Are Routine Jobs Moving South?

Evidence from Changes in the Occupational Structure of Employment in the U.S. and Mexico

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Motivation

- Falling share of employment in routine task-intensive, middle-wage jobs
- Widely documented across developed countries (Goos, Manning & Salomons, 2009; Acemoglu & Autor, 2011)
- Potential driving forces:
  1. Falling trade/offshoring costs: e.g. Antras, Garicano & Rossi-Hansberg (2006), Egger, Kreickemeier, Moser & Wrona (2016)
  2. Routine-replacing technological change: e.g. Autor, Levy & Murnane (2003), Goos & Manning (2007)
- These two driving forces have very different implications in terms of patterns that should be observed in **developing countries**

Motivation

1. Falling trade/offshoring costs:
   - Routine jobs moving South
   - Should observe an **increase** in routine employment in countries such as Mexico
     - "Our jobs are fleeing the country, they are going to Mexico, and many other countries" (Donald Trump, 2016)
2. Routine-replacing technological change:
   - Routine jobs disappearing everywhere
   - Should observe a **decrease** in routine employment in countries such as Mexico

Our Paper

- Contrast changes in occupational structure of employment in the U.S. and Mexico
- Use **detailed ($\sim$185) job categories** based on matching of occupational codes (job titles)
- Compare evolution of employment across common occupational categories, not along the occupational wage distribution
  - Routine-intensive jobs need not be middle-wage jobs in Mexico
- Determine whether routine-intensive occupations are growing or shrinking in Mexico

Preview of Findings

For 2001–2011:

- Employment share changes positively correlated across the two countries
- Routine manual jobs generally declining in both countries

For 2013–2018:

- Routine manual jobs as a whole are stable in US; growing in Mexico
- Patterns across detailed job categories remain positively correlated, even when focusing on auto industry (which grows strongly in Mexico)

Overall:

- No support for hypothesis that routine jobs have moved from the U.S. to Mexico in the 2000s
- Common shocks (e.g. technology, rise of China) seem a more likely driver of the changes

Contributions to the Literature

- **Polarization Literature:**
  - So far, limited evidence on de-routinization outside of high-income countries [exceptions: World Bank (2016), Ariza & Raymond Bara (2018), Reijnders & de Vries (2018)]
  - New evidence for Mexico; much finer level of detail; US-Mexico comparison
- **Offshoring Literature:**
  - So far, mainly focused on impacts on skill premium [e.g. Goldberg & Pavcnik (2007), Autor, Dorn & Hanson (2013), Acemoglu, Gancia & Zilibotti (2015), Burstein & Vogel (2017), Hummels, Munch & Xiang (2018)]
  - Alternative approach to explore basic underlying idea that certain types of jobs (occupations) are moving to developing countries due to falling trade/offshoring costs
- **Impacts of Trade on Mexican Labor Market:** e.g. Iacovone, Rauch & Winters (2013), Utar & Torres Ruiz (2013), Mendez (2015)

Data

National Labor Force Survey micro-data for both countries

Mexico:

- *Encuesta Nacional de Empleo* (ENE); *Encuesta Nacional de Ocupación y Empleo* (ENOE)
- Quarterly frequency; 2001–2018
- $\sim$ 594,000 obs per year

United States:

- Current Population Survey (CPS)
- Monthly frequency
- $\sim$ 730,000 obs per year

Sample Restrictions

- Civilian workers aged 16–65
- Non-missing information on current occupation
- Exclude workers in agriculture and farming occupations
- Mexican data includes both formal and informal sector workers

Table: Descriptive Statistics for Employed Workers

	U.S.		Mexico	
	2005	2018	2005	2018
Average Age	39.63	40.63	35.98	38.16
Fraction Female	46.77	47.39	40.82	42.41
Average Real Wage (2009 USD)	19.92	21.43	2.32	2.04
Manufacturing Share of Emp	11.71	10.26	19.57	19.15
Educational Composition:				
Elementary Education or Less	1.95	1.46	31.31	18.89
Middle School	8.06	5.35	27.09	29.18
High School	60.07	55.38	24.05	27.52
College Education or Higher	29.93	37.80	17.55	24.41
Nr of Observations (Unweighted)	764,197	651,179	572,500	592,236

Matching Occupation Codes

We **match occupation codes** across the two countries in order to compare the evolution of employment by occupation

Matching based on **job titles**: e.g., “accountants and auditors”, “engineers and scientists”

$\sim$**185 occupational categories** matched across the two countries

Occupation Matching: Examples

Code	Occupation Description	occ1990dd Codes	CMO Codes	SINCO Codes
33	Physicians	84	1130	2411, 2412, 2424
34	Dentists	85	1132	2413
35	Veterinarians	86	1151, 1241	2232, 2614
36	Optometrists	87, 677	1133, 1222	2422
37	Nurses, Therapists and Other Health Occupations	89, 88, 83, 95, 98, 99, 103, 104, 105, 106	1139, 1131	2425, 2817, 2823, 2824, 2825, 2826, 2426
38	Pharmacists	96	1121, 1231	2428, 2814
39	Dieticians and Nutritionists	97	1134, 1223	2423, 2816
40	Subject Instructors (College)	154	1300	2321
41	Kindergarten and Earlier School Teachers	155	1340	2335

Occupation Matching: Examples

Code	Occupation Description	occ1990dd Codes	CMO Codes	SINCO Codes
67	Airplane Pilots and Traffic Controllers	226, 227	5530, 8102	8311, 5231
68	Technicians, n.e.c.	235	1242, 1252, 1290, 1209, 1249	2511, 2512, 2532, 2991, 2992
69	Salespersons	274, 275, 256	7100, 7110, 7120, 7121, 7190, 7111	4111, 4231, 9723, 4999, 4221, 4211, 4213
70	Cashiers and Account Collectors	276, 328, 338, 378, 383	6210, 6211, 6219	3121, 3122, 9732
71	Door-to-door Sales, Street Sales, and News Vendors	277	7200, 7201, 7210, 7211, 7213, 7209, 7219, 7290	9511, 9512, 9521, 9624, 4224
72	Supervisors and Inspectors, n.e.c.	303, 361	6102, 6120, 6130, 6131, 6132, 6150, 6180, 6139	1621, 1622, 1721, 1524, 1722, 1624, 1629, 3201, 3101

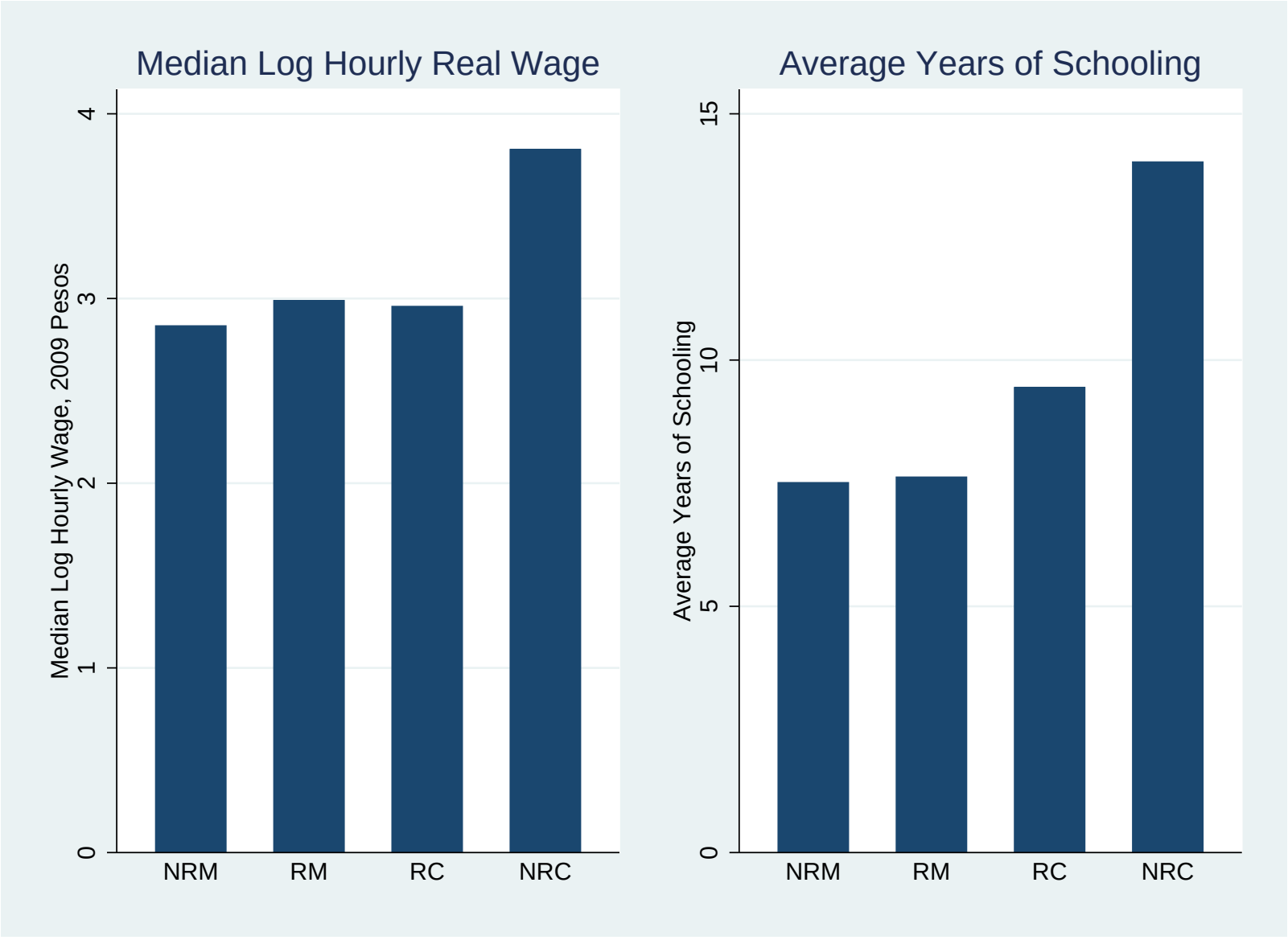
Grouping of Occupations

Occupation Group	Occupation Codes (occ_mxus)
Non-Routine Cognitive (NRC)	
Executive and Managerial Occupations	1 – 9
Management Related Occupations	10 – 18
Professional Specialty Occupations	19 – 60
Technicians and Related Occupations	61 – 68
Routine Cognitive (RC)	
Sales Occupations	69 – 71
Administrative Support Occupations	72 – 88
Routine Manual (RM)	
Mechanics and Repairers	117 – 123
Construction Occupations	124 – 136
Extractive Occupations	137 – 140
Precision Production Occupations	141 – 156
Machine Operators, Assemblers, and Inspectors	157 – 175
Transportation and Material Moving Occupations	176 – 185
Non-Routine Manual (NRM)	
Housekeeping and Cleaning Occupations	89 – 90
Protective Service Occupations	91 – 96
Other Service Occupations	97 – 111

Cross-Country Comparability

Are Occupational Wage Rankings Similar?

Figure: Wage and Education Levels across Major Occ Groups, Mexico, 2005



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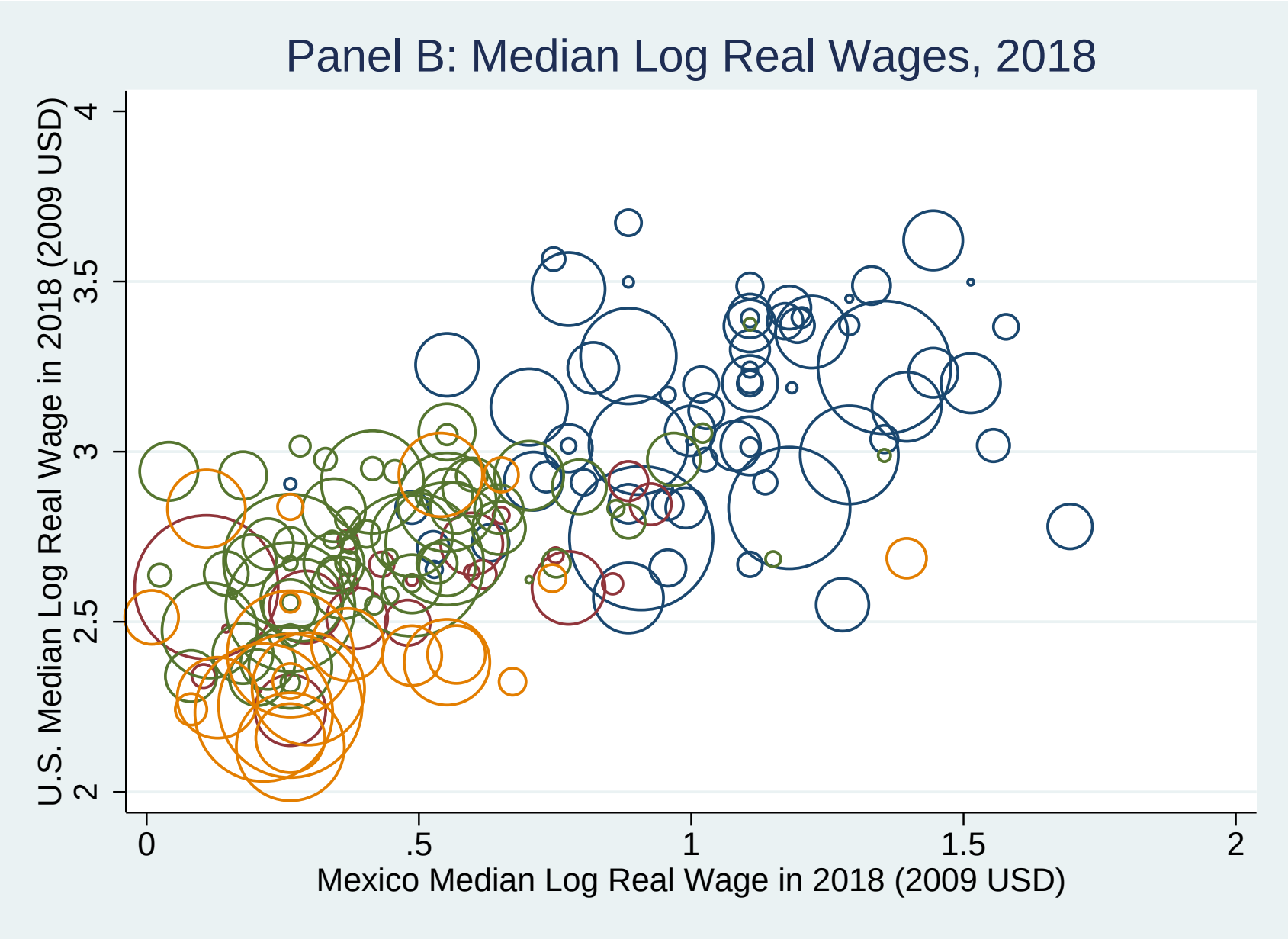
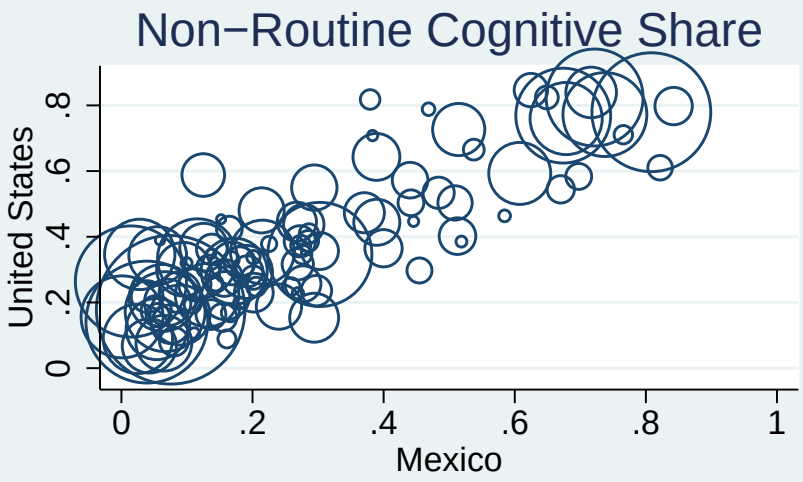
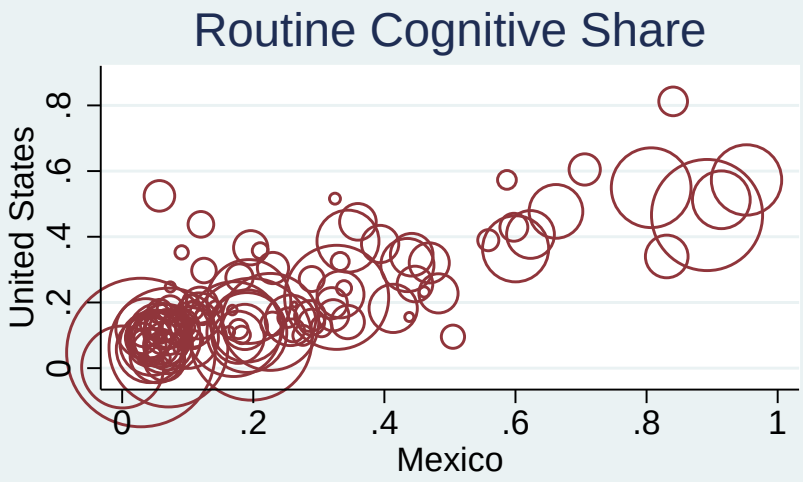


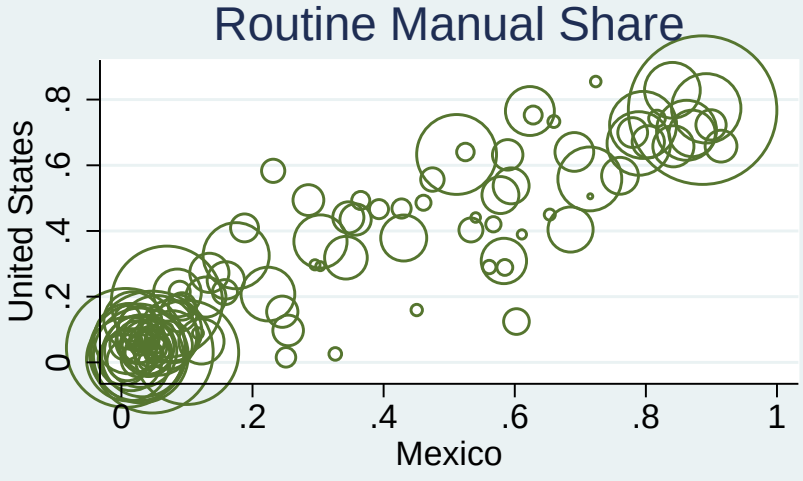
Do Industries use a Similar Occupational Mix?

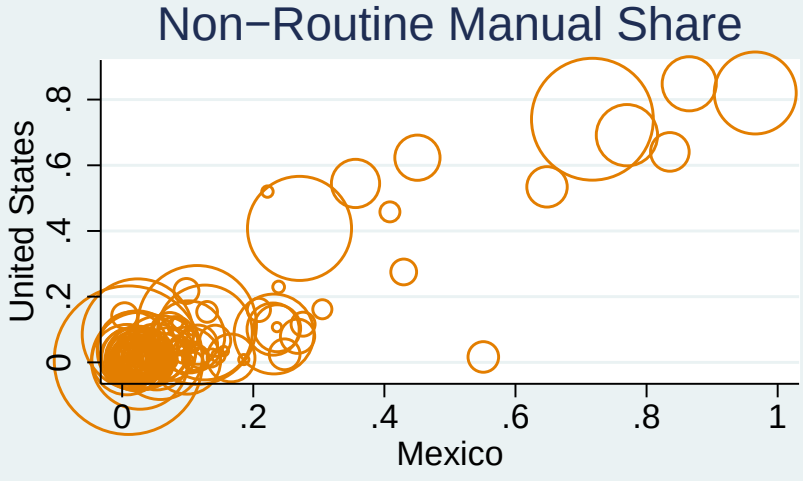
Occupational Employment Shares

By industry, 2005



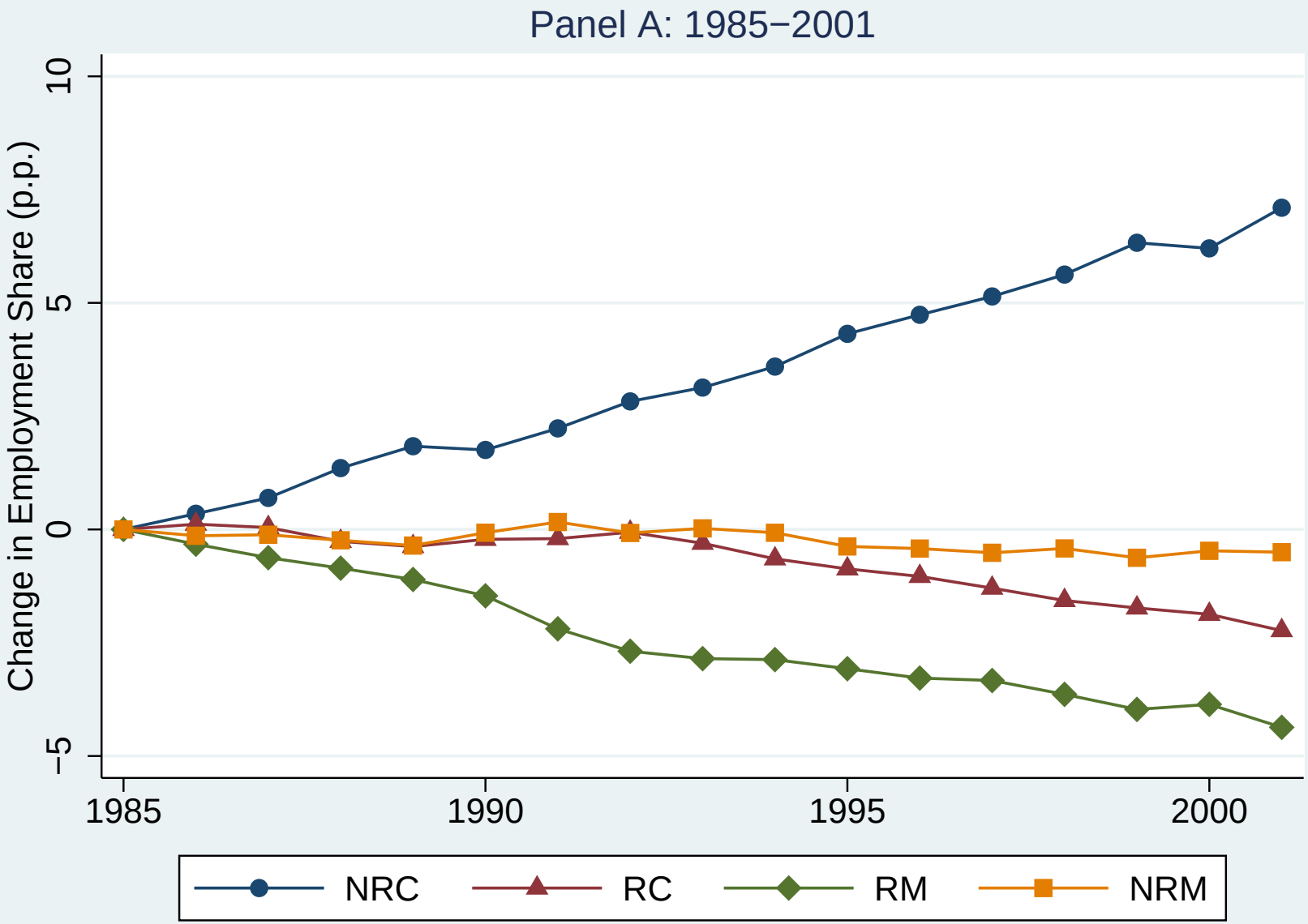




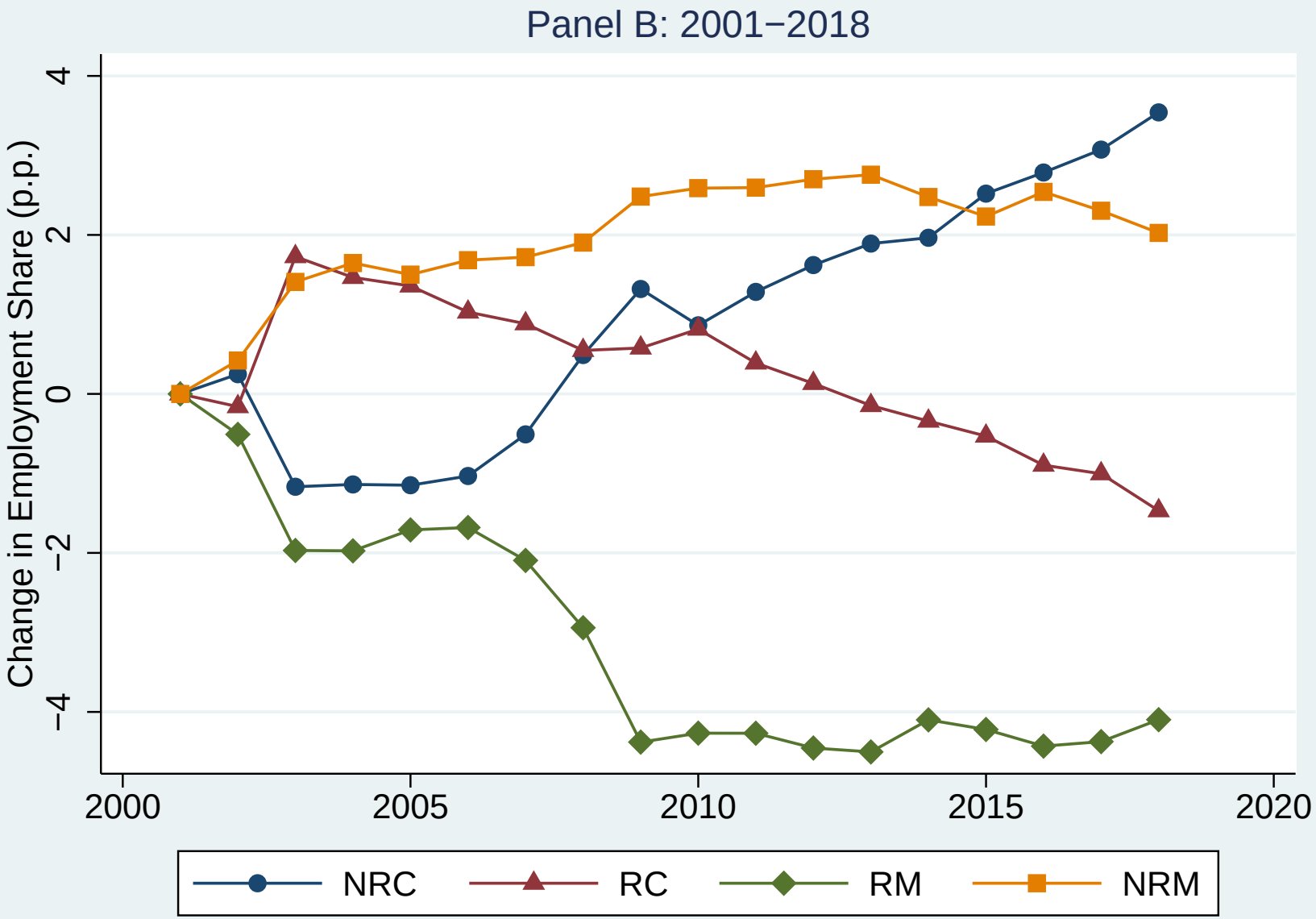


Employment Changes: Broad Occupation Groups

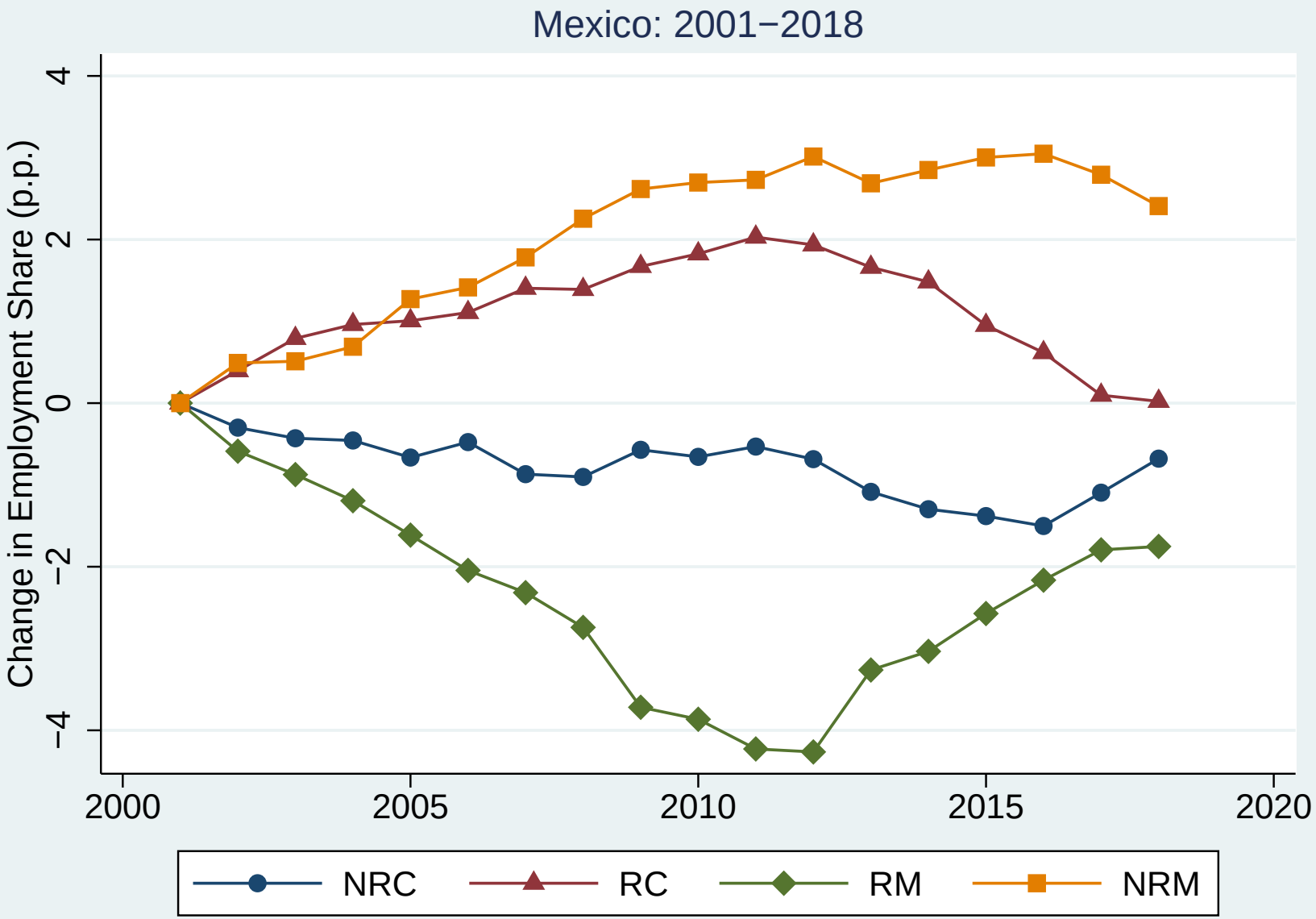
Employment Share Changes: US



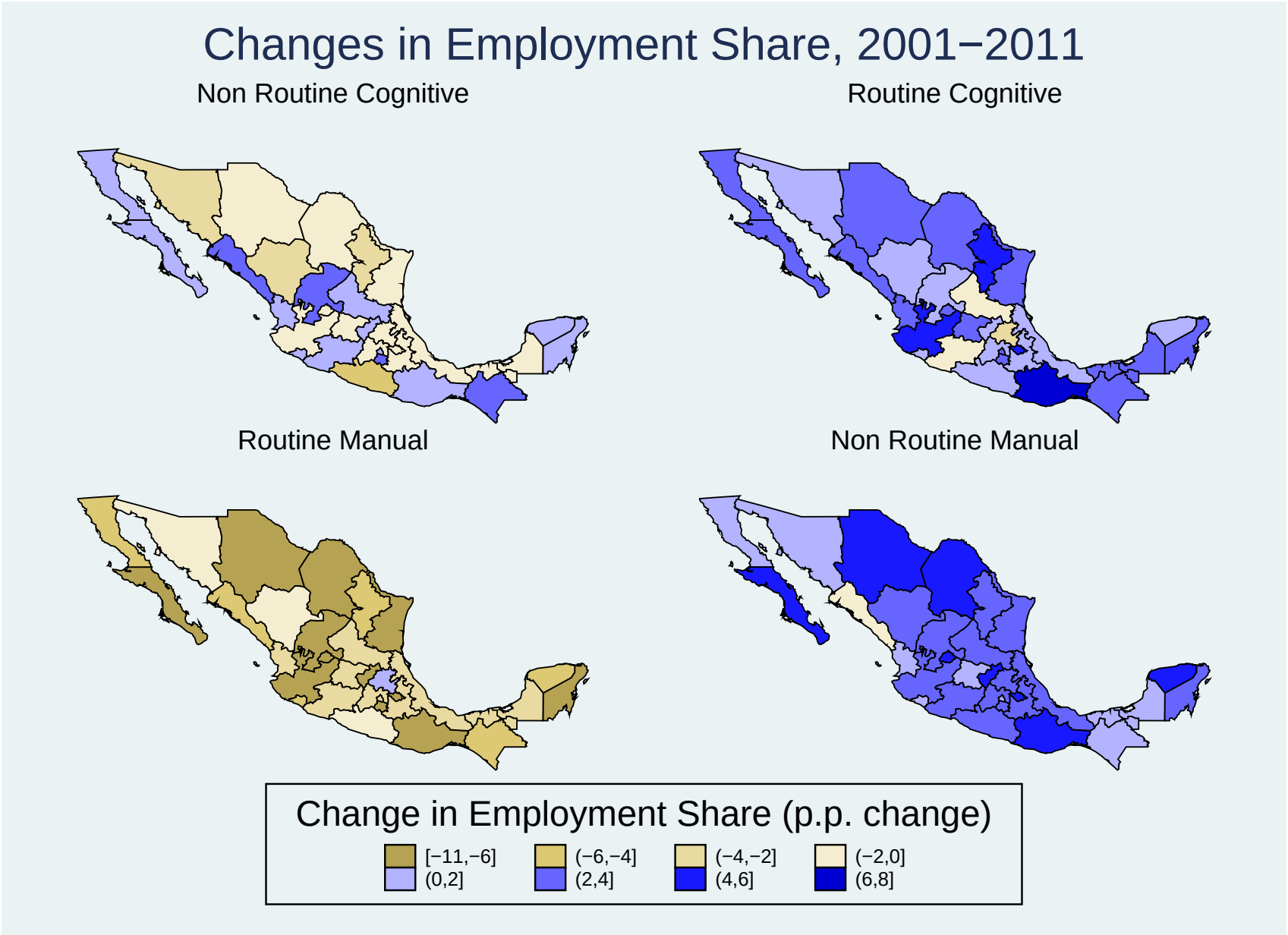
Employment Share Changes: US



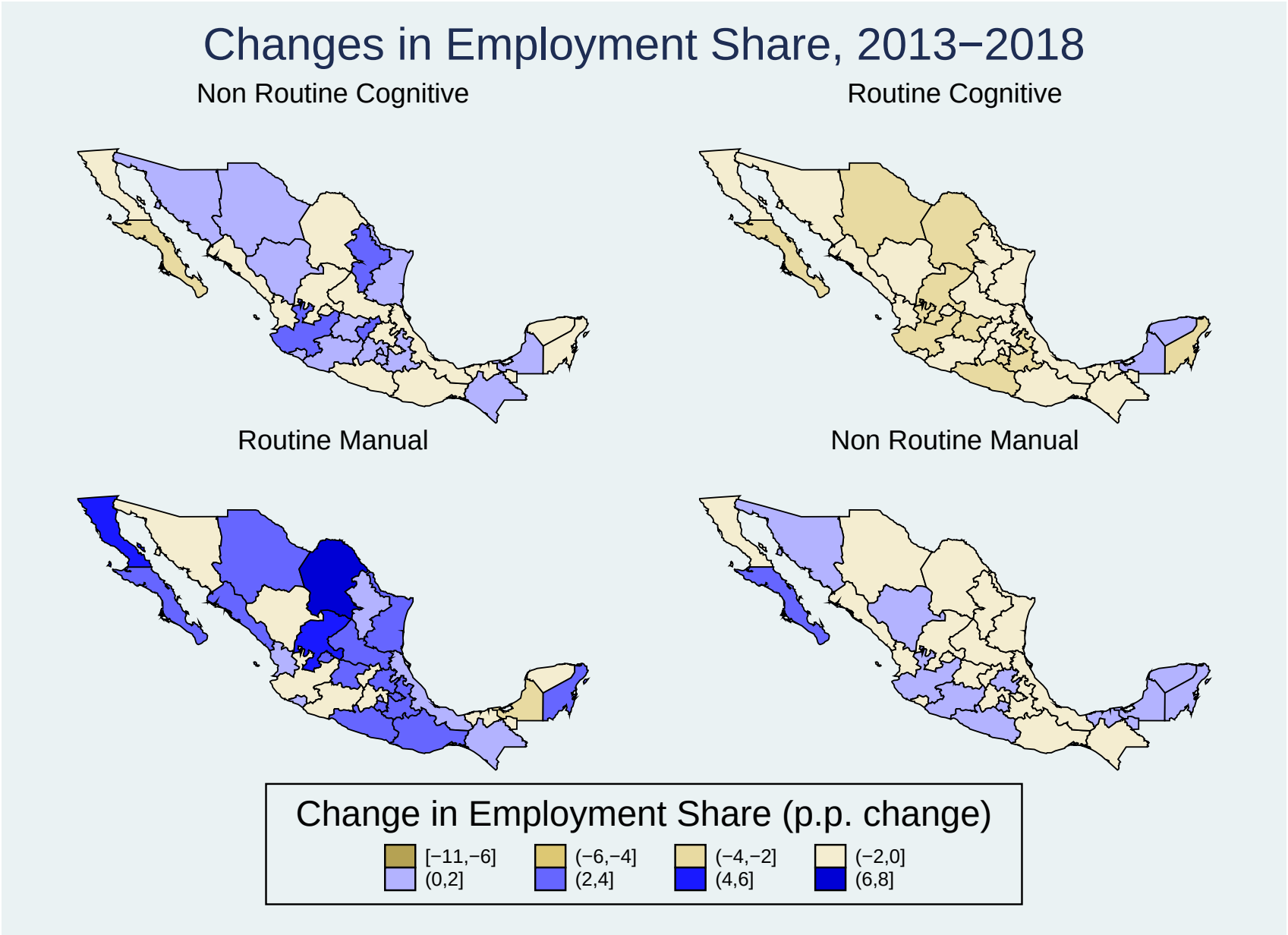
Employment Share Changes: Mexico



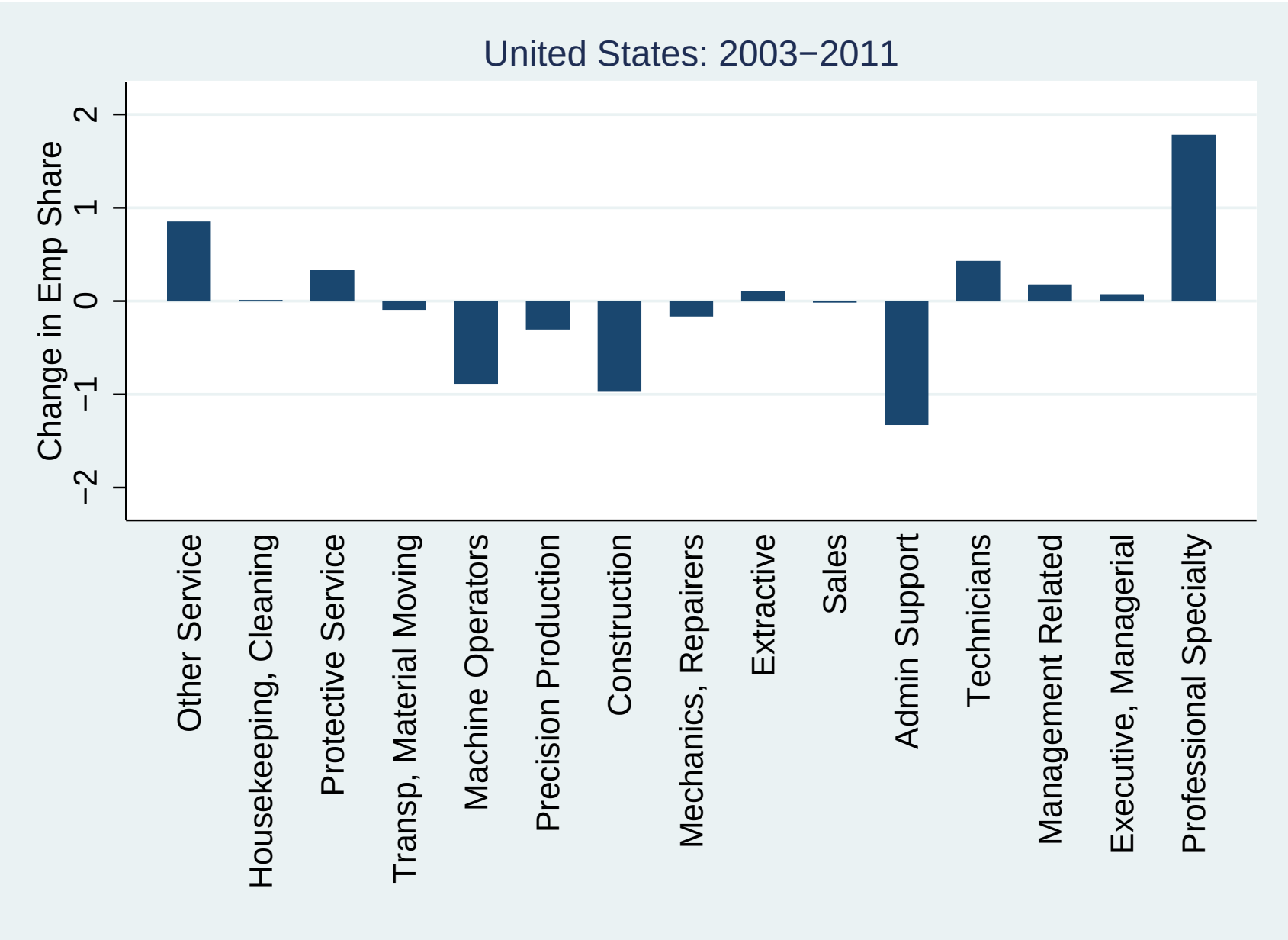
Employment Share Changes: Mexico, 2001–2011



Employment Share Changes: Mexico, 2013–2018



Employment Share Changes: US, 2003–2011



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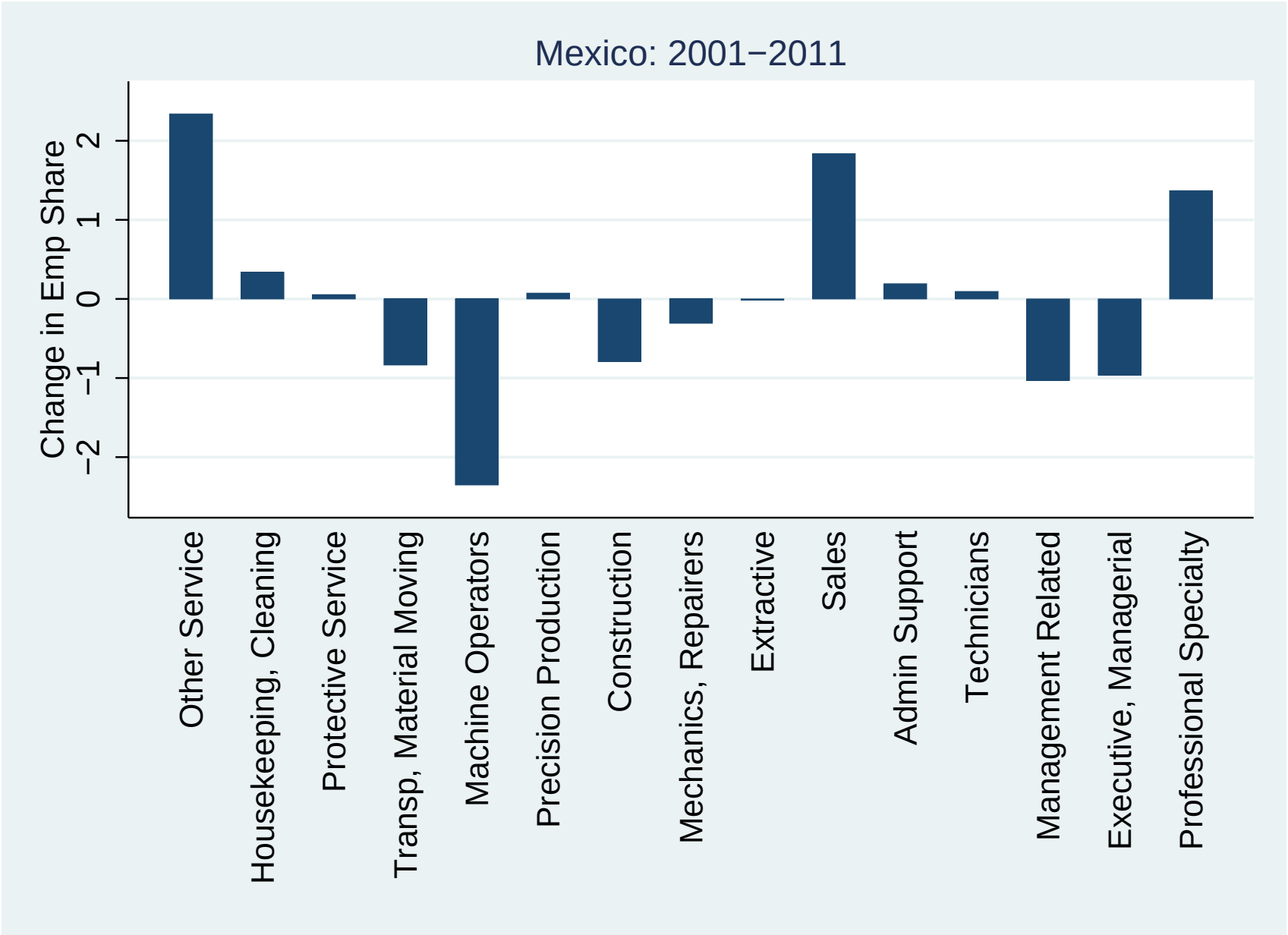
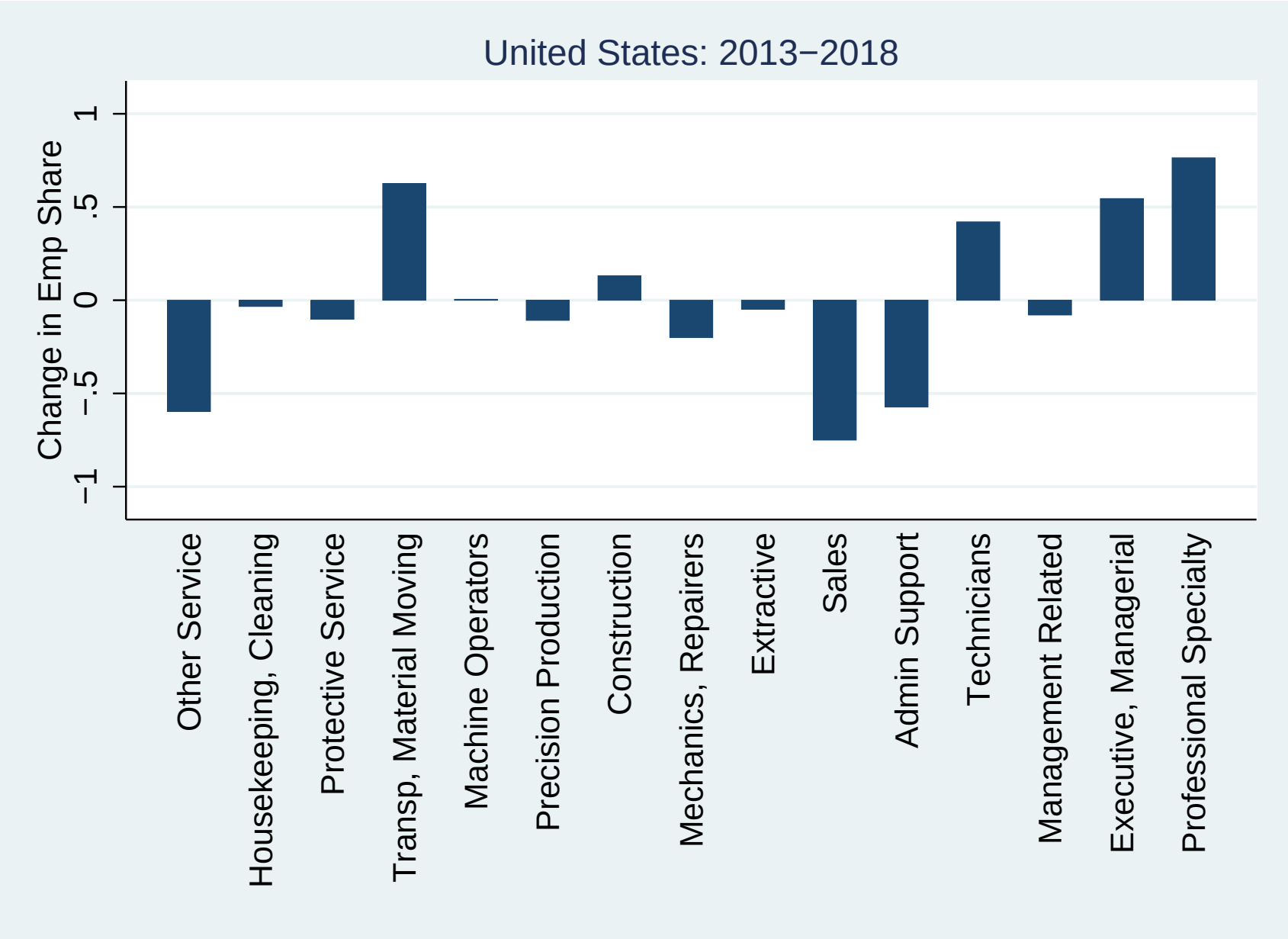
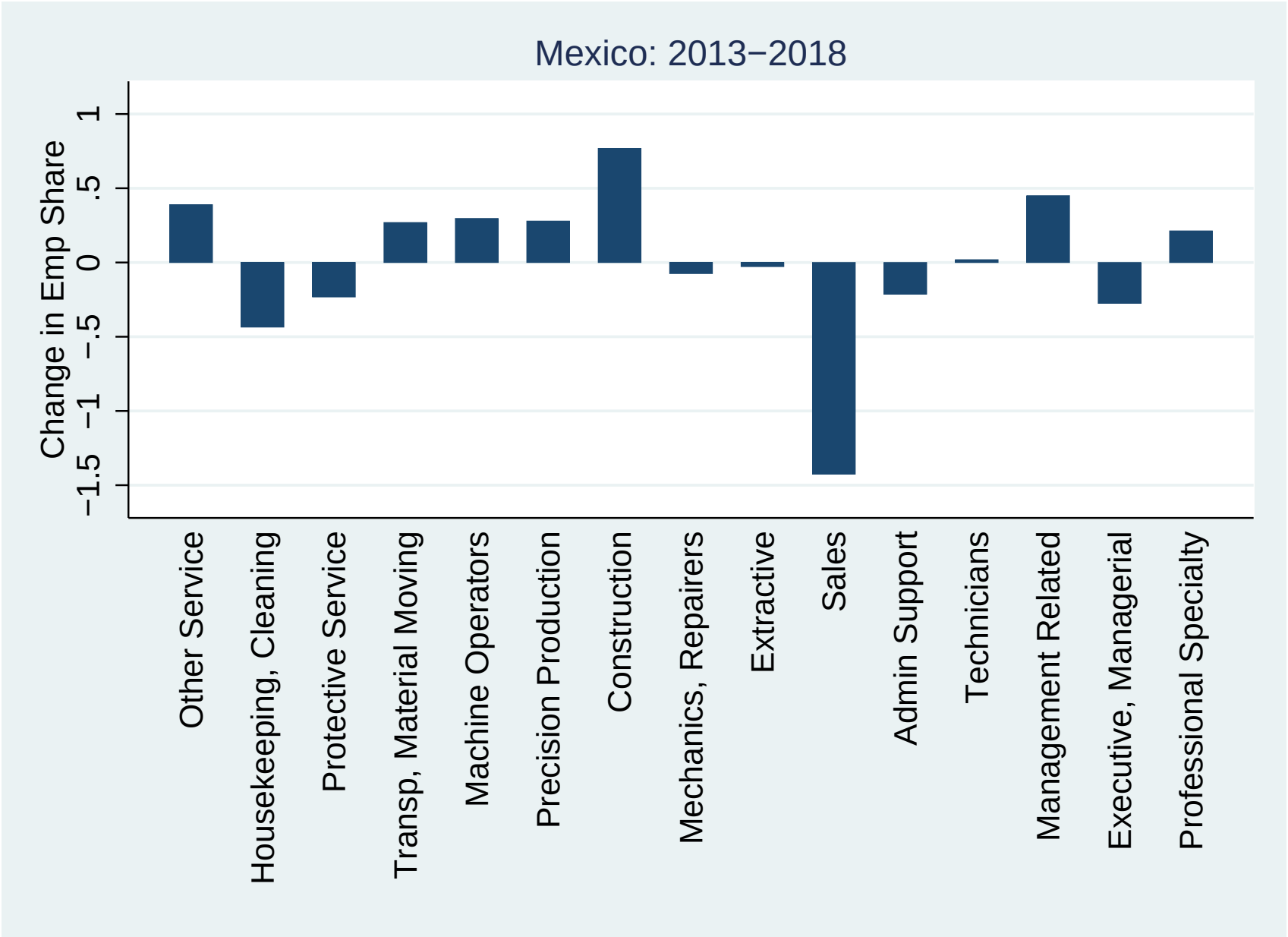


Employment Share Changes: US, 2013–2018

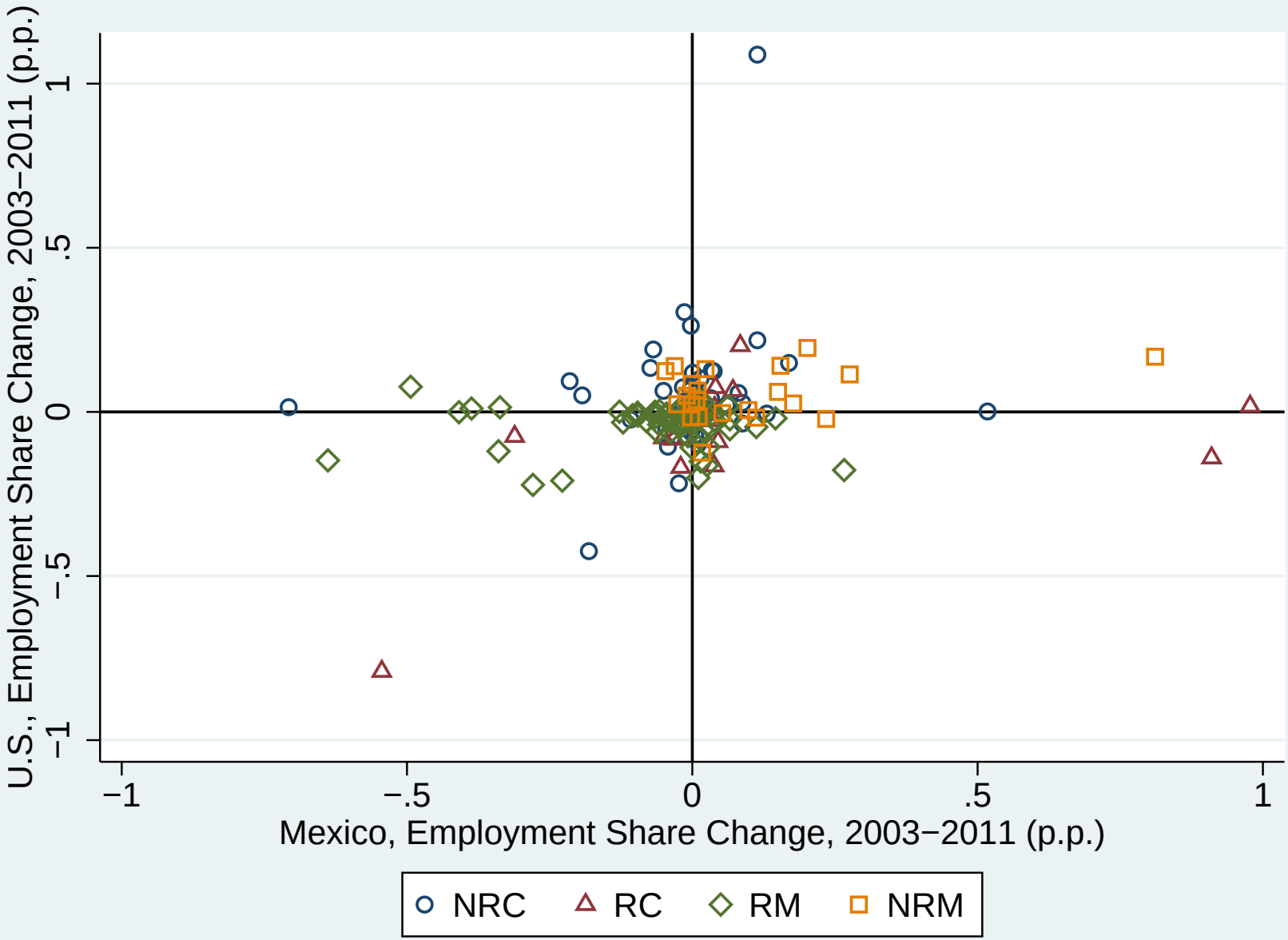


Employment Share Changes: Mexico, 2013–2018



Employment Changes: Detailed Occupation Groups

Main Result: Emp Share Chgs, 2003–11, US vs MX



Main Result: Emp Share Chgs, 2003–11, US vs MX

Table: Occupations with largest declines in emp shares in the U.S., 2003–11

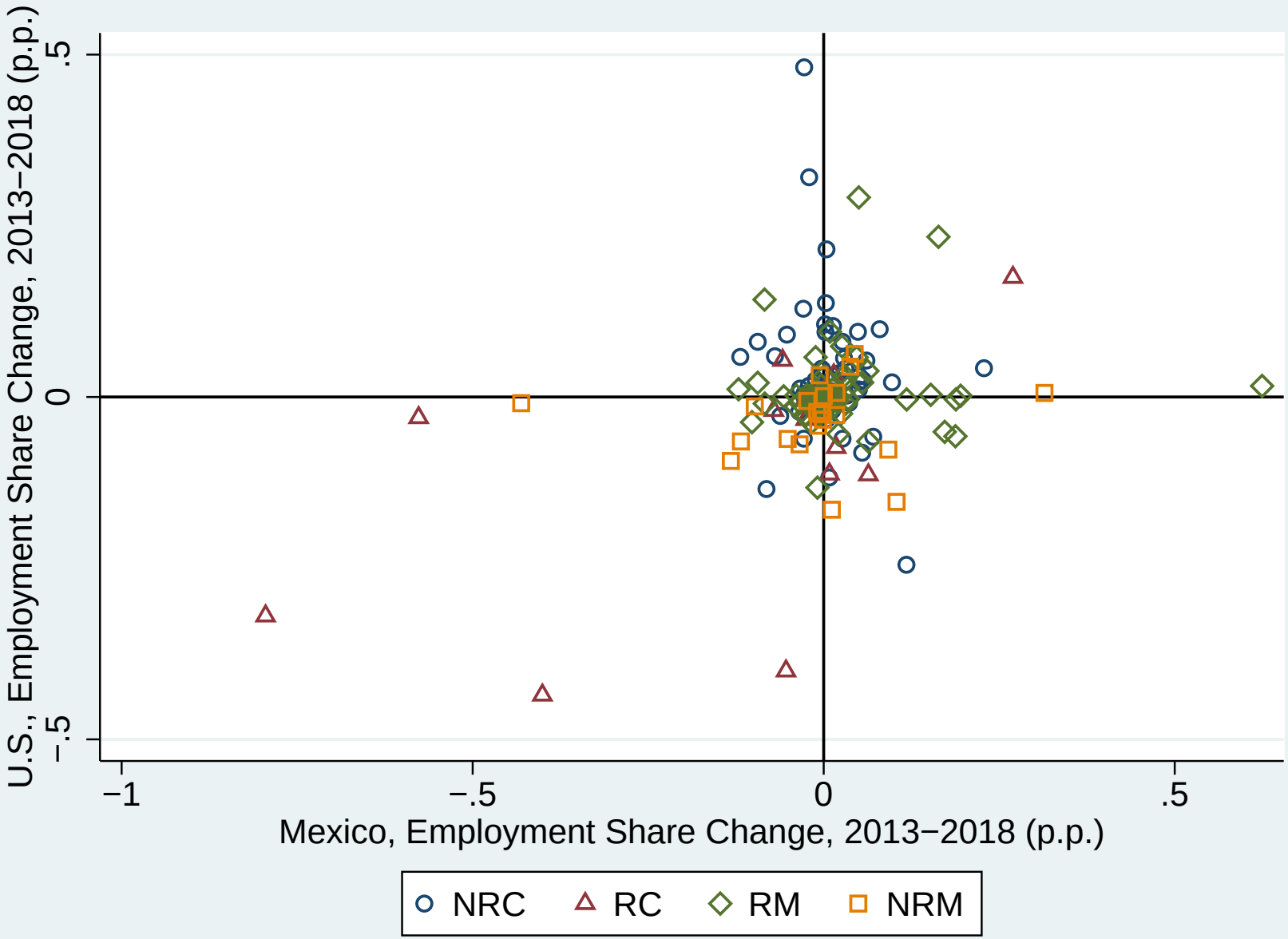
	Group	Chg in Emp Share (p.p.) U.S.	Mexico
Secretaries, Typists and Stenographers	RC	-0.790	-0.544
Chief Executive, Proprietors, Public Admin	NRC	-0.424	-0.181
Assemblers of Electrical Equipment	RM	-0.222	-0.279
Accountants and Auditors	NRC	-0.218	-0.023
Carpenters	RM	-0.209	-0.228
Supervisors of Construction Work	RM	-0.201	0.011
Truck, Delivery, and Tractor Drivers	RM	-0.177	0.266
Records Clerks	RC	-0.169	-0.020
Supervisors and Inspectors, n.e.c.	RC	-0.164	0.038
Supervisors, n.e.c.	RM	-0.162	0.026
Machine Operators, n.e.c.	RM	-0.151	0.015
Textile Sewing Machine Operators	RM	-0.148	-0.639

Main Result: Emp Share Chgs, 2003–11, US vs MX

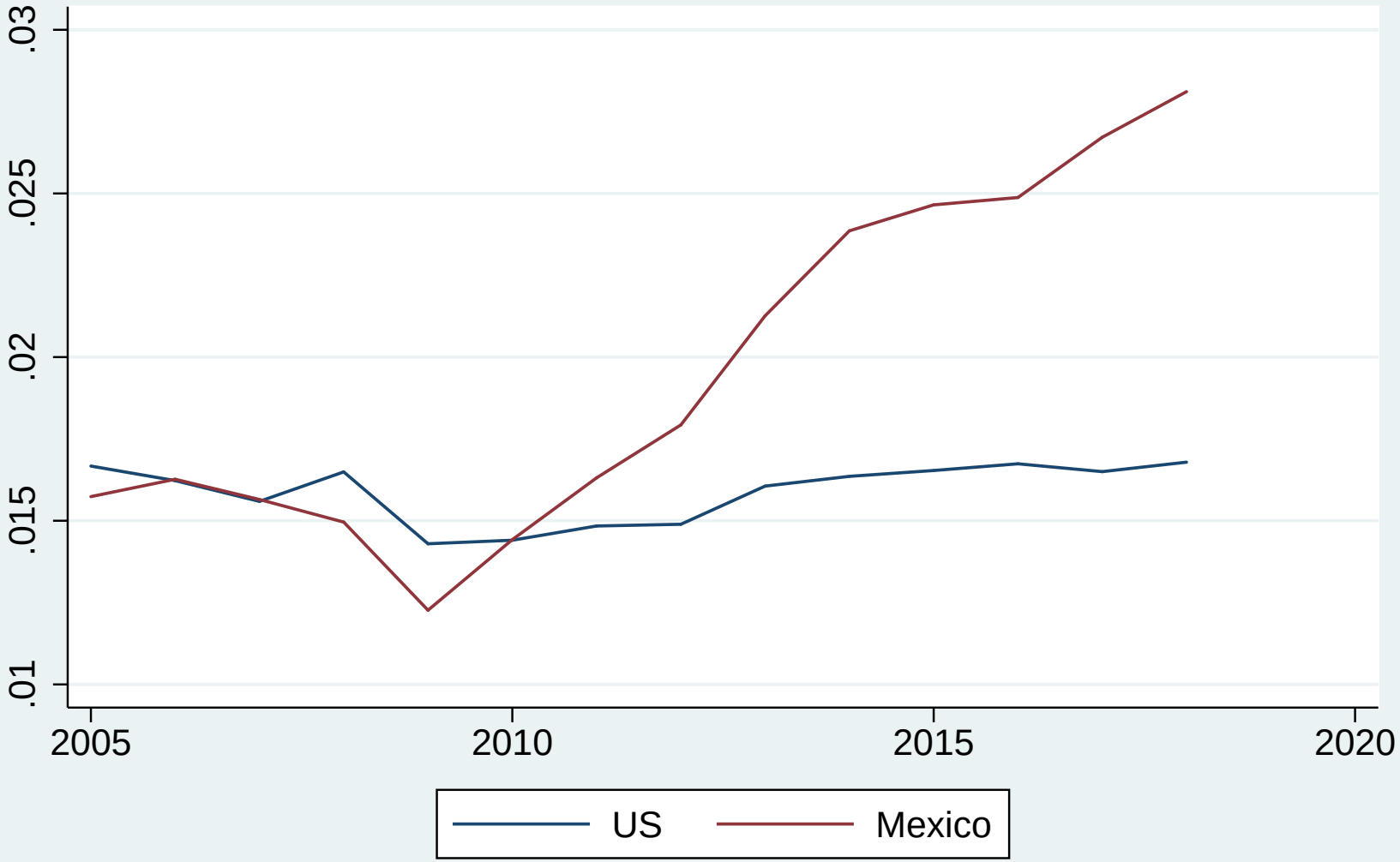
Table: Occupations with largest increases in emp shares in the U.S., 2003–11

	Group	Chg in Emp Share (p.p.) U.S.	Mexico
Teachers, n.e.c.	NRC	0.134	-0.073
Guards and Police, Except Public Service	NRM	0.139	-0.031
Janitors and Pest Control Workers	NRM	0.141	0.155
Lawyers and Judges	NRC	0.149	0.169
Cooks	NRM	0.168	0.811
Primary School Teachers	NRC	0.190	-0.068
Bartenders and Waiters/Waitresses	NRM	0.195	0.202
Cashiers and Account Collectors	RC	0.202	0.084
Other Technicians	NRC	0.218	0.114
Management Support Occupations	NRC	0.263	-0.003
Managers and administrators, n.e.c.	NRC	0.304	-0.014
Nurses, Therapists and Other Health Occupations	NRC	1.088	0.114

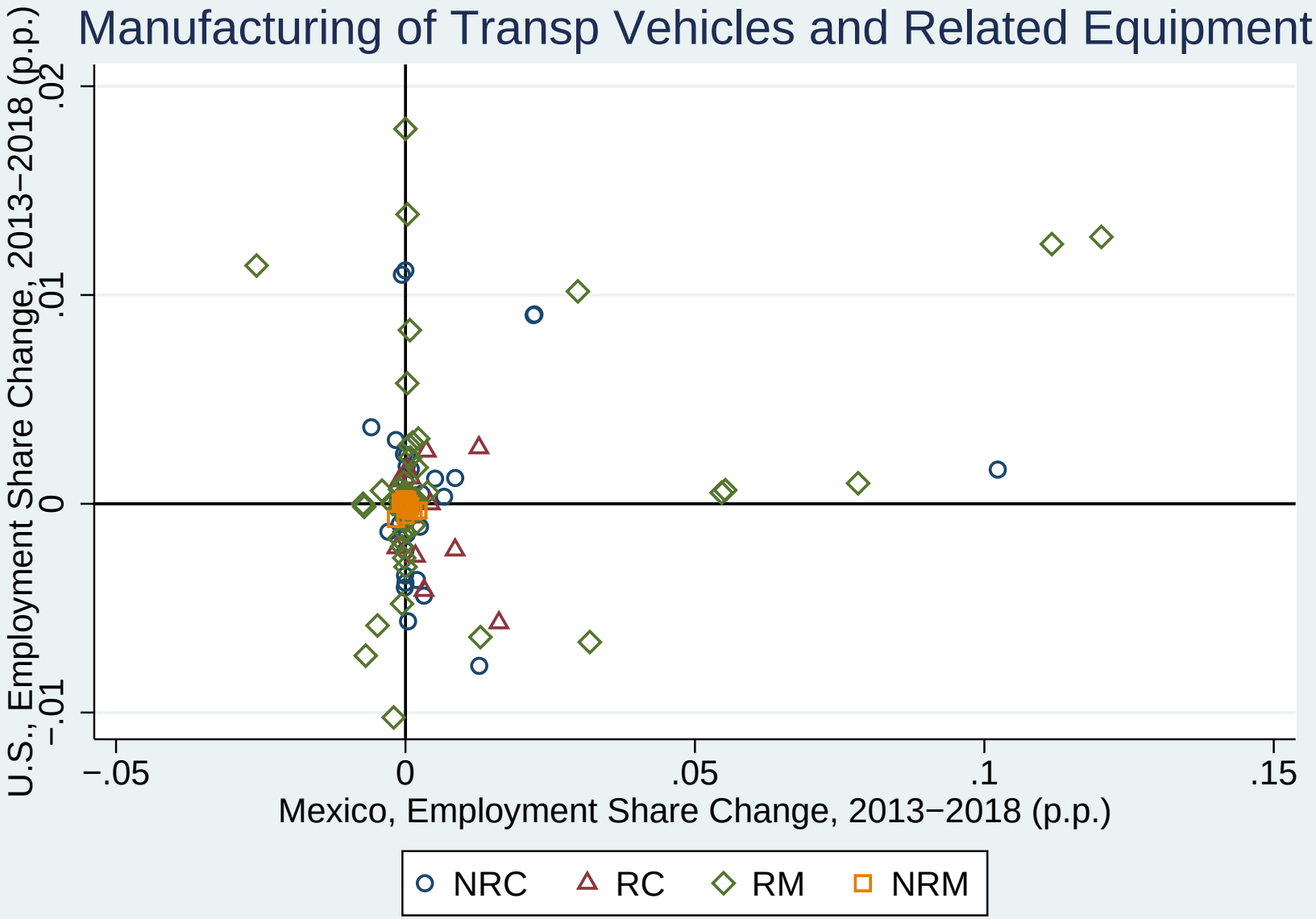
Emp Share Chgs, 2013–18, US vs MX



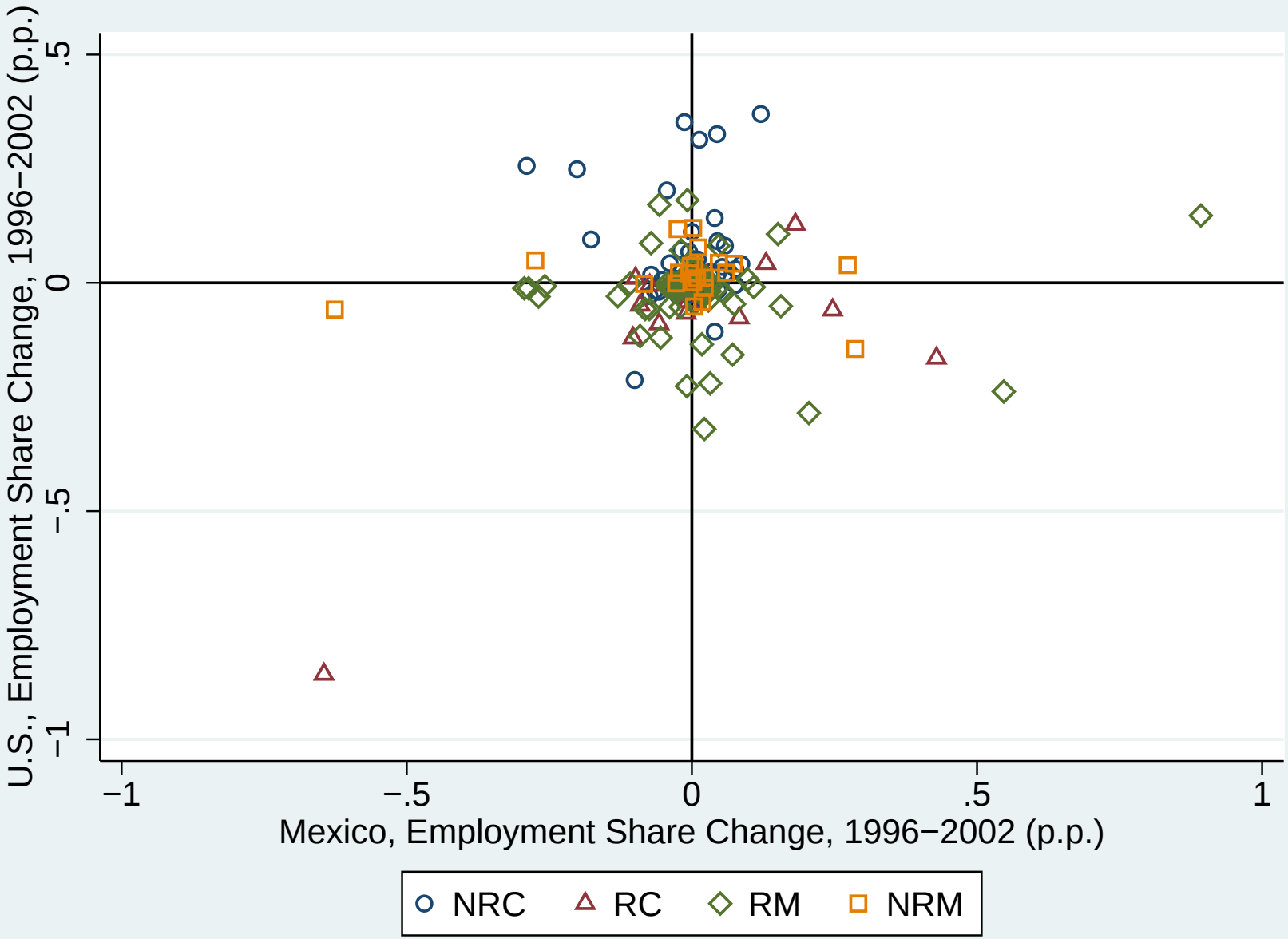
Focusing on the Auto Industry



Focusing on the Auto Industry



Were Things Different in the 90s?



Summary

- We compare employment patterns across $\sim$185 detailed occupational categories in the U.S. and Mexico
- Generally positive correlation in employment share changes across the two countries, even when considering routine manual jobs within the auto manufacturing sector

$\Rightarrow$ Little support for hypothesis that jobs have moved from the U.S. to Mexico in the 2000s

- Occupational inputs across countries seem complementary rather than substitutes
- Common shocks impacting both countries (e.g. technological change, rise of China) a more likely explanation for the observed patterns

Thank you!