

Are Routine Jobs Moving South?

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

Matías Cortés (*York University*)

Diego M. Morris (*Nottingham Trent University*)

February 2019

- 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**

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

- Contrast changes in occupational structure of employment in the U.S. and Mexico
- Use **detailed 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

- Employment share patterns strongly correlated across the two countries
 - In particular, routine manual jobs are declining in both countries
- ⇒ No support for hypothesis that these jobs have moved from the U.S. to Mexico
- Common shocks, e.g. the development of routine-replacing automation technologies, a more likely driver of the decline

● **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 jobs 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)

National Labor Force Survey micro-data for both countries

Mexico:

- *Encuesta Nacional de Empleo (ENE); Encuesta Nacional de Ocupación y Empleo (ENOE)*
- Quarterly frequency; 2000–2015
- ~ 594,000 obs per year

United States:

- Current Population Survey (CPS)
- Monthly frequency
- ~ 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	
	2000	2015	2000	2015
Average Age	38.56	40.74	34.68	37.89
Fraction Female	46.90	47.20	37.36	41.21
Average Real Wage (2009 USD)	20.46	22.43	2.21	2.05
Manufacturing Share of Emp	15.11	10.49	23.69	18.69
<i>Educational Composition:</i>				
Elementary Education or Less	1.90	1.65	40.87	24.67
Middle School	9.22	5.68	25.33	32.60
High School	61.04	56.86	17.25	23.29
College Education or Higher	27.84	35.81	16.55	19.44
Nr of Observations (Unweighted)	687,681	688,316	593,657	569,918

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”

100 occupational categories matched across the two countries

Occupation Matching: Examples

occ_cm	Occupation Description	CMO Codes	SINCO Codes	occ1990dd Codes
1	Accountants and auditors	1172	2121	23
2	Actors, directors, and producers	1413	2175	187
3	Architects	1100	2263	43
4	Chemical engineers	1104	2251	48
5	Chemists	1120	2222	73
6	Civil engineers	1101	2261	53
7	Dancers	1414	2174	193
8	Dentists	1132	2413	85, 204
9	Economists, market and survey researchers	1170	2123	166
10	Electrical engineers	1105	2241, 2642	55
11	Insurance adjusters, examiners, and investigators	7134	4222	24, 253, 375
12	Lawyers/Legal assistants and paralegals	1160	2135	178, 234

Occupation Matching: Examples

occ_cm	Occupation Description	CMO Codes	SINCO Codes	occ1990dd Codes
25	Other type of art performer	1400, 1419, 1423, 1429, 1430, 1431, 1432	2151, 2162, 2164, 2541, 2543, 2544, 2551, 2655, 2712	165, 183, 184, 185, 217, 645, 649, 684
26	Engineers and scientists	1106, 1109, 1110, 1111, 1129, 1140, 1141, 1149, 1150, 1152, 1153, 1168	2134, 2211, 2212, 2221, 2223, 2231, 2242, 2252, 2253, 2421, 2611, 2612, 2613, 2621, 2622	44, 45, 47, 56, 57, 59, 68, 69, 74, 76, 77, 78, 79, 83, 258, 829, 844
27	Other Teachers	1300, 1310, 1320, 1330, 1331, 1332, 1340, 1350, 1351, 1352, 1353, 1354, 1359, 1360, 1361, 1362, 1363, 1364, 1369, 1390	2321, 2322, 2331, 2332, 2333, 2334, 2335, 2339, 2341, 2342, 2343, 2391, 2713, 2714, 2715	154, 155, 156, 157, 158, 159, 163, 387

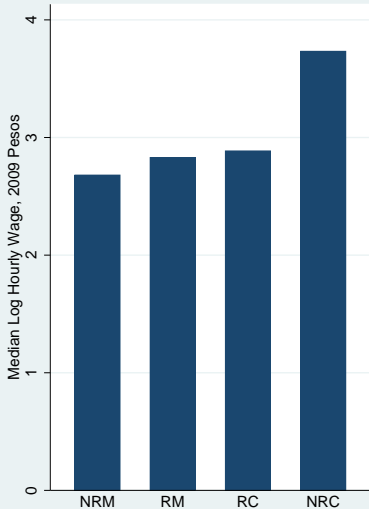
Grouping of Occupations

Occupation Group	Occupation Codes (occ_cm)
Non-Routine Cognitive (NRC)	
Management Related Occupations	1 – 27, 30 – 32
Professional Specialty Occupations	33 – 43, 89 – 90
Technicians and Related Support Occupations	44
Routine Cognitive (RC)	
Sales Occupations	45 – 52
Administrative Support Occupations	53 – 61
Routine Manual (RM)	
Mechanics and Repairers	62 – 64, 74
Production and Construction Related Occupations	28, 29, 65 – 75
Machine Operators, Assemblers, and Inspectors	76 – 85
Transportation and Material Moving Occupations	86
Non-Routine Manual (NRM)	
Housekeeping and Cleaning Occupations	87, 88
Protective Service Occupations	91
Other Service Occupations	92 – 100

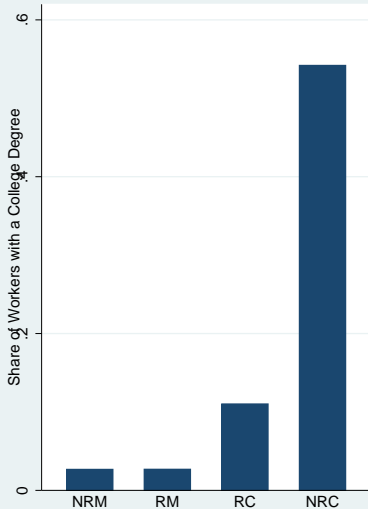
Patterns Across Broad Occupation Groups

Ranking of Broad Occupation Groups in Mexico (2000)

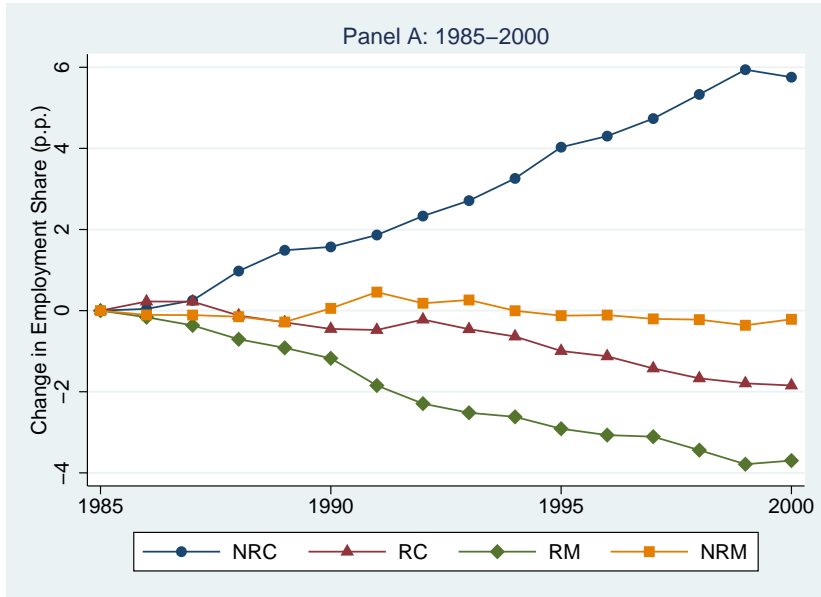
Median Log Hourly Real Wage



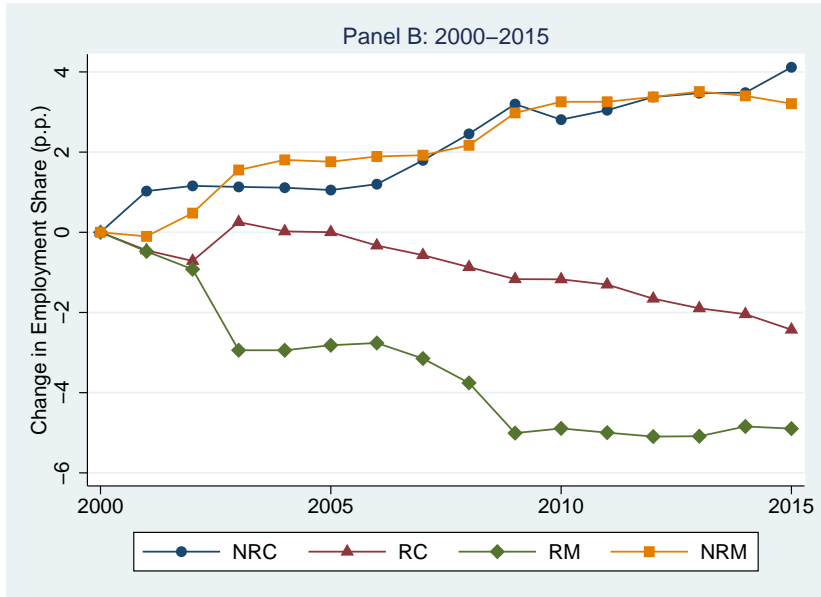
Share of Workers with a College Degree



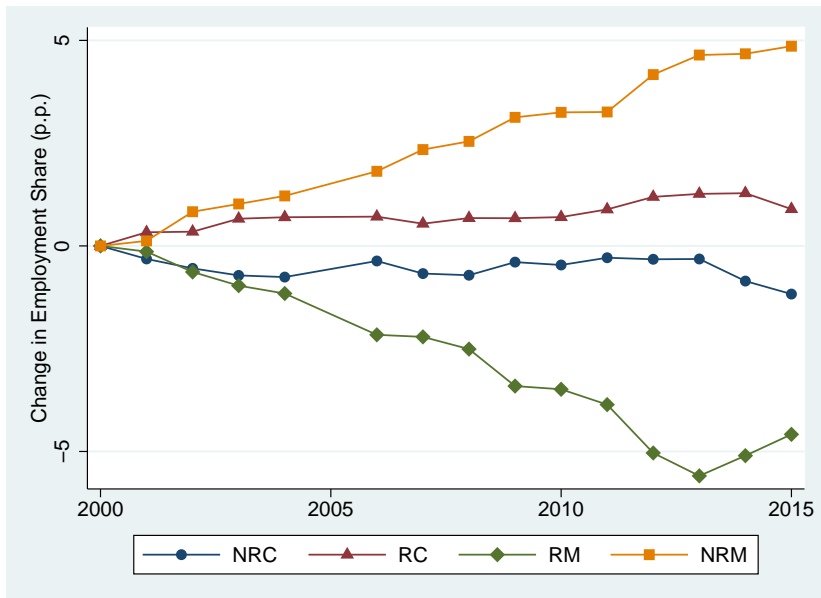
Employment Share Changes: US



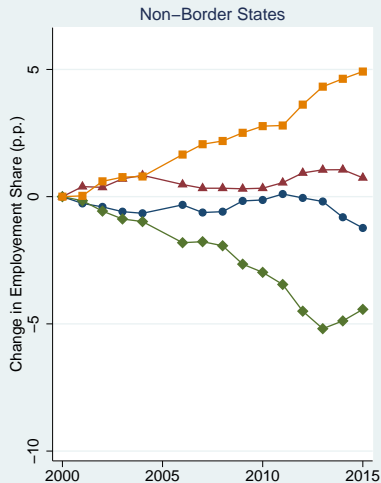
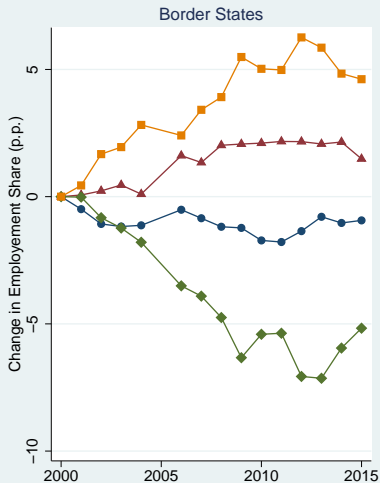
Employment Share Changes: US



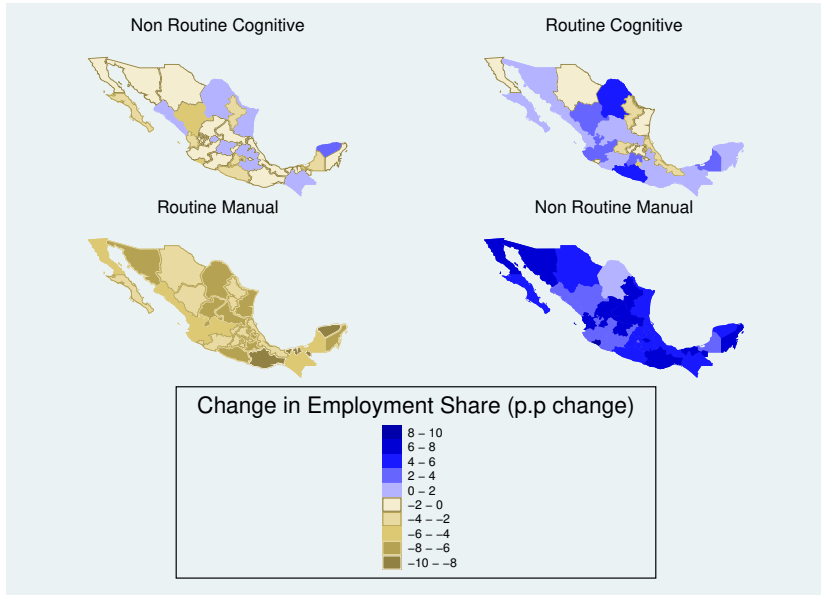
Employment Share Changes: Mexico



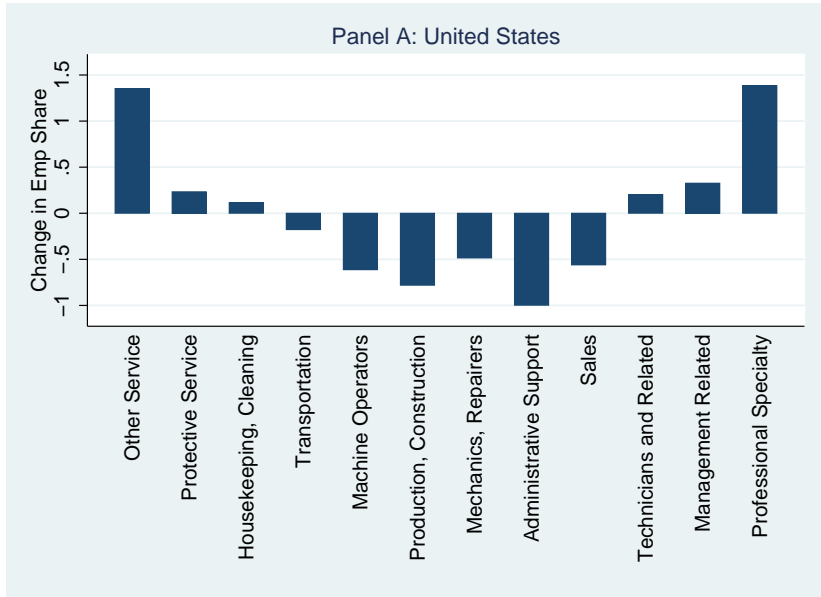
Employment Share Changes: Mexico



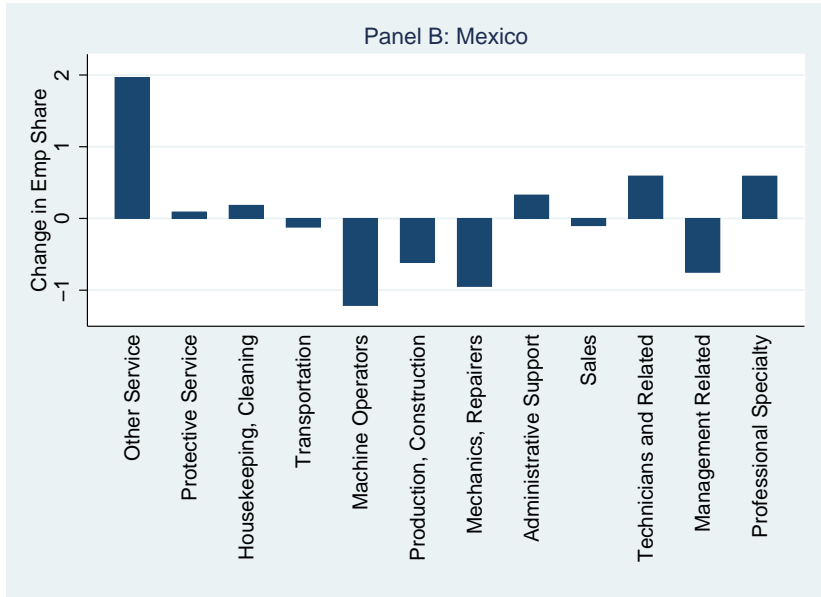
Employment Share Changes: Mexico, 2000–2015



Employment Share Changes: US, 2003–2011



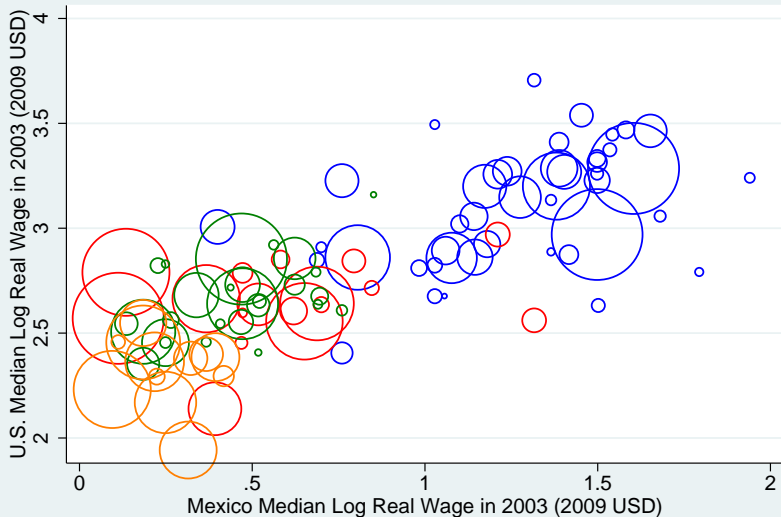
Employment Share Changes: Mexico, 2003–2011



Patterns Across Detailed Occupation Groups

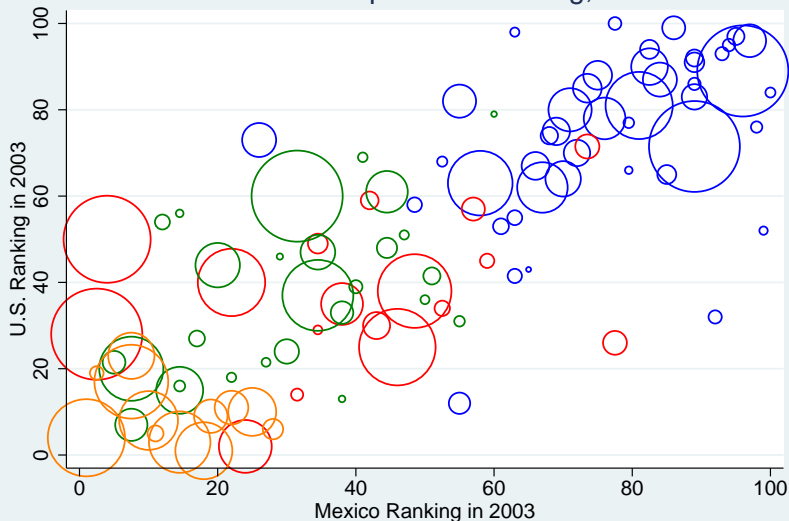
Wages across 100 Detailed Occ Categ: US vs MX

Panel A: Median Log Real Wages, 2003

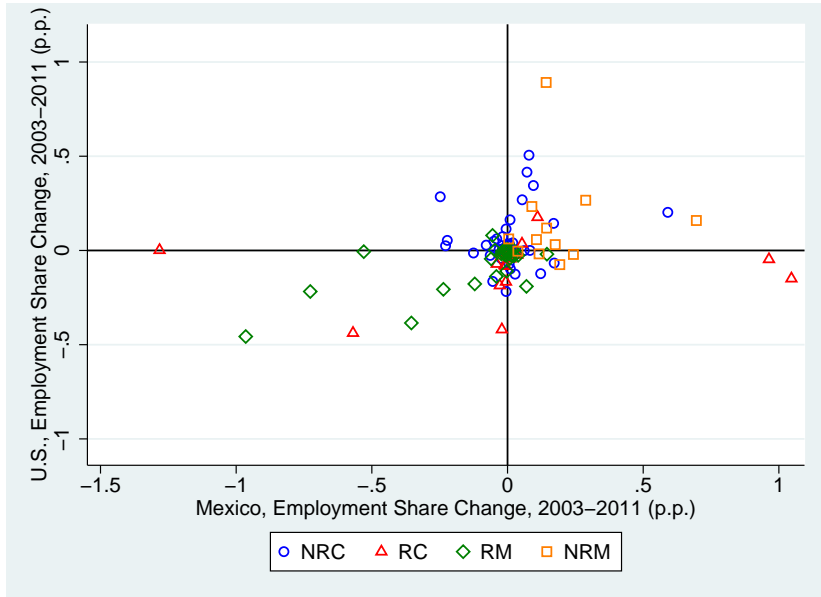


Wage Ranking: US vs MX

Panel B: Occupational Ranking, 2003



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



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

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

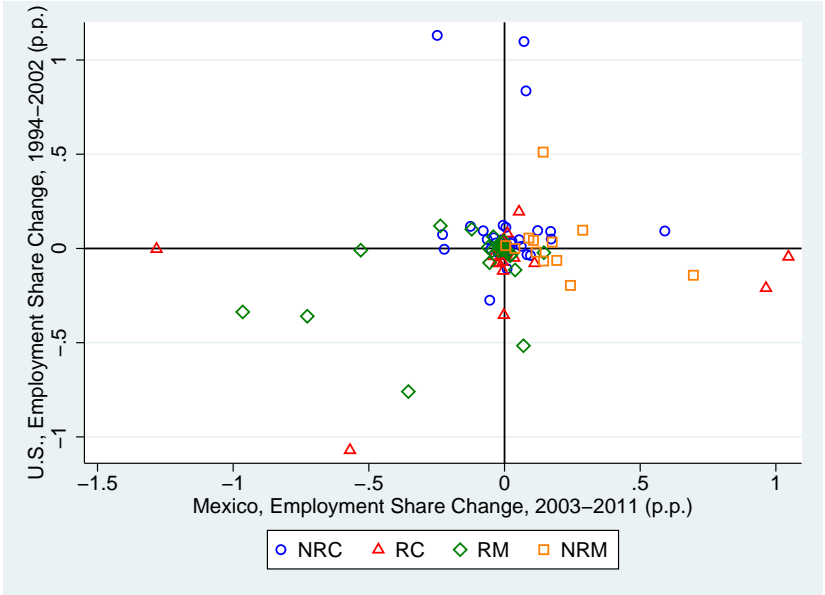
	Group	Chg in Emp Share (p.p.)	
		U.S.	Mexico
Production related occupations	RM	-0.457	-0.965
Secretary	RC	-0.438	-0.569
Merchant at commercial establishment	RC	-0.419	-0.021
Other machine operators n.e.c	RM	-0.385	-0.354
Winding and twisting textile and apparel operatives	RM	-0.218	-0.727
Construction inspectors	NRC	-0.218	-0.005
Carpenters	RM	-0.206	-0.236
Production, installation and maintenance laborers	RM	-0.191	0.070
Data entry keyers	RC	-0.186	-0.028
Transportation and material moving occupations	RM	-0.178	-0.121
Typists	RC	-0.166	-0.006
Production supervisors or foremen	NRC	-0.164	-0.054

Main Results: 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
Other type of food cook, waiter	NRM	0.159	0.696
Engineers and scientists	NRC	0.163	0.009
Cashiers	RC	0.177	0.111
Technicians	NRC	0.202	0.591
Security professionals and related worker	NRM	0.233	0.090
Food preparation or related worker	NRM	0.267	0.288
Registered nurses	NRC	0.269	0.054
Managers and administrators n.e.c.	NRC	0.285	-0.248
Other managers/coordinators n.e.c.	NRC	0.345	0.095
Other professionals n.e.c.	NRC	0.416	0.072
Other teachers	NRC	0.506	0.079
Personal service occupations, n.e.c.	NRM	0.891	0.142

Lagged Changes?



Summary

- We compare employment patterns across 100 detailed occupational categories in the U.S. and Mexico
- With few exceptions, routine manual jobs have been on the decline in both countries
- ⇒ No support for hypothesis that these jobs have moved from the U.S. to Mexico
- Suggests that common shocks, e.g. the development of routine-replacing automation technologies, drive the decline in both countries

Thank you!