Automation, Trade and Political Outcomes

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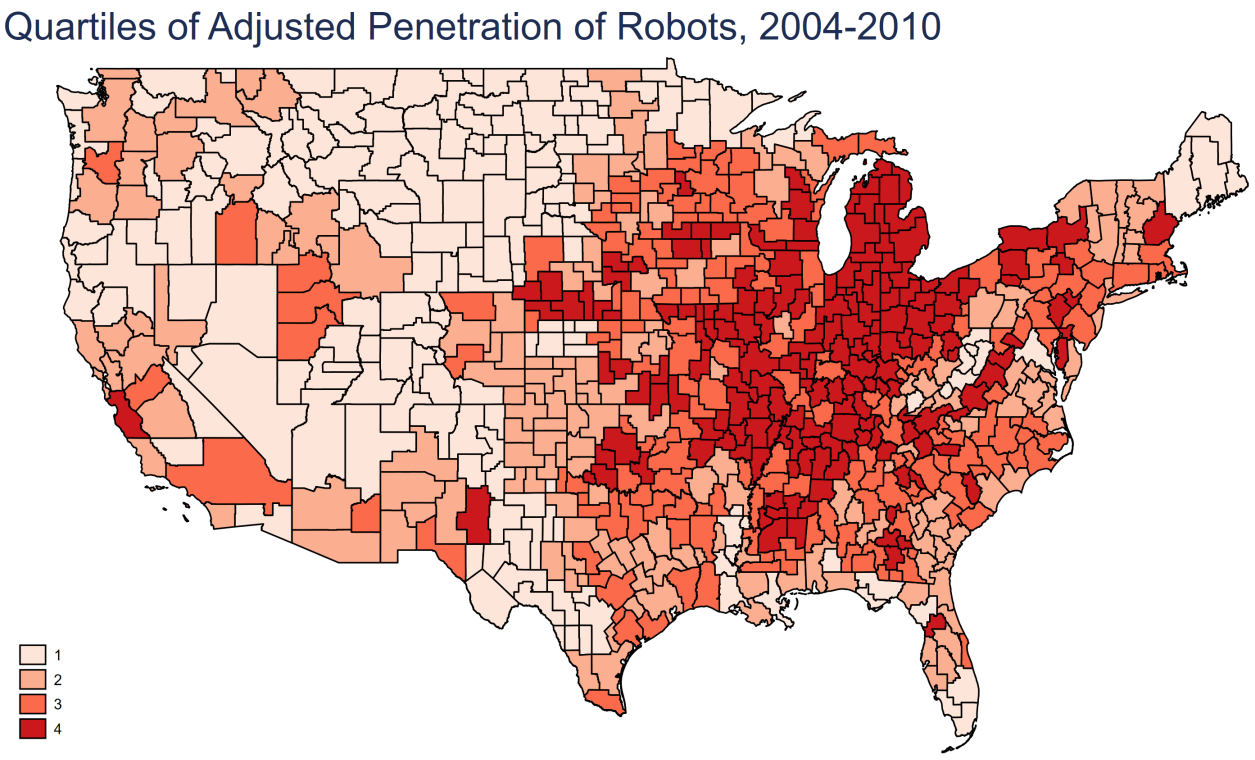
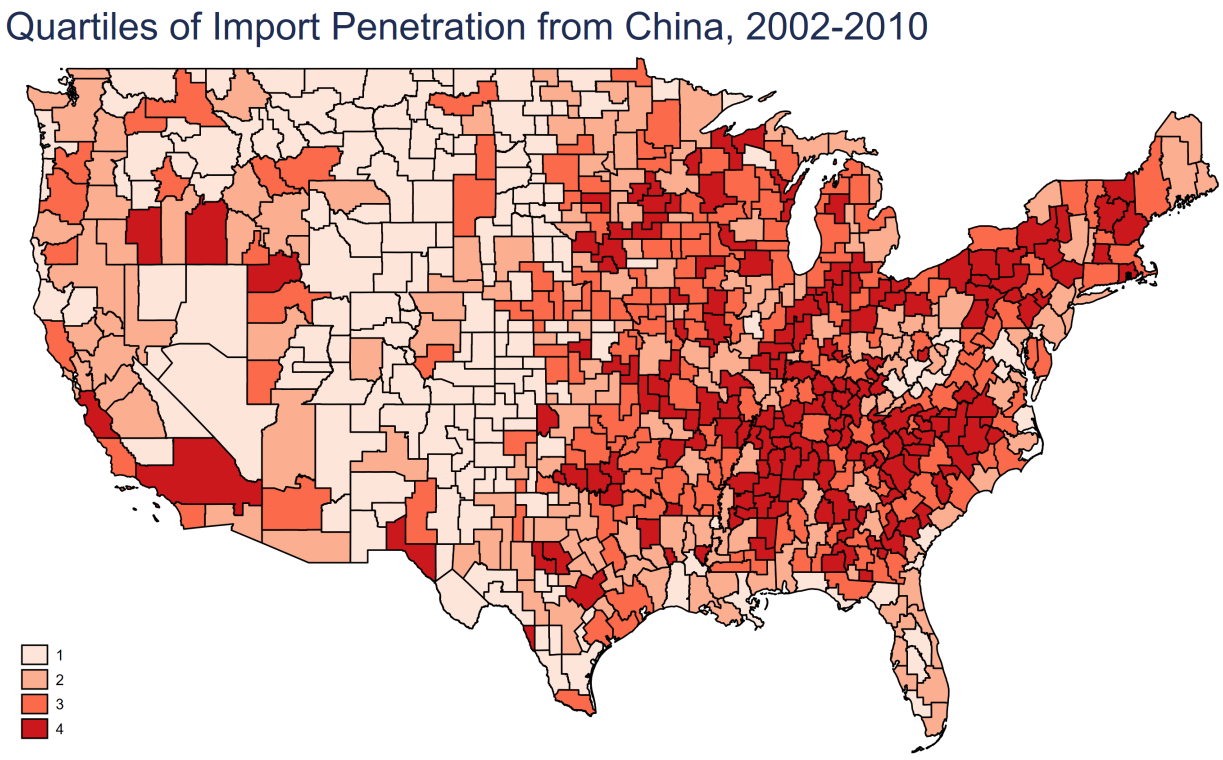
Shock I: Robots



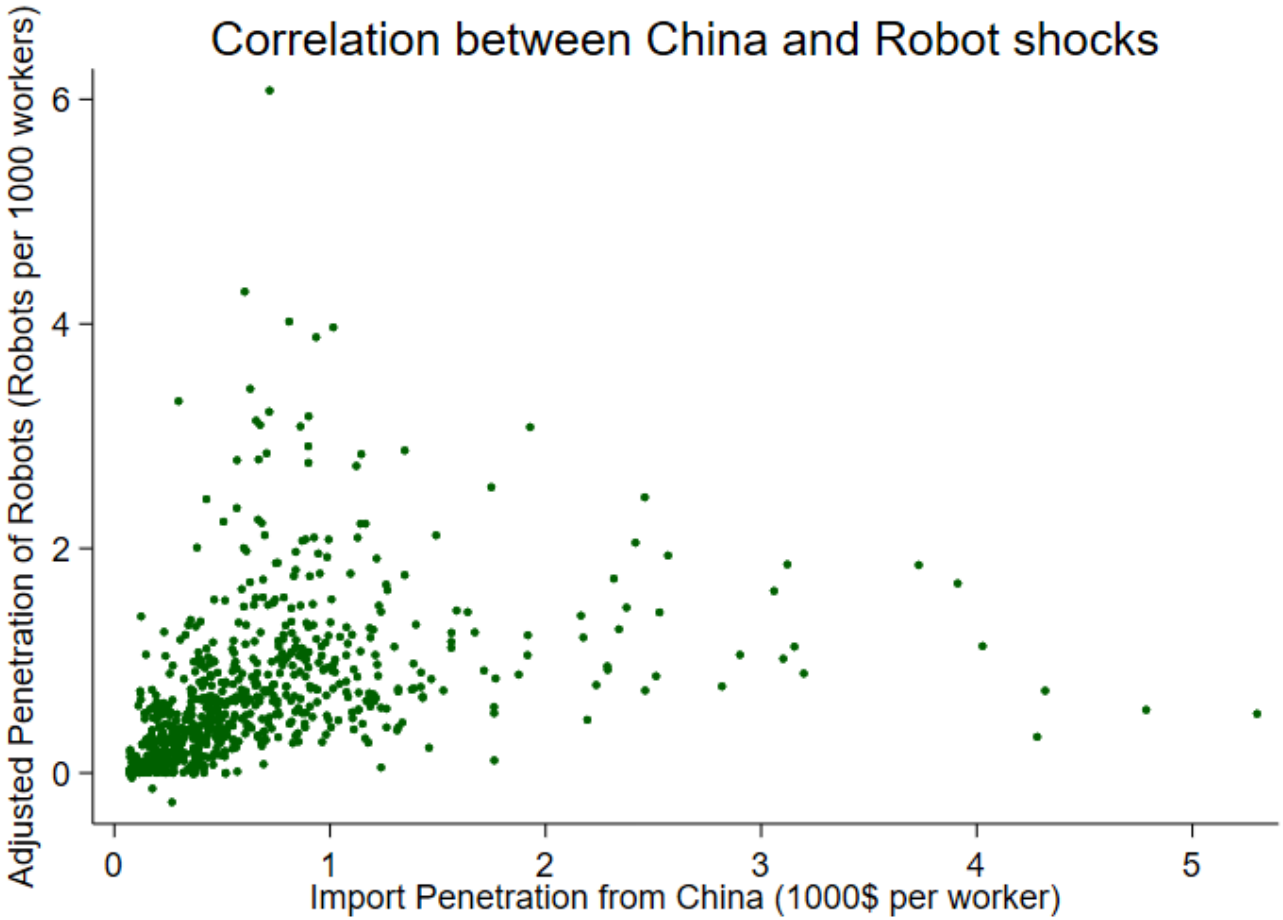
Geographical units: 1990 Commuting Zones. The APR is measured as the change in the number of robots per thousand workers.

Shock II: Import Penetration from China



Geographical units: 1990 Commuting Zones. Import penetration is measured as the change in Chinese imports per worker.

Are the shocks correlated?



Research Question

Do the two shocks have different effects on political outcomes?

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- Political outcomes include contributions, ideological shifts and election results.

- But not obvious how to estimate the two effects simultaneously

Results preview

- Automation and Trade have opposite effects on political contributions
- Polarization in donations is only increased by the China Shock

Political Economy

- **China Shock**: Acemoglu, D. Autor, et al. 2016, D. Autor, Dorn, and G. Hanson 2013 and Pierce and Schott 2016
- **Industrial Automation**: Acemoglu and Restrepo 2020 and Acemoglu and Restrepo 2022
- **Joint effect**: Faber, Sarto, and Tabellini 2022, Chen, Frey, and Presidente 2022 and Galle and Lorentzen 2024

Political Science

- **China Shock and Politics**: D. Autor, Dorn, G. Hanson, and Majlesi 2020, Di Tella and Rodrik 2020, Colantone and Stanig 2018, Colantone, Ottaviano, and Stanig 2022
- **Automation and Politics**: Anelli, Colantone, and Stanig 2019, Gallego and Kurer 2022Frey, Berger, and Chen 2018

My Contributions

- Expanding the literature on the simultaneous estimation of local labour market shocks, with a focus on their impact on political outcomes in the United States between 2002 and 2010.

My Contributions

- Expanding the literature on the simultaneous estimation of local labour market shocks, with a focus on their impact on political outcomes in the United States between 2002 and 2010.
- Contrary to Anelli, Colantone, and Stanig 2019 and Frey, Berger, and Chen 2018, I find evidence against a positive effect of automation on far-right political surges.
- In support of the econometric specification, the findings from D. Autor, Dorn, G. Hanson, and Majlesi 2020 are generally confirmed.

Data

- Import shock and Contributions, Congress election results from D. Autor, Dorn, G. Hanson, and Majlesi 2020
- Robot shock from Acemoglu and Restrepo 2020
- Unit of analysis: county-congressional district units.

Basic Specification

$$\Delta Y_{cj,02-10} = \beta_1 \Delta IP_{cj,02-10} + \beta_2 APR_{cj,04-10} + X'_{cjt_0}\gamma + \epsilon_{cj,02-10}$$

- $\Delta Y_{cj,02-10}$ is the change in the outcome of interest in period $2002 - 10$[1], corresponding to the county-congressional-district cell c, belonging to the j Commuting Zone.

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- $\Delta Y_{cj,02-10}$ is the change in the outcome of interest in period $2002 - 10$[1], corresponding to the county-congressional-district cell c, belonging to the j Commuting Zone.
- The political variables $\Delta Y_{cj,02-10}$ can be summarised in four categories: campaign contributions, voter turnout, republican vote shares in congress and presidential elections.
- $\Delta IP^{cu}_{j,02-10}$ and $APR^{cu}_{j,04-10}$ are, respectively, the Import penetration and adjusted robot penetration.
- X'_{cjt_0} is a vector of census-division dummies and initial CZ political, economic and demographic controls, including shares of employment in manufacturing at $t_0 = 2000$

Endogeneity

- The literature has shown that endogeneity is an issue for both the independent variables of interests.
- Acemoglu and Restrepo 2020 propose a SSIV approach for the Robot shock.
  - D. Autor, Dorn, G. Hanson, and Majlesi 2020 adopt a SSIV strategy for the China shock.
    - Following D. H. Autor, Dorn, and G. H. Hanson 2015, I estimate the following Double 2SLS specification:

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$$\Delta Y_{cj,02-10} = \beta_1 \widehat{\Delta IP}_{cj,02-10} + \beta_2 \widehat{APR}_{cj,04-10} + X'_{cjt_0}\gamma + \epsilon_{cj,02-10}$$

Double Instrumentation Slide

Treatment: from Commuting Zones to ...?

- It can be the case that a congressional district belongs to several commuting zones, or vice versa.
- The mapping from CZ-level shocks to County-CD is however feasible. How?

Treatment: from Commuting Zones to ...?

- It can be the case that a congressional district belongs to several commuting zones, or vice versa.
- The mapping from CZ-level shocks to County-CD is however feasible. How?
- You assign to every county-district cell the associated shock from the county's commuting zone and the political outcome coming from the district, weighted by the cell's share of voting population in the district.
- Redistricting complicates matters but only after 2010.

Instrument Validity I

Test	**expof_us_adj**	**d_imp_usch_p**
F(2, 431)	27.10	8.84
P-value	0.0000	0.0002
SW Chi-sq(1)	64.00	13.34
P-value	0.0000	0.0003
SW F(1, 431)	63.32	13.20

Table: Weak-instrument-robust tests for individual regressors

Instrument Validity II

Test	Statistic	Degrees of Freedom	P-value
AR Wald Test F	F(2, 431) = 6.88	2, 431	0.0011
AR Wald Test χ	Chi-sq(2) = 13.91	2	0.0010
SW S Statistic	Chi-sq(2) = 7.66	2	0.0217

Table: Weak-instrument-robust inference tests for joint significance of endogenous regressors B_1

A comment on IV

- The IVs are both jointly and individually significant.
- The exclusion restriction, conditional on the **joint vector of instruments**, is maintained
- The regression should yield consistent estimates given that $N - k - 1$ is large enough.

Effect on Political Contributions I

	Total Contributions 2002-2010						
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
US APR 2004-10	-2.803	-3.130	-10.12**	-11.33**	-12.09**	-14.65***	
	(4.771)	(4.951)	(5.023)	(4.877)	(4.774)	(4.799)	
Import Penetration 2002-10	16.93*	26.88	32.27	37.95*	35.95*		
	(9.596)	(22.17)	(21.07)	(20.91)	(20.68)		
IV for APR 2004-2010							-21.21***
							(7.074)
IV for Import Penetration							6.410*
							(3.331)
Observations	3,772	3,772	3,772	3,772	3,772	3,772	3,772
Specification	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	Multiple FE
Industry Shares	NO	YES	YES	YES	YES	YES	YES
Census Division Dummies	NO	NO	YES	YES	YES	YES	YES
Demographics	NO	NO	NO	YES	YES	YES	YES
Presidential Results	NO	NO	NO	NO	YES	YES	YES

Effect on Political Contributions II

	Total Left-Wing Contributions 2002-2010						
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
US APR 2004-10	-7.886	-3.656	-10.86	-15.73**	-15.74**	-20.69***	
	(5.149)	(6.465)	(7.264)	(7.335)	(7.374)	(7.549)	
Import Penetration 2002-10	28.30**	56.15*	63.57**	69.70**	69.40**		
	(11.60)	(29.32)	(31.06)	(30.23)	(30.20)		
IV for APR 2004-2010							-29.35***
							(10.11)
IV for Import Penetration							12.85**
							(5.039)
Observations	3,772	3,772	3,772	3,772	3,772	3,772	3,772
Specification	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	Multiple FE
Industry Shares	NO	YES	YES	YES	YES	YES	YES
Census Division Dummies	NO	NO	YES	YES	YES	YES	YES
Demographics	NO	NO	NO	YES	YES	YES	YES
Presidential Results	NO	NO	NO	NO	YES	YES	YES

Effect on Political Contributions III

	Total Moderate Contributions 2002-2010						
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
US APR 2004-10	0.900	0.348	-8.600*	-8.443*	-9.170**	-10.80**	
	(3.962)	(3.975)	(4.700)	(4.485)	(4.486)	(4.671)	
Import Penetration 2002-10	8.422	14.54	21.47	24.67	22.78		
	(8.255)	(19.35)	(18.60)	(19.63)	(19.56)		
IV for APR 2004-2010							-15.75**
							(6.227)
IV for Import Penetration							3.969
							(3.459)
Observations	3,772	3,772	3,772	3,772	3,772	3,772	3,772
Specification	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	Multiple FE
Industry Shares	NO	YES	YES	YES	YES	YES	YES
Census Division Dummies	NO	NO	YES	YES	YES	YES	YES
Demographics	NO	NO	NO	YES	YES	YES	YES
Presidential Results	NO	NO	NO	NO	YES	YES	YES

Effect on Political Contributions IV

	Total Right-Wing Contributions 2002-2010						
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
US APR 2004-10	-2.228	-2.547	-9.323	-11.39**	-12.97**	-16.16***	
	(5.755)	(6.051)	(6.167)	(5.733)	(5.461)	(5.455)	
Import Penetration 2002-10	10.17	32.54	43.95	48.46*	44.66*		
	(13.36)	(27.98)	(26.74)	(26.87)	(26.56)		
IV for APR 2004-2010							-23.23***
							(8.129)
IV for Import Penetration							8.090*
							(4.456)
Observations	3,772	3,772	3,772	3,772	3,772	3,772	3,772
Specification	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	Multiple FE
Industry Shares	NO	YES	YES	YES	YES	YES	YES
Census Division Dummies	NO	NO	YES	YES	YES	YES	YES
Demographics	NO	NO	NO	YES	YES	YES	YES
Presidential Results	NO	NO	NO	NO	YES	YES	YES

Comment I

- The estimates from D. Autor, Dorn, G. Hanson, and Majlesi 2020 are confirmed
- Automation and the China Shock have completely opposite effects on political contributions
- Different effects on donations' polarisation as well.

Congress Elections I

	Republican Two Party Vote Share: Solid Republican 2002-2010						
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
US APR 2004-10	-0.0481	-0.137	0.281	0.359	0.313	0.757*	
	(0.368)	(0.545)	(0.609)	(0.528)	(0.517)	(0.419)	
Import Penetration 2002-10	-1.518	-3.397	-5.678	-6.141	-6.216		
	(1.285)	(3.448)	(3.858)	(3.927)	(3.939)		
IV for APR 2004-2010							0.956
							(0.637)
IV for Import Penetration							-1.219**
							(0.567)
Observations	3,772	3,772	3,772	3,772	3,772	3,772	3,772
Specification	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	Multiple FE
Industry Shares	NO	YES	YES	YES	YES	YES	YES
Census Division Dummies	NO	NO	YES	YES	YES	YES	YES
Demographics	NO	NO	NO	YES	YES	YES	YES
Presidential Results	NO	NO	NO	NO	YES	YES	YES

Congress Elections II

	Republican Two Party Vote Share: Solid Democratic 2002-2010						
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
US APR 2004-10	0.325	0.926**	0.590	0.441	0.352	0.417	
	(0.418)	(0.381)	(0.371)	(0.319)	(0.331)	(0.316)	
Import Penetration 2002-10	-0.246	2.565	-0.570	-0.705	-0.915		
	(0.864)	(2.167)	(1.884)	(1.825)	(1.811)		
IV for APR 2004-2010							0.608
							(0.498)
IV for Import Penetration							-0.160
							(0.391)
Observations	3,772	3,772	3,772	3,772	3,772	3,772	3,772
Specification	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	Multiple FE
Industry Shares	NO	YES	YES	YES	YES	YES	YES
Census Division Dummies	NO	NO	YES	YES	YES	YES	YES
Demographics	NO	NO	NO	YES	YES	YES	YES
Presidential Results	NO	NO	NO	NO	YES	YES	YES

Congress Elections III

	Republican Two Party Vote Share: Competitive 2002-2010						
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
US APR 2004-10	0.112	0.457	1.063	1.181	1.068	0.624	
	(0.762)	(0.992)	(1.164)	(1.105)	(1.091)	(1.068)	
Import Penetration 2002-10	1.208	2.890	5.601	6.479	6.229		
	(1.777)	(4.236)	(4.660)	(4.909)	(4.964)		
IV for APR 2004-2010							1.152
							(1.663)
IV for Import Penetration							1.307
							(0.941)
Observations	3,772	3,772	3,772	3,772	3,772	3,772	3,772
Specification	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	Multiple FE
Industry Shares	NO	YES	YES	YES	YES	YES	YES
Census Division Dummies	NO	NO	YES	YES	YES	YES	YES
Demographics	NO	NO	NO	YES	YES	YES	YES
Presidential Results	NO	NO	NO	NO	YES	YES	YES

Congress Elections IV

	Change of Seat to Republican 2002-2010						
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
US APR 2004-10	-2.978**	-1.590	-5.372*	-5.848*	-6.133**	-7.821**	
	(1.431)	(1.905)	(2.972)	(3.064)	(2.983)	(3.080)	
Import Penetration 2002-10	6.647	13.61	23.53**	24.24**	23.64**		
	(5.451)	(12.16)	(11.55)	(11.74)	(11.94)		
IV for APR 2004-2010							-11.18***
							(3.638)
IV for Import Penetration							4.328**
							(2.162)
Observations	3,772	3,772	3,772	3,772	3,772	3,772	3,772
Specification	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	Multiple FE
Industry Shares	NO	YES	YES	YES	YES	YES	YES
Census Division Dummies	NO	NO	YES	YES	YES	YES	YES
Demographics	NO	NO	NO	YES	YES	YES	YES
Presidential Results	NO	NO	NO	NO	YES	YES	YES

Comment II

- Linear estimator has limited validity for dummy variables.
- However, the estimation results point to quantitatively opposite effects of the two shocks.
- 2010 was a red wave election year.

Ideology of Congress Member I

	Ideology of elected Congress member according to CF Score 2010: Democratic Liberal						
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
US APR 2004-10	0.883	1.373	2.152	2.381	2.503	3.086	
	(1.543)	(1.917)	(2.164)	(2.313)	(2.342)	(2.442)	
Import Penetration 2002-10	-0.294	0.307	-5.206	-8.459	-8.160		
	(3.796)	(8.707)	(8.768)	(8.851)	(8.823)		
IV for APR 2004-2010							4.447
							(3.373)
IV for Import Penetration							-1.470
							(1.748)
Observations	3,772	3,772	3,772	3,772	3,772	3,772	3,772
Specification	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	Multiple FE
Industry Shares	NO	YES	YES	YES	YES	YES	YES
Census Division Dummies	NO	NO	YES	YES	YES	YES	YES
Demographics	NO	NO	NO	YES	YES	YES	YES
Presidential Results	NO	NO	NO	NO	YES	YES	YES

Ideology of Congress Member II

	Ideology of elected Congress member according to CF Score 2010: Democratic Moderate						
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
US APR 2004-10	2.095	0.217	3.220	3.467	3.630*	4.735**	
	(1.689)	(2.376)	(2.536)	(2.201)	(2.176)	(2.141)	
Import Penetration 2002-10	-6.354	-13.92	-18.32	-15.78	-15.48		
	(5.954)	(15.31)	(13.99)	(13.74)	(13.90)		
IV for APR 2004-2010							6.728**
							(2.944)
IV for Import Penetration							-2.858
							(2.713)
Observations	3,772	3,772	3,772	3,772	3,772	3,772	3,772
Specification	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	Multiple FE
Industry Shares	NO	YES	YES	YES	YES	YES	YES
Census Division Dummies	NO	NO	YES	YES	YES	YES	YES
Demographics	NO	NO	NO	YES	YES	YES	YES
Presidential Results	NO	NO	NO	NO	YES	YES	YES

Ideology of Congress Member II

	Ideology of elected Congress member according to CF Score 2010: Republican Moderate						
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
US APR 2004-10	3.948	3.915	3.404	3.476	3.076	3.469	
	(2.510)	(2.763)	(3.522)	(3.613)	(3.624)	(3.599)	
Import Penetration 2002-10	1.406	-0.282	-3.779	-4.581	-5.505		
	(5.769)	(12.05)	(11.87)	(11.92)	(12.13)		
IV for APR 2004-2010							5.118
							(5.852)
IV for Import Penetration							-0.905
							(2.312)
Observations	3,772	3,772	3,772	3,772	3,772	3,772	3,772
Specification	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	Multiple FE
Industry Shares	NO	YES	YES	YES	YES	YES	YES
Census Division Dummies	NO	NO	YES	YES	YES	YES	YES
Demographics	NO	NO	NO	YES	YES	YES	YES
Presidential Results	NO	NO	NO	NO	YES	YES	YES

Ideology of Congress Member IV

	Ideology of elected Congress member according to CF Score 2002-2010: Republican Conservative						
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
US APR 2004-10	-6.914***	-5.494**	-8.779***	-9.322***	-9.209***	-11.29***	
	(2.347)	(2.690)	(2.992)	(2.839)	(2.829)	(2.897)	
Import Penetration 2002-10	5.225	13.85	27.31*	28.81*	29.12*		
	(6.636)	(14.90)	(15.18)	(15.45)	(15.51)		
IV for APR 2004-2010							-16.29***
							(4.478)
IV for Import Penetration							5.229**
							(2.174)
Observations	3,772	3,772	3,772	3,772	3,772	3,772	3,772
Specification	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	Multiple FE
Industry Shares	NO	YES	YES	YES	YES	YES	YES
Census Division Dummies	NO	NO	YES	YES	YES	YES	YES
Demographics	NO	NO	NO	YES	YES	YES	YES
Presidential Results	NO	NO	NO	NO	YES	YES	YES

Comment III

- Very large and significant estimates.
- Opposing effects on republican support are confirmed.
- This holds despite 2010 was a red election year.

Consistent with the literature?

- Di Tella and Rodrik 2020 find that automation and trade shocks have complementary effects on political attitudes and ideology, both favouring a shift to protectionism.
- Similarly, Anelli, Colantone, and Stanig 2019 find that automation exposure shifts ideology towards right-leaning populism.

A Migration Story? I

- Faber, Sarto, and Tabellini 2022 highlight the differential effect of the two shocks on Migration between Commuting Zones. In particular,robot exposure caused an overall employment decline, while Chinese imports likely induced a reallocation of economic activity across sectors, which partly offset the employment losses in manufacturing.
- Local share of High Skilled workers explains the effect on employment spillovers and migration?

A Migration Story? II

Table E4: Heterogeneity of effects by initial service intensity, stacked differences (reduced form)

	(1)	(2)	(3)	(4)	(5)	(6)
	Employment			Migration		
	Total	Manuf.	Non-manuf.	Pop.	In-mig.	Out-mig.
Exposure to robots	-1.03***	-1.07***	-1.08***	-0.39***	-1.43***	0.11
× HSI	(0.13)	(0.28)	(0.17)	(0.11)	(0.41)	(0.40)
Exposure to robots	-1.09***	-1.02*	-1.17***	-0.53***	-0.81	-0.54
× LSI	(0.29)	(0.54)	(0.26)	(0.19)	(0.73)	(0.72)
Exposure to Chinese imports	0.52	-3.01***	1.22*	1.03**	1.61*	0.97
× HSI	(0.52)	(0.84)	(0.63)	(0.50)	(0.85)	(0.95)
Exposure to Chinese imports	-1.16**	-2.69***	-0.53	-0.41	-0.17	-0.28
× LSI	(0.54)	(0.91)	(0.52)	(0.40)	(0.54)	(0.75)
P(HSI=LSI):						
– Exposure to robots	0.84	0.91	0.76	0.48	0.34	0.25
– Exposure to Chinese imports	0.02	0.79	0.02	0.01	0.04	0.19

A Potential Explanation

- Industrial Automation and Trade have heterogeneous effects on migration.
- Automation has caused a greater demographic decline, probably because of the negative spillovers into High Skilled employment.
- Are high skilled workers more mobile? And are they more republican?
- Wendy K. Tam Cho and Hui 2013 supports this explanation.

Summing Up

- Trade and technology shocks are intertwined
- But do they contribute in the same way to political change?
- The answer is puzzling and worth further investigation.

Summing Up

- Trade and technology shocks are intertwined
- But do they contribute in the same way to political change?
- The answer is puzzling and worth further investigation.
- What about 2010-2016? And presidential elections?

Thank You!

Literature References I

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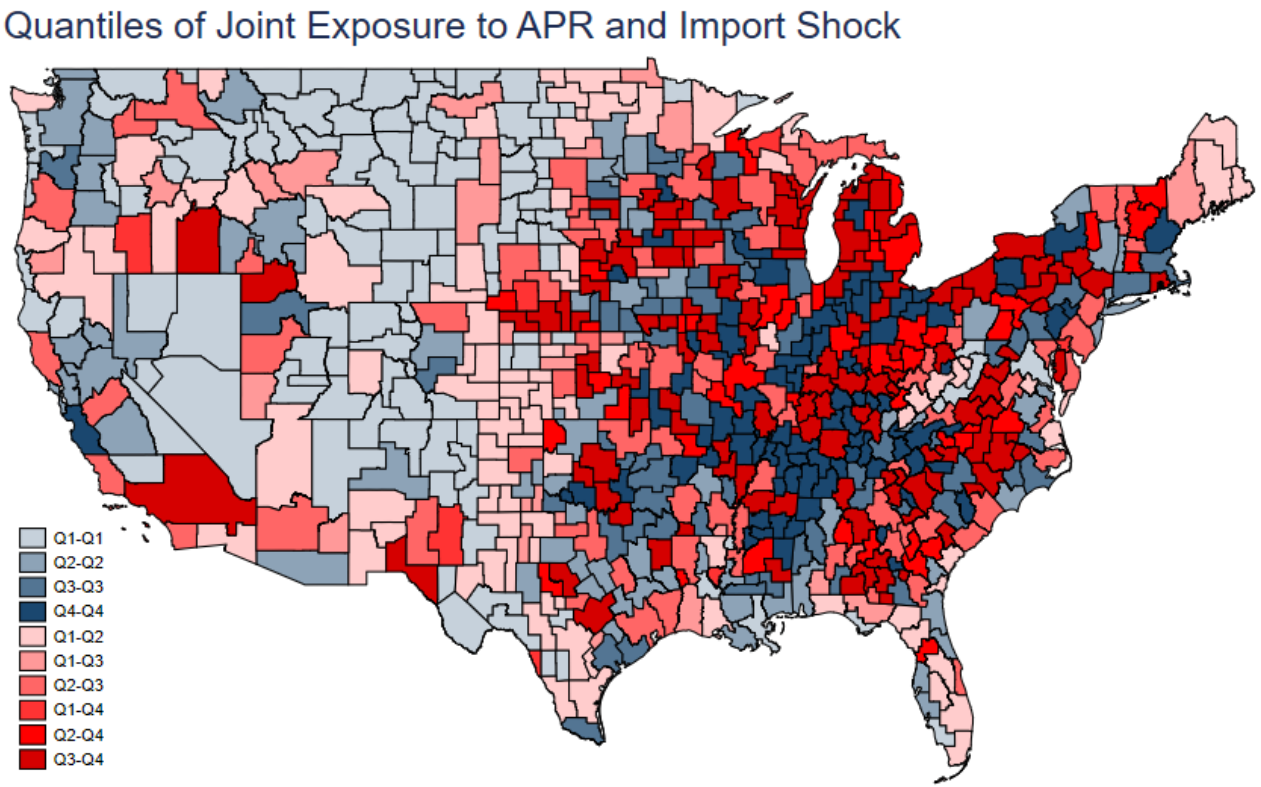
Yes, but..


Quantiles of Joint Exposure to APR and Import Shock
Q1-Q1
Q2-Q2
Q3-Q3
Q4-Q4
Q1-Q2
Q1-Q3
Q2-Q3
Q1-Q4
Q2-Q4
Q3-Q4

Double Instrumentation

- Following D. H. Autor, Dorn, and G. H. Hanson 2015, I estimate the following Double 2SLS specification:
- $\Delta IP^{co}_{j\,02-10} = \sum_k \frac{L_{jk,1990}}{L_{j,1990}} \Delta IP^{co}_{k,02-10}$,
- $APR_{k,04-10} = \frac{1}{5} \sum_{e \in \text{EURO5}} \left[\frac{\Delta R^e_{k,04-10}}{L^e_{k,1990}} - g^e_{k,04-10} \frac{R_{k,04}}{L^e_{k,1990}} \right]$
- So that one eventually estimates

$$\Delta Y_{cj,02-10} = \beta_1 \widehat{\Delta IP}_{cj,02-10} + \beta_2 \widehat{APR}_{cj,04-10} + X'_{cjt_0}\gamma + \epsilon_{cj,02-10}$$

Back