Trade Shock and Consumption Risk Sharing

Lilia Habibulina and Iryna Stewen

University of Zurich and University of Hamburg

EEA annual meeting, August 26 2024

Research Questions

- How the China Trade Shock (CTS) impacted household income and consumption in the United States between 1993 and 2007?
- Through which channels did household consumption react to the CTS?
  - Given that the CTS affected both income and prices (here,housing prices).
  - In particular we study how consumption smoothing (or risk sharing) was affected by changes in income and housing prices?
- How US state-level financial integration mitigated this impact?

Main Findings

- Using data from the Consumer Expenditure Survey, we find a significant negative impact of the CTS on household income and consumption.
- However, income of educated, married and urban living households and consumption of elderly households appear to be less affected.
- Consumption in more financially integrated states droped less. The CTS impacted household income and housing prices in financially integrated states less severely. Both effects resulted in lower sensitivity of consumption to the CTS.
- The effect is particularly pronounced for housing consumption.
- Home owners were considerably more exposed to the negative impact of Chinese imports on income and house prices, compared to home renter.
- Home owners in financially liberalized states were able to better smooth consumption in response to the income and house price shocks.

Household Data

- Consumer Expenditure Survey (CES) provides detailed data on household income and expenditures, as well as information on family characteristics and housing structure.
- The sample includes a rotating panel of households that completed their interviews between 1993 and 2007.
- Sample restrictions: households that have completed the full set of interviews, households that are classified as complete income respondents, households with positive income, food and non-food expenditures, and households with a reference person aged above 21 and below 64.
- Main expenditure categories: Food, Housing, Apparel and Services, Transportation, Health Care, Entertainment, Education.

The CTS as state exposure to chinese import

- Chinese Import Exposure per Worker (Autor, Dorn, and Hanson, 2013):

$$IE_{st}^{US} = \sum_{j} \frac{L_{sjt-1}}{L_{st-1}} \cdot \frac{IM_{jt}^{US}}{L_{jt-1}}$$

where IM_{cjt}^{US} is Chinese imports to US in sector j in year t.

- Instrument for Chinese Import Exposure per Worker:

$$IE_{st}^{Oth} = \sum_{j} \frac{L_{sjt-1}}{L_{st-1}} \cdot \frac{IM_{jt}^{Oth}}{L_{jt-1}}$$

where IM_{ocjt} is Chinese imports to eight other developed countries.

Empirical Framework: baseline

The baseline regression model:

$$y_{i,s,t} = \beta_1 IE^{Oth}_{s,t} + \beta_2 IE^{Oth}_{s,t} \times \mathbf{X}_{i,s,t} + \beta_3 IE^{Oth}_{s,t} \times FI_s + \beta_4 \mathbf{X}_{i,s,t} + \delta_s + \tau_t + \epsilon_{i,s,t}$$

- $y_{i,s,t}$ denotes a logarithmic income of household i living in state s in year t.
- $IE^{Oth}_{s,t}$ is a measure of Chinese import exposure per worker in state s in year t.
- FI_s is a measure of financial openness of state s.
- $\mathbf{X}_{i,s,t}$ is a vector of household characteristics (i.e. dummy variables for urban, race, sex, marital status, as well as age and educational level of the reference person).
- δ_s and τ_t are state and year fixed effects respectively.

The CTS reduces income on average but not for married, urban and educated HH

Table 1: The Effect of Chinese Imports on U.S. Household Income

	Income after taxes				
	(1)	(2)	(3)	(4)	(5)
Chinese Imports per Worker	0.0140	-0.0216	-0.1230***	-0.2365***	-0.2635***
	(0.0302)	(0.0270)	(0.0445)	(0.0717)	(0.0772)
Chinese Imports per Worker × Deregulation		0.0017**	0.0018**	0.0018**	0.0019***
		(0.0007)	(0.0007)	(0.0007)	(0.0007)
Chinese Imports per Worker × Education			0.0222***	0.0215***	0.0215***
			(0.0069)	(0.0071)	(0.0071)
Chinese Imports per Worker × Marital				0.0355**	0.0354**
				(0.0139)	(0.0162)
Chinese Imports per Worker × Urban				0.0910*	0.0907*
				(0.0529)	(0.0522)
Chinese Imports per Worker × Race					0.0039
					(0.0243)
Chinese Imports per Worker × Age					0.0006
					(0.0006)
Chinese Imports per Worker × Sex					-0.0035
					(0.0188)
Observations	24641	24641	24641	24641	24641
Adjusted R^2	0.28	0.28	0.28	0.28	0.28

Notes: This table reports 2SLS estimates. The sample includes households that completed interviews between 1993 and 2007, households with positive income, food and non-food expenditures, and a reference person aged between 21 and 64. All income and consumption variables are per year and household member (using adult equivalence scale) and log-demeaned (using US-wide averages). All regressions include the vector of household characteristics, state and year fixed effects and are weighted by BLS population weights. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Estimation Method - Risk Sharing

- The risk sharing regression model:

$$\tilde{c}_{i,s,t} = \beta_y \tilde{y}_{i,s,t} + \alpha_s + \tau_t + \epsilon_{i,s,t}$$

$\tilde{y}_{i,s,t}$ and $\tilde{c}_{i,s,t}$ denote a logarithmic deviation of income and consumption of household i living in state s from the U.S.-wide average in year t.

Risk Sharing is higher for educated HH living in more financially integrated states

Table 3: Estimation of U.S. Household Consumption Risk Sharing

	Total Expenditures				
	(1)	(2)	(3)	(4)	(5)
Income after Taxes	0.4567***	0.6866***	0.7249***	0.6407***	0.6471***
	(0.0170)	(0.0809)	(0.0813)	(0.1046)	(0.1035)
Income after Taxes × Deregulation		-0.0203***	-0.0191***	-0.0183***	-0.0182***
		(0.0066)	(0.0062)	(0.0060)	(0.0059)
Income after Taxes × Education			-0.0125**	-0.0133***	-0.0134***
			(0.0053)	(0.0049)	(0.0049)
Income after Taxes × Marital				0.0178	0.0100
				(0.0241)	(0.0213)
Income after Taxes × Urban				0.0666	0.0698
				(0.0727)	(0.0781)
Income after Taxes × Race					-0.0081
					(0.0187)
Income after Taxes × Age					-0.0003
					(0.0007)
Income after Taxes × Sex					0.0247
					(0.0209)
Observations	24641	24641	24641	24641	24641
Adjusted R^2	0.58	0.58	0.58	0.58	0.58

Notes: This table reports OLS estimates. The sample includes households that completed interviews between 1993 and 2007, households with positive income, food and non-food expenditures, and a reference person aged between 21 and 64. All income and consumption variables are per year and household member (using adult equivalence scale) and log-demeaned (using US-wide averages). All regressions include the vector of household characteristics, state and year fixed effects and are weighted by BLS population weights. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

The Impact of the Trade Shock on HH Consumption Risk Sharig through the Income Channel

- The first stage regressions:

$$y_{i,s,t} = \beta_1 IE_{s,t} + \beta_2 IE_{s,t} \times FI_s + \beta_3 IE_{s,t} \times \mathbf{X}_{i,s,t} + \beta_4 \mathbf{X}_{i,s,t} + \alpha_s + \tau_t + \epsilon_{i,s,t}$$

- The second stage regression:

$$c_{i,s,t} = \beta_{y1} \widehat{y_{i,s,t}} + \beta_{y2} \widehat{y_{i,s,t} \times FI_s} + \beta_{y3} \mathbf{X}_{i,s,t} + \alpha_s + \tau_t + \sigma_{i,s,t}$$

Estimation Results - the Income Channel

Table 5: The Effect of Chinese Imports on U.S. Household Consumption through the Income Channel

	Total (1)	Food (2)	House (3)	Apparel (4)	Transport (5)	Entertainment (6)
Income after Taxes	0.8124***	0.3314***	0.7700***	-0.1309	0.6030***	1.3723***
	(0.1106)	(0.1131)	(0.1509)	(0.2204)	(0.2094)	(0.3155)
Income after Taxes × Deregulation	-0.0174**	-0.0077	-0.0279***	0.0004	0.0091	-0.0388
	(0.0087)	(0.0068)	(0.0099)	(0.0132)	(0.0212)	(0.0239)
Observations	24641	24641	24639	24345	24541	24361
Adjusted R^2	0.55	0.35	0.46	0.08	0.20	0.31

Notes: This table reports 2SLS estimates. The sample includes households that completed interviews between 1993 and 2007, households with positive income, food and non-food expenditures, and a reference person aged between 21 and 64. All income and consumption variables are per year and household member (using adult equivalence scale) and log-demeaned (using US-wide averages). All regressions include the vector of household characteristics, state and year fixed effects and are weighted by BLS population weights. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

The Impact of the Trade Shock on HH Consumption Risk Sharing through the Price Channel

- The first stage regressions:

$$hp_{s,t} = \beta_1 IE_{s,t} + \beta_2 IE_{s,t} \times FI_s + \alpha_s + \tau_t + \epsilon_{i,s,t}$$

- The second stage regression:

$$c_{i,s,t} = \beta_{h1} \widehat{hp_{s,t}} + \beta_{h2} \widehat{hp_{s,t} \times FI_s} + \mathbf{X}_{i,s,t} + \alpha_s + \tau_t + \sigma_{i,s,t}$$

$hp_{s,t}$ is a logarithm of house price index in state s in year t.

Estimation Results - the Price Channel

Table 6: The Effect of Chinese Imports on U.S. Household Consumption through the Price Channel

	Total (1)	Food (2)	House (3)	Apparel (4)	Transport (5)	Entertainment (6)
House Price Index	0.4017**	0.8365**	0.5196**	-0.0999	0.1475	-0.0791
	(0.1896)	(0.3845)	(0.2170)	(0.7493)	(0.4567)	(0.5285)
House Price Index × Deregulation	-0.0197***	-0.0185	-0.0265***	-0.0254	-0.0280	-0.0021
	(0.0071)	(0.0321)	(0.0085)	(0.0514)	(0.0248)	(0.0161)
Observations	24641	24641	24639	24345	24541	24361
Adjusted R^2	0.31	0.19	0.30	0.14	0.09	0.20

Notes: This table reports 2SLS estimates. The sample includes households that completed interviews between 1993 and 2007, households with positive income, food and non-food expenditures, and a reference person aged between 21 and 64. All income and consumption variables are per year and household member (using adult equivalence scale) and log-demeaned (using US-wide averages). All regressions include the vector of household characteristics, state and year fixed effects and are weighted by BLS population weights. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Consumption Risk Sharing for Home Owners vs. Home Renters

- The impact of Chinese imports on household consumption through the income- and price-channels can differ between households owning and renting a house.
- We split the sample into two groups of households: home owners and home renters.
- Households that own a house with or without mortgage are classified as home owners.
- Households that occupy their homes for rent payments are classify as home renters.

Estimation Results - Home Owners vs. Home Renters

Table 7: The Effect of Chinese Imports on U.S. Household Consumption through the Income and Price Channels for Home Owners and Home Renters

Total Expenditures	Owners			Renters		
	(1)	(2)	(3)	(4)	(5)	(6)
Income after Taxes	0.7950***		0.6559***	0.6540***		0.6497***
	(0.1777)		(0.2367)	(0.0858)		(0.0893)
Income after Taxes × Deregulation	-0.0335***		-0.0289*	-0.0204***		-0.0201***
	(0.0129)		(0.0150)	(0.0070)		(0.0072)
House Price Index		0.3579**	0.1678		0.3326	0.1317
		(0.1711)	(0.1694)		(0.2306)	(0.1710)
House Price Index × Deregulation		-0.0218***	-0.0083		-0.0070	-0.0048
		(0.0074)	(0.0113)		(0.0148)	(0.0108)
Observations	17804	17804	17804	6837	6837	6837
Adjusted R^2	0.54	0.29	0.52	0.58	0.33	0.58

Notes: This table reports 2SLS estimates. The sample includes households that completed interviews between 1993 and 2007, households with positive income, food and non-food expenditures, and a reference person aged between 21 and 64. All income and consumption variables are per year and household member (using adult equivalence scale) and log-demeaned (using US-wide averages). All regressions include the vector of household characteristics, state and year fixed effects and are weighted by BLS population weights. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Home Owners vs. Home Renters

Table 8: The Effect of Chinese Imports on U.S. Household Consumption through the Income and Price Channels for Home Owners and Home Renters

Housing	Owners			Renters		
	(1)	(2)	(3)	(4)	(5)	(6)
Income after Taxes	0.8275***		0.7668***	0.4884***		0.4856***
	(0.2095)		(0.1544)	(0.0625)		(0.0652)
Income after Taxes × Deregulation	-0.0434***		-0.0311**	-0.0132**		-0.0130**
	(0.0154)		(0.0137)	(0.0053)		(0.0054)
House Price Index		0.6113***	0.3699**		0.2124	0.0598
		(0.1930)	(0.1755)		(0.1678)	(0.1171)
House Price Index × Deregulation		-0.0400***	-0.0251***		0.0023	0.0034
		(0.0103)	(0.0093)		(0.0114)	(0.0066)
Observations	17804	17804	17804	6835	6835	6835
Adjusted R^2	0.45	0.29	0.46	0.47	0.31	0.47

Notes: This table reports 2SLS estimates. The sample includes households that completed interviews between 1993 and 2007, households with positive income, food and non-food expenditures, and a reference person aged between 21 and 64. All income and consumption variables are per year and household member (using adult equivalence scale) and log-demeaned (using US-wide averages). All regressions include the vector of household characteristics, state and year fixed effects and are weighted by BLS population weights. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Home Owners with vs without Mortgages

Table A11: The Effect of Chinese Imports on U.S. Household Consumption through the Income and Price Channels for Home Owners with and without Mortgage

Shelter	Owners with Mortgage			Owners without Mortgage		
	(1)	(2)	(3)	(4)	(5)	(6)
Income after Taxes	0.9898***		0.7703***	0.9689***		0.9238***
	(0.1906)		(0.1353)	(0.2550)		(0.2579)
Income after Taxes × Deregulation	-0.0527***		-0.0303**	-0.0471**		-0.0433*
	(0.0168)		(0.0123)	(0.0221)		(0.0224)
House Price Index		0.7945***	0.6051***		1.6754	1.3002
		(0.1951)	(0.1672)		(1.0935)	(1.1422)
House Price Index × Deregulation		-0.0484***	-0.0376***		-0.1099***	-0.0680*
		(0.0110)	(0.0100)		(0.0348)	(0.0360)
Observations	14622	14622	14622	3175	3175	3175
Adjusted R^2	0.41	0.28	0.41	0.40	0.33	0.40

Notes: This table reports 2SLS estimates. The sample includes households that completed interviews between 1993 and 2007, households with positive income, food and non-food expenditures, and a reference person aged between 21 and 64. All income and consumption variables are per year and household member (using adult equivalence scale) and log-demeaned (using US-wide averages). All regressions include the vector of household characteristics, state and year fixed effects and are weighted by BLS population weights. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Conclusion

- The China trade shock has negatively affected household income and consumption, in particular housing consumption.
- However, this negative impact was significantly mitigated in states that liberalized their financial sector earlier.
- Households in more financially liberalized states were able to better smooth consumption after income and price shocks caused by the Chinese imports.
- Financial liberalization facilitated consumption smoothing through the income channel for both home owners and home renters, while the price channel was most important for home owners.

Thank you!