The Forced Friendships of Friend-Shoring: Firm-Level Evidence from the Eurasian Economic Union*

(PRELIMINARY)

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Date: October 5, 2023 **First Draft:** July 27, 2023

Abstract: Trade preferences for blocs of geopolitical allies, a strategy now widely known as friend-shoring, implies increased trade discrimination that can lead to unintended consequences. Recent examples of a country raising tariff barriers while joining a trade bloc are rare, due to tariff commitments under the World Trade Organization. The Eurasian Economic Union provides a unique recent case study because Kazakhstan increased external tariffs to Russia's levels in forming a customs union in 2010, five years before ascending to the WTO. We find that firm exposure to import tariff increases impeded Kazakhstan's export diversification, even within the customs union. Our conclusions are based on several industry-level measures of import tariff exposure constructed from Kazakhstan's firm-level trade transactions. A differences-in-differences estimation reveals that higher import tariff exposure for Kazakhstan industries caused substantially lower export growth to Russia. A second differences-in-difference analysis finds that firms with higher import tariff exposure were less resilient to the shock of Kazakhstan's unexpected devaluation in early February 2014. Our analysis sheds light on Kazakhstan's underwhelming performance in achieving economic diversification goals, and we provide the first evidence on negative export consequences for a country raising external tariffs when joining a trade bloc.

Keywords: input tariffs, global value chains, export diversification, customs union

JEL codes: F13, F14, F15, F23

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*We are grateful to Márta Bisztray, Paola Conconi, Jozef Konings, James Lake, and Balázs Muraközy for helpful feedback, as well as audience participants at the Duke Fuqua School of Business Economics Area and the 2023 European Trade Study Group.

1. Introduction

Recent geopolitical conflicts such as the United States' trade war with China and Russia's invasion of Ukraine draw attention to the possibility of policy aimed at increasing sourcing from geopolitical allies, known as friend-shoring. The idea was amplified prominently in a 2022 speech by U.S. Treasury Secretary Janet Yellen.[1] One form friend-shoring could take is allies forming trade blocs with higher external trade barriers. International economists highlight the negative consequences of such trade barriers because they would limit gains from trade, increase trade diversion, and reduce resilience to macroeconomic shocks (Benson and Kapstein, 2023).[2] Further support for these claims comes from counterfactuals based on calibrated quantitative general equilibrium trade models with industry data and linkages (Javorcik et al., 2022; Clancy et al., 2023; Bolhuis et al., 2023). But there is limited recent evidence of supply chain consequences from actual external tariff increases when joining a trade bloc.

A unique 21st century example of a country raising average external tariffs to join a trade bloc is Kazakhstan joining with Russia and Belarus in 2010 to form the Eurasian Customs Union, which preceded today's Eurasian Economic Union. Such tariff increases for customs union formation have been rare in recent decades, since raising bound tariffs to join a customs union would require complicated tariff renegotiations under the General Agreement on Tariffs and Trade (GATT), which remains the foundation agreement of the World Trade Organization (WTO). Kazakhstan did not complete its WTO accession until 2015. Kazakhstan's accession

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[1] Yellen, Janet L. 2022. Remarks by Secretary of the Treasury...on Way Forward for the Global Economy. U.S. Department of Treasury. https://home.treasury.gov/news/press-releases/jy0714

[2] See also, Rajan R. 2022. Just say no to friend-shoring. *Project Syndicate*. https://www.project-syndicate.org/commentary/friend-shoring-higher-costs-and-more-conflict-without-resilience-by-raghuram-rajan-2022-06

to the Eurasian Customs Union then offers a rare opportunity to explore the actual consequences of tariff increases when joining a trade bloc.

We find that the external tariff increases impeded Kazakhstan's export diversification even within the customs union, where countries would typically anticipate increased trade flows. Our conclusions are based on several industry-level measures of import tariff exposure (ITE) constructed from Kazakhstan's firm-level trade transactions, building on methods of Handley et al. (2023) that allow for finer detail than available input-output tables. A differences-in-differences (DID) estimation reveals that higher import tariff exposure for Kazakhstan industries caused substantially lower export growth to Russia. Our analysis sheds light on Kazakhstan's underwhelming performance in economic diversification, and we provide the first evidence from actual experience on negative consequences of friend-shoring, as we have defined it.

A second DID analysis finds that firms with higher import tariff exposure were less resilient to the shock of Kazakhstan's unexpected 19 percent devaluation in early February 2014 that ended 5 years of maintaining a fixed exchange rate. We find that exposure to input tariff increases has a substantial negative effect on product-level export growth after the devaluation. Though the tariff increases occur prior to 2010, our results reveal their persistent effects.

Our paper's main contribution is in documenting the negative supply chain consequences of external tariff increases in a trade bloc following actual increases in external tariffs. Our study then complements existing evidence for the negative consequences of friend-shoring, which to date has been based only on counterfactual increases in trade barriers in quantitative models (Javorcik et al., 2022; Clancy et al., 2023; Bolhuis et al., 2023).

We also add to a growing recent literature on the supply chain consequences of tariff increases and a longer literature on changes in input tariffs, two categories of studies within the modern empirical trade policy literature (Caliendo & Parro, 2022). The recent literature studies how tariff increases on Chinese inputs affect US exports (Handley et al., 2023) and U.S. employment (Flaaen & Pierce, 2021), and how U.S. antidumping duties affect downstream manufacturing (Bown et al., 2023). Our paper uniquely looks at how permanent external tariff increases when joining a customs union can be disruptive enough to undermine export growth even within a customs union, which is a distinct case from either the bilateral U.S.-China relationship or temporary trade barriers. A longer literature explores how input tariff decreases improve firm productivity (Amiti & Konings, 2007; Kashara & Rodrigue, 2008; Topalova & Khandelwal, 2011; Halpern et al., 2015) whereas we study persistent effects of input tariff increases.

Our study also adds insight into the consequences of exchange rate devaluations. The textbook summary of consequences (e.g., figure 9.3 of Feenstra and Taylor, 2017) is that developed countries expand exports (e.g., the 1992 European Monetary System crisis) whereas emerging markets suffer from financial crises due to foreign currency borrowing and weak banking systems (e.g., the 1997 Asian Financial Crisis). Research continues to focus on the role of financial frictions in export dynamics after devaluations (e.g., Kohn et al., 2020). Our work adds unintended supply chain consequences of trade policy as an additional explanation for why firms fail to exploit export opportunities following a devaluation in emerging economies.

The paper proceeds as follows. Section 2 provides background on Kazakhstan's trade policy and monetary policy. Section 3 presents data, estimation, and results

for the DID for joining the customs union. Section 4 covers the DID for the devaluation. Section 5 concludes by discussing the implications of the results for Kazakhstan and for friend-shoring.

2. Background

This section provides details on Kazakhstan's trade policy and monetary policy relevant for the analysis.

2.1 Trade Policy

The key points of trade policy are that Kazakhstan formed a customs union with Russia and Belarus in 2010, and gradually increased tariffs from 2004 to 2010 before entering the union. The customs union then gradually rolled back some of the decreases as Russia ascended to the WTO in 2012 and Kazakhstan in 2015.

The union today is known as the Eurasian Economic Union, since Armenia and Kyrgyzstan joined in 2015.

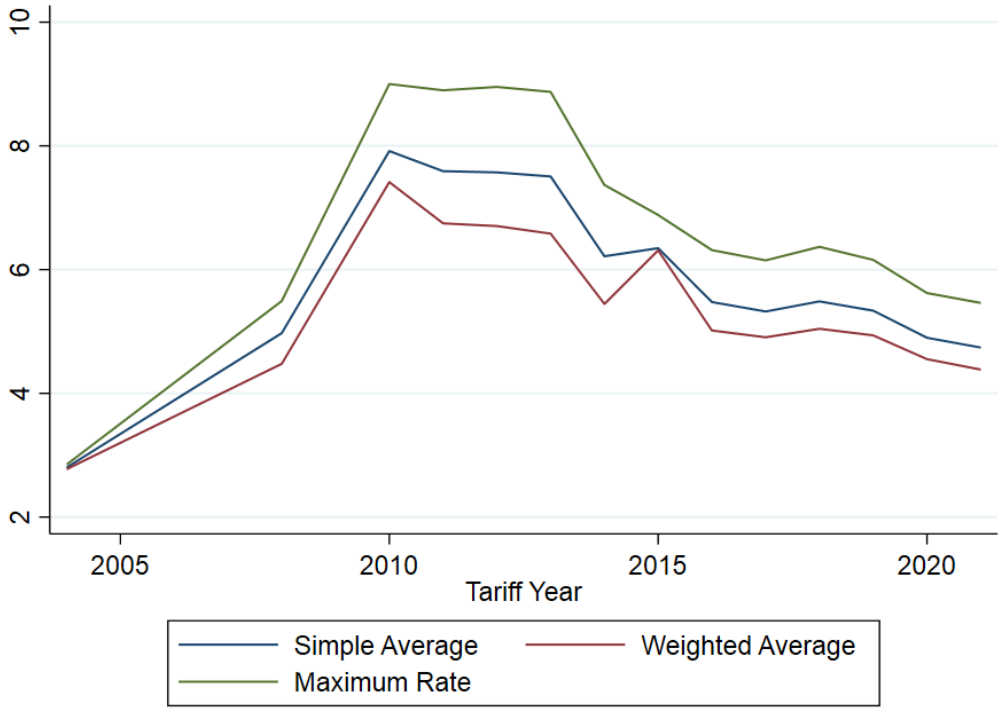
Several studies (e.g., World Bank, 2012; Carneiro, 2013) have considered ex-ante and ex-post consequences of the customs union using industry-level trade data and counterfactuals. The broad consensus of this literature was that the main benefits for members would be in non-tariff harmonization in agriculture and in free movement of labor to Russia and remittances.

Notably there was limited retaliation against Kazakhstan for raising tariffs, a sharp contrast with the now well-studied example of the U.S. raising tariffs against China. One institutional reason for the absence of retaliation is that Kazakhstan

had not yet completed its WTO accession. One theoretical reason for the absence of retaliation is that Kazakhstan is a small country in global markets, even though it is a large country geographically (the 9th largest in land area).

Figure 1 shows the evolution in applied tariffs in Kazakhstan between 2004 and 2021, indicating a significant rise from 2008 to 2010. During this period, Kazakhstan increased its external tariffs to match those of Russia to become a part of the customs union in 2010.

Figure 1. Applied tariffs in Kazakhstan (2004-2021), %



Source: Authors' calculations based on the WITS UN Trains applied tariff data.

2.2 Monetary Policy

We survey here a brief overview of recent monetary policy in Kazakhstan relevant for our sample period.

A shock that we later exploit in our analysis (in Section 4) is a 19% devaluation in early February 2014. Kazakhstan successfully maintained a fixed exchange rate regime from February 2009 prior to the devaluation.

A well-known second major currency shock for Kazakhstan occurred when the National Bank of Kazakhstan (NBK) first allowed the tenge to float in August 2015, leading to an immediate 23% depreciation. We focus on the February 2014 shock because this was more unanticipated. The August 2015 depreciation was much more anticipated given that the ruble had floated in November 2014, and this shows in the large increases in deposit dollarization through early 2015.

Kazakhstan has largely maintained conventional monetary policy with a floating exchange rate and inflation targeting since August 2015. After a period of substantial monetary interventions in the first months of the floating exchange rate regime, during which the IMF classified Kazakhstan as having an "other managed regime" (i.e. a managed float), Kazakhstan has been classified as a floating regime by the IMF since December 2015 (IMF, 2023). This classification still permits occasional foreign exchange interventions in times of exchange volatility. Kazakhstan adopted inflation targeting with a gradually decreasing band and a long-run goal of inflation under 4%. Kazakhstan was largely successful in hitting year-over-year targets from August 2016 and until the COVID pandemic started in March 2020. After badly missing its inflation targets in 2021 and 2022, the NBK announced a medium-run target of 5% in July 2023 and discarded the practice of setting intermediate annual target ranges.

3. Effects of import tariff exposure upon forming the customs union

This section details the DID estimation for the effect of import tariff exposure as Kazakhstan joined the Eurasian customs union in 2010. Though we use import tariff exposure (ITE) measures based on Kazakhstan's trade transactions, we are limited in having only the transaction-level data from 2012 onward within the customs union, whereas otherwise we must rely on publicly available HS4 product-level trade data for Kazakhstan. Consequently, we will use coarser analysis then in the next section on the 2014 devaluation.

3.1. Data sources

Our transaction-level customs data is obtained from the Bureau of National Statistics (BNS) of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. The information comes from compulsory custom declarations filed by the Kazakh firms on a monthly basis that trade within the Eurasian Economic Union and include trade (both the value (in USD) and volume of imports and exports) by firm, product (defined at the ten-digit level of the Harmonized System (HS) code) and destination. The dataset covers the period between 2012m1 to 2020m12. We use only the 2012 data to construct ITE measures, and then only Kazakhstan, Belarus, and Russia were in the customs union.

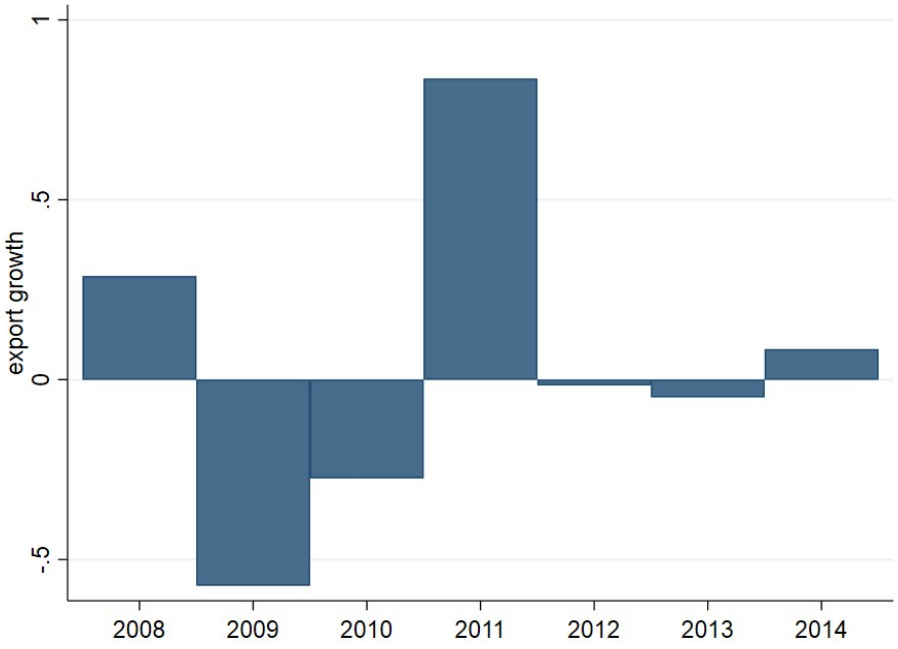
We supplement our confidential data with public trade data by HS4 product code:

1) From 2007-2010: Customs Control Committee of Kazakhstan;
2) 2011: Eurasian Economic Commission;
3) From 2012-2014: Bureau of National Statistics of Kazakhstan

Figure 2 and 3 shows for 2007-2014 the annual level and growth in exports.

Figure 2. Evolution of exports (in logs), 2007-2014

Figure 3. Evolution of export growth, 2007-2014



Sources: Authors' calculations based on publicly available data.

We merge the BNS data with the tariff data from the World Integrated Trade Solution (WITS) database which comes on an annual basis and includes information on applied tariffs applied by Kazakhstan on imports from the rest of the world at the 6-digit HS product code level.[3]

Table 1 shows that most of the exporting firms (that also import) saw an increase in tariffs from 1 to 10% (32.6%), with 3.1% of them facing an increase in tariffs from 10 to 25% and 0.3% facing an increase from 25 to 100%. Appendix Table A-2 provides additional context on the share of exporters facing increases on some product, or same HS2, or same HS4.

Table 1. Share of exporters facing an increase in import tariffs
(with at least one import product facing an increase)

	Increase in tariffs, %				
	(0-1)	[1-5)	[5-10)	[10-25)	[25-100]
Share of exporters	33.74	45.01	17.43	2.83	0.99

Source: Authors' calculations based on 2012 firm-level data and 2012 public tariff data.

3.2. Import tariff exposure measures

We rely on the empirical regularity that trade is persistent over time (Bernard et al. 2018), to construct our measures of products exposure to import tariff

[3] We observe tariffs starting from 2004, then 2008, 2009, 2010 as shown in Appendix Table A1. The absence of tariff data from 2005-2007 is common for trade policy studies of Kazakhstan.

increases.[4] The first two measures are based on the Handley, Kamal, and Monarch (2023) methodology (HKM), while the third measure takes into account the import share at the product level by exploiting the firm-level data.

We start by constructing a product level import tariff exposure measure (ITE) at the product level derived from the cross-sectional data for the year 2012. So, the ITE measure, by definition, is analogous to HKM:

$$ITE_p^{HS2} = \frac{Exporters_{p,2012}^{same\ HS2}}{Exporters_{p,2012}} \qquad \text{(eq. 1)}$$

where the denominator counts the number of unique exporters selling HS4 product p in 2012. The numerator accounts for a subset of these exporters who imported products subject to import tariff increases during the period 2008-2010. To define the set of imports that constitute a firm's export supply chain the baseline HKM method employs the HS4 heading, in our case we employ HS2 heading since the finest level of our data is at the HS 4-digit level. For each HS4 product we calculate the total number of exporters in 2012 who imported at least one product subject to tariff increase that falls in the same HS2 category. The narrow ITE measure, instead, employs HS4 heading: we calculate the total number of exporters in 2012 who imported at least one product subject to tariff increase that fall in the same HS4 category:

$$ITE_p^{HS4} = \frac{Exporters_{p,2012}^{same\ HS4}}{Exporters_{p,2012}} \qquad \text{(eq. 2)}$$

Finally, we consider an ITE measure that exploits firm level data to account for tariffs weighted by import value:

[4] Persistence is a stronger assumption in our context, since firms may substitute inputs after tariffs increased. Our treatment thus measures import tariff exposure that firms could not avoid, so an identifying assumption is that input substitution is uncorrelated with export opportunities.

$$ITE_p^{Firm} = \left(\sum_{p}^{product} w_{ip} * (\Delta duties_i / \sum import_{ip}) \right) \quad \text{(eq. 3)}^5$$

where $w_{ip} = export_{ip} / \sum export_p$ $\Delta duties_i = \sum import_{ip} * \Delta tariff_p$ which presents the export share for each product p at firm i and $\Delta tariff_p$ is product tariff changes.

Table 2 presents summary statistics, with means and standard deviations in parentheses, for all the exposure measures, employing the three distinct definitions of supply-chain linkages. The first row in the table focuses on the exposure measures constructed using 2012 BNS firm level data. Under the baseline definition, the ITE_p^{HS2} measure shows a mean value of 0.151. In contrast, the ITE_p^{HS4} measure exhibits a smaller mean of 0.082, while the ITE_p^{Firm} has the smallest mean value of 0.009.

Table 2. Summary statistics: ITE measure

	Mean	SD	Min.	Max.
ITE_p^{HS2}	0.151	0.272	0	1
ITE_p^{HS4}	0.082	0.195	0	1
ITE_p^{Firm}	0.023	0.021	-0.024	0.097

Source: Authors' calculations based on 2012 firm-level data and public-level tariff data for the year 2012.

[5] This equation follows equation 7, p(12) from HKM (2023).

With respect to the baseline definition, for the average HS4 exported product, approximately 15% of exporters are found to import products that meet two criteria: (i) they face import tariff increases during the period 2008-2010 and (ii) they belong to the same HS2 category as the exported product.

Appendix Table A-3 includes a list of products most affected and least affected by import tariff exposure, as a basic check that the measures are sensible in the context of Kazakhstan. The list is in line with our expectations, as higher-tech manufactured products reliant on supply chains are more affected and various primary products are among the least affected.

3.3 Results for import tariff exposure post-customs union formation

Our empirical methodology involves integrating import tariff exposure measures computed using firm-level data with public-level export data spanning the period 2007-2014, encompassing annual Kazakh exports at the HS4 product level. The primary focus of our study is to analyze the impact of increase in import tariffs on Kazakh export growth within the Eurasian Economic Union.

Following HKM, we use a generalized difference-in-differences (DID) estimation strategy, enabling us to assess whether there is a reduction in export growth for products with higher exposure to import tariffs (the first difference) during the years 2011-2014 compared to the preceding period of 2009-2010 (the second difference):

$$\Delta \ln exports_{pt} = \theta \Delta \ln(1 + \tau_{pt}) + \gamma ITE_{p} \times POST_{t} + \alpha_{p} + \lambda_{ct} + \varepsilon_{pt}, \quad \text{(eq. 4)}$$

We use log differences of exports relative to the previous year, denoted as $\Delta \ln exports_{pt}$. This allows us to capture the log change in exports for each HS4 product (p) in a given year (t). The changes in external tariffs are represented as $\Delta \ln (1 + \tau_{pt})$, as this variable captures increased trade protection for the industry within the customs union. The ITE measure at the product level remains time-invariant and is constructed using information from firm-level trade flows and public-level tariff data in the year 2012. $POST_t$ is a binary indicator for imposition of tariffs ($POST_t$=0 for t in 2009-2010 and $POST_t$=1 for t in2011-2014).[6] Lastly, α_p indicates HS4 product fixed effect, λ_{ct} HS2-year fixed effects, and ε_{pt} the error term. The coefficient of interest is γ - the average change in the effect of exposure before and after the increase in import tariffs.

In Table 3, we present coefficient estimates for different ITE measures. Our findings reveal that products with higher exposure to Kazakh import tariff increases experienced diminished export growth compared to less exposed products in the post-tariff period, compared to the same difference observed in the pre-tariff period. The coefficient in Column (1) indicates that a product at the mean of the ITE_p^{HS2} distribution (=0.151) experiences approximately 19.8 log points ((−1.313 × 0.151) × 100 = -19.84) lower export growth than a product with no affected exporters. Additionally, the table shows that an increase in foreign export tariffs, $\Delta \ln(1 + \tau_{pt})$, has a positive effect on export growth. Both the broad (Column 2) and narrow (Column 3) exposure measures lead to similar conclusions: the rise in foreign export tariffs has positive and significant effect on

[6] Results are robust to defining POST as 1 for t in 2011-2013.

export growth, whereas products with higher import tariff exposure experienced lower export growth.

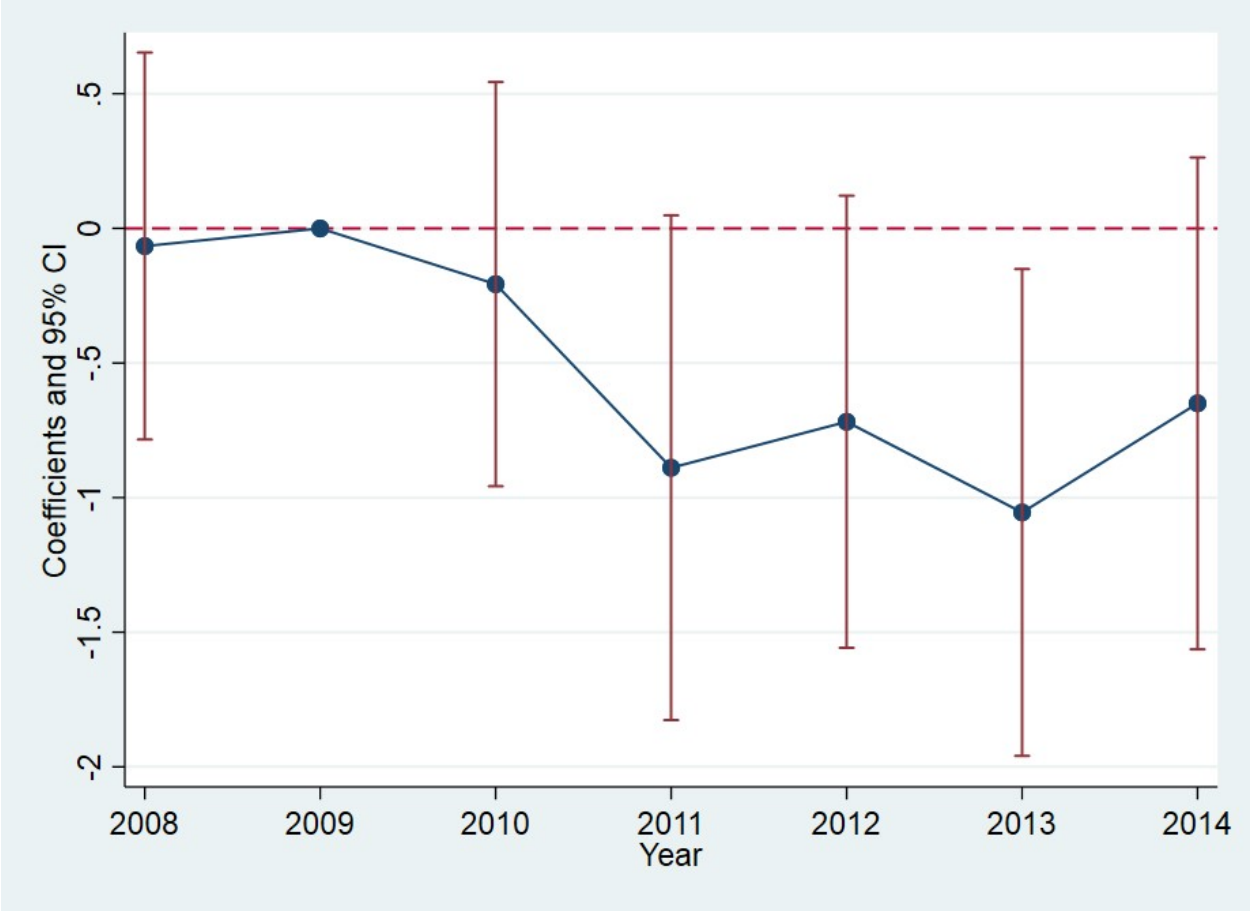
Table 3. Export growth and import tariff exposure

	ITE HS2	ITE HS4	ITE FIRM
$\Delta \ln(1 + \tau_{pt})$	4.579**	4.679**	3.576
	(2.205)	(2.217)	(2.236)
$POST_t$=1 # ITE_p^{HS2}	-1.382***		
	(0.363)		
$POST_t$=1 # ITE_p^{HS4}		-0.816**	
		(0.393)	
$POST_t$=1 # $\ln ITE_p^{Firm}$			-0.251***
			(0.058)
HS4 f.e.	Yes	Yes	Yes
HS2-year f.e	Yes	Yes	Yes
R-squared	0.7937	0.7914	0.7917
Observations	1079	1079	1065

Note: The unit of analysis is HS4 product-years, run from 2009-2014, with POST indicator defined as 1 for 2011-2014. Each ITE measure in the table varies at the HS4 level. Standard errors are clustered by HS4 product.

The validity of DID, as always, depends on the satisfaction of parallel trends preceding the treatment. To evaluate parallel trends for a continuous treatment variable, we estimate a specification similar to eq. 4 for ITE FIRM, except with the interaction estimated for every year, relative to a base year of 2009. Indeed, in Figure 4 we see no effect of the import tariff exposure for growth prior to 2010, and the estimated declines in export growth are observable in each year from 2011-2014. Results are similar for the other measures.

Figure 4: Evaluation of parallel trends for ITE FIRM



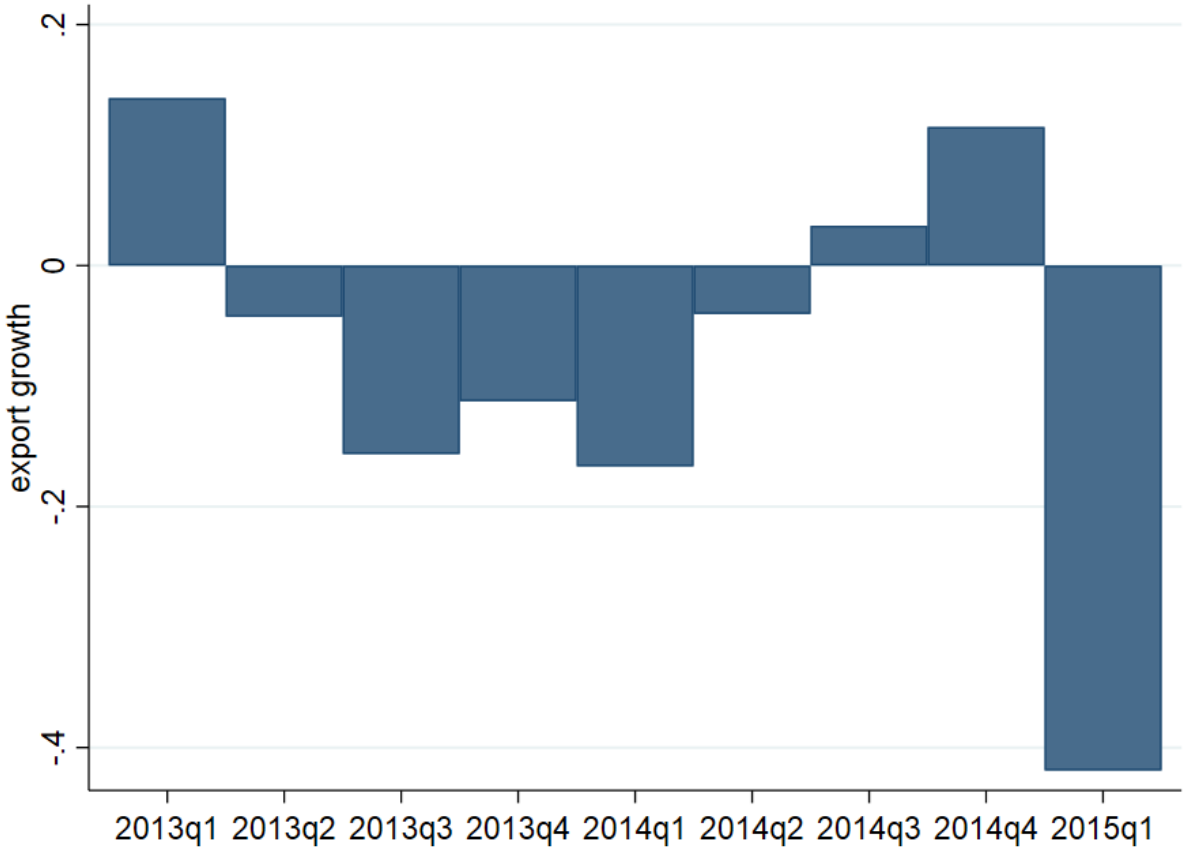
4. Effects of import tariff exposure on resilience after a devaluation

This section details the DID estimation for the effect of import tariff exposure as Kazakhstan experienced an unexpected 19% devaluation in February 2014. Due to data availability from 2012 onward, we can use finer analysis than in Section 3. We can run our export growth regressions at the firm level and construct our import tariff exposure (ITE) measures varying at the HS6 product level rather than HS4.

4.1. Data sources

First, we make use of the customs data which was described in Section 3.1, though we now make use of this data from 2012 to 2015, cutting off our study period at the end of Kazakhstan's fixed exchange rate regime. We maintain a focus on trade flows to Russia and Belarus, the original members of the union, and we disregard Armenia and Kyrgyzstan who joined only in 2015. Figure 5 shows the average 12-month growth rate of exports for each quarter starting from 2013q1 to 2015q1. A longer time series of exports is included in Appendix Figure A-1.

Figure 5. Quarterly export growth (year-on-year), 2013q1-2015q1



Source: Authors' calculations based on firm-level data.

We merge the BNS data with the tariff data from the World Integrated Trade Solution (WITS) database which comes on an annual basis and includes information on applied tariffs applied by Kazakhstan on imports from the rest of the world at the 6-digit HS product code level. Appendix Table A-4 provides additional context on the share of exporters facing increases on some product, or same HS4, or same HS6.

4.2. Import tariff exposure measures

Similar to Section 3.2, we construct two ITE measures based on HKM, while the third measure takes into account the import share at the product level by exploiting the firm-level data.

We start by constructing a product level import tariff exposure measure (ITE) at the product level derived from the cross-sectional data for the year 2012. So, the ITE measure, by definition, is identical to HKM:

$$ITE_p^{Baseline} = \frac{Exporters_{p,2012}^{same\ HS4}}{Exporters_{p,2012}} \qquad \text{(eq. 5)}$$

where the denominator counts the number of unique exporters selling HS6 product p in 2012. The numerator accounts for a subset of these exporters who imported products subject to import tariff increases during the period 2008-2010. The baseline HKM method employs the HS4 heading, to define the set of imports that constitute a firm's export supply chain. For each HS6 product we calculate the total number of exporters in 2012 who imported at least one product subject to tariff increase that falls in the same HS4 category. The narrow ITE measure, instead, employs HS6 heading: we calculate the total number of exporters in 2012 who imported at least one product subject to tariff increase that fall in the same HS6 category:

$$ITE_p^{Narrow} = \frac{Exporters_{p,2012}^{same\ HS6}}{Exporters_{p,2012}} \qquad \text{(eq. 6)}$$

Finally, we consider an ITE measure that exploits firm level data to account for tariffs weighted by import value:

$$ITE_p^{Firm'} = \left(\sum_p^{product} w_{ip} * (\Delta duties_i / \sum import_{ip}) \right) \qquad \text{(eq. 7)}$$

where $w_{ip} = export_{ip} / \sum export_p$ $\Delta duties_i = \sum import_{ip} * \Delta tariff_p$ which presents the export share for each product p at firm i and $\Delta tariff_p$ is the change in tariff for every product.

Table 4 presents summary statistics, with means and standard deviations in parentheses, for all the exposure measures, employing three distinct definitions of supply-chain linkages. The first row in the table focuses on the exposure measures constructed using 2012 BNS firm level data. Under the baseline definition, the $ITE_p^{Baseline}$ measure shows a mean value of 0.111. In contrast, the ITE_p^{Narrow} measure exhibits a smaller mean of 0.082, while the ITE_p^{Firm} has the smallest mean value of 0.008.

With respect to the baseline definition, for the average HS6 exported product, approximately 11% of exporters are found to import products that meet two criteria: (i) they face import tariff increases during the period 2008-2010 and (ii) they belong to the same HS4 category as the exported product.

Table 4. Summary statistics: ITE measure

	Mean	SD	Min.	Max.
$ITE_p^{Baseline}$	0.111	0.222	0	1
ITE_p^{Narrow}	0.082	0.189	0	1
$ITE_p^{Firm'}$	0.008	0.017	-0.034	0.116

Source: Authors' calculations based on 2012 firm-level data and public-level tariff data for the year 2012.

Similar to Table A-3, Appendix Table A-5 includes a list of products most affected and least affected by import tariff exposure. Sensibly, higher-tech manufactured products are more affected and various primary products are among the least affected. The results differ slightly due to the alternative aggregation.

4.3 Results for import tariff exposure post-devaluation

Our empirical methodology involves integrating import tariff exposure measures at the product level from the year 2012 with firm-level data spanning the period 2012 to 2015, encompassing monthly Kazakh exports at the HS6 product-month level. The primary focus of our study is to analyze the impact of increase in import tariffs on Kazakh export growth within the Eurasian Economic Union.

Following HKM, we use a generalized difference-in-differences (DID) estimation strategy, enabling us to assess whether there is a reduction in export growth for

products with higher exposure to import tariffs (the first difference) during the years 2014-2015 compared to the preceding period of 2012-2013 (the second difference):

$$\Delta \ln exports_{ipq} = \theta \Delta \ln(1 + \tau_{pq}) + \gamma ITE_p \times period_t + \alpha_p + \boldsymbol{\lambda}_{cq} + \varepsilon_{ipq}, \quad \text{(eq. 4)}$$

We use log differences of exports relative to the same quarter in the previous year, denoted as $\Delta \ln exports_{ipq}$. This allows us to capture the log change in exports for each firm i and specific HS6 product (p) in a given quarter (q). The changes in external tariffs are represented as $\Delta \ln(1 + \tau_{pt})$, and this variable captures increased trade protection for the industry within the customs union. The ITE measure at the product level remains time-invariant and is constructed using information from firm-level trade flows and tariff data in the year 2012. $period_t$ is a binary indicator for imposition of tariffs ($period_t$=0 if t = 2012, 2013 and $period_t$=1 if t=2014, 2015), α_p is a HS6 product fixed effect, α_{cq} is a HS4-quarter fixed effects and ε_{ipq} is the error term. The coefficient of interest is γ - the average change in the effect of exposure before and after the increase in import tariffs.

In Table 5, we present coefficient estimates for the interaction between $ITE_p^{Baseline}$ and an indicator denoting the post-2014Q1 period, as specified in Equation (4). Our findings reveal that products with higher exposure to Kazakh import tariff increases experienced diminished export growth compared to less exposed products in the post-tariff period, compared to the same difference observed in the pre-tariff period. The coefficient in Column (1) indicates that a product at the mean of the $ITE_p^{Baseline}$ distribution (=0.306) experiences approximately 3 log points ((−0.754 × 0.157) × 100 = 11.84) lower export growth than a product with no affected

exporters. Additionally, the table shows that an increase in foreign export tariffs, $\Delta\ln(1+\tau_{pt})$, has no effect on export growth. Both the broad (Column 2) and narrow (Column 3) exposure measures lead to similar conclusions: the rise in import tariffs is not correlated with higher Kazakh export growth, whereas products with higher import tariff exposure experienced lower export growth.

Table 5. Export growth and import tariff exposure

	ITE HS4	ITE HS6	ITE FIRM'
$\Delta\ln(1+\tau_{pt})$	-3.802***	-3.779***	-3.834***
	(1.367)	(1.367)	(1.365)
$period_t$=1 # $ITE_p^{Baseline}$	-0.754**		
	(0.298)		
$period_t$=1 # ITE_p^{Narrow}		-1.203***	
		(0.403)	
$period_t$=1 # $\ln ITE_p^{Firm'}$			-9.715**
			(3.912)
HS6 f.e.	Yes	Yes	Yes
HS4-quarter f.e.	Yes	Yes	Yes
R-squared	0.1405	0.1412	0.1419
Observations	2721	2721	2727

Note: The unit of analysis is HS6 product-quarters, run from 2012-2015, with the $period_t$=1 indicator defined for 2014-2015. Each ITE measure in the table varies at the HS6 level. Standard errors are clustered by HS6 product.

5. Conclusion

We have provided the first evidence for negative supply chain consequences based on actual external tariff increases for a trade bloc. We have found for the case of Kazakhstan, they can serve to undermine trade even within the trade bloc.

Though Kazakhstan's case may be extreme, the evidence provides confirmation from actual experience for the negative consequences of friend-shoring found in a growing literature that uses counterfactuals in quantitative models to evaluate prospective friend-shoring trade blocs

Our results have immediate industrial policy implications for economic diversification in resource-rich economies. Kazakhstan is a country that still maintains import substitution as an approach to economic diversification, and our study documents specifically how input tariff increases in the Eurasian Customs Union weakened the export diversification of Kazakhstan. Earlier work shows that the share of value added in Kazakhstan's exports fell from 20 percent in 2005 to 7 percent in 2015 (Arenas, 2020), and our study suggests import tariff exposure caused this decline in global value chain participation.

In a September 2023 speech in which President Tokayev of Kazakhstan argues that economic diversification matters for an inclusive "Just Kazakhstan", he also argues that Kazakhstan should increase trade protection to achieve diversification goals. He says, "Many countries are now taking active steps to protect their domestic markets. Even in developed countries, there has been a shift toward protectionist industrial policy. In Kazakhstan, however, according to WTO classification, the level of protection for the domestic market is considered low, with only 128 non-tariff measures applied. Therefore, we need new, bold approaches to trade policy."[7] The call here for further protection points to the urgency of research illuminating the unintended supply chain consequences of Kazakhstan's recent episode of tariff increases.

[7] Tokayev Kassym-Jomart. 2023 September 1. "State of the Nation Address 'Economic course of a Just Kazakhstan'". https://www.akorda.kz/en/president-kassym-jomart-tokayevs-state-of-the-nation-address-economic-course-of-a-just-kazakhstan-283243

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Appendix

Table A-1. Average tariffs, by year

Year	Simple Average	Weighted Average	Maximum Rate
2004	0,028	0,028	0,028
2008	0,050	0,045	0,055
2010	0,079	0,074	0,090
2011	0,076	0,067	0,089
2012	0,076	0,067	0,090
2013	0,075	0,066	0,089
2014	0,062	0,054	0,074
2015	0,063	0,063	0,069
2016	0,055	0,050	0,063
2017	0,053	0,049	0,061
2018	0,055	0,050	0,064
2019	0,053	0,049	0,062
2020	0,049	0,046	0,056
2021	0,047	0,044	0,055

Of all exporters, 42% of exporters also import. 77% of importing exporters faced an increase in tariffs for at least one product. 43% face increase in tariffs within the same HS2 products.

Table A-2. Exporters facing increase in import tariffs

	At least one product	Same HS2	Same HS4
Share of exporters	0.770	0.431	0.314

Source: Authors' calculations based on 2012 firm-level data for the year 2012.

Table A-3. Export sectors that are most and least affected by import tariffs

Panel A: most affected HS2 products	
HS2	Description
87	Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof
39	Plastics and articles thereof
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles
90	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof
44	Wood and articles of wood; wood charcoal
Panel B: least affected HS2 products	

15	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes
7	Edible vegetables and certain roots and tubers
19	Preparations of cereals, flour, starch or milk; pastrycooks' products
20	Preparations of vegetables, fruit, nuts or other parts of plants
24	Tobacco and manufactured tobacco substitutes

[Note: This table uses the ITE FIRM measure and aggregates to the HS2 level]

Figure A-1. Quarterly export growth (year-on-year), 2013q1-2020q4

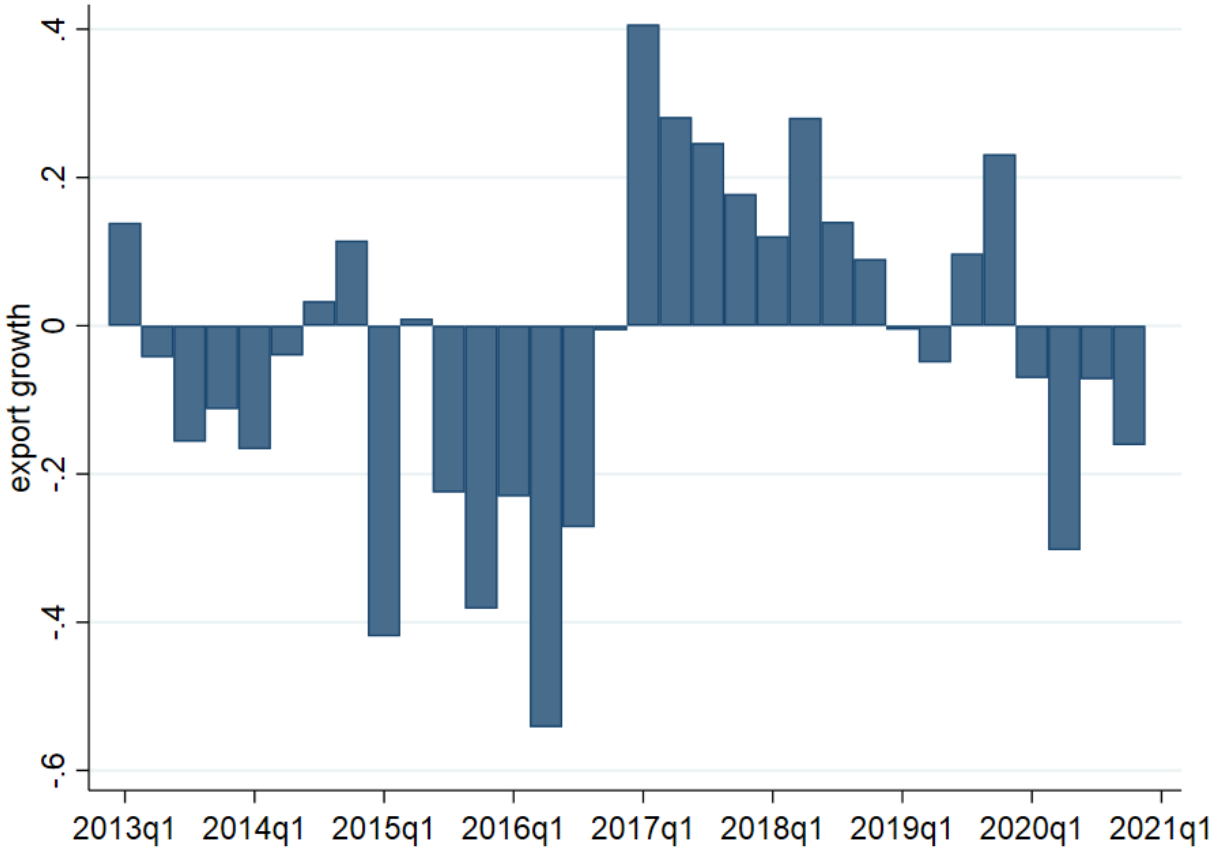

Table A-4. Exporters facing increase in import tariffs

	At least one product	Same HS4	Same HS6
Share of exporters	0.400	0.241	0.200
Share of exports	0.258	0.078	0.041

Source: Authors' calculations based on 2012 firm-level data for the year 2012.

Table A-5. Export sectors that are most and least affected by import tariffs

Panel A: most affected HS2 products	
HS2	Description
59	Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable for industrial use
72	Iron and steel
38	Miscellaneous chemical products
35	Albuminoidal substances; modified starches; glues; enzymes
44	Wood and articles of wood; wood charcoal
Panel B: least affected HS2 products	
95	Toys, games and sports requisites; parts and accessories thereof
3	Fish and crustaceans, molluscs and other aquatic invertebrates
19	Preparations of cereals, flour, starch or milk; pastrycooks' products
17	Sugars and sugar confectionery

Note: This table uses the ITE (narrow) measure and aggregates to HS2 products.