

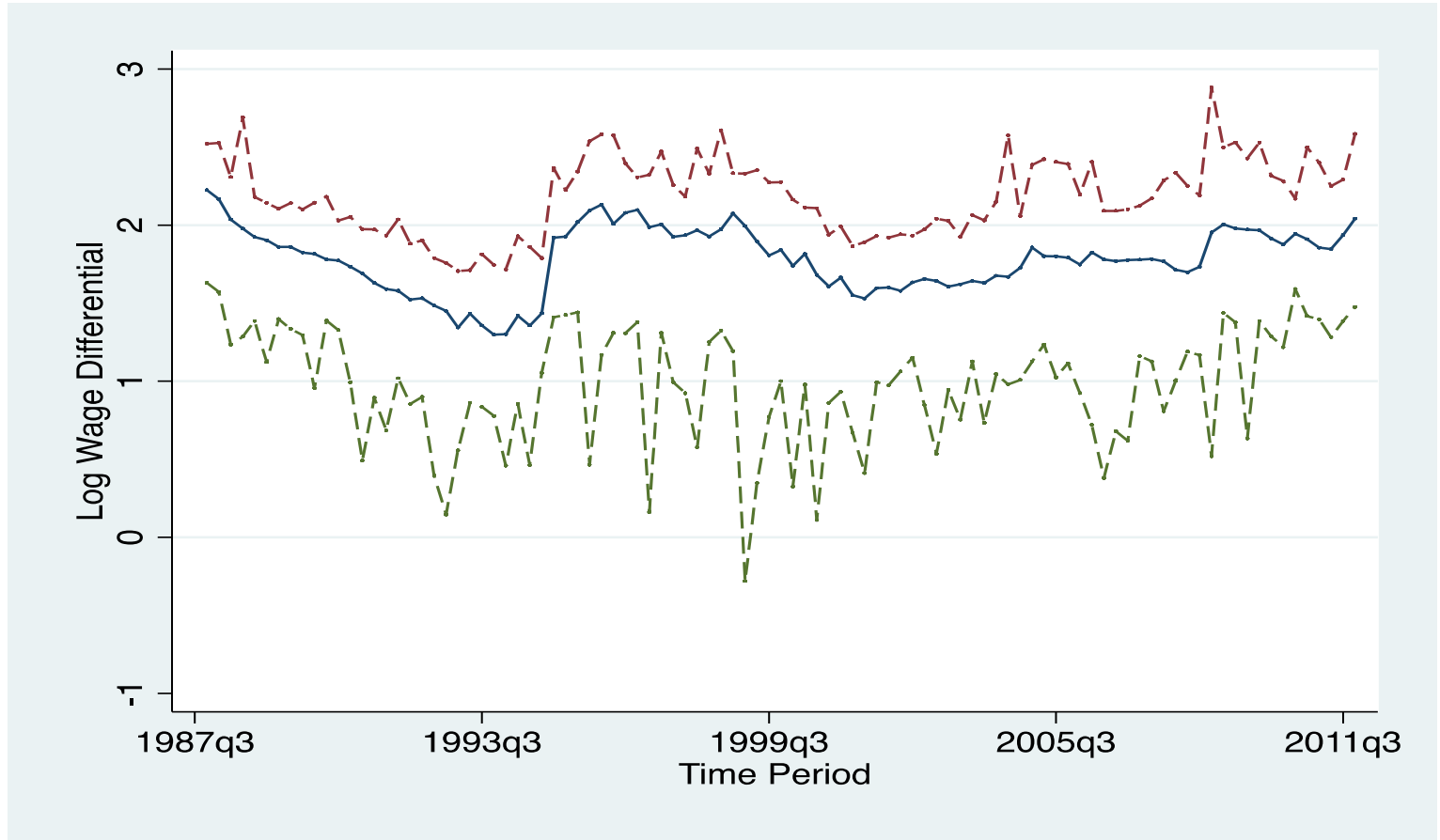
Are Mexican and U.S. Workers Complements or Substitutes?

Raymond Robertson
Texas A&M University and IZA

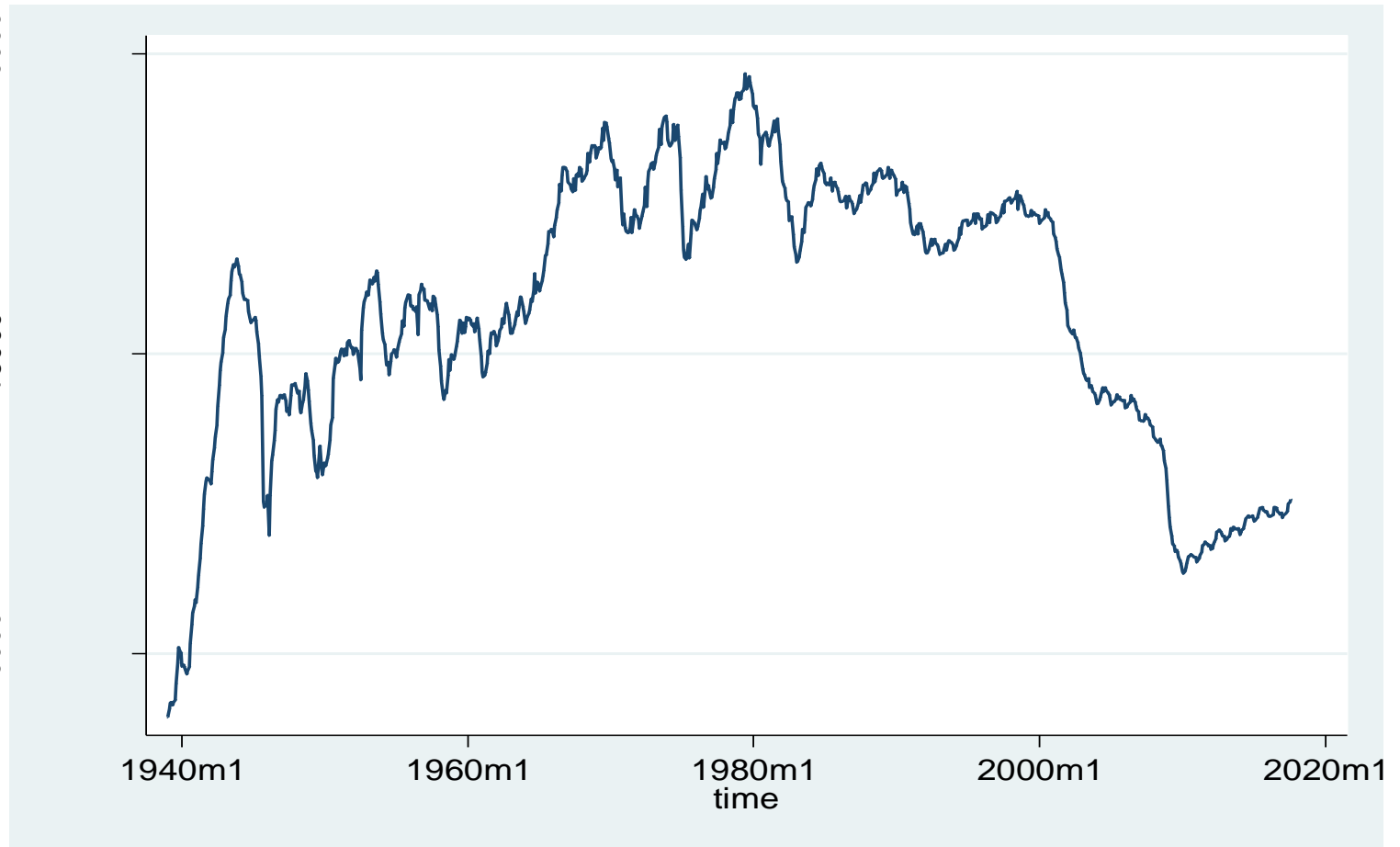
Motivation

- US Concerns about NAFTA
 - Competition between Mexican and U.S. workers
 - Assessing structure of trade
- Comparing implications of trade models
 - Heckscher-Ohlin
 - Increasing returns/Fragmentation models

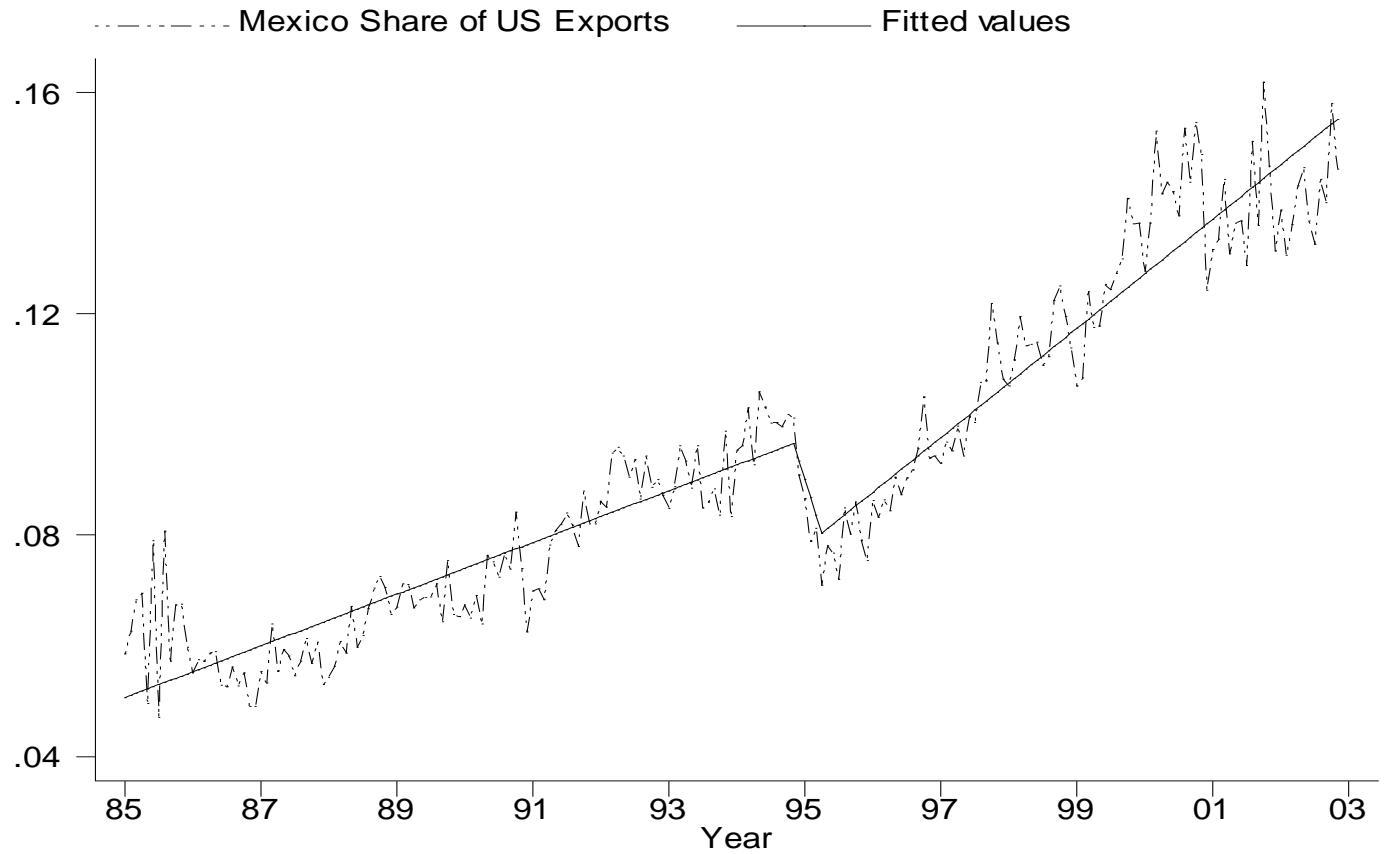
US-Mexican Wage Differential



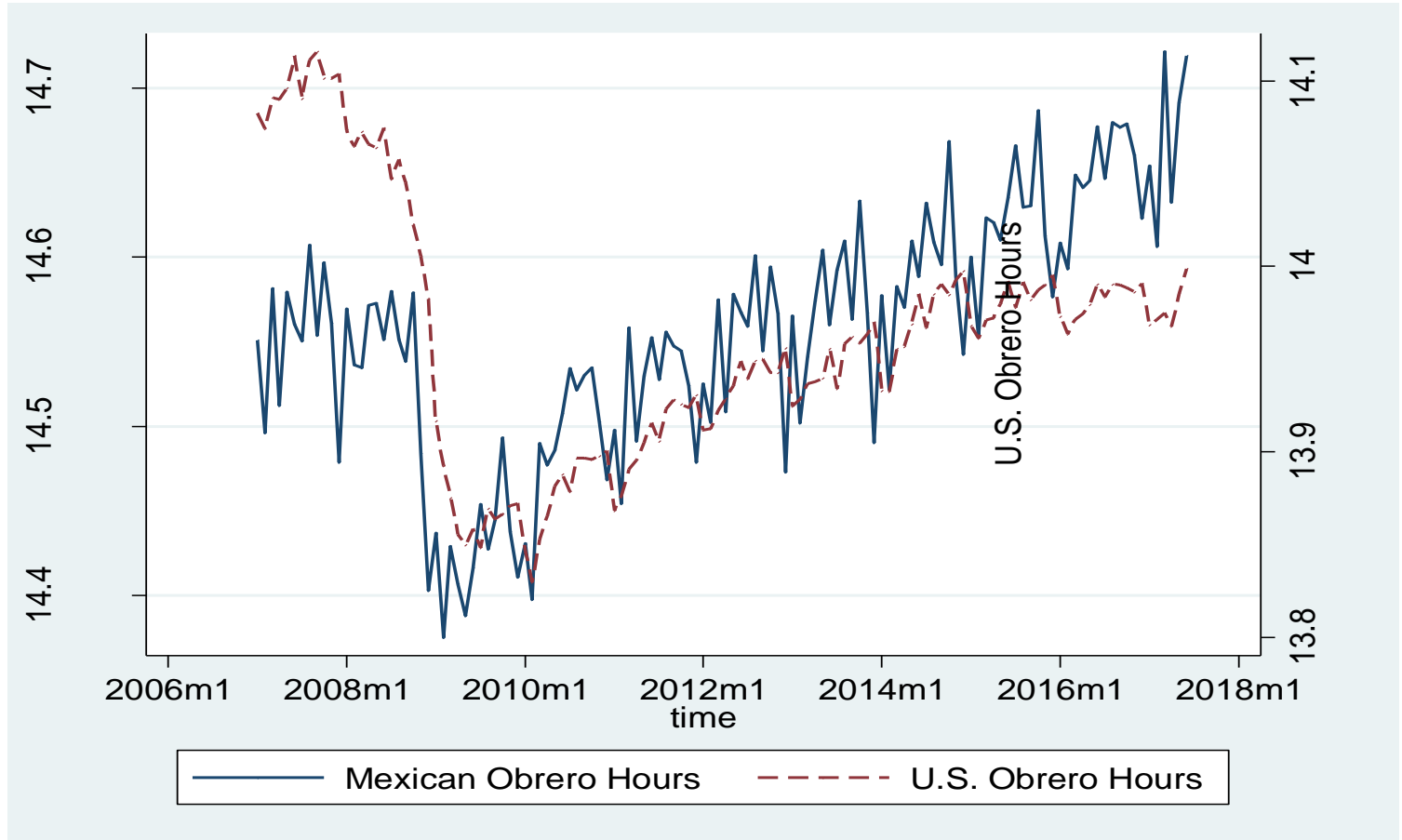
Falling U.S. Manufacturing Employment



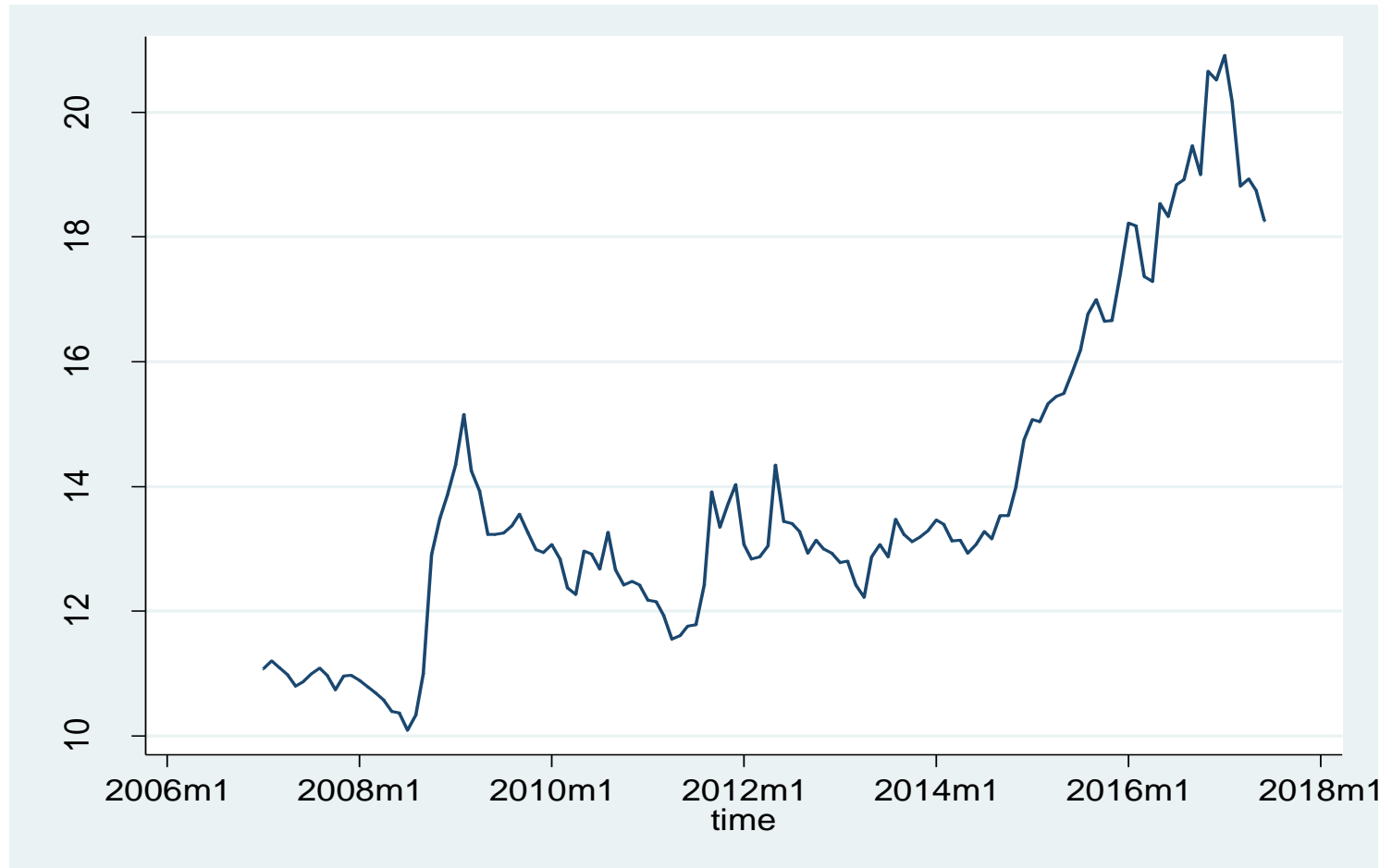
Post NAFTA



Production Worker Hours



Nominal Exchange Rates



Theoretic Background

- Heckscher-Ohlin (neoclassical) trade model predicts that U.S. production workers and
 - Mexican Nonproduction workers are complements
 - Mexican Production workers are substitutes
- Fragmentation models predict the opposite
- Apply labor demand approach (Hamermesh 1993)

Theoretical Framework

- Model North American production with a single cost function

$$C_{it} = G(w_{it}^{us-u}, w_{it}^{mx-s}, w_{it}^{mx-u}, Y)$$

- Derive a system of labor demand functions

$$L_{it}^{us-u} = \alpha_0 + \alpha_1 w_{it}^{us-u} + \alpha_2 w_{it}^{mx-s} + \alpha_3 w_{it}^{mx-u} + \alpha_4 y_{it}^{mx} + \varepsilon_{it}$$

$$L_{it}^{mx-s} = \beta_0 + \beta_1 w_{it}^{us-u} + \beta_2 w_{it}^{mx-s} + \beta_3 w_{it}^{mx-u} + \beta_4 y_{it}^{mx} + \lambda_{it}$$

$$L_{it}^{mx-u} = \gamma_0 + \gamma_1 w_{it}^{us-u} + \gamma_2 w_{it}^{mx-s} + \gamma_3 w_{it}^{mx-u} + \gamma_4 y_{it}^{mx} + \zeta_{it}$$

Estimation Issues

- Estimate the system using Zellner's Seemingly Unrelated Regressions model
- Include industry fixed effects
- Theory implies constraints
 - Symmetry
 - Homogeneity

Data: United States

Current Employment Statistics

- Covers about 300,000 employer units
- Over 35% of total payroll employment.
- Conducted by the U.S. Bureau of Labor Statistics
- Do not include value of production or earnings of nonproduction workers.
- Hours and earnings data are available for about 850 industries.

Data: Mexico

Monthly Industrial Survey (EIM)

- The Mexican National Institute for Statistics, Geography, and Informatics (*Instituto Nacional de Estadística, Geografía, e Informática*, or *INEGI*) conducts the survey.
- Data for 205 industries are available on the internet.
- Cover 80% of Mexican manufacturing production.
- The survey design is based in the Mexican Industrial Census, which is taken every five years. For the period covered in this paper, the survey covers between 5,587 and 6,884 establishments.
- The survey excludes firms in the maquiladora industry, basic petrochemicals, petroleum refining, and firms with fifteen or fewer employees (*microindustria*).
- Variables include employment, hours, and wages for production (*obreros*) and nonproduction (*empleados*) workers, as well as the value of production and sales.

Estimation Results: 2007-2017

	(1)	(2)	(3)
	Constant Output	Constant Output	Constant Output
	US Blue Collar	MX White Collar	MX Blue Collar
US Hourly Wage Blue	-1.197 (3.08)**	0.362 (4.17)**	-0.251 (2.50)*
MX Hourly Wage White	0.362 (4.17)**	-0.323 (5.17)**	0.267 (3.75)**
MX Hourly Wage Blue	-0.251 (2.50)*	0.267 (3.75)**	-0.375 (4.54)**
Production Value	2.344 (2.28)*	4.279 (10.08)**	7.837 (14.78)**

Additional Results

- Aggregation Levels
 - Same significant results
 - No clear pattern of change over aggregate level
- By Industry
 - Very strong results for apparel
 - Weak results for chemicals
 - Mixed results for automobiles

Robustness Checks

- Nominal and real pesos
- With and without exchange rates
- With and without industry fixed effects
- With and without output
- With and without constraints
 - Homogeneity
 - Symmetry
- Different periods

Estimation Results: 1994-2007

	(1)	(2)	(3)
	Constant Output	Constant Output	Constant Output
	US Blue Collar	MX White Collar	MX Blue Collar
US Hourly Wage Blue	-0.802 (0.033)**	0.050 (0.008)**	-0.229 (0.008)**
MX Hourly Wage White	0.050 (0.008)**	-0.123 (0.005)**	-0.003 (0.004)
MX Hourly Wage Blue	-0.229 (0.008)**	-0.003 (0.004)	-0.164 (0.005)**
Production Value	0.088 (0.005)**	0.237 (0.005)**	0.351 (0.005)**

Estimation Results: 1987-1994

	(1)	(2)	(3)
	Constant Output	Constant Output	Constant Output
	US Blue Collar	MX White Collar	MX Blue Collar
US Hourly Wage Blue	-1.208 (0.041)**	-0.044 (0.008)**	0.040 (0.009)**
MX Hourly Wage White	-0.044 (0.008)**	-0.173 (0.008)**	-0.017 (0.007)*
MX Hourly Wage Blue	0.040 (0.009)**	-0.017 (0.007)*	-0.204 (0.009)**
Production Value	0.058 (0.006)**	0.197 (0.009)**	0.234 (0.009)**

Results Summary

- Post-NAFTA: U.S. production workers are complements with Mexican production workers
- Post-NAFTA: U.S. production workers are substitutes for Mexican production workers
- Prior to NAFTA: Opposite relationship

Policy Implications

- Clear evidence of integration across value chains
- Specialization according to skill
- Revisions of NAFTA need to maintain cross-border integration
- Lessons from adjustment costs: can't save US employment through trade policy
- Exchange rates and NX