EXPECTED WAGE LOSSES DUE TO TRADE-RELATED JOB DISPLACEMENTS

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Abstract

We use econometric estimation and an industry-specific economic simulation model, combined with data from U.S. manufacturing industries and individual U.S. workers, to estimate the expected wage losses of workers displaced due to tariff reductions. We find small but significant wage losses conditional on job displacement for 15 types of workers across seven manufacturing industries. The modeling framework that we introduce provides a practical tool for prospective analysis of the labor market effects of changes in tariffs that does not require data that specifically identify trade-related displacements. It also does not require significant historical variation in tariff rates or measures of confounding factors to serve as controls.

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1 Introduction

Reductions in tariffs generally increase imports and reduce the demand for labor in competing domestic industries. This can lead to job displacement and a reduction in wage of workers in their next job as they lose the value of their job-specific human capital.

In general, it can be difficult to estimate the impact of tariff changes on labor markets using a reduced-form econometric model. There might not be sufficient historical variation in tariff rates, and there are typically too many confounding factors to measure and include as controls in a regression. To avoid these difficulties, we use a simulation model of trade-related displacements along with an econometric model of wages losses of individual workers. This approach is especially useful for analyzing hypothetical policy changes – like estimating the effects on wages of reducing 2021 U.S. tariff rates to 2016 rates – and is not tied to a specific historical event like most reduced-form econometric models.[1] We combined the modeled probability of displacement with the estimated wage losses conditional on displacement to estimate the expected wage losses of workers displaced due to the tariff reductions.

We define a benchmark group as non-unionized workers younger than 40 with a college degree and less than five years of tenure who are likely have an easier transition to a new job. We find that, a unionized worker age 40 years or older without a college degree and with five or more years of job tenure has the largest estimated wage loss due to displacement relative to this benchmark group (37.8%), while a non-unionized worker age 40 years or older with a college degree and less than five years of tenure has the smallest estimated wage loss due to displacement (7.3%). Simulating a rollback of 2021 average tariff rates to 2016 average rates results in an average probability of displacement of 6.2% for the seven manufacturing industries that we model. Workers in the apparel knitting mills industry have the highest

[1] By combining econometric estimation and a calibrated partial equilibrium simulation model, we can estimate the impact of tariff reductions on wages even if we cannot isolate which displacements in the sample are trade-related.

probability of displacement (11.0%) and workers in the cut and sew apparel manufacturing industry have the lowest (1.2%). Combining our econometric estimates with our simulation model results, we find that the average expected (probability weighted) wage loss for all 15 worker types across all seven industries is 1.24%. Expected wage losses range from a low of 0.09% to a high of 4.16% *relative to* the benchmark group of workers who likely have easier transitions.

Our emphasis on the expected wage losses of displaced workers due to tariff liberalization complements recent papers that focused on other labor market outcomes following trade-related displacements. For example, Daun and Riker (2021) uses the Current Population Statistics (CPS) Displaced Workers Supplement (DWS) to look at prolonged unemployment following displacement in the wake of a tariff reduction. Jestrab and Riker (2023) uses CPS longitudinal data to look at the probability that workers switch or leave the labor force.

The rest of this short paper is presented in five parts. Section 2 presents the theoretical framework. Section 3 discusses model calibration and reports simulation results. Section 4 reports our econometric estimation. Section 5 presents our estimates of expected wage losses for different types of workers. Section 6 concludes.

2 Theoretical Framework

The first task of the model is to simulate the percent change in labor demand in the industry as a result of tariff liberalization. We use monopolistic competition introduced by Krugman (1980) and applied to partial equilibrium modeling of trade policy in Ahmad (2019). The second task of the model is to estimate the expected wage losses of different types of workers.

2.1 Job Displacements

Our industry-specific partial equilibrium model includes a continuum of domestic and foreign products that are imperfect substitutes. Demand has the standard constant elasticity of substitution (CES) form in equations (1) and (2).

$$q_i \;=\; k_i\;(P_i)^{\eta_i}\;\left(\frac{p_i}{P_i}\right)^{-\sigma_i}\;\frac{1}{n_i} \tag{1}$$

$$q_i^* \;=\; k_i\;(P_i)^{\eta_i}\;\left(\frac{p_i^*\;\tau_i}{P_i}\right)^{-\sigma_i}\;\frac{1}{n_i^*} \tag{2}$$

q_i and q_i^* are the quantities demanded of each domestic or foreign production, n_i and n_i^* are the numbers of symmetrically differentiated domestic and foreign varieties, and p_i and p_i^* are their producer prices. k_i is total expenditure on the products in the industry, τ_i is the industry tariff factor (equal to one plus the tariff rate), σ_i and η_i are the elasticity of substitution and the total industry constant price elasticity of demand, respectively, and P_i is the CES price index for industry i represented by equation (3).

$$P_i = \left[n_i\;(p_i)^{1-\sigma}\;+\;b_i\;n_i^*\;(p_i^*\;\tau_i)^{1-\sigma_i}\right]^{\frac{1}{1-\sigma_i}} \tag{3}$$

b_i is a calibrated preference parameter for imports.

Many firms produce symmetrically differentiated products, and each has monopolistic power in a unique variety. The domestic firms will choose p_i to maximize their profit function defined in equation (4).

$$\pi_i = (p_i - c_i)\;q_i\;-\;f_i \tag{4}$$

c_i is the constant marginal cost of production in industry i, and f_i is the fixed cost in industry i. All domestic firms face the same demand function, q_i. Each firm's price has an infinitesimal impact on the overall price index, P_i, so the firms set p_i according to the first order condition in equation (5).

$$p_i = c_i \left(\frac{\sigma_i}{\sigma_i - 1} \right) \tag{5}$$

The total employment in industry i, L_i, is given by equation (6).

$$L_i = \theta_i \; q_i \tag{6}$$

θ_i is a calibrated per unit labor requirement of producing q_i that is constant across all firms within each industry i.

We use the model to solve for new equilibrium prices, quantities and labor demand after a reduction in the industry tariff, and then calculate the resulting percent change in labor demand of the domestic industry, $\hat{L}_i$. Since θ_i, the per unit labor requirement of q_i, is constant, $\hat{L}_i$ is equal to the percent change in quantity.

$$\hat{L}_i = \hat{q}_i \tag{7}$$

We assume the displacement of individual workers within domestic industry i is decided by random assignment regardless of their individual characteristics or occupations. This assumption allows us to treat the change in labor demand in domestic industry i as the probability of displacement faced by all individual workers in industry i.

The probability of displacement (ϕ_i) — which multiplied by 100 is also the percent change in labor, if negative — due to a reduction in τ_i is given by equation (8).

$$\phi_i = \max\left(0, -\hat{L}_i\right) \geq 0 \tag{8}$$

2.2 Wages

The worker's wage in each year is the product of the worker's productivity and a base wage for inexperienced workers in the industry. Productivity increases with experience, including job-specific tenure, age, and education. The worker also receives a wage premium if the worker is a member of a union. When the worker's job is displaced, some productivity that is job- or industry-specific is lost because it is not transferable to the next job, while the productivity of education is likely maintained in the new job. We use job tenure, age, and education as proxies for productivity in our econometric analysis, since we do not directly observe the human capital of the workers. The worker is displaced from a job where she or he received a pre-displacement wage ($w_{g,PRE}$) and then is surveyed within three years while working at a new job where they receive a post-displacement wage ($w_{g,POST}$). Where, g indicates a type of worker with a specific combination of characteristics that act as proxies for productivity in the model.

Equation (9) is the resulting percent wage loss from job displacement for worker of type g conditional on displacement.

$$\hat{w}_g = \frac{w_{g,PRE} \; - \; w_{g,POST}}{w_{g,PRE}} \tag{9}$$

Whenever there is a decline from a worker's pre-displacement wage that compensates for the job tenure, experience and union status of the incumbent ($w_{f,PRE}$) to post-displacement wage in a new job where there is not job tenure, specific experience, or union status ($w_{g,POST}$), there will be a negative percent change in wage and our measure of wage loss ($\hat{w}_g$) will be positive. The expected wage loss of a worker with characteristics set g, Δ_{ig}, is the product of the probability of displacement in the event of a tariff reduction in industry i and the percent wage loss for worker type g conditional on displacement:

$$\Delta_{ig} = \phi_i \; \hat{w}_g \tag{10}$$

3 Simulations of Displacements

We calibrate the partial equilibrium model in equations (1) to (8) using data on the value of shipments, wage payments, and cost of materials from the U.S. Census Annual Survey of Manufactures (ASM) in 2021, and data on the value of exports and imports from the ITC's Trade Dataweb.[2]

We calibrate σ_i, the elasticity of substitution between imports and domestic products in industry i, using the method in Ahmad and Riker (2020), applied to data from the 2021 ASM.

$$\sigma_i = \frac{TVS_i}{TVS_i \; - \; EXP_i \; - \; PAY_i \; - \; COM_i} \tag{11}$$

TVS_i is the total value of shipments of domestic producers in industry i, EXP_i is the value of their exports, PAY_i is their total payroll, and COM_i is their total cost of materials. We calculate μ_i, the import penetration rate in industry i, using data on the landed duty-paid (delivered) value of imports (IMP_i), the value of exports, and the total value of shipments of domestic producers.

$$\mu_i = \frac{IMP_i}{TVS_i \; - \; EXP_i \; + \; IMP_i} \tag{12}$$

We set η_i equal to -1. This is a common assumption in partial equilibrium modeling of trade policy, since it implies a separability of demand between industries.

We simulate the probability of job displacement if industry tariffs were reduced from

[2] The ASM data are publicly available at `https://www.census.gov/programs-surveys/asm/data.html`. The trade data are publicly available at `https://dataweb.usitc.gov/`.

2021 average rates to 2016 average rates for seven U.S. manufacturing industries. Table 1 reports the import penetration rate (μ_i), elasticity of substitution (σ_i), change in the tariff factor ($\hat{\tau}_i$), and modeled probability of displacement (ϕ_i) for seven NAICS four-digit manufacturing industries where these effects are likely largest, reflecting the industries' high import penetration rates, high initial tariff rates, or both.

Table 1: Modeled Probability of Displacement Due to Tariff Reductions

NAICS	Description	μ_i	σ_i	$\hat{\tau}_i$	ϕ_i
3151	Apparel knitting mills	90.33%	4.49	-0.041	0.110
3152	Cut and sew apparel manufacturing	94.82%	3.09	-0.007	0.012
3162	Footwear manufacturing	96.43%	4.20	-0.016	0.042
3169	Other leather and allied product manufacturing	95.98%	3.03	-0.029	0.049
3272	Glass and glass product manufacturing	31.84%	2.63	-0.062	0.030
3351	Electric lighting equipment manufacturing	59.92%	2.71	-0.095	0.089
3371	Household and institutional furniture and kitchen cabinet manufacturing	57.05%	3.20	-0.083	0.099

Of these seven, the industries with the largest probabilities are Apparel knitting mills (3151), Household and institutional furniture and kitchen cabinet manufacturing (3371), and Electrical lighting equipment manufacturing (3351). They have large probabilities for different reasons: the first industry has a relatively high elasticity of substitution value and a relatively high import penetration rate, while the second and third industries have relatively large changes in the industries' tariffs.

4 Econometric Estimation and Model Calibration

In this section, we estimate a set of econometric models of the wage losses of displaced workers ($\hat{w}_g$) for different types of workers. The data for the econometric estimation is from the public-use micro-data sample of the 2000–2022 Displaced Worker Supplements (DWS) of the Current Population Survey. The DWS is a survey of workers who lost their job in the prior three years due to reasons ranging from plant or company closures to position or shift cuts.[3] Similar to Daun and Riker (2021), the data used in the econometric models pools together workers who were displaced from all U.S. industries regardless of the reason why they lost their jobs.

Equation (13) is the least restricted version of the econometric specification.

$$\hat{w}_{jt} = \beta_T \; Tenure5yrs_{jt} + \beta_N \; NotCollege_{jt} + \beta_A \; Age40_{jt} + \beta_U \; Union_{jt} + \gamma_t + \delta_s + \epsilon_{jt} \quad (13)$$

$\hat{w}_{jt}$ is the wage defined in equation (9). $Tenure5yrs_{jt}$ is a binary indicator equal to one if worker j was employed for five or more years in the job prior to displacement, $NotCollege_{jt}$ is an indicator equal to one if worker j does not hold a bachelors degree or higher. $Age40_{jt}$ is an indicator equal to one if individual j was age 40 years or older when they were displaced in time period t. $Union_{jt}$ is an indicator equal to one if worker j belonged to a union prior to displacement. γ_t, δ_s, and ϵ_{jt} are a fixed effect for the displacement year t, a fixed effect for the survey year s, and the error term of the model, respectively.

Table 2 reports the OLS point estimates for five alternative specifications, with robust standard errors in parentheses.[4] Column (1) is our preferred specification, because it is the least restricted and has the highest adjusted R^2 statistic. The estimated coefficients are similar in sign and magnitude for the other, more restricted specifications, and the coefficients on tenure, education, age, and union are significant at the 95% confidence level or above in all of the specifications where they are included. All of the coefficients are positive, meaning a worker who falls into any of these categories experiences greater wage losses due to displacement.

In our specification we have two sets of fixed effects, one for the year the worker was

[3] The reasons for displacement reported in the DWS could be a result of changes in trade policy or other reasons not associated with trade such as technological advancements or mismanagement.

[4] All of the alternative specifications include a constant.

Table 2: OLS Regression of the Wage Loss of Displaced Workers

	(1)	(2)	(3)	(4)	(5)
$Tenure5yrs_{jt}$	0.091***	0.100***	0.126***	0.115***	0.094***
	(0.0129)	(0.0129)	(0.0138)	(0.0136)	(0.0130)
$NotCollege_{jt}$	0.093*	0.094**	0.090*	0.089*	0.108**
	(0.0360)	(0.0361)	(0.0359)	(0.0358)	(0.0364)
$Age40_{jt}$	0.073***	0.077***	—	—	0.071***
	(0.0144)	(0.0145)	—	—	(0.0137)
$Union_{jt}$	0.121***	—	—	0.127***	0.124***
	(0.0149)	—	—	(0.0151)	(0.0153)
Displacement Year FE	Yes	Yes	Yes	Yes	No
Survey Year FE	Yes	Yes	Yes	Yes	No
Observations	5,942	5,942	5,942	5,942	5,942
Adjusted R^2	0.0459	0.0408	0.0358	0.0414	0.0283

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

displaced (γ_t) and one for the year of the DWS (δ_s). The displacement-year fixed effect controls for general market conditions at the time of displacement. The survey-year fixed effect controls for market conditions in the later period when the worker responded to the DWS. [5]

Table 3 reports the estimated wage loss conditional on displacement from our preferred specification, column (1) in Table 2, for the 16 possible combinations of worker characteristics *relative to* a benchmark group of workers who are likely to have the least costly transitions, Type (16).[6] The benchmark group is the omitted category in regression specification (1). Their estimated wage loss is only based on overall labor market conditions in years t and s. A worker 40 years or older displaced with five or more years of tenure, no college degree, and union membership has an estimated wage loss of 37.8% relative to the benchmark worker type, while a displaced worker younger than 40 with less than five years of tenure, not in a

[5] In addition to the regressions in Table 2, we also ran the same regression specifications with an additional fixed effect controlling for the number of years between the displacement year and the year the worker was surveyed. The resulting coefficients and standard errors were identical to what is reported in Table 2 except for slight changes in the constant term. This could be due to the additional fixed effect introducing multicollinearity into the model since it is equal to the difference between the displaced year and survey year.

[6] Specifically, the expected relative wage loss of type g is $\hat{\beta}_T\ Tenure5yrs_g + \hat{\beta}_N\ NotCollege_g + \hat{\beta}_A\ Age40_g + \hat{\beta}_U\ Union_g$.

union, without a college degree has an estimated wage loss of 9.3% relative to the benchmark worker type.

5 Estimated Expected Wage Losses

Finally, we calculate the expected wage losses of each worker type, using both the modeled ϕ_i from Table 1 and the econometric estimates of $\hat{w}_g$ from Table 3. Table 4 reports our estimate of Δ_{ig} for each of the 15 worker types other than the benchmark type (one in each row) and for the seven NAICS four-digit manufacturing industries (one in each column). In addition to the point estimates, the table reports the levels of statistical significance of the estimates based on the variances and covariances of the estimates of the four regression coefficients, as well as 95% confidence intervals.

All of the expected wage loss estimates in Table 4 are small, reflecting the small probability of displacement from the tariff reductions we are modeling. There is a 1.2% chance of displacement due to the tariff reduction in the cut and sew apparel manufacturing industry, which means 98.8% of workers in the industry will not be displaced if the tariff is reduced to 2016 average rates. In our calculation, the expected value of wage loss also considers the 98.8% of workers that will not be displaced and experienced no relative wage loss. The expected wage loss relative to the benchmark type of worker ranges from 0.0009 or 0.09% for worker (14) in the cut and sew apparel manufacturing industry (NAICS 3152) to 0.0416 or 4.16% for worker (1) in the apparel knitting mills industry (NAICS 3151).

The expected wage loss due to the trade-related job displacement is likely smaller in other industries not included in our analysis. As we showed in Section 3, the probability of displacement, and therefore expected wage loss, in each industry is highly dependent on the elasticity of substitution and the size of the tariff reduction. We chose industries that experienced large increases in average tariffs between 2016 and 2021. Workers in other

Table 3: Estimated Wage Loss of Displaced Workers

Worker Type	$Tenure5yrs$	$NotCollege$	$Age40$	$Union$	Wage Loss
(1)	Yes	Yes	Yes	Yes	0.378***
					(0.0488)
(2)	Yes	Yes	Yes	—	0.257***
					(0.0457)
(3)	Yes	Yes	—	Yes	0.305***
					(0.0418)
(4)	Yes	—	Yes	Yes	0.285***
					(0.0246)
(5)	Yes	Yes	—	—	0.184***
					(0.0387)
(6)	Yes	—	Yes	—	0.164***
					(0.0191)
(7)	Yes	—	—	Yes	0.212***
					(0.0190)
(8)	Yes	—	—	—	0.091***
					(0.0129)
(9)	—	Yes	Yes	Yes	0.287***
					(0.0470)
(10)	—	Yes	Yes	—	0.166***
					(0.0436)
(11)	—	Yes	—	Yes	0.214***
					(0.0396)
(12)	—	Yes	—	—	0.093**
					(0.0360)
(13)	—	—	Yes	Yes	0.194***
					(0.0217)
(14)	—	—	Yes	—	0.073***
					(0.0144)
(15)	—	—	—	Yes	0.121***
					(0.0149)
(16)	—	—	—	—	—

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: Expected Wage Loss (Δ_{ig}) Due to Job Displacement from Tariff Reductions

	NAICS 3151	NAICS 3152	NAICS 3162	NAICS 3169	NAICS 3272	NAICS 3351	NAICS 3371
(1)***	**0.0416**	**0.0045**	**0.0159**	**0.0185**	**0.0114**	**0.0337**	**0.0375**
	[0.0311, 0.0521]	[0.0033, 0.0057]	[0.0119, 0.0199]	[0.0139, 0.0232]	[0.0085, 0.0142]	[0.0252, 0.0422]	[0.0280, 0.0469]
(2)***	**0.0283**	**0.0031**	**0.0108**	**0.0126**	**0.0077**	**0.0229**	**0.0255**
	[0.0184, 0.0381]	[0.0020, 0.0042]	[0.0070, 0.0146]	[0.0082, 0.0170]	[0.0050, 0.0104]	[0.0149, 0.0309]	[0.0166, 0.0343]
(3)***	**0.0336**	**0.0037**	**0.0128**	**0.0150**	**0.0092**	**0.0272**	**0.0302**
	[0.0246, 0.0426]	[0.0027, 0.0046]	[0.0094, 0.0163]	[0.0109, 0.0190]	[0.0067, 0.0116]	[0.0199, 0.0345]	[0.0221, 0.0383]
(4)***	**0.0314**	**0.0034**	**0.0120**	**0.0140**	**0.0086**	**0.0254**	**0.0283**
	[0.0261, 0.0367]	[0.0028, 0.0040]	[0.0100, 0.0140]	[0.0116, 0.0163]	[0.0071, 0.0100]	[0.0211, 0.0297]	[0.0235, 0.0330]
(5)***	**0.0202**	**0.0022**	**0.0077**	**0.0090**	**0.0055**	**0.0164**	**0.0182**
	[0.0119, 0.0286]	[0.0013, 0.0031]	[0.0045, 0.0109]	[0.0053, 0.0127]	[0.0032, 0.0078]	[0.0096, 0.0231]	[0.0107, 0.0257]
(6)***	**0.0181**	**0.0020**	**0.0069**	**0.0080**	**0.0049**	**0.0146**	**0.0163**
	[0.0139, 0.0222]	[0.0015, 0.0024]	[0.0053, 0.0085]	[0.0062, 0.0099]	[0.0038, 0.0060]	[0.0113, 0.0179]	[0.0126, 0.0120]
(7)***	**0.0234**	**0.0025**	**0.0089**	**0.0104**	**0.0064**	**0.0189**	**0.0210**
	[0.0193, 0.0275]	[0.0021, 0.0030]	[0.0074, 0.0105]	[0.0086, 0.0122]	[0.0053, 0.0075]	[0.0156, 0.0222]	[0.0173, 0.0247]
(8)***	**0.0100**	**0.0011**	**0.0038**	**0.0045**	**0.0027**	**0.0081**	**0.0090**
	[0.0073, 0.0128]	[0.0008, 0.0014]	[0.0028, 0.0049]	[0.0032, 0.0057]	[0.0020, 0.0035]	[0.0059, 0.0104]	[0.0065, 0.0115]
(9)***	**0.0316**	**0.0034**	**0.0121**	**0.0141**	**0.0086**	**0.0256**	**0.0284**
	[0.0214, 0.0417]	[0.0023, 0.0046]	[0.0082, 0.0159]	[0.0096, 0.0186]	[0.0058, 0.0114]	[0.0174, 0.0338]	[0.0193, 0.0376]
(10)***	**0.0183**	**0.0020**	**0.0070**	**0.0081**	**0.0050**	**0.0148**	**0.0164**
	[0.0089, 0.0277]	[0.0010, 0.0030]	[0.0034, 0.0106]	[0.0039, 0.0123]	[0.0024, 0.0075]	[0.0072, 0.0224	[0.0080, 0.0249]
(11)***	**0.0236**	**0.0026**	**0.0090**	**0.0105**	**0.0064**	**0.0191**	**0.0212**
	[0.0150, 0.0321]	[0.0016, 0.0035]	[0.0057, 0.0123]	[0.0067, 0.0143]	[0.0041, 0.0088]	[0.0121, 0.0260]	[0.0135, 0.0289]
(12)*	**0.0102**	**0.0011**	**0.0039**	**0.0046**	**0.0028**	**0.0083**	**0.0092**
	[0.0025, 0.0180]	[0.0003, 0.0020]	[0.0009, 0.0069]	[0.0011, 0.0080]	[0.0007, 0.0049]	[0.0020, 0.0146]	[0.0022, 0.0162]
(13)***	**0.0214**	**0.0023**	**0.0082**	**0.0095**	**0.0058**	**0.0173**	**0.0192**
	[0.0167, 0.0261]	[0.0018, 0.0028]	[0.0064, 0.0099]	[0.0074, 0.0116]	[0.0046, 0.0071]	[0.0135, 0.0211]	[0.0150, 0.0235]
(14)***	**0.0080**	**0.0009**	**0.0031**	**0.0036**	**0.0022**	**0.0065**	**0.0072**
	[0.0049, 0.0111]	[0.0005, 0.0012]	[0.0019, 0.0043]	[0.0022, 0.0050]	[0.0013, 0.0030]	[0.0040, 0.0090]	[0.0044, 0.0100]
(15)***	**0.0133**	**0.0015**	**0.0051**	**0.0059**	**0.0036**	**0.0108**	**0.0120**
	[0.0101, 0.0165]	[0.0011, 0.0018]	[0.0039, 0.0063]	[0.0045, 0.0074]	[0.0028, 0.0045]	[0.0082, 0.0134]	[0.0091, 0.0149]

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The significance across industries of each worker type is the same.

industries that experienced smaller tariff increases have lower probability of job displacement and lower expected wage loss from tariff reductions.

6 Conclusions

We have developed and applied a practical method for quantifying the differences in wage losses from tariff reductions within an industry across different types of workers, and also within a worker type across several manufacturing industries. We simulated the probability of displacement in response to a hypothetical or future tariff reduction, without requiring a history of tariff reductions for econometric identification. We used an econometric model to estimate the loss of wages from job displacement for a variety of worker types. We calculated confidence intervals around the estimated expected wage losses based on the precision of these econometric estimates. We calibrated demand elasticities to observed markups.

Still, there are several limitations of the model. First, we do not directly observe which job displacements are due to tariff changes, so we have assumed that involuntary displacements will lead to a similar wage loss for each type of worker regardless of the cause of the involuntary displacement. Second, we assign a probability that each individual employed in the industry is displaced based on simple random assignment: the probability is equal to the modeled percent decline in overall employment in the domestic industry in response to the tariff reductions. This might not capture higher exposure for some types of workers. Unfortunately, the DWS data do not seem to be adequate to estimate additional within-industry heterogeneity in displacement rates. Third, we estimate the expected changes in wage within three years of the displacement but do not estimate potential life-long effects on the workers' earnings. All of these limitations are useful areas for further research.

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