Are Tariffs Biased?
The Effects of the 2018 U.S. Tariffs on the Gender Wage Gap

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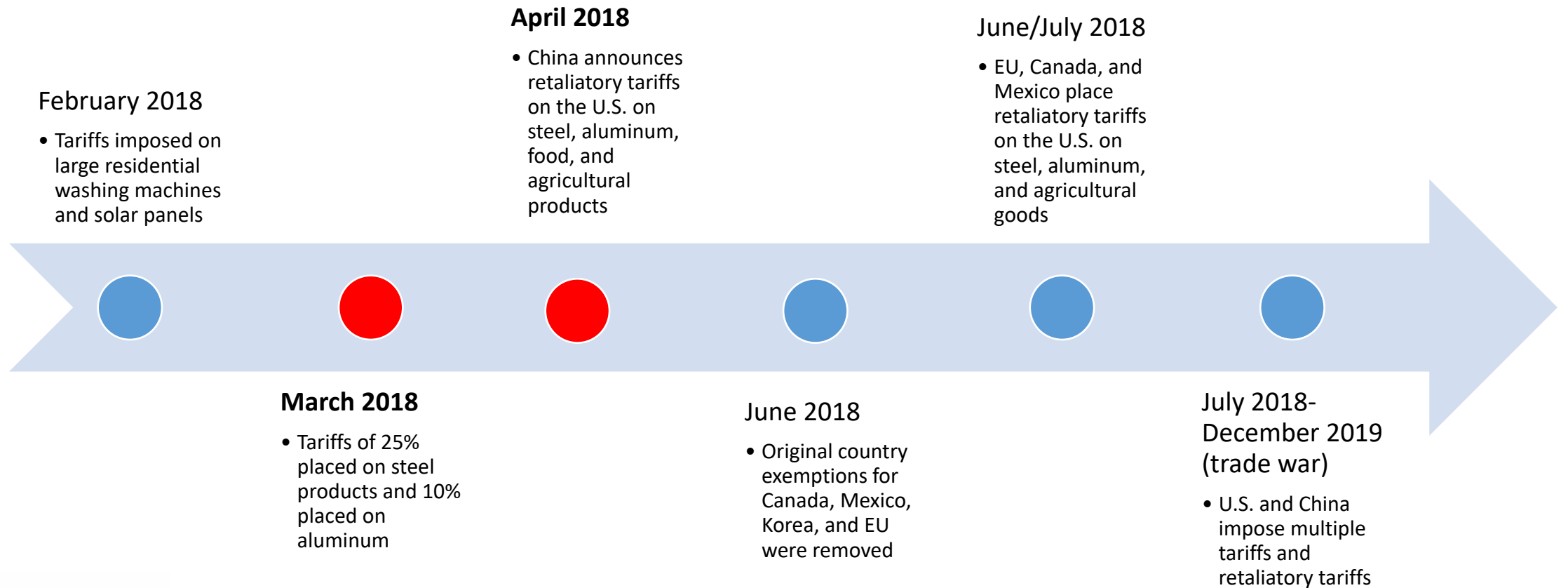**SGE Innovation, Growth, and Trade Session – ASSA 2022**
January 8, 2022

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2018 U.S. Tariffs

February 2018
- Tariffs imposed on large residential washing machines and solar panels

March 2018
- Tariffs of 25% placed on steel products and 10% placed on aluminum

April 2018
- China announces retaliatory tariffs on the U.S. on steel, aluminum, food, and agricultural products

June 2018
- Original country exemptions for Canada, Mexico, Korea, and EU were removed

June/July 2018
- EU, Canada, and Mexico place retaliatory tariffs on the U.S. on steel, aluminum, and agricultural goods

July 2018-December 2019 (trade war)
- U.S. and China impose multiple tariffs and retaliatory tariffs

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3

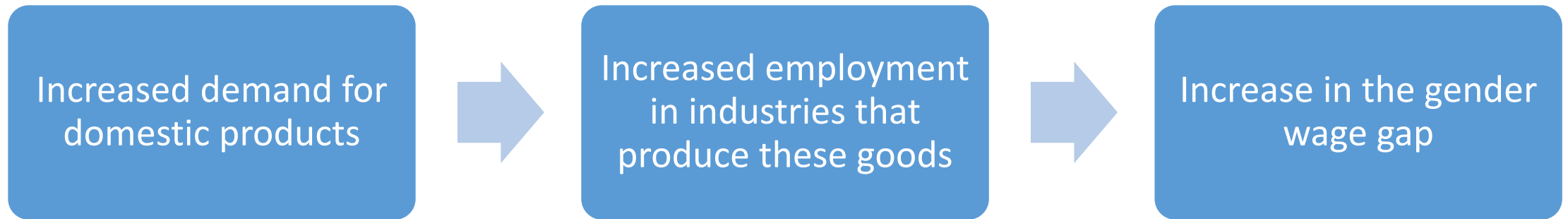# Growing Literature on 2018 Tariffs

- Flaaen and Pierce (2019) find that employment is lowered in manufacturing industries exposed to tariffs because the increase in input costs and retaliatory tariffs exceed the positive effects of tariffs.

- Fajgelbaum et al. (2020) find an aggregate real income loss of $7.2 billion, or 0.04% of GDP, due to tariffs and retaliatory tariffs.

- Amiti et al. (2019) find that by December 2018, import tariffs were costing U.S. an additional $3.2 billion per month in added tax and another $1.4 billion per month in deadweight welfare losses.
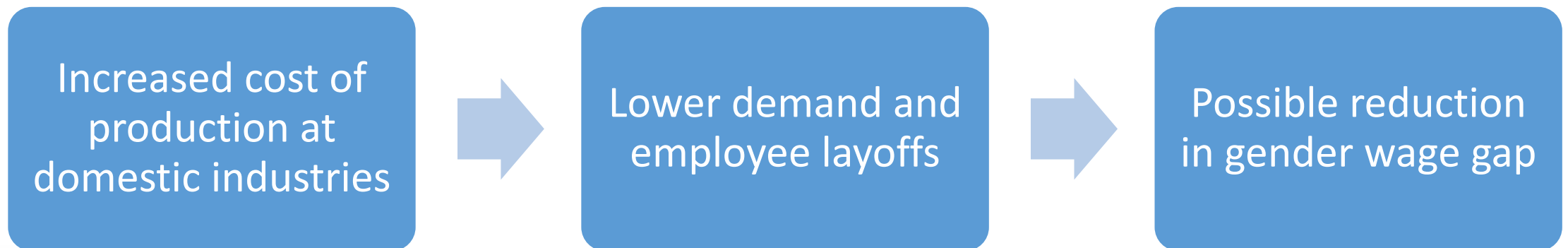
Research Question

How did the 2018 tariffs on steel and aluminum affect the gender wage gaps in the United States?

Mechanisms Through which Tariffs May Affect the Gender Wage Gap
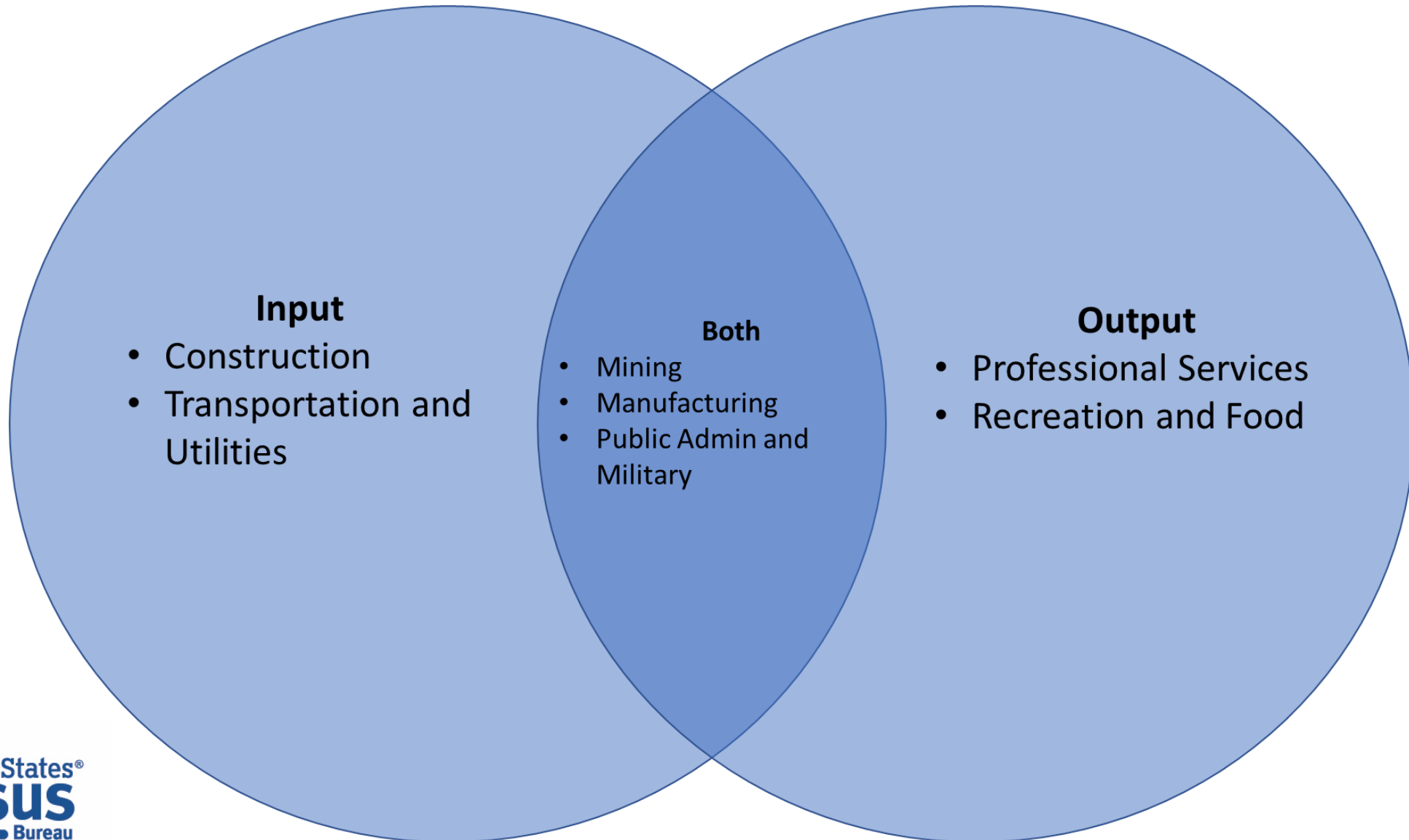
Tariffs on Final Goods

| Increased demand for domestic products | → | Increased employment in industries that produce these goods | → | Increase in the gender wage gap |

Tariffs on Intermediate Goods

| Increased cost of production at domestic industries | → | Lower demand and employee layoffs | → | Possible reduction in gender wage gap |

Data

- Survey of Income and Program Participation (SIPP)
  - Household survey that collects information on employment characteristics, social program participation, demographic characteristics, etc.
  - Contains individual-month level information for years 2017–2019.
  - Conduct analysis at both monthly and annual level.
- Focus on the primary jobs of individuals
  - Primary jobs are one that generated the largest proportion of total annual earnings.
  - We aggregate industry codes from the 2017 Census Industry classification into their two-digit NAICS sector.
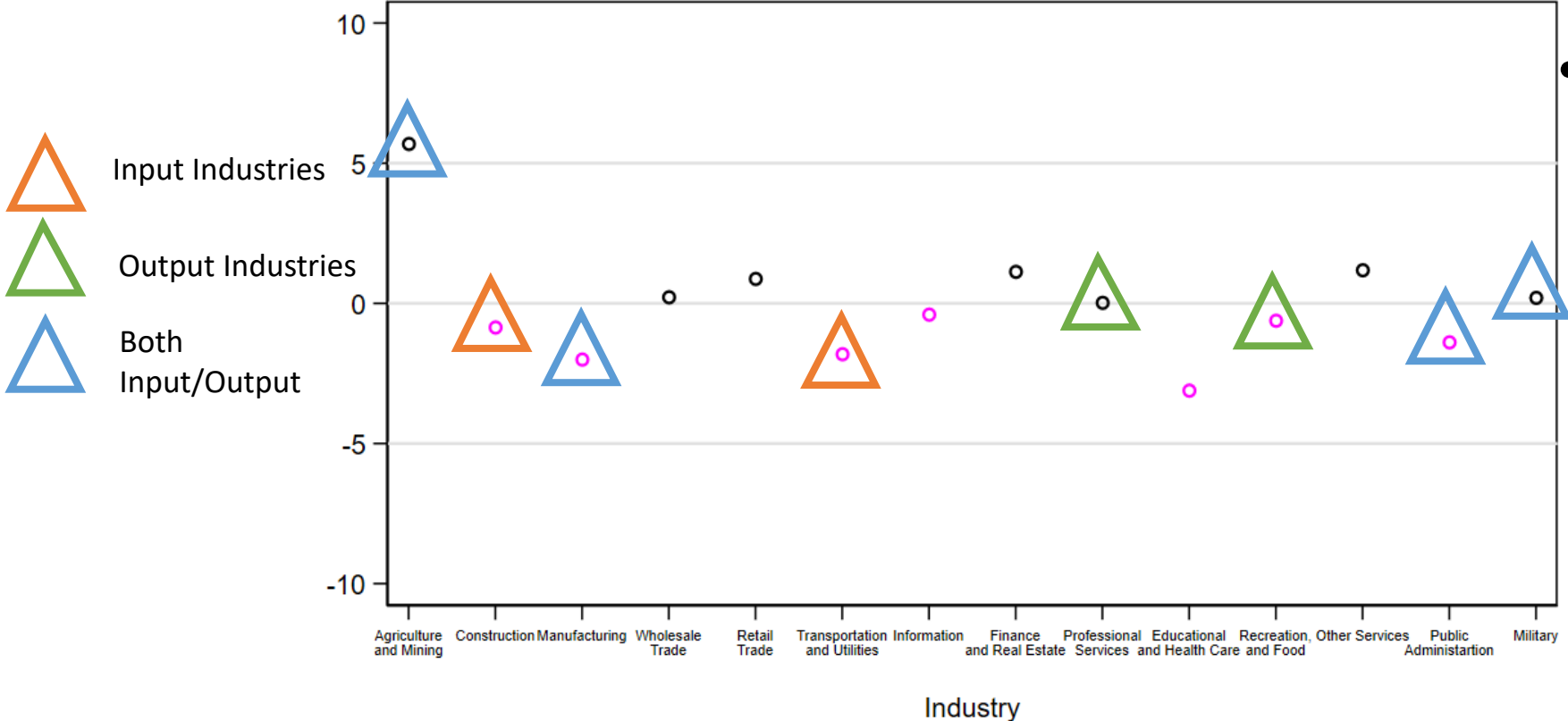
Identifying Steel-Intensive Industries

- Use Input-Output Accounts data from the Bureau of Economic Analysis to identify industries that are more likely to use steel as an input or an output
  - We take the top five producers from the output accounts data and the top five consumers from the input accounts.

Steel-Intensive Industries

Input
- Construction
- Transportation and Utilities

Both
- Mining
- Manufacturing
- Public Admin and Military

Output
- Professional Services
- Recreation and Food

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9

Differences in Male-to-Female Wage Ratio

- This shows the differences in male-to-female wage ratios before and after the 2018 tariffs
  - Points highlighted in magenta indicate a drop in the wage ratio from pre- to post-tariffs

Empirical Framework

- Estimate a pooled OLS model:

$$Log(Y_{ijt}) = \alpha + \delta_j + T_t + \beta_1\tau_t + \beta_2 w_i + \beta_3(\delta_j * \tau_t) + \beta_4(\delta_i * w_i) + \beta_5(\tau_t * w_i) + \boxed{\beta_6(\delta_j * \tau_t * w_i)} + \alpha_1 X_{ijt} + \epsilon_{ijt}$$

- Y_{ijt} is the wages of person i, working in industry j, and in month-year t or year t.
- δ_j is an indicator for steel-intensive industries.
- T_t is time fixed effects.
- τ_t is an indicator for the timing of the tariffs (March+) in the monthly and (2018+) in the annual specifications.
- w_i is an indicator for being a woman.
- The treatment variable of interest is $(\delta_j * \tau_t * w_i)$.
- X_{ijt} is a vector of time-varying individual characteristics.
- ϵ_{ijt} is the error term.

Identification Challenges

- While this is not a triple differences model, we are concerned with pre-trends in the data
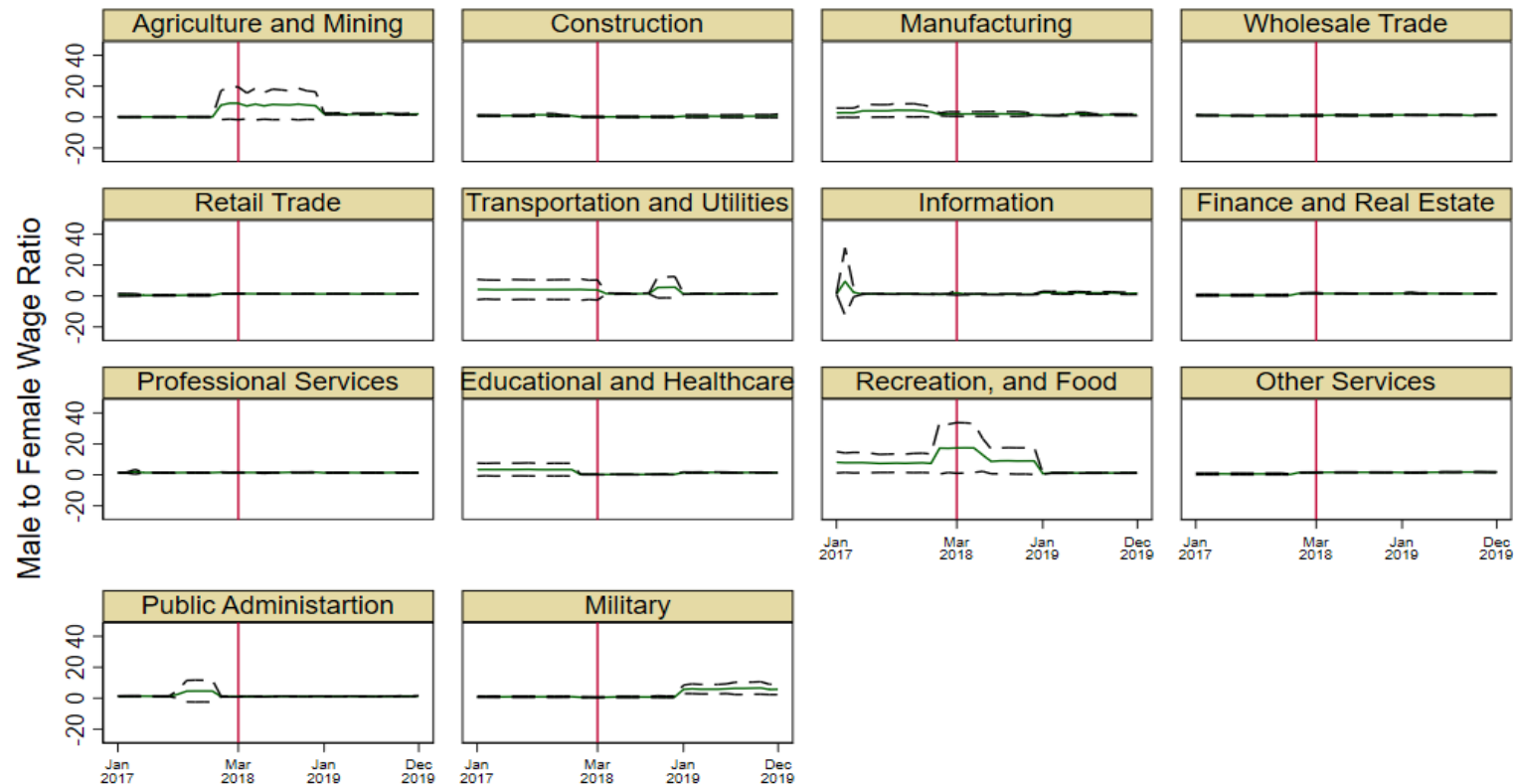
Part A: Effects in Steel-intensive Industries

	log (total annual earnings) (1)	log (annual hourly wage) (2)	log (monthly earnings) (3)	log (monthly hourly wage) (4)
A. Full Sample				
annual tariff=1 * female=1	0.017	0.018		
	(0.024)	(0.019)		
steel-intensive=1 * female=1	-0.074***	-0.034*	-0.047**	-0.027
	(0.026)	(0.020)	(0.021)	(0.017)
annual tariff=1 * steel-intensive=1 * female=1	-0.048	-0.014		
	(0.036)	(0.027)		
monthly tariff=1 * female=1			0.061***	0.057***
			(0.021)	(0.018)
monthly tariff=1 * steel-intensive=1 * female=1			-0.107***	-0.098***
			(0.030)	(0.027)
F-Statistics	625.5	435.5	578.4	477.8
Observations	56,000	56,000	605,000	602,000

Source: Authors' calculations from the Survey of Income and Program Participation 2018, Waves 1-3.

Notes: Dependent variables in columns (1)-(2) are annual: log of total annual earnings, and log of annual hourly wage, respectively. Dependent variables in columns (3)-(4) are monthly: log of monthly earnings, and log of monthly hourly wage, respectively. All measures of earnings are from the primary job, which is defined as the job producing the largest share of earnings for an individual in the reference year. Annual tariff = 1 for the years the steel and aluminum tariffs were implemented and kept in place (2018 and 2019). Monthly tariff = 1 for the months and years the steel and aluminum tariffs were implemented and keep in place (March 2018 - December 2019 inclusive). Steel-intensive = 1 if either a steel-intensive input or a steel-intensive output industry. Using Input-Output Accounts Data by the Bureau of Economic Analysis, we define steel-intensive input industries as industries with the largest domestic consumption of steel and steel-intensive output industries as industries with the largest production of steel. For more details on steel-intensive industries, refer to the paper. All estimates weighted: columns (1)-(2) use annual weights, columns (3)-(4) use monthly weights. Standard errors are in parentheses and clustered at the household level. * p<0.10; ** p<0.05; *** p<0.01.

Part B: Effects in Steel-intensive Industries

	log (total annual earnings) (1)	log (annual hourly wage) (2)	log (monthly earnings) (3)	log (monthly hourly wage) (4)
B. Excluding Outliers				
annual tariff=1 * female=1	0.024	0.025		
	(0.023)	(0.017)		
steel-intensive=1 * female=1	-0.078***	-0.029	-0.058***	-0.035**
	(0.025)	(0.018)	(0.020)	(0.016)
annual tariff=1 * steel-intensive=1 * female=1	-0.054	-0.029		
	(0.035)	(0.025)		
monthly tariff=1 * female=1			0.055***	0.046***
			(0.020)	(0.017)
monthly tariff=1 * steel-intensive=1 * female=1			-0.095***	-0.075***
			(0.028)	(0.024)
F-Statistics	638.1	497.3	602.4	517.6
Observations	56,000	56,000	599,000	596,000

Source: Authors' calculations from the Survey of Income and Program Participation 2018, Waves 1-3.

Notes: Dependent variables in columns (1)-(2) are annual: log of total annual earnings, and log of annual hourly wage, respectively. Dependent variables in columns (3)-(4) are monthly: log of monthly earnings, and log of monthly hourly wage, respectively. All measures of earnings are from the primary job, which is defined as the job producing the largest share of earnings for an individual in the reference year. Annual tariff = 1 for the years the steel and aluminum tariffs were implemented and kept in place (2018 and 2019). Monthly tariff = 1 for the months and years the steel and aluminum tariffs were implemented and keep in place (March 2018 - December 2019 inclusive). Steel-intensive = 1 if either a steel-intensive input or a steel-intensive output industry. Using Input-Output Accounts Data by the Bureau of Economic Analysis, we define steel-intensive input industries as industries with the largest domestic consumption of steel and steel-intensive output industries as industries with the largest production of steel. For more details on steel-intensive industries, refer to the paper. All estimates weighted: columns (1)-(2) use annual weights, columns (3)-(4) use monthly weights. Panel B restricted to individual earnings below the 99th percentile of total annual earnings (column 1), annual hourly wage (column 2), monthly earnings (column 3), and monthly hourly wage (column 4) distributions. Standard errors are in parentheses and clustered at the household level. * p<0.10; ** p<0.05; *** p<0.01.

Effects in Steel-intensive Input Industries

	log (total annual earnings) (1)	log (annual hourly wage) (2)	log (monthly earnings) (3)	log (monthly hourly wage) (4)
A. Full Sample				
annual tariff=1 * female=1	-0.003	0.011		
	(0.017)	(0.013)		
steel-intensive input=1 * female=1	0.039	0.016	0.020	0.030
	(0.048)	(0.036)	(0.045)	(0.037)
annual tariff=1 * steel-intensive input=1 * female=1	-0.079	0.005		
	(0.078)	(0.057)		
monthly tariff=1 * female=1			0.009	0.008
			(0.015)	(0.013)
monthly tariff=1 * steel-intensive input=1 * female=1			-0.002	-0.008
			(0.076)	(0.068)
F-Statistics	615.4	424.0	557.9	462.9
Observations	56,000	56,000	605,000	602,000

Source: Authors' calculations from the Survey of Income and Program Participation 2018, Waves 1-3.

Notes: Dependent variables in columns (1)-(2) are annual: log of total annual earnings, and log of annual hourly wage, respectively. Dependent variables in columns (3)-(4) are monthly: log of monthly earnings, and log of monthly hourly wage, respectively. All measures of earnings are from the primary job, which is defined as the job producing the largest share of earnings for an individual in the reference year. Annual tariff = 1 for the years the steel and aluminum tariffs were implemented and kept in place (2018 and 2019). Monthly tariff = 1 for the months and years the steel and aluminum tariffs were implemented and keep in place (March 2018 - December 2019 inclusive). Steel-intensive = 1 if either a steel-intensive input or a steel-intensive output industry. Using Input-Output Accounts Data by the Bureau of Economic Analysis, we define steel-intensive input industries as industries with the largest domestic consumption of steel and steel-intensive output industries as industries with the largest production of steel. For more details on steel-intensive industries, refer to the paper. All estimates weighted: columns (1)-(2) use annual weights, columns (3)-(4) use monthly weights. Standard errors are in parentheses and clustered at the household level. * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

Effects in Steel-intensive Output Industries

	log (total annual earnings) (1)	log (annual hourly wage) (2)	log (monthly earnings) (3)	log (monthly hourly wage) (4)
A. Full Sample				
annual tariff=1 * female=1	-0.004	0.005		
	(0.018)	(0.014)		
steel-intensive output=1 * female=1	0.042	0.033	0.055**	0.036*
	(0.033)	(0.024)	(0.025)	(0.021)
annual tariff=1 * steel-intensive output=1 * female=1	0.018	0.033		
	(0.044)	(0.035)		
monthly tariff=1 * female=1			0.031**	0.022
			(0.016)	(0.014)
monthly tariff=1 * steel-intensive output=1 * female=1			-0.103***	-0.075**
			(0.039)	(0.035)
F-Statistics	614.8	420.7	556.7	458.4
Observations	56,000	56,000	605,000	602,000

Source: Authors' calculations from the Survey of Income and Program Participation 2018, Waves 1-3.

Notes: Dependent variables in columns (1)-(2) are annual: log of total annual earnings, and log of annual hourly wage, respectively. Dependent variables in columns (3)-(4) are monthly: log of monthly earnings, and log of monthly hourly wage, respectively. All measures of earnings are from the primary job, which is defined as the job producing the largest share of earnings for an individual in the reference year. Annual tariff = 1 for the years the steel and aluminum tariffs were implemented and kept in place (2018 and 2019). Monthly tariff = 1 for the months and years the steel and aluminum tariffs were implemented and keep in place (March 2018 - December 2019 inclusive). Steel-intensive = 1 if either a steel-intensive input or a steel-intensive output industry. Using Input-Output Accounts Data by the Bureau of Economic Analysis, we define steel-intensive input industries as industries with the largest domestic consumption of steel and steel-intensive output industries as industries with the largest production of steel. For more details on steel-intensive industries, refer to the paper. All estimates weighted: columns (1)-(2) use annual weights, columns (3)-(4) use monthly weights. Standard errors are in parentheses and clustered at the household level. * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

Effects in Steel-intensive Both Input and Output Industries

	log (total annual earnings) (1)	log (annual hourly wage) (2)	log (monthly earnings) (3)	log (monthly hourly wage) (4)
A. Full Sample				
annual tariff=1 * female=1	0.019 (0.018)	0.025* (0.014)		
steel-intensive=1 * female=1	0.070** (0.032)	0.025 (0.024)	0.059** (0.024)	0.017 (0.021)
annual tariff=1 * steel-intensive input and output=1 * female=1	-0.132*** (0.043)	-0.069** (0.033)		
monthly tariff=1 * female=1			0.022 (0.016)	0.018 (0.014)
monthly tariff=1 * steel-intensive input and output=1 * female=1			-0.070* (0.037)	-0.066** (0.034)
F-Statistics	642.5	434.1	582.4	470.5
Observations	56,000	56,000	605,000	602,000

Source: Authors' calculations from the Survey of Income and Program Participation 2018, Waves 1-3.

Notes: Dependent variables in columns (1)-(2) are annual: log of total annual earnings, and log of annual hourly wage, respectively. Dependent variables in columns (3)-(4) are monthly: log of monthly earnings, and log of monthly hourly wage, respectively. All measures of earnings are from the primary job, which is defined as the job producing the largest share of earnings for an individual in the reference year. Annual tariff = 1 for the years the steel and aluminum tariffs were implemented and kept in place (2018 and 2019). Monthly tariff = 1 for the months and years the steel and aluminum tariffs were implemented and keep in place (March 2018 - December 2019 inclusive). Steel-intensive = 1 if either a steel-intensive input or a steel-intensive output industry. Using Input-Output Accounts Data by the Bureau of Economic Analysis, we define steel-intensive input industries as industries with the largest domestic consumption of steel and steel-intensive output industries as industries with the largest production of steel. For more details on steel-intensive industries, refer to the paper. All estimates weighted: columns (1)-(2) use annual weights, columns (3)-(4) use monthly weights. Standard errors are in parentheses and clustered at the household level. * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

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Results Takeaways

- Using longitudinal data and pooled OLS estimations, we show that the gender wage gap widens

- In the wake of steel and aluminum tariffs and retaliatory tariffs, women experienced lower wages in more steel-intensive industries relative to men

  - Suggest tariffs operate chiefly though industries that use steel and aluminum as final goods

Thank you!

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