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US Import Value Examination During Trump's First Term

China

Vietnam

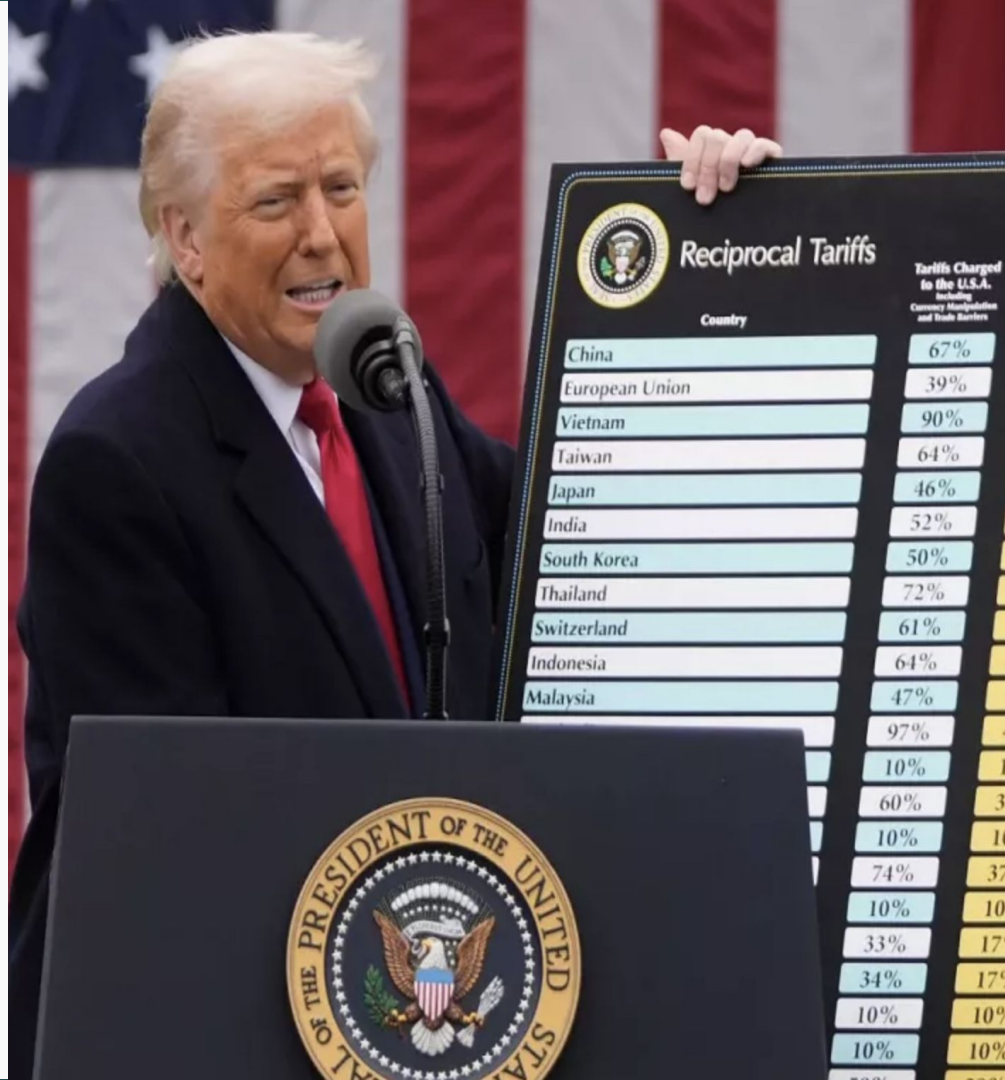
Canada

Mexico

Ireland

Germany

January 2017 – December 2020



Dataset

Source: U.S. International Trade Commission (USITC)

Time period: January 2017 - December 2020

Independent variables:

- 1) Quantity (in millions)
- 2) (Effective) Tariff Rate (%)
- 3) Country

Dependent variable: Customs Value (millions in USD)

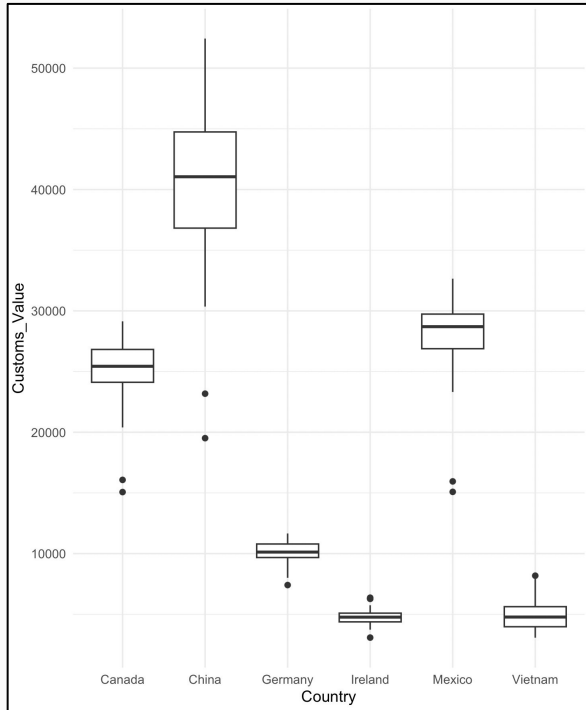
Train data: 2017-2019

Test data: 2020

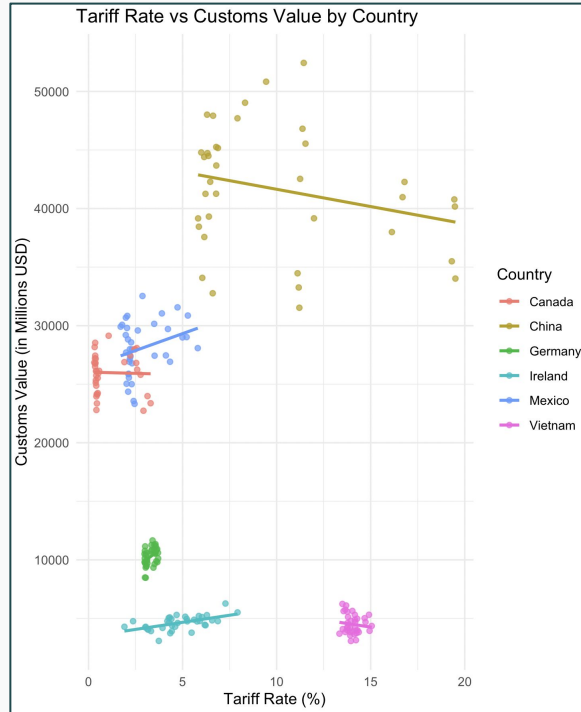


Data Analysis

Country vs. Customs Value



Tariff Rate vs. Customs Value



Model Trials

With All Interaction Terms

```
> model3 <- lm(Customs_Value ~ Country + Tariff_Rate + Quantity +  
+ Country * Tariff_Rate + Country * Quantity + Tariff_Rate * Quantity, data = my_data)  
> summary(model3)
```

Call:

```
lm(formula = Customs_Value ~ Country + Tariff_Rate + Quantity +  
Country * Tariff_Rate + Country * Quantity + Tariff_Rate *  
Quantity, data = my_data)
```

Residuals:

Min	1Q	Median	3Q	Max
-12564.4	-528.4	82.9	821.5	13078.7

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-4.228e+02	7.709e+03	-0.055	0.956306
CountryChina	3.762e+04	1.118e+04	3.363	0.000882 ***
CountryGermany	1.161e+04	9.120e+03	1.273	0.204225
CountryIreland	1.844e+03	8.508e+03	0.217	0.828601
CountryMexico	1.982e+04	8.087e+03	2.451	0.014883 *
CountryVietnam	1.331e+03	1.431e+04	0.093	0.925939
Tariff_Rate	5.215e+02	8.084e+02	0.645	0.519386
Quantity	1.303e+00	3.970e-01	3.283	0.001163 **
CountryChina:Tariff_Rate	-1.373e+03	4.685e+02	-2.932	0.003663 **
CountryGermany:Tariff_Rate	-2.067e+03	1.915e+03	-1.079	0.281546
CountryIreland:Tariff_Rate	-4.992e+02	8.331e+02	-0.599	0.549502
CountryMexico:Tariff_Rate	6.333e+02	7.215e+02	0.878	0.380900
CountryVietnam:Tariff_Rate	-4.216e+02	1.107e+03	-0.381	0.703603
CountryChina:Quantity	-6.314e-01	6.322e-01	-0.999	0.318805
CountryGermany:Quantity	1.320e+00	2.310e+00	0.572	0.568075
CountryIreland:Quantity	4.001e+01	5.408e+01	0.740	0.460042
CountryMexico:Quantity	-7.124e-01	4.595e-01	-1.550	0.122204
CountryVietnam:Quantity	1.347e+00	1.606e+00	0.839	0.402419
Tariff_Rate:Quantity	1.014e-03	3.499e-02	0.029	0.976897

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2874 on 269 degrees of freedom

Multiple R-squared: 0.9582, Adjusted R-squared: 0.9554

F-statistic: 342.7 on 18 and 269 DF, p-value: < 2.2e-16

AIC Backward Elimination

```
> step(model3)
```

Start: AIC=4605.36

```
Customs_Value ~ Country + Tariff_Rate + Quantity + Country *  
Tariff_Rate + Country * Quantity + Tariff_Rate * Quantity
```

	Df	Sum of Sq	RSS	AIC
- Country:Quantity	5	44244543	2266655675	4601.0
- Tariff_Rate:Quantity	1	6942	2222418073	4603.4
<none>			2222411132	4605.4
- Country:Tariff_Rate	5	213110986	2435522118	4621.7

Step: AIC=4601.04

```
Customs_Value ~ Country + Tariff_Rate + Quantity + Country:Tariff_Rate +  
Tariff_Rate:Quantity
```

	Df	Sum of Sq	RSS	AIC
- Tariff_Rate:Quantity	1	1304186	2267959861	4599.2
<none>			2266655675	4601.0
- Country:Tariff_Rate	5	264186303	2530841978	4622.8

Step: AIC=4599.21

```
Customs_Value ~ Country + Tariff_Rate + Quantity + Country:Tariff_Rate
```

	Df	Sum of Sq	RSS	AIC
<none>			2267959861	4599.2
- Country:Tariff_Rate	5	402320485	2670280346	4636.2
- Quantity	1	376759997	2644719859	4641.5

Call:

```
lm(formula = Customs_Value ~ Country + Tariff_Rate + Quantity +  
Country:Tariff_Rate, data = my_data)
```

Coefficients:

(Intercept)		CountryChina	CountryGermany
10742.7082		25668.8811	587.0693
CountryIreland		CountryMexico	CountryVietnam
-6739.8723		7308.3520	2946.1912
Tariff_Rate		Quantity	CountryChina:Tariff_Rate
444.3798		0.7265	-1298.2128
CountryGermany:Tariff_Rate	CountryIreland:Tariff_Rate	CountryMexico:Tariff_Rate	
-1148.6198	-324.5947		771.1606
CountryVietnam:Tariff_Rate			
-1134.7080			

Final Model

R Summary Output of the Model

$$E(\ln(y)) = 5.672 + 0.618x_1 + 0.214x_2 + 0.695x_3 + 0.487x_4 - 0.398x_5 + 0.043x_6 + 0.456x_7 - 0.006x_8$$

```
> model_loglog <- lm(
+   log(Customs_Value) ~ Country + Tariff_Rate + log_Quantity +
+   Tariff_Rate:log_Quantity,
+   data = train_data_scaled
+ )
>
> summary(model_loglog)
```

Call:
lm(formula = log(Customs_Value) ~ Country + Tariff_Rate + log_Quantity +
Tariff_Rate:log_Quantity, data = train_data_scaled)

Residuals:

Min	1Q	Median	3Q	Max
-0.313689	-0.050568	0.005083	0.058507	0.253109

Coefficients:

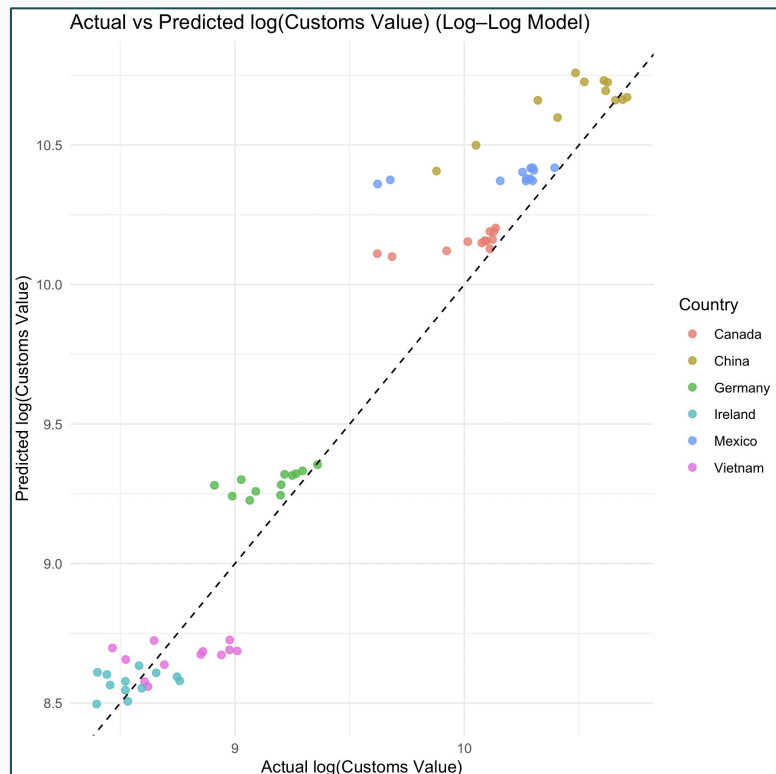
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	5.672391	0.386089	14.692	< 2e-16 ***
CountryChina	0.617740	0.037411	16.512	< 2e-16 ***
CountryGermany	0.214347	0.099975	2.144	0.03320 *
CountryIreland	0.695025	0.209153	3.323	0.00105 **
CountryMexico	0.487312	0.041459	11.754	< 2e-16 ***
CountryVietnam	-0.398480	0.137644	-2.895	0.00420 **
Tariff_Rate	0.042968	0.018296	2.349	0.01979 *
log_Quantity	0.456291	0.039195	11.642	< 2e-16 ***
Tariff_Rate:log_Quantity	-0.005581	0.001925	-2.899	0.00415 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

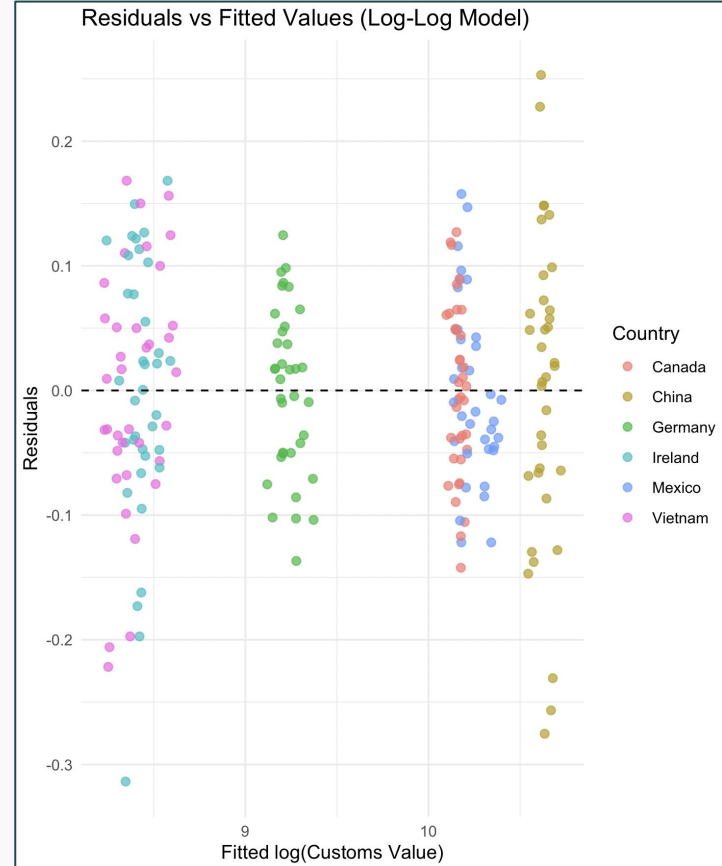
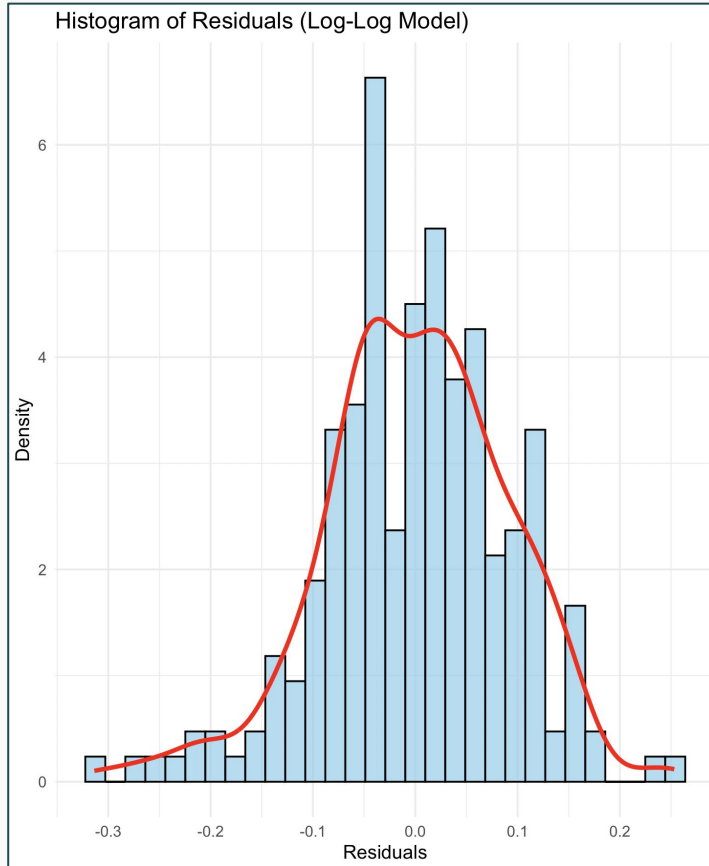
Residual standard error: 0.0925 on 207 degrees of freedom
Multiple R-squared: 0.9897, Adjusted R-squared: 0.9893
F-statistic: 2487 on 8 and 207 DF, p-value: < 2.2e-16

Results/Predictions on Test Set

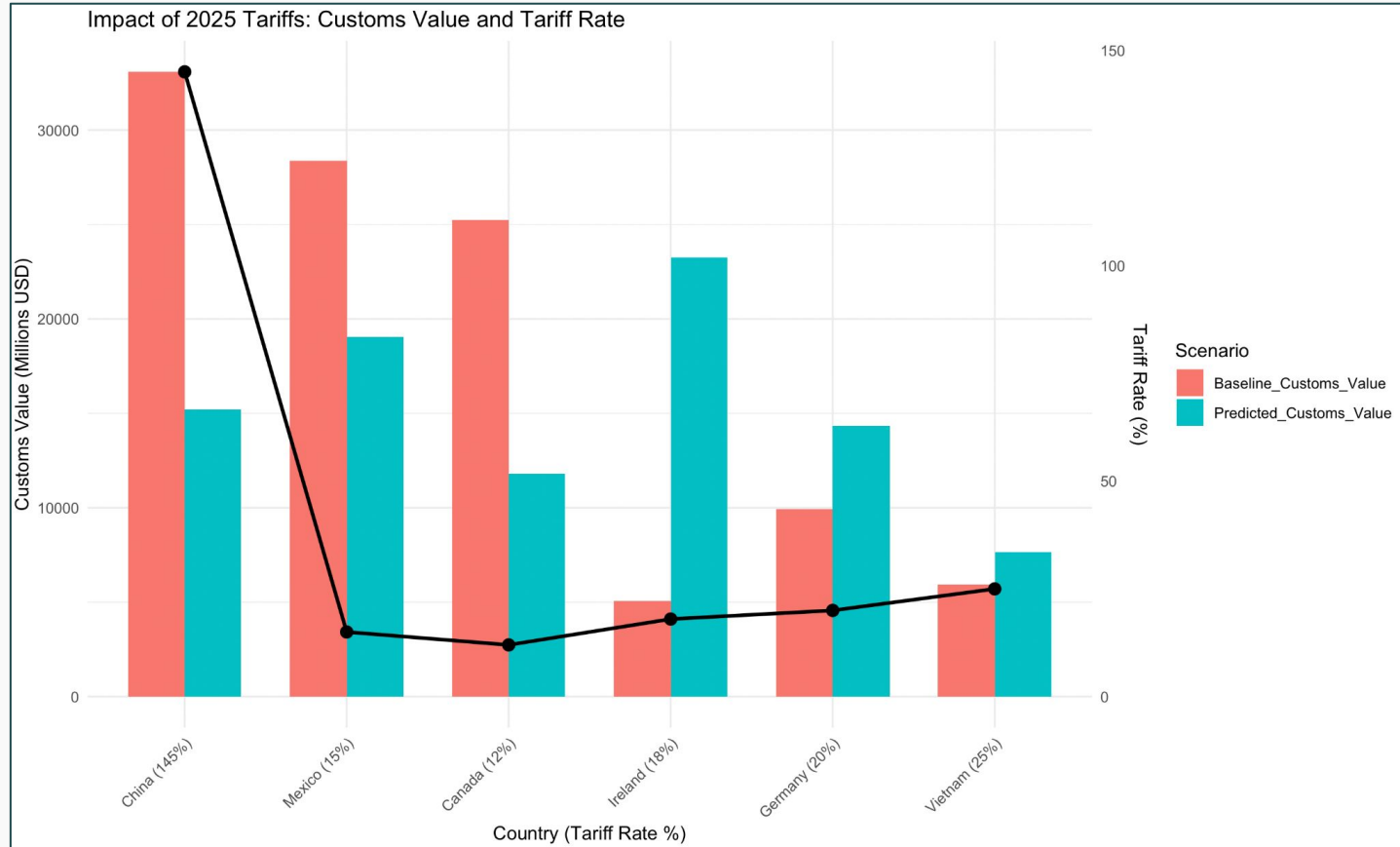
Test RMSE: 0.2188 Test R²: 0.916



Residual Plots



Prediction



Forrest Trump

Thank You for
Listening

