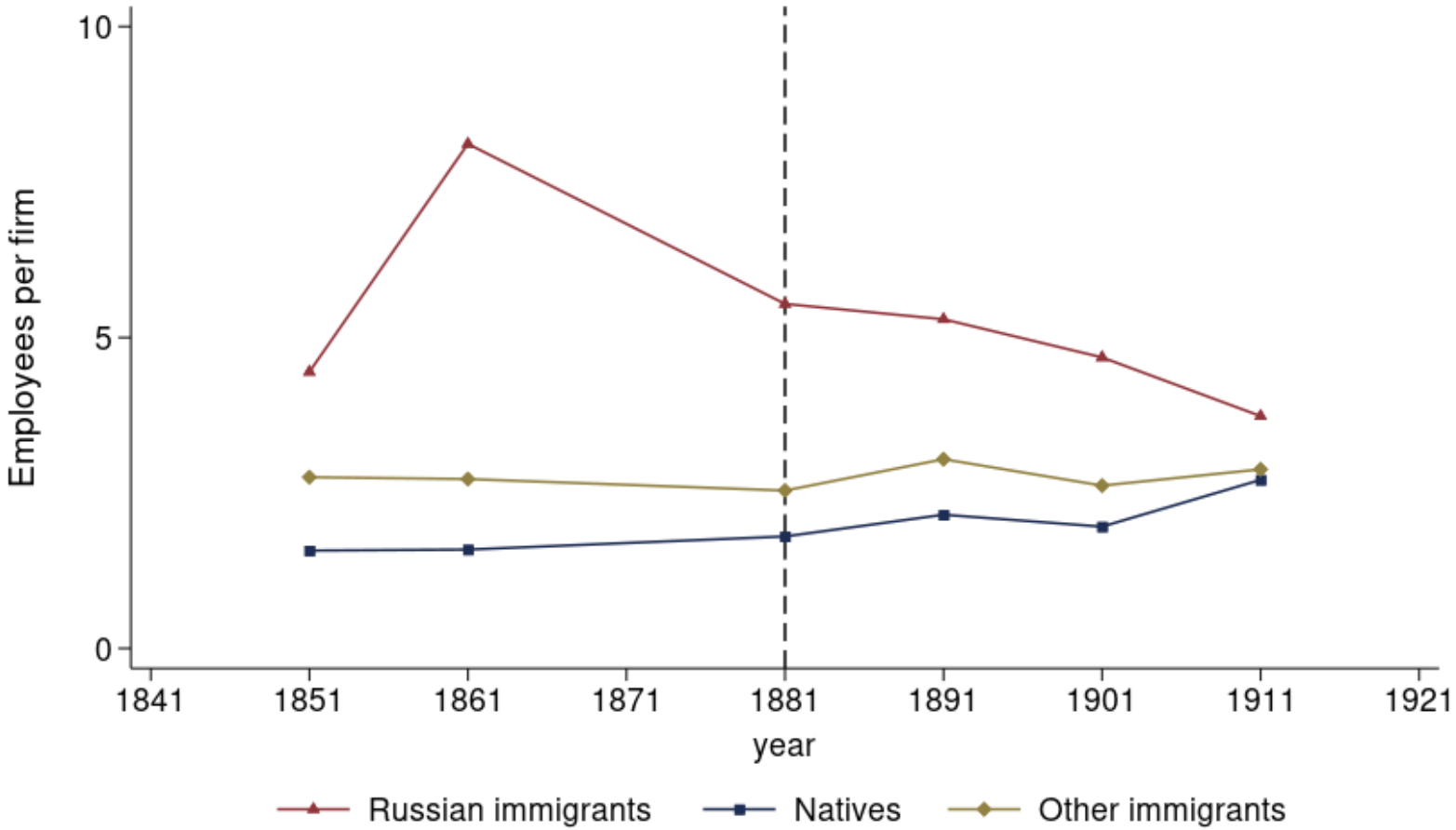
Share of employees among tailors



Source: BBCE data (1851-1911)

Back Firm

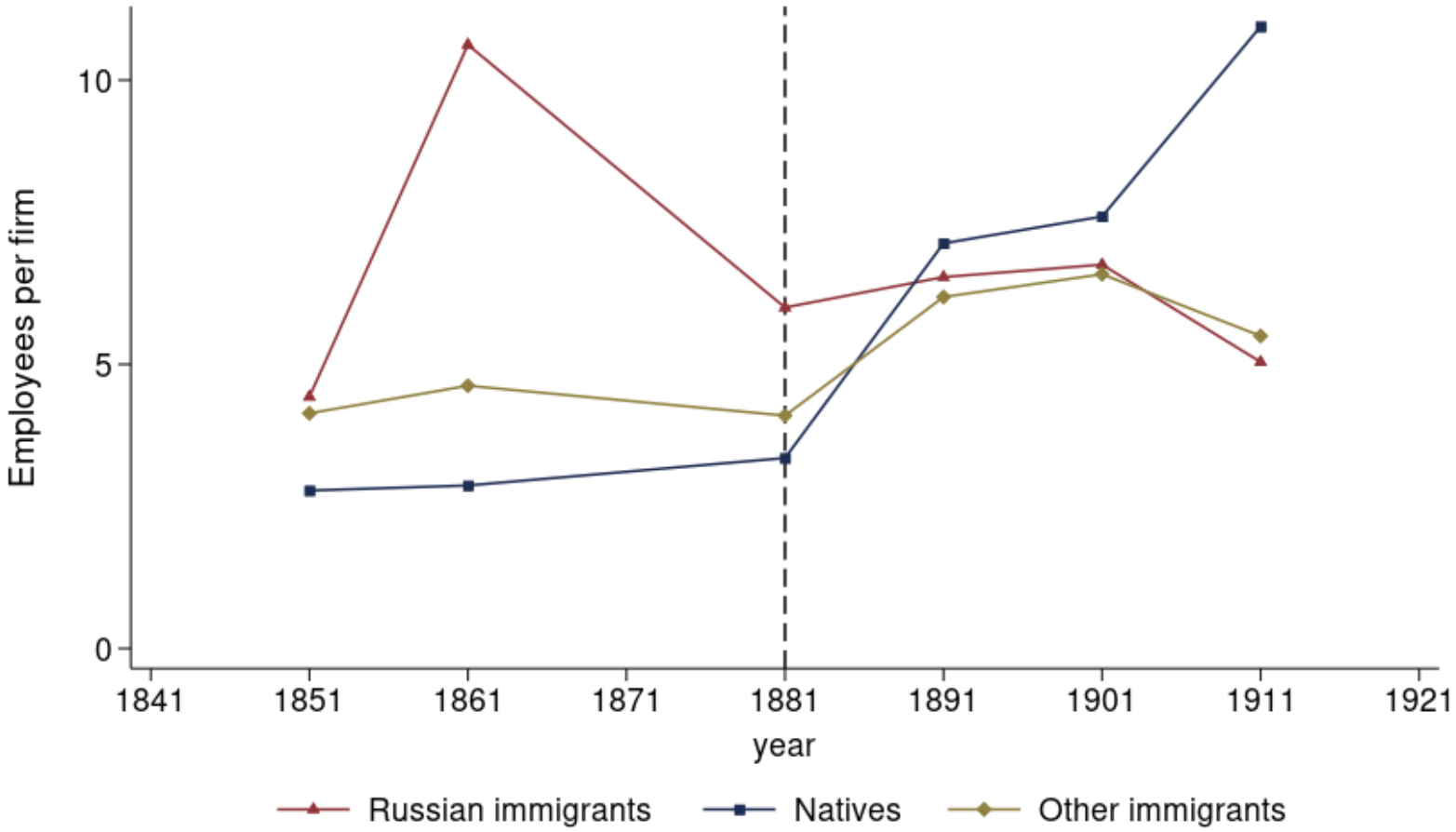
Employees per tailoring firm



Source: BBCE data (1851-1911)

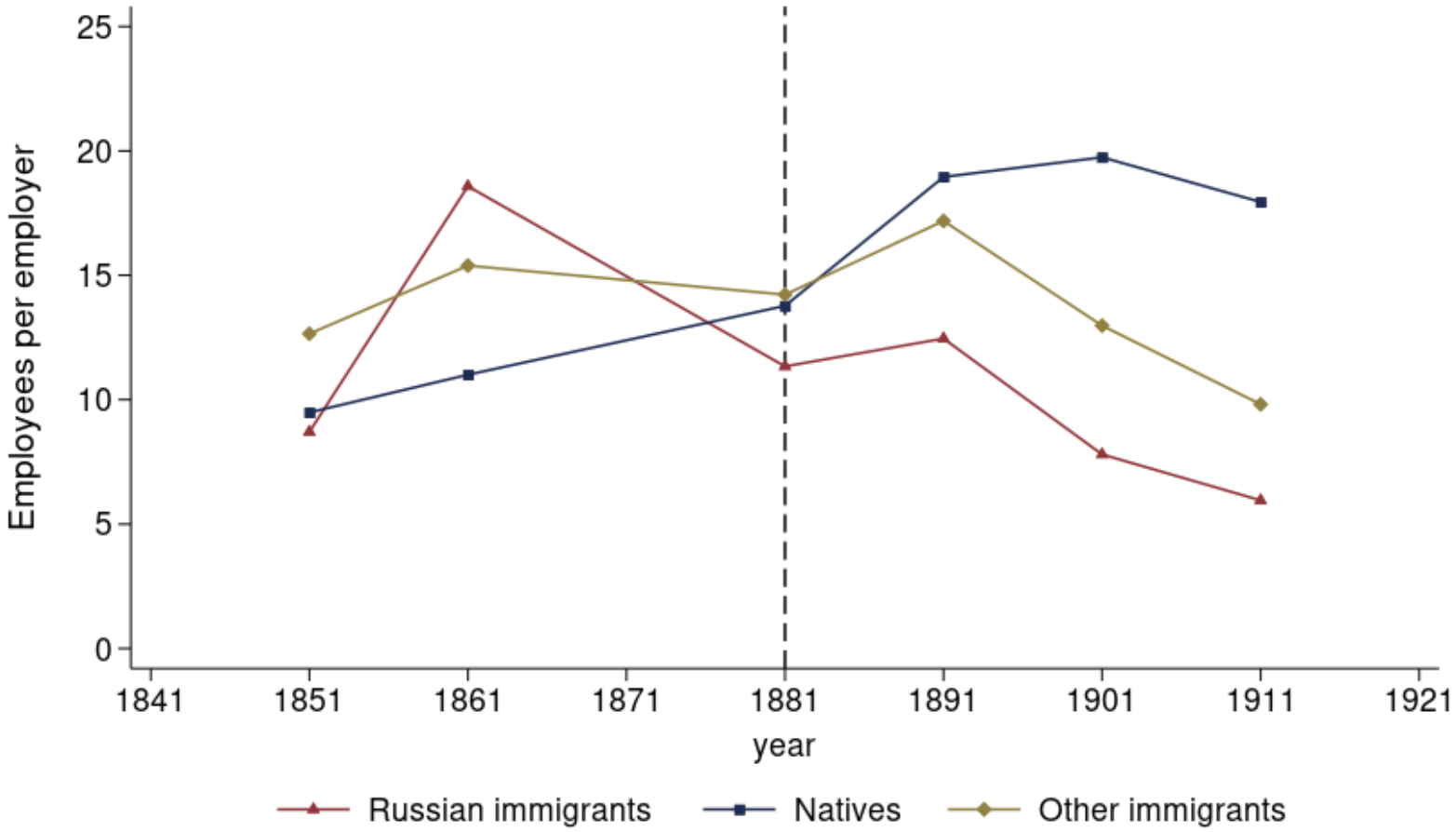
Back to Employee shares

Employees per tailoring firm - top 5 districts of Russian inflows



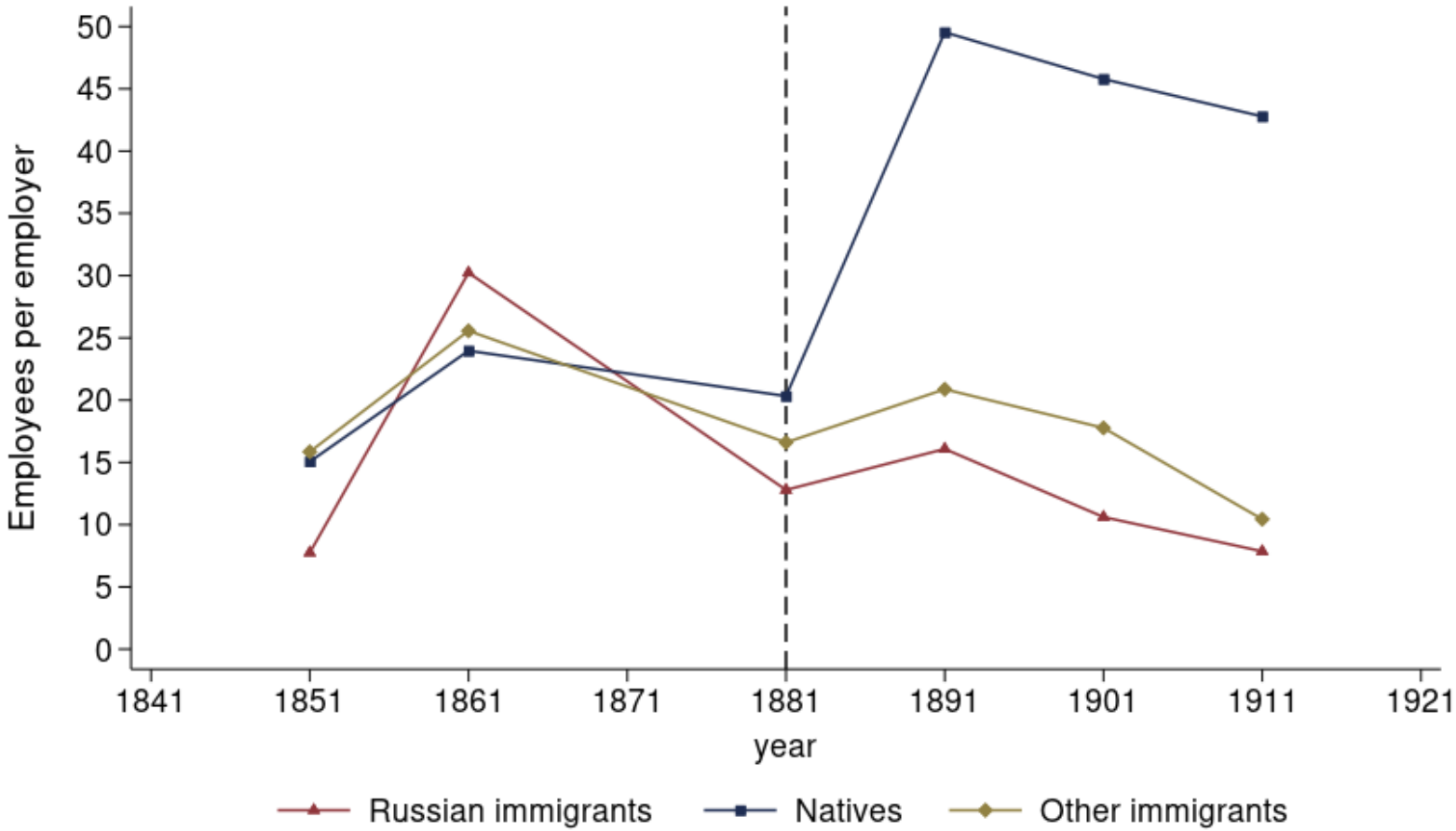
Source: BBCE data (1851-1911)

Employees per tailoring employer



Source: BBCE data (1851-1911)

Employees per tailoring employer - top 5 districts of Russian inflows



Source: BBCE data (1851-1911)

Location of tailoring in 1851 and the immigration shock

First stage with location of tailoring in 1851 as instrument		
	1881-1891	**1891-1901**
	(1)	(2)
Shift-share, 1851 tailoring shares	0.386	0.501
	(0.344)	(0.457)
Observations	554	554
R^2	0.0002	0.0007
F-stat	0.70	1.11

Source: ICeM data (1851-1911)

Back to first stage

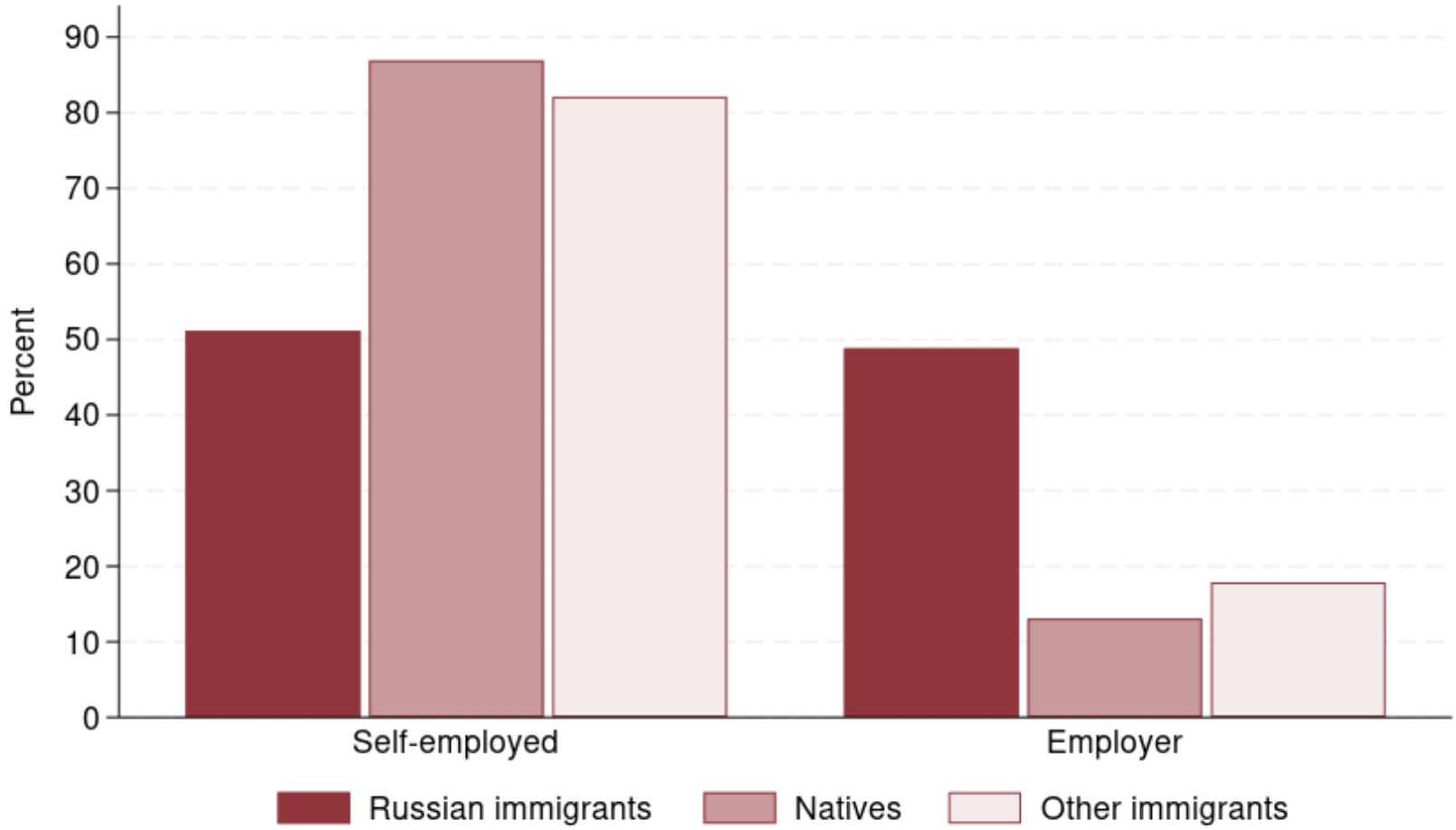
Location of Russian tailoring workers and wealth in 1851

Dependent variable: Share of Russian tailoring workers concentrated in district in 1851		
	(1)	(2)
Wealth indicator in 1851		
Share bottom 10% Human Capital in district	0.00002	
	(0.00005)	
Share top 10% Human Capital in district		0.00093
		(0.00051)
Observations	554	554
R^2	0.0456	0.0688
F-stat	0.97	3.09

Source: ICeM data (1851-1911)

Back to first stage

Self-employed and employers in tailoring



Source: BBCE data (1881) Back to workshops

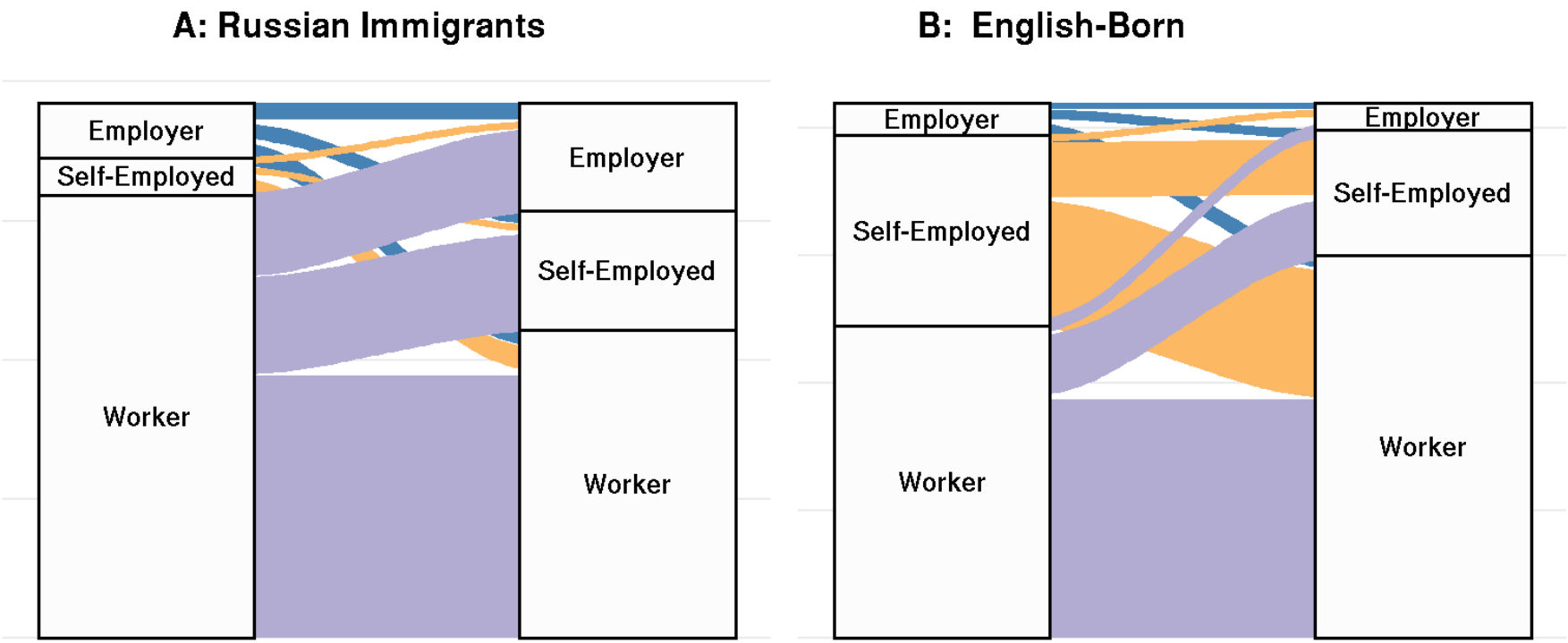
Effects on native tailors by employment status

	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
Panel A. Dependent variable: ΔNative employees in tailoring				
ΔRussians in tailoring	0.484	0.166**	0.053	−0.150
	(0.310)	(0.071)	(0.065)	(0.115)
Panel B. Dependent variable: ΔNative employers in tailoring				
ΔRussians in tailoring	0.006	0.017**	0.022**	0.006
	(0.007)	(0.007)	(0.009)	(0.009)
Panel C. Dependent variable: ΔNative self-employed in tailoring				
ΔRussians in tailoring	−0.110***	−0.135**	−0.150**	−0.284*
	(0.024)	(0.058)	(0.067)	(0.158)

Source: ICeM data (1851-1911)

Back

Employers and Self-Employed: 1881-1891



Employment Status: 1881-1891

Back

Employment effects on native tailors - overall

Dependent variable: ΔEmployment of native tailors				
	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
ΔRussians in tailoring	0.379	0.048	−0.075	−0.428*
	(0.318)	(0.117)	(0.073)	(0.248)

Source: ICeM data (1851-1911)

Back

Female shares among inflows of Russian tailors - granular occupations

	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
Panel A. Dependent variable: ΔShare of Russian female machinists in tailoring				
ΔShare of Russian in tailoring	−0.002***	−0.006***	0.008***	0.008***
	(0.003)	(0.001)	(0.000)	(0.001)
Female native machinists share 1881				0.005
Panel B. Dependent variable: ΔShare of Russian female specialists in tailoring				
ΔShare of Russian in tailoring	0.038***	0.057***	0.026***	0.032***
	(0.012)	(0.003)	(0.003)	(0.001)
Female native specialists share 1881				0.002
Panel C. Dependent variable: ΔShare of Russian female generalists in tailoring				
ΔShare of Russian in tailoring	0.194***	0.178***	0.209***	0.210***
	(0.008)	(0.002)	(0.002)	(0.004)
Female native generalists share 1881				0.801

Source: ICeM data (1851-1911)

Back

Effects on female native tailors by employment status

	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
Panel A. Dependent variable: ΔFemale Native employees in tailoring				
ΔRussians in tailoring	0.334	0.066	0.009	−0.154**
	(0.272)	(0.046)	(0.051)	(0.069)
Panel B. Dependent variable: ΔFemale Native employers in tailoring				
ΔRussians in tailoring	−0.015***	−0.011**	0.010	0.003
	(0.004)	(0.005)	(0.006)	(0.007)
Panel C. Dependent variable: ΔFemale Native self-employed in tailoring				
ΔRussians in tailoring	−0.120***	−0.143**	−0.145**	−0.272*
	(0.023)	(0.059)	(0.063)	(0.151)

Source: ICeM data (1851-1911)

Back

Effects on male native tailors by employment status

	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
Panel A. Dependent variable: ΔMale Native employees in tailoring				
ΔRussians in tailoring	0.150***	0.100***	0.044**	0.004
	(0.040)	(0.037)	(0.020)	(0.057)
Panel B. Dependent variable: ΔMale Native employers in tailoring				
ΔRussians in tailoring	0.021***	0.028***	0.012***	0.003
	(0.004)	(0.006)	(0.003)	(0.004)
Panel C. Dependent variable: ΔMale Native self-employed in tailoring				
ΔRussians in tailoring	0.011*	0.008	−0.005	−0.012
	(0.005)	(0.005)	(0.004)	(0.009)

Source: ICeM data (1851-1911)

Employment effects on female native tailors - granular occupations

	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
Panel A. Dependent variable: ΔEmployment of female native machinists				
ΔRussians in tailoring	0.025**	0.017***	0.044	−0.002
	(0.012)	(0.002)	(0.031)	(0.022)
Panel B. Dependent variable: ΔEmployment of female native specialists				
ΔRussians in tailoring	0.033***	0.026***	0.031***	0.017***
	(0.008)	(0.001)	(0.012)	(0.004)
Panel C. Dependent variable: ΔEmployment of female native generalists				
ΔRussians in tailoring	0.132	−0.134	−0.200***	−0.437**
	(0.249)	(0.090)	(0.070)	(0.199)

Source: ICeM data (1851-1911)

Back

Employment effects on male native tailors - granular occupations

	1881-1891		1891-1901	
	OLS	IV	OLS	IV
Independent variable	(1)	(2)	(3)	(4)
Panel A. Dependent variable: ΔEmployment of male native machinists				
ΔRussians in tailoring	0.022***	0.023***	0.026**	0.051***
	(0.004)	(0.001)	(0.010)	(0.003)
Panel B. Dependent variable: ΔEmployment of male native specialists				
ΔRussians in tailoring	0.038*	0.021***	0.018*	0.024***
	(0.021)	(0.003)	(0.009)	(0.005)
Panel C. Dependent variable: ΔEmployment of male native generalists				
ΔRussians in tailoring	0.112***	0.092***	0.008	−0.085
	(0.022)	(0.029)	(0.017)	(0.058)

Source: ICeM data (1851-1911)