Trade and Employment

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Policy Discussions

- Trade is sometimes seen as reducing unemployment
  - "The TPP will support 650,000 thousand American jobs" (President Obama, 2015)
- And sometimes as creating unemployment
  - "One million jobs have been lost because of NAFTA" (Senator Obama, 2008)

Who is right?

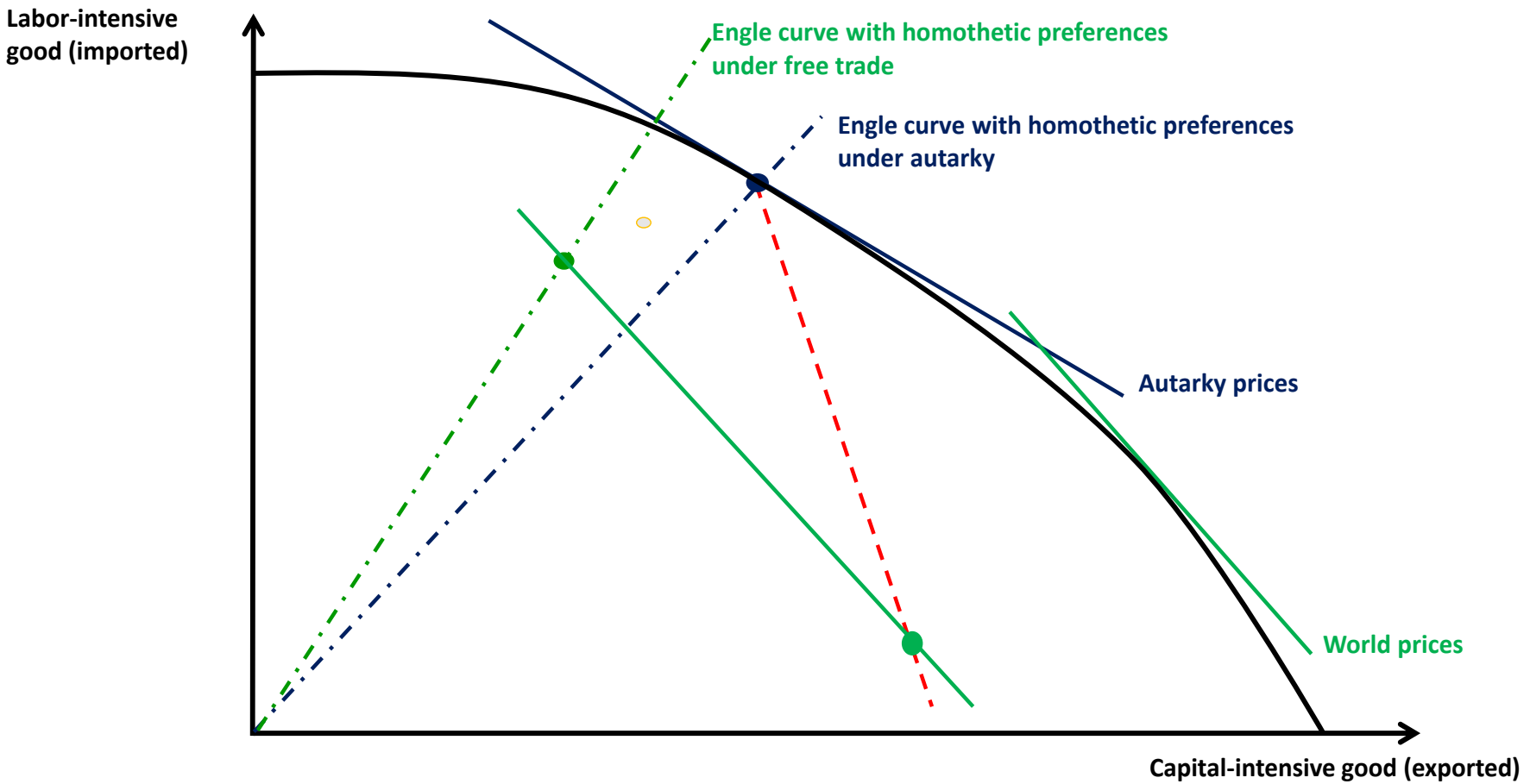
- Neither Obama, according to (most) economists...
  - "It should be possible to emphasize to students that the level of employment is a macroeconomic issue depending in the long run on the natural rate of unemployment, with microeconomic policies like tariffs having little net effect."
    (Krugman, AER 1993 on What do undergrads need to know about trade)

- But in most models (full) employment is exogenously given.
- When employment is endogenous, things get messy:
  - Brecher (1974) impact depends on labor abundance
  - Davis (1998): impact depends on which country has the more rigid labor market
  - Davidson, Martin and Matusz (1999): unemployment as a source of comparative advantage
  - Egger and Kreickemeier (2009): trade raises unemployment in a fair-wage setup
  - Helpman and Itshkoki (2010) impact of trade on unemployment is ambiguous depending on the structure.
- "These are complex models with complex and ambiguous results, but at least they admit the possibility that trade reform could have long-run consequences for employment." (Hoekman and Winters, 2005)

Brecher (QJE 1974) seminal contribution

- 2x2x2 HO model
- Small open economy
- Country is relatively abundant in capital and therefore has a comparative advantage in the capital-intensive good
- Unemployment due to exogenous minimum wage above w^e
- Minimum wage set so that at the autarky prices there is no unemployment

Brecher (QJE 1974)



Empirical support for Brecher (QJE 1974)?

- Dutt, Mitra and Ranjan (JIE 2009) test the Brecher prediction

$$u_c = \alpha_0 + \alpha_1 T_c + \alpha_2 T_c * (K/L)_c + \alpha_3 (K/L)_c * \beta \mathbf{X_c} + \mathbf{e_c}$$

- where T_c are measures of trade protection in country c

- Brecher (1974) predicts $\alpha_2 < 0$, and

$$\frac{\partial u_c}{\partial T_c} = \alpha_1 + \alpha_2 \times (K/L)_c$$

- Overall impact of T_c on unemployment depends on $(K/L)_c$

Very little support in Dutt, Mitra and Ranjan (JIE 2009)

Table 6
The effect of trade policies on the unemployment rate (Heckscher–Ohlin specification; with controls).

	Unweighted tariff	Overall trade restrictiveness index	GCR trade barriers	Import duty	Openness $(X+M/GDP)$
Trade policy measure	0.227 (0.244)	0.958 (0.856)	9.230* (4.888)	3.824** (1.443)	0.158 (0.188)
Trade policy*capital–labor ratio	0.015 (0.025)	−0.089 (0.094)	−0.763 (0.503)	−0.349** (0.149)	−0.017 (0.018)
Capital–labor ratio	1.427 (1.911)	1.268 (3.281)	4.330* (2.538)	4.521** (2.220)	1.350 (2.364)
Employment laws index	−2.029 (2.667)	−1.126 (3.032)	−2.477 (2.725)	−3.208 (2.596)	−3.750 (2.940)
Labor union power	6.346* (3.641)	2.521 (6.177)	5.270 (3.204)	6.316* (3.375)	7.768** (3.522)
GDP	−2.399 (2.273)	−2.639 (3.658)	−3.622* (2.103)	−4.478* (2.210)	−1.298 (2.210)
Population (ages 15–64)	1.764 (2.456)	2.111 (3.914)	2.779 (2.248)	4.107* (2.328)	0.181 (2.317)
Civil liberties	−0.903* (0.532)	−0.904 (1.002)	−0.940* (0.548)	−0.874 (0.596)	0.224 (0.856)
Output volatility	0.179 (0.419)	0.632 (0.532)	0.325 (0.416)	0.329 (0.347)	0.472 (0.504)
Black market premium	−0.064 (0.061)	0.027 (0.070)	−0.035 (0.039)	−0.025 (0.042)	−0.037 (0.049)
Observations	48	29	48	47	48
R-squared	0.31	0.42	0.37	0.42	0.27
Positive relation	48	22	48	31	7
Negative relation	0	7	0	16	41

Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.
All variables are averaged over the 1990s, except OTRI and GCR which are available for a single year.
Employment laws index and labor union power are available only for 1997.
The last 2 rows divides the number of observations into countries that have a positive and countries that have a negative relation between trade policy and unemployment rate.

- Other existing models also have ambiguous predictions
- Sometimes trade increases unemployment, sometimes it reduces it....
- When theory is ambiguous, scientists turn to empirical evidence...
- But a lot of ambiguity there too....

Empirical evidence

- Trade increases unemployment
  - Harrison and Revenga (1998) for Romania, Poland, Czech Republic and Slovakia.
  - Menezes-Filho and Muendler (2011), Mesquita and Najer (2000), and Paes de Barros, Corseuil and Gonzaga (1999) for Brazil
  - Edwards and Edwards (1996) in Chile
  - Rama (1994) in Uruguay
- No impact
  - Bentivogli and Pagano (1999) for France, Germany, Italy and the United Kingdom.
  - Trefler (2004) for Canada
- Trade reduces unemployment
  - Felbermayr, Prat and Schmerer (2011) for OECD countries
  - Nathanson (2011) for Israel
  - Kee and Hoon (2005) for Singapore
  - Dutt, Mitra and Rajan (2009) across countries

Carrère, Fugazza, Olarreaga and Robert-Nicoud (2016)

- Develop a theory of trade and unemployment sufficiently rich to explain ambiguous results
  - They embed a DMP model a la Helpman and Itskhoki (2010) in a DFS Ricardian setup
- Empirically test the predictions of the model
- Does it explain existing ambiguous results?

Why DMP's search model?

- GE model of search frictions with microeconomic foundations
- Key 1: $w = w^e + \text{stuff}$, so that $u > 0$
- Would obtain similar results with minimum wages, fair-wages or centralized wage bargaining
- Key 2: Unemployment is sector specific

Why DFS Ricardian model with a continuum of goods?

- Continuum of goods to better fit empirical testing with many goods
- Key: comparative advantage
- HO or Eaton-Kortum Ricardian model leads to the similar predictions (Carrère, Grujovic, Robert-Nicoud, 2016).

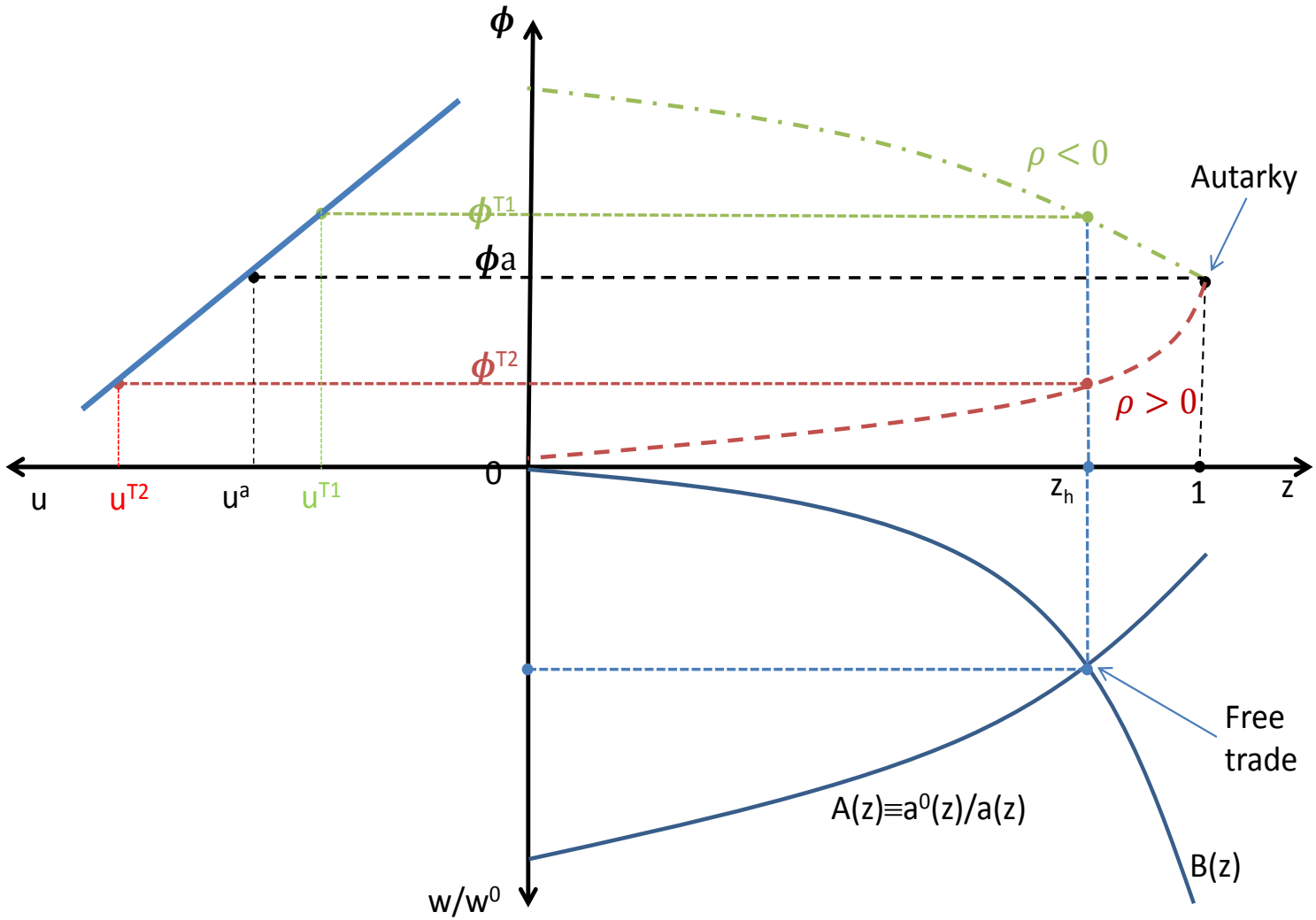
Bottom line of Carrère et al. (2016)

- Trade has an ambiguous effect on unemployment
- The sign depends on the correlation between sector level labor market frictions and comparative advantage
- If positively correlated, then trade increases unemployment
- If negatively correlated, then trade reduces unemployment
- Empirically we find support for these predictions

Rest of the lecture

- Carrère et al (2016) model in 1 Figure
- Empirical strategy
- Results
- Conclusion

Carrère et al. (2016) model in 1 Figure



Understanding the mechanism

Setup

- Two types of sectors: export sectors (n_x) and domestic sectors (n_d)
- Export sectors have (average) unemployment levels u_x and domestic sectors u_d
- Workers' choice of sector to search for jobs is sunk
- ℓ_x workers (on average) searching jobs in each x sector
- ℓ_d workers searching jobs in each d sectors

Understanding the mechanism (cont.)

Full participation of workers in the labor market implies:

$$L = n_x \ell_x + n_d \ell_d \tag{1}$$

Aggregate unemployment is given by:

$$u = \bar{u}_x \frac{n_x \ell_x}{L} + \bar{u}_d \frac{n_d \ell_d}{L} \tag{2}$$

Understanding the mechanism (cont.)

Totally differentiate (1) and (2) and rearrange:

$$\begin{aligned} \mathrm{d}u &= (\bar{u}_x - \bar{u}_d)\frac{n_x \mathrm{d}\ell_x}{L} + (\bar{u}_x - \bar{u}_d)\frac{\ell_x \mathrm{d}n_x}{L} \\ &\quad + \left[\frac{n_x \ell_x}{L}\mathrm{d}\bar{u}_x + \frac{n_d \ell_d}{L}\mathrm{d}\bar{u}_d\right] \end{aligned}$$

- Trade opennes implies $\mathrm{d}n_x > 0$ and $\mathrm{d}\ell_x > 0$
- If $u_x > u_d$, then u increases
- If $u_x < u_d$ then u decreases
- Term in square brackets is an efficiency term

Empirical strategy

- This prediction can be tested by running:

$$u_{ct} = \alpha_c + \alpha_t + \beta_1 \rho_{ct} + \beta_2 y_{ct} + \mu_{ct} \tag{3}$$

- where ρ is the correlation between comparative advantage and sector level unemployment
- The model predicts $\beta_1 > 0$ (and $\beta_2 < 0$)

Measuring comparative advantage

- Costinot, Donaldson and Komunjer (2012) gravity approach

$$\ln x_{cps} = \alpha_{cp} + \alpha_{cs} + \alpha_{ps} + \epsilon_{cps} \tag{4}$$

  where the ratio of α_{cs} give us the relative productivity of country c in sector s with respect to a benchmark country.
- Robustness with Hanson, Lind and Muendler (2014) normalization.

Measuring u_s?

- Using definition of aggregate unemployment

$$u_{ct} = \sum_s w_{cts} u_s \quad \text{where} \quad w_{cts} = \frac{L_{cts}}{L_{ct}} \tag{5}$$

where L_{ct} is aggregate labor force and L_{cts} is the labor force in sector s.

But we do not observe L_{cts}?

- But we observe ℓ_{cts}, and

$$L_{cts} = \ell_{cts} + u_s L_{cts} = \frac{\ell_{cts}}{1 - u_s} \tag{6}$$

where ℓ_{cts} is employment in sector s

Estimating u_s

- Substituting L_{cts} into (**??**):

$$u_{ct} = \sum_s \frac{u_s}{1 - u_s} \frac{\ell_{cts}}{L_{ct}} \tag{7}$$

- We observe u_{ct}, ℓ_{cts} and $L_{ct} = \left(\sum_s \ell_{cts}\right) / \left(1 - u_{ct}\right)$

Estimating u_s (continued)

- We can then estimate u_s:

$$\frac{u_{ct}}{1-u_{ct}} = \sum_s \beta_s \frac{\ell_{cts}}{\sum_s \ell_{cts}} + \epsilon_{ct} \tag{8}$$

where $\beta_s = \frac{u_s}{1-u_s}$

High and low frictions by sector

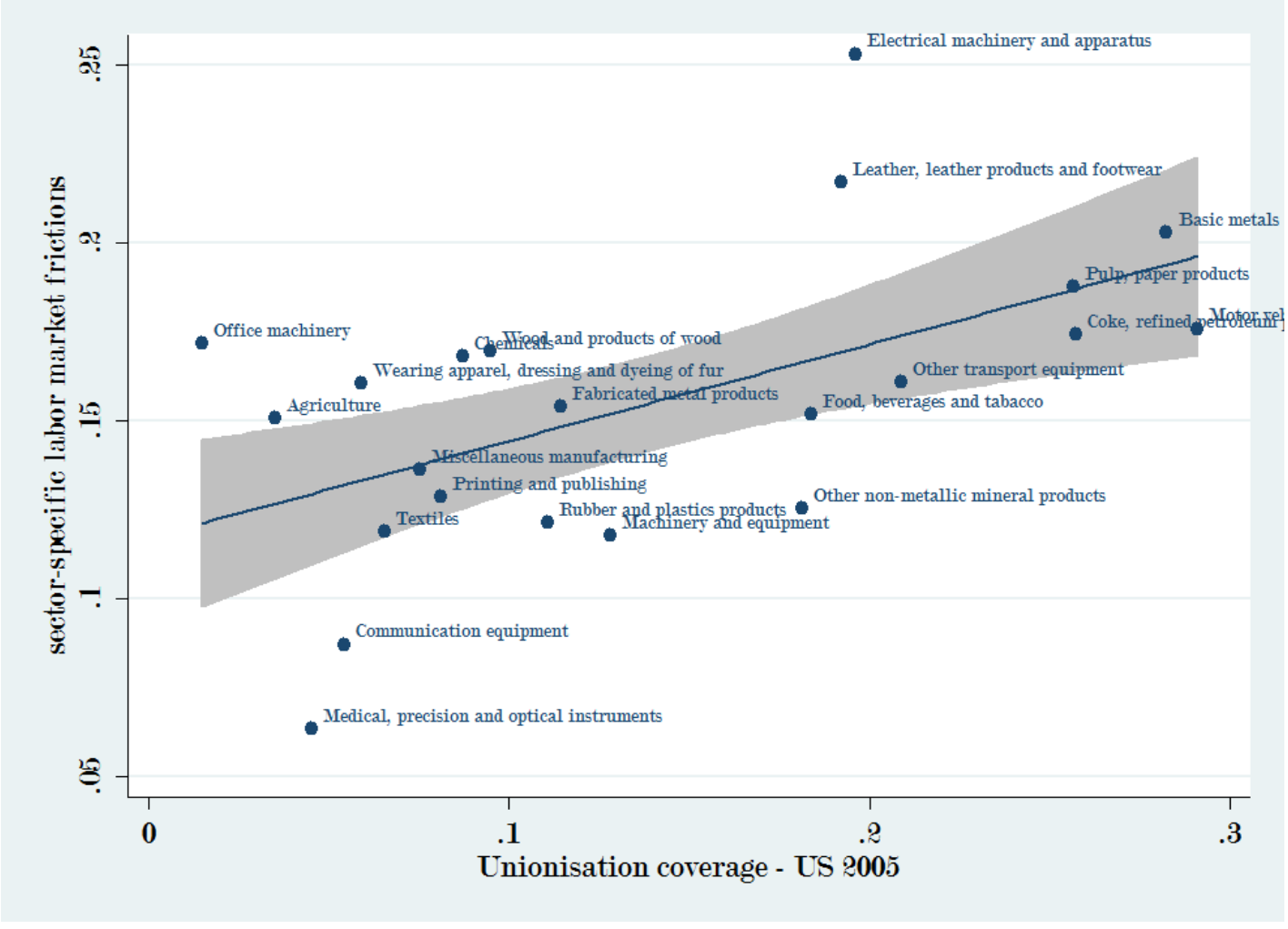
Low labor-market frictions

Industry	u_s
Medical, precision and optical instruments	6.34
Radio, television and communication equipment	8.73
Machinery and equipment, n.e.c.	11.80
Textiles	11.88
Rubber and plastic products	12.15

High labor-market frictions

Industry	u_s
Electrical machinery and apparatus	25.31
Leather, leather products and footwear	21.70
Basic metals	20.31
Paper and paper products	18.79
Motor vehicles, trailers	17.60

External test



See www.unionstats.com

High and low correlation between u_s and RCA

Low ρ countries	
Country	ρ
Israel	-0.26*
Hong Kong	-0.15*
Denmark	-0.11*
Japan	-0.11*
Switzerland	-0.10*
Malaysia	-0.10*

High ρ countries	
Country	ρ
Russia	0.32*
Romania	0.32*
Cape Verde	0.31*
Algeria	0.30*
Ukraine	0.29*

Empirical results

	Baseline (1)	Hanson et al. (2)	Unioniz. (3)	Rank (4)	Quintiles (5)	Tariff (6)
GDP per capita	-0.69***	-0.70***	-0.69***	-0.69***	-0.68***	-0.63***
	(0.16)	(0.17)	(0.16)	(0.17)	(0.07)	(0.18)
Correlation r_{ctz} and u_z	0.41**	0.35**	0.21**	0.26***		0.60***
	(0.18)	(0.17)	(0.09)	(0.09)		(0.22)
2nd quintile					0.05	
					(0.04)	
3rd quintile					0.07**	
					(0.03)	
4th quintile					0.09*	
					(0.05)	
5th quintile					0.15*	
					(0.06)	
Avg. Tariff						-0.07
						(0.06)
Observations	1189	1189	1189	1189	1189	910
R^2	0.21	0.21	0.21	0.21	0.21	0.23

Robustness

	Baseline (1)	2-periods (2)	Placebo (3)	$\backslash c$ (4)	2-regions (5)
GDP per capita	-0.69***	-0.72***	0.09	-0.70***	-0.66***
	(0.16)	(0.20)	(0.17)	(0.19)	(0.16)
Correlation r_{ctz} and u_z	0.41***	0.38**	0.01	0.27**	0.24**
	(0.18)	(0.16)	(0.40)	(0.16)	(0.11)
Observations	1189	739	1189	1189	1189
R^2 (pseudo R^2 in Col. 2)	0.21	0.32	n.a.	0.21	0.21

Concluding remarks

- Trade reforms can lead to reallocation effects that can dampen real income effects on unemployment.
- Even if the trade agreement fully exploits country's comparative advantage this may result in increases in unemployment.
- This will depend on the correlation between labor market frictions and comparative advantage.

Making sense of existing results

- In Brazil, Chile, Romania, Poland, Czech Republic and Slovakia trade increases unemployment.
  - We find $\rho > 0$
  - Bottom quintile and statistically different from zero
- In Canada France, Germany, Italy, United Kingdom trade has no impact on unemployment
  - $\rho \approx 0$
  - And statistically insignificant
- In Singapore and Israel trade reduces unemployment
  - We find $\rho < 0$
  - Top quintile and statistically different from zero