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Abstract

This study examines the Eurasian Economic Union's trade effects, focusing on global production sharing. We measure the extent of global production sharing with the exports of parts and components. With a panel dataset of disaggregated bilateral flows of 5 members and 28 partners, we estimate an augmented gravity model for 2010-17 using the Hausman and Taylor Estimator. The study has two important findings. First, there are significant trade diversion effects in final goods, parts, and components. Second, the formation of the economic union results in declining intra-bloc exports. Besides, we find that market size, inter-country differentials of income, business-friendly climate, and cultural similarities are the other significant determinants of bilateral trade.

Keywords: *Eurasian Economic Union, Trade Effects, Global Production Sharing, Parts and Components Trade, Gravity Model, Hausman and Taylor Estimator*

JEL Codes: *F10, F14*

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INTRODUCTION

The history of Eurasian economic integration starts with the establishment the Eurasian Economic Community in October 2000. It created a single economic space (Khitakhunov et al. 2016). The Eurasian Customs Union prevailed from 2010 to 2014. It formed the next major step towards the materialisation of the pipelined policies. The customs union consisted of Belarus, Kazakhstan and Russia. They installed a Common External Tariff (CET) with third countries and eliminated all internal customs controls (Khitakhunov et al. 2016). The gradual removal of tariff and non-tariff barriers was the stated common goal of Eurasian integration. A robust form of integration was the Eurasian Economic Union (hereafter EAEU) in January 2015, which included Armenia, the Kyrgyz Republic, and the three core members.

The EAEU and its stated goals offer a new platform for intra-regional cooperation to strengthen the global value chain and related trade in production networks (Ustyuzhanina, 2016). Eurasian countries, particularly Russia, played a subordinate role in the global value chains, and the region's share of value-added remained negligible for a long time (Ustyuzhanina, 2016). Eurasian countries, except Belarus, lack competitiveness in high-technology manufacturing (Falkowski, 2017). Using the Balassa revealed comparative advantage index, Falkowski (2017) shows that Eurasian countries have comparative advantages in medium and low-technology manufacturing trade. However, there is dynamism in the trade ties between Belarus and Russia. While Belarus imports half of its components from the automotive sector, the finished goods made of Russian components are exported to third countries, including Russia, where some of the equipment is assembled (Ustyuzhanina, 2016). Belarus and Russia contribute nearly 40 per cent to mutual trade in machinery goods and miscellaneous manufacturing in 2015 Khitakhunov (2017). The EAEU eliminates institutional barriers and transaction costs mainly by removing customs barriers Ustyuzhanina (2016), which can significantly improve the regional business

environment. Consequently, the region has attracted a notable increase in foreign direct investment. The motives for attracting foreign investment range from accessing new technologies and markets, as well as marketing and management know-how, to becoming part of global value chains which might be challenging for domestic firms to achieve on their own (Adarov and Havlik, 2017; Balas et al., 2018).

According to the Vinerian specifications, forming an economic integration agreement results in trade-creating and diverting effects (Deme and Ndrianasy, 2017). The empirical literature on Eurasian integration hints that EAEU is trade-diverting (Tumanyan, 2018), even though we find contending results in sector-specific studies focussing on the impact of tariff and non-tariff barriers. However, the Eurasian region's potential in the global production sharing domain remains underexplored.

In this paper, using finely disaggregated trade data in parts and components, we examine the trade effects of the economic union's formation, explicitly focusing on global production sharing. Following the standard trade literature, we consider trade in parts and components an indicator of the extent of production sharing between the EAEU countries and their partners. The sample period for our empirical analysis is 2010-17, from the inception of the customs union. The continuity of trade data also determines the initial year of analysis. The study estimates an augmented gravity model to examine the nature of trade effects following the formation of the economic union, incorporating the factors which stimulate and deter bilateral trade.

This paper extends the existing literature on the trade effects of economic integration agreements on production networks by studying the trade creation and diversion effects of EAEU on machinery parts and components exports. Our contributions to the literature are three-fold. First, to the best of our knowledge, this is the first empirical study on the EAEU explicitly focusing on production sharing in the manufacturing sector. Second, our dataset is broad in scope because of Armenia and

Kyrgyzstan's inclusion in the analysis. In contrast, previous empirical studies, except Tumanyan (2018), on Eurasian integration focused on the customs union members. Our third contribution is econometric. Unlike previous Eurasian integration studies, we provide robust estimates of trade effects as we control endogeneity issues.

Our analysis shows that EAEU formation has resulted in a significant decline in internal trade. This result is in line with the findings of Borodin and Strokov (2015). Further, we provide new empirical evidence for the trade-diverting effects of the EAEU on parts and components exports. Earlier studies which identified trade-diverting effects lacked strong econometric support. Our results confirm that the nature of Eurasian integration is fundamentally trade-diverting.

The rest of the article is structured as follows. In section 2, we present a brief review of the empirical literature on economic integration's trade effects. Section 3 presents some stylised facts that direct us to the research gap. Section 4 discusses the data and variables. Section 5 discusses the empirical results, and the concluding remarks are in section 6.

BRIEF REVIEW OF THE EMPIRICAL LITERATURE

Many empirical studies have analysed the trade effects of economic integration. We find mixed evidence from the empirical literature. Becker and Suarez (2001) and Garcia et al. (2013) find trade diversion among MERCOSUR countries, particularly in Brazil, Paraguay and Uruguay. Ghosh and Yamarik (2004) argue that economic integration of any type is trade-creating, and the depth of integration increases the amount of total trade creation. However, Vicard (2009) contends, based on an analysis similar to Ghosh and Yamarik (2004), that the depth of integration does not increase the amount of trade creation. Cabalu and Alfonso (2007) find significant trade creation effects in the ASEAN Free Trade Agreement. Adam and Moutos (2008) find that the effect of the

Customs Union Agreement (CUA) between Turkey and the European Union significantly improves bilateral trade. However, the trade effects are asymmetric and favourable to high-technology EU countries. Neypati et al. (2007) point out significant behavioural changes in Turkey's exports and import patterns, apart from benefitting bilateral trade. Zarzoso et al. (2009) show substantial trade creation and import diversion for the EU with export diversion for EUROMED in one of the earliest studies to incorporate dynamic effects in assessing the trade effects of economic integration. Zidi and Dhifallah (2013) find significant trade creation between Tunisia and the EU and export diversion between Tunisia and the rest of the world. Urata and Okabe (2014) argue that customs unions have more potential to create welfare effects than FTAs. Kahouli and Maktouf (2015) show trade-creating effects for EU-15 compared to all other FTAs in the Mediterranean region. Deme and Ndrianasy (2017) examine the trade effects of regional trade agreements (RTAs) of the ECOWAS countries, addressing third-country heterogeneity. They find significant trade-diverting effects on lower-income countries.

The empirical literature on trade effects specific to the Eurasian region hints that the EAEU is mainly trade-diverting (Blockmans et al., 2012; Tumanyan, 2018). Blockmans et al. (2012) show trade diversion in the Russian imports of machinery and equipment, as evident by the periodical increase in imports from EAEU members. Isakova et al. (2015) find weak trade creation effects and significant trade diversion due to tariff changes. Kovalev et al. (2017) argue that redistributive effects in the union are necessary conditions for member countries to attract trade from other countries. Mukhamediyev and Khitakhunov (2018) show that the effects of customs unions on intra-bloc trade are insignificant, while Tumanyan (2018) finds significant net trade diversion because of the effect of CET applied. Vakulchuk and Knobel (2018) predict high internal trade growth without tariff and non-tariff barriers. Following the empirical literature, we hypothesise that the EAEU has a trade-diverting nature with limited evidence for trade creation. We explore trade trends and

patterns of EAEU trade in machinery goods, parts, and components to draw additional inferences.

It should be noted that some research has already been conducted on the trade effects of Eurasian integration (see, e.g., Blockmans et al., 2012; Mogilevskii, 2012; Isakova et al., 2015; Vinokurov et al., 2015; Tumanyan, 2018). However, the literature review reveals that all empirical studies have been conducted on aggregate trade flows, and researchers have hardly explored the dynamics of global production sharing despite the region's performance in recent years. Our study fills this research gap.

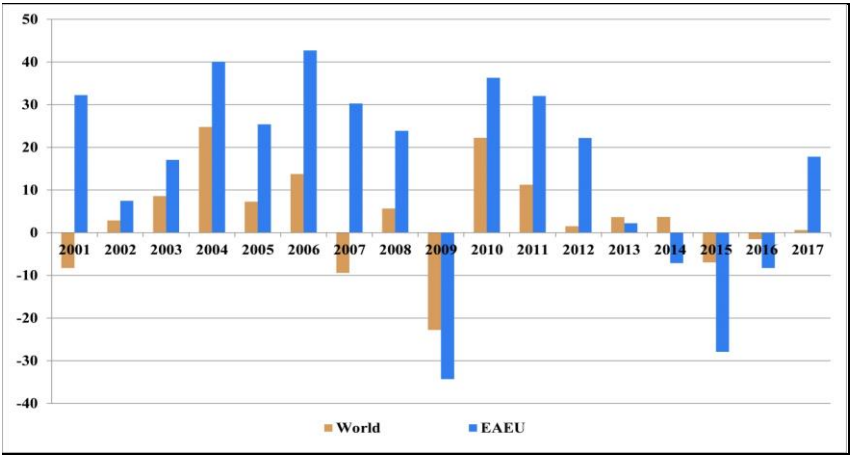
SOME STYLISED FACTS

This section presents three stylised facts to form a hypothesis about the trends in EAEU trade. First, we point out a secular reduction in the parts and components trade in the period after the customs union formation. Figure 1 shows that the annual average growth in parts and components trade in the EAEU has continuously declined since 2010, although the previous decade witnessed significant trade growth. Average growth in parts and components trade in 2010-17 in the EAEU is more than four times higher than the world growth rate for the same period. However, this seemingly positive trend is applicable if we consider the whole period of 2000-17. Notably, in the years of deceleration, the decline in trade is higher in magnitude for the EAEU than the world level, indicative of reduced trade overall. However, it does not necessarily indicate a decline in the internal trade.

Table 1 shows the trends in the exports and imports of machinery, final goods, parts, and components in the EAEU countries. From the table, we infer those imports in machinery goods and the parts and components recorded significant growth during 2000-17, compared to the exports. We also identify that the exports and imports of machinery goods grew faster (at 199% and 1135% respectively) than parts and

components. Further, parts and components in the EAEU countries show a growth rate of 128% in exports and 1094% in imports during the same period. For comparative purposes, we show similar figures for the entire Eurasian region. We find that the Eurasian region follows identical patterns to EAEU except for the exports of parts and components, which show a higher rate of 161% compared to EAEU's 128%.

Figure 1: Annual Growth in Parts and Components Trade, 2000-2017



Source: Author's calculations based on the UN COMTRADE database

However, if we bifurcate the period of analysis, different inferences follow. The first sub-period of analysis, 2000-10, shows an increase in all trade flows irrespective of the type of goods, compared to the second period, 2010-17. A substantial share of the growth in trade flows stems from 2000-10. The post-2010 period saw a significant decline in the growth of exports and imports of machinery, final goods, parts, and components. We also find that the decrease in imports is considerably higher in margin than exports. We find similar inferences compared to Figure 1, indicating an overall decline in the union's trade potential post-2010 period. The trend is not significantly different for the entire region of Eurasia.

Table 1: Growth Performance of Machinery Goods and Parts and Components Trade (in Million US$), 2000-2017

	Machinery goods		Parts and components	
	Exports	**Imports**	**Exports**	**Imports**
EAEU				
2000	11003	12621	3545	3966
2010	19579	134404	5912	39942
2017	32844	155845	8088	47344
	199	*1135*	*128*	*1094*
% change 2000-10	*78*	*965*	*67*	*907*
% change 2010-17	*68*	*16*	*37*	*19*
Eurasia				
2000	14091	18745	4605	6286
2010	32688	165571	10701	49634
2017	41644	188987	11996	56101
	196	*908*	*161*	*793*
% change 2000-10	*132*	*783*	*132*	*690*
% change 2010-17	*27*	*14*	*12*	*13*

Source: Author's calculations based on the UN COMTRADE database

Table 2: Processing Trade in Machinery Goods (in Million US$), 2000-2017

	Processing trade		Share of processing trade in machinery trade	
	EAEU	**Eurasia**	**EAEU**	**Eurasia**
2000	416	563	1.73%	1.71%
2010	2931	4493	1.87%	2.27%
2017	2218	4182	1.18%	1.81%

Source: Author's calculations based on the UN COMTRADE database

Table 2 shows the share of processing trade machinery final goods in the EAEU, with the comparative figure of the Eurasian region. We observe that the processing trade (re-imports plus re-exports) in the EAEU has risen in the last two decades. However, the EAEU's share of processing trade in machinery final goods shows a decline from 1.73 per cent in 2000 to 1.18 per cent in 2017. On the other hand, the Eurasian region showed a relatively higher share of 1.81 per cent in 2017 compared to 1.71 per cent in 2000. A period-wise analysis strengthens our inference of significantly higher processing trade before 2010. These declining shares indicate that Eurasian countries, besides EAEU, improve their potential for processing trade and participate actively in global production sharing while the EAEU countries' performance is weakening.

EAEU's internal trade of machinery final goods follows patterns similar to what we infer from the analysis above. In 2011 and 2012, internal trade reached its zenith and slumped in the following years, registering negative growth rates for four consecutive years. The growth rate in 2013 was -9.9 per cent, with some improvement to -1.1 per cent in 2016. Vakulchuk and Knobel (2018) state that EAEU's internal trade was 7.7 per cent of total trade in 2016, the lowest among all economic integration blocs.

The stylised facts show that the Eurasian region, particularly the EAEU, is a potential target destination for global production sharing; however, it lost its forte in the post-2010 period. Based on the empirical literature review, we suspect significant trade diversion in the EAEU, with little evidence for trade creation. Aiding the inference with the trade trends, we suspect the possibility of a reduction in the intra-bloc trade after the formation of the economic union.

DATA AND VARIABLES DESCRIPTION

We analyse the empirical estimation of the determinants of global production sharing in the EAEU countries. In this section, we specify the estimation equation and describe the data.

Model Specification and Estimation Method

We employ a gravity model of trade to analyse the nature of bilateral exchanges in the EAEU countries. The model addresses bilateral exports as a function of economic masses and the distance between the trading partners. The standard model postulates a direct relationship between economic masses and an inverse relationship for distance with trade flows. Apart from the central gravity variables, we include country-specific income differences, barriers to trade, and geographical and cultural factors to augment the gravity model.

$$lnEXP_{ijt}^{k} = \beta_0 + \beta_1 lnGDP\_REP_{it} + \beta_2 lnGDP\_PAR_{jt} + \beta_3 lnDIS_{ijt} + \beta_4 lnDPG_{ijt} + \beta_5 lnCE_{it} + \beta_6 lnRER_{ijt} + \beta_7 TAF_{ijt} + \beta_8 lnINDEX_{ijt} + \alpha_1 EAEU_{ijt} + \alpha_2 RoW_{ijt} + D_1 ADJ_{ij} + D_2 LAN\_OFF_{ij} + \theta_t + \epsilon_{ijt} \quad \text{.....(1)}$$

The subscripts i and j refer to the reporting and partner countries with i = 1,2, 3, 4, 5 and j = 1,2, 3,....32. There are 160 bilateral pairs in the analysis. Subscript t refers to the time in years where t= 1, 2...8. The superscript k indicates the type of exports, i.e. machinery final goods or parts and components. Hence, k = 1, 2. θ_t captures the time effects. We estimate two gravity equations in the current analysis. The 160 country

pairs across 8 years make the total number of observations 1280. We estimate the equation above using a panel data approach. The Breusch Pagan Lagrangian Multiplier test favours the panel data framework over the least-squares counterpart, confirming the presence of unobserved heterogeneity across country pairs. The Hausman test favours the application of fixed effect over random effect estimator. However, the presence of time-invariant explanatory variables, such as distance and dummy variables, limits the use of the fixed-effect model. Further, Egger (2005) points out a potential endogeneity issue in the model because of the simultaneity bias between the trade and GDP values.

We employ the endogeneity corrected Hausman and Taylor Instrumental Variable Estimator (hereafter HTE) in the estimation to solve these econometric issues. Kien (2009) and Athukorala et al. (2017), among others, employ the HTE to estimate bilateral trade flows. The HTE is a random-effects model that inherently controls fixed effects (Hausman and Taylor, 1981). It assumes that the error term is correlated with only some, not all, of the explanatory variables. To correct endogeneity issues, the model uses each time-varying exogenous variable as instruments, therefore finding instruments within. One of our variables of interest, namely *RoW*, is time-invariant. HTE is an appropriate estimator in the presence of time-invariant explanatory variables. These features make the HTE a superior method to conventional panel data estimators.

In two exports equations, we examine the trade effects on machinery final goods and machinery parts and components. Following Shimbov et al. (2013), we restrict the empirical analysis to machinery final goods, parts, and components. Guided by the empirical literature on global production sharing, we identify 15 among the 22 intermediate goods categories belonging to SITC 7 and SITC 8 at the aggregate level of SITC Revision 3. Further, these 15 intermediate goods categories accounted for 81 per cent of total intermediate goods trade in EAEU, indicating that a substantial share of intermediate goods comes from SITC 7 and 8. Drawing from the empirical literature, we hypothesise that

the economic union's formation has a trade-creating effect in regional trade and a trade-diverting effect with the external world. However, the stylised facts indicate the possibility of declined internal trade in the region.

Data and Variables

We use the Standard Industrial Trade Classification Revision 3 (SITC Rev.3) nomenclature provided by the United Nations Commodity Trade Statistics Database (UN Comtrade) in the current analysis. Machinery and transport equipment (SITC 7) and miscellaneous manufactured articles (SITC 8) provide the data for empirical analysis. Following the literature on global production sharing, we employ the gross values of exports of machinery, final goods and parts and components of the same groups in current US$ as the dependent variables measuring production sharing (Kimura et al., 2007; Shimbov, 2013). The data set covers 5 EAEU members and their 28 partner countries. The partners accounted for 92 per cent of EAEU's total trade in machinery goods and 93 per cent of trade in parts and components from the same product category in 2010. We obtain these variables from the UN Comtrade database.

In this analysis, the central gravity variables are the market size of the reporting and the partner economies and their bilateral distance. Following Athukorala et al. (2017), we employ the real GDPs of the reporter *(GDP_REP)* and the partner *(GDP_PAR)* countries at 2010 constant (US$) prices obtained from the World Development Indicators Database (WDI) of the World Bank. *GDP_REP* represents the supply capacity, and the *GDP_PAR* represents the capacity to absorb. Further, larger economies tend to have a high capacity for supply and absorption; hence, we expect a positive relationship. The other gravity variable is the bilateral geographical distance *(DIS)*, which captures transportation costs, especially shipping costs. Even though technological advancements reduce transportation and communication costs, empirical evidence suggests that bilateral distance is still a key determinant of trade flows. The larger the distance between two trading partners, the

lesser the trade volume is expected to be, yielding an inverse relationship. However, geographical distance alone cannot be an appropriate variable to capture transportation costs. Hence, we employ the weighted bilateral distance, obtained from the CEPII database, between the trading countries' capitals to account for the technological advancements.

We employ two dummy variables to capture the trade effects of the EAEU, namely *EAEU* and *RoW*, representing trade creation and trade diversion, respectively. EAEU takes a value of unity from 2014 if bilateral partners belong to EAEU and zero otherwise. A positive coefficient of EAEU indicates trade creation in the intra-bloc trade, and a negative coefficient points to a decline in internal trade. *RoW* takes unity if the member country of EAEU exports to a partner outside the union and zero otherwise. *RoW* captures the trade diversion effects of the EAEU. A negative coefficient of *RoW* indicates trade diversion.

We employ several control variables in the analysis, following the trade literature. We include costs of export *(CE)*, using the average cost of exporting per container of the exporting country, to capture bilateral trade costs. Since *CE* measures trade costs, we expect a negative impact on bilateral flows. We obtain this variable from the World Bank Doing Business database.

Next, following Kimura et al. (2007), we employ absolute differences in per capita income *(DPG)* to measure inter-country differences in income and locational advantages. By definition, DPG has a negative impact on bilateral trade. We include the real bilateral exchange rate *(RER)* to capture the price fluctuations in the domestic and international markets and measure international competitiveness. Specifically, we expect *RER* to have a weaker impact on intermediate goods exports (Athukorala et al., 2017). By construction, an increase in *RER* indicates depreciation, leading to a rise in bilateral exports. We source both of these variables from the WDI database. We include the

Index of Business Freedom (INDEX) obtained from the Heritage Foundation to capture the institutional environment in the reporting countries. We expect a business-friendly climate in the exporting country will significantly boost trade. Finally, we use the reporter's simple average tariffs for manufacturing goods *(TAF)* to control the tariff changes. Reduced tariffs boost bilateral flows. The World Integrated Trade System (WITS) database provides tariff data.

Table 3: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.
MA_EXP	1,280	18.85	20.21
PC_EXP	1,280	17.67	19.11
GDP_REP	1,280	26.66	27.18
GDP_PAR	1,280	28.18	28.78
DIS	1,280	7.74	7.21
EAEU	1,280	0.06	0.24
RoW	1,280	0.88	0.33
CE	1,280	11.68	10.84
DPG	1,280	10.07	9.80
RER	1,280	4.48	5.05
INDEX	1,280	4.08	2.00
TAF	1,269	3.25	1.64
ADJ	1,280	0.11	0.32
LAN_OFF	1,280	0.04	0.19

Following the natural trade partner hypothesis, we add two dummy variables, *ADJ* and *LAN_OFF*, to capture the effect of the common border and common language, respectively. *ADJ* values unity if trading countries share a common geographical border and zero otherwise. Countries with common borders trade more because of proximity and similar socio-cultural characteristics. Further, *LAN_OFF* takes a value of unity if the bilateral partners have a common official language and zero otherwise. Having a common official language eases trade practice. We expect these two variables to impact bilateral export flows positively. We obtain these two variables from the CEPII database.

The descriptive statistics show sufficient variability within the data. The first two are the dependent variables measured in current US$. All variables, except *TAF* and dummy values, enter the analysis in their natural log form. Dummy variables are binary, and TAF is in percentage. In this study, we consider *GDP_REP, GDP_PAR, TAF, RER,* and *INDEX* to be endogenous explanatory variables. Although the existing theory guides selecting these variables, we test endogeneity for each variable.

RESULTS AND DISCUSSION

Tables 4 and 5 report the estimation results covering more than 1100 observations. We report the estimates of the trade effect of EAEU on the final goods exports in Table 4 and parts and components exports in Table 5. Most of our explanatory variables are statistically significant with a theoretically expected sign. The econometric model specification is appropriate, with valid instruments correcting for potential endogeneity issues, as evident from the Sargan-Hansen J statistic values at the end of each Hausman and Taylor estimation column. For comparative purposes, we also show the results of fixed effect estimations.

The standard economic mass variables, i.e. *GDP_REP* and *GDP_PAR*, are statistically significant across all equations with an expected positive sign. This outcome supports the general hypothesis drawn from the literature of production sharing that market size significantly promotes bilateral trade through higher supply and absorption capacity of the trading partners. The distance variable *(DIS)* negatively and significantly impacts bilateral exports, indicating that trade costs captured by geographical distance deter bilateral flows. The magnitude of *DIS* indicates a more than proportionate decline in bilateral flows if the distance between reporter and partner is high. The effect of distance is relatively higher for the parts and components than for final goods after controlling for time effects. We infer that EAEU countries' bilateral trade patterns conform to the standard gravity model of analysis, with expected signs, and with these results.

Our first variable of interest is the dummy variable, EAEU, which captures the union's trade (exports) creation. *EAEU* is statistically significant in all equations across different estimation methods, with a negative sign. Hence, we infer that the formation of EAEU results in a substantial decline in internal exports of machinery final goods and machinery parts and components. This result is in tandem with Mukhamediyev and Khitakhunov (2018), who find a negative but insignificant relationship, and Isakova et al. (2015), who show significant trade destruction, specifically in Russia's case. The empirical literature shows an improvement in EAEU's internal trade until 2012 and a decline by 2016 to reach pre-2010 levels (Mukhamediyev and Khitakhunov, 2018). Our results support these findings. The coefficients of EAEU are similar in magnitude in Tables 4 and 5. This is not a surprising result as SITC 7 and 8 are product categories in which the concentration of parts and components is higher than that of other product categories in the same SITC nomenclature.

The *RoW* is the other variable of interest, which captures the trade diversion in the union. *RoW* is statistically significant across different estimation methods in all equations, with a negative sign. This result suggests a trade-diverting effect of the EAEU with third countries. Based on this result, we infer that the formation of the EAEU results in members diverting their trade from efficient third countries to less efficient members. The empirical literature on the effects of EAEU on Eurasian trade points out the trade-diverting nature of the economic union (Tumanyan, 2018). The magnitude of the coefficients of *RoW* shows high levels of trade diversion in the union.

Table 4: Trade Effects of The EAEU on Machinery Goods

Variables	Fixed Effects		HTE	
	(1)	(2)	(3)	(4)
GDP_REP	2.616***	2.841**	2.072***	1.614***
	(0.761)	(1.319)	(0.403)	(0.277)
GDP_PAR	1.004	0.97	1.186**	1.071**
	(0.753)	(0.812)	(0.467)	(0.426)
DIS	-	-	-2.283***	-1.984***
	-	-	(0.681)	(0.589)
EAEU	-0.382***	-0.379**	-0.340***	-0.379***
	(0.129)	(0.146)	(0.12)	(0.143)
RoW	-	-	-4.426***	-3.896***
	-	-	(1.207)	(1.07)
TAF	0.00266	-0.00364	0.0153	0.0147
	(0.0568)	(0.0623)	(0.0576)	(0.0636)
DPG	-0.0733	-0.076	-0.0413	-0.0524
	(0.0488)	(0.0493)	(0.0622)	(0.059)
RER	-0.1	-0.178	0.0905	-0.172
	(0.532)	(0.584)	(0.462)	(0.352)
INDEX	1.367*	2.527	1.492**	1.318
	(0.746)	(1.949)	(0.689)	(1.573)
CE	0.0718	0.0887	0.0709	0.277
	(0.216)	(0.32)	(0.215)	(0.268)
ADJ	-	-	-0.577	0.202
	-	-	(0.911)	(0.65)
LAN_OFF	-	-	-0.324	-0.461
	-	-	(1.431)	(1.077)
Constant	-82.40***	-91.82**	-53.97***	-42.90***
	(19.53)	(41.47)	(9.35)	(10.47)
Time effects	No	Yes	No	Yes
Observations	1,242	1,242	1,242	1,242
Number of ids	160	160	160	160
Sargan Hansen J statistic $\chi^2_{(3)}$ =			1.642	13.170
p - value=			0.6498	0.2143

Note: Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Trade Effects of the EAEU on Machinery Parts and Components

Variables	Fixed Effects		HTE	
	(1)	(2)	(3)	(4)
GDP_REP	1.408*	0.516	1.400***	1.116***
	(0.846)	(1.461)	(0.18)	(0.164)
GDP_PAR	0.39	0.444	1.058***	1.529***
	(0.705)	(0.793)	(0.392)	(0.355)
DIS	-	-	-1.544**	-2.196***
	-	-	(0.709)	(0.603)
EAEU	-0.266*	-0.304*	-0.307**	-0.381**
	(0.154)	(0.164)	(0.134)	(0.153)
RoW	-	-	-3.712***	-4.410***
	-	-	(1.122)	(1.101)
TAF	-0.037	-0.0545	-0.0334	-0.0742
	(0.072)	(0.0785)	(0.0713)	(0.0771)
DPG	-0.151*	-0.163*	-0.110*	-0.197**
	(0.0819)	(0.0831)	(0.0643)	(0.0867)
RER	0.518	0.58	0.218	-0.3
	(0.447)	(0.469)	(0.321)	(0.262)
INDEX	1.696	0.682	0.865	0.394
	(1.255)	(2.845)	(1.021)	(2.22)
CE	-0.0779	0.239	-0.0298	0.138
	(0.27)	(0.361)	(0.261)	(0.357)
ADJ	-	-	1.178	0.83
	-	-	(0.776)	(0.776)
LAN_OFF	-	-	0.256	-0.571
	-	-	(1.059)	(1.207)
Constant	-38.14	-16.71	-37.85***	-35.25***
	(24.03)	(51.3)	(8.704)	(13.46)
Time effects	No	Yes	No	Yes
Observations	1,117	1,117	1,117	1,117
Number of ids	157	157	157	157
Sargan Hansen J statistic $\chi^2_{(3)}$ =			2.328	13.679
p-value			0.5071	0.1882

Note: Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

We find that the *TAF* variable is insignificant in all equations. This finding aligns with Isakova et al. (2015), who argue that tariff changes have limited effects on bilateral trade in Eurasia. One reason for such a surprising result is that the EAEU envisages eliminating non-tariff trade barriers as the common goal. Therefore, tariff changes in the manufacturing sector have no significant impact on bilateral trade flows. Further, the CET policy adopted by EAEU bases itself on Russia's tariff lines, which, to other members, is relatively higher than the tariff that prevailed in the pre-union period.

In line with the predictions of models on vertical specialisation, we find that higher inter-country differences in income, *DPG*, and deter bilateral trade follow, as trade occurs between countries at different levels of development. However, we find that the impact of *DPG* is significant only on the exports of machinery parts and components and not for final goods. A plausible explanation for an unexpected result is the presence of final assembly goods in the machinery final goods. The income differences relatively less influence final assembly goods compared to parts and components. Unlike final assembly hubs, lower production costs drive the location choice of parts and components trade.

We find that the *INDEX* variable is significant at the 5 per cent level in the exports of machinery final goods with an expected positive sign. The coefficient shows a more than proportionate change in bilateral exports if the domestic environment is more business-friendly. However, the variable becomes insignificant once we control for time effects. Further, the *INDEX* variable is insignificant in the parts and components exports. Following theoretical predictions, we find that the impact of RER is insignificant in all equations. The result shows that exchange rate fluctuations weakly affect bilateral trade of machinery, final goods and parts and components (Athukorala et al., 2017).

The *CE* variable shows an insignificant impact throughout the model. A plausible explanation for such a result is the presence of a weighted distance variable which captures all the trade-related

procedural costs. Further, excluding this variable does not change the first result we obtain for the union's trade effects. We also find that the adjacency *(ADJ)* and common official language *(LAN_OFF)* dummy variables are insignificant across all specifications. The results show that the EAEU does not follow the natural trading partner hypothesis in bilateral exports.

Robustness Checks

We conduct robustness checks to confirm our benchmark results. First, we account for the effects of the customs union (pre-2014 period) with an alternative definition of the EAEU dummy variable, namely *EAEU_2010*. This variable takes unity from 2010 for all bilateral pairs of the three core members and zero otherwise. We test whether the customs union impacts regional trade, in line with or different from our benchmark results. Second, we replace the official language dummy *LAN_ETH*, which takes a value of 1 if the bilateral partners share a common ethnic language and zero otherwise. Tables 6a and 6b report the analysis results for the impact of the customs union. Tables 7a and 7b report the results of the analysis of the effect of common ethnic language. All tables are in the appendix of the paper.

Tables 6a and 6b show that the effect of the customs union on internal trade is insignificant for both final goods and parts and components, although the coefficient values indicate a decline in exports. This result is in line with the findings of Mukhamediyev and Khitakhunov (2018). We infer that the insignificant impact indicates a partial success of the measures of economic integration. However, we find a significant trade-diverting impact of the EAEU. Hence, we infer that irrespective of economic integration, the member countries hold a trade-diverting policy with the outside world.

Table 6a: EAEU Alternative Definition: Machinery Goods

Variables	Fixed Effects		HTE	
	(1)	(2)	(3)	(4)
GDP_REP	2.538***	2.926**	2.265***	1.825***
	(0.759)	(1.33)	(0.592)	(0.314)
GDP_PAR	0.932	0.904	0.986**	1.001***
	(0.763)	(0.816)	(0.438)	(0.382)
DIS	-	-	-2.230***	-1.991***
	-	-	(0.705)	(0.531)
EAEU_2010	-0.198	-0.193	-0.187	-0.191
	(0.205)	(0.213)	(0.197)	(0.21)
RoW	-	-	-4.056***	-3.794***
	-	-	(1.212)	(1.021)
TAF	0.000476	-0.011	0.00814	0.00833
	(0.056)	(0.062)	(0.0559)	(0.0634)
DPG	-0.0511	-0.0528	-0.000176	-0.0288
	(0.0482)	(0.0486)	(0.0657)	(0.0589)
RER	-0.0623	-0.106	-0.00653	-0.0962
	(0.533)	(0.582)	(0.456)	(0.36)
INDEX	1.288*	2.483	1.360**	1.447
	(0.749)	(1.951)	(0.684)	(1.586)
CE	0.116	0.0795	0.107	0.239
	(0.215)	(0.319)	(0.21)	(0.271)
ADJ	-	-	-0.85	-0.0455
	-	-	(1.301)	(0.702)
LAN_OFF	-	-	-0.405	-0.386
	-	-	(1.678)	(1.196)
Constant	-79.02***	-92.35**	54.00***	-46.89***
	(19.74)	(41.97)	(10.69)	(10.46)
Time effects	No	Yes	No	Yes
Observations	1,242	1,242	1,242	1,242
Number of ids	160	160	160	160
Sargan Hansen J statistic $\chi^2_{(3)}$ =			1.684	9.451
p-value			0.6404	0.4899

Note: Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6b: EAEU Alternative Definition: Parts and Components

Variables	Fixed Effects		HTE	
	(1)	(2)	(3)	(4)
GDP_REP	1.332	0.497	1.109***	1.132***
	(0.848)	(1.481)	(0.396)	(0.177)
GDP_PAR	0.305	0.335	1.087***	1.382***
	(0.709)	(0.794)	(0.324)	(0.282)
DIS	-	-	-1.248*	-2.026***
	-	-	(0.743)	(0.515)
EAEU_2010	-0.0519	0.0208	-0.0796	-0.129
	(0.235)	(0.247)	(0.22)	(0.232)
RoW	-	-	-3.536***	-4.019***
	-	-	(1.047)	(0.908)
TAF	-0.0361	-0.0601	-0.0227	0.0817
	(0.0727)	(0.0791)	(0.0725)	(0.0767)
DPG	-0.130*	-0.134*	-0.118*	-0.160**
	(0.0756)	(0.0744)	(0.0707)	(0.0752)
RER	0.589	0.74	0.541	-0.282
	(0.454)	(0.476)	(0.443)	(0.255)
INDEX	1.622	0.531	1.016	0.298
	(1.261)	(2.846)	(1.072)	(2.238)
CE	-0.042	0.246	0.0222	0.148
	(0.269)	(0.36)	(0.258)	(0.358)
ADJ	-	-	2.003	0.925
	-	-	(1.231)	(0.695)
LAN_OFF	-	-	0.704	-0.462
	-	-	(1.207)	(1.061)
Constant	-34.51	-13.57	-36.11***	-33.46**
	(24.15)	(51.66)	(8.829)	(13.08)
Time effects	No	Yes	No	Yes
Observations	1,117	1,117	1,117	1,117
Number of ids	157	157	157	157
Sargan Hansen J statistic $\chi^2_{(3)}$ =			1.621	14.737
p-value			0.6547	0.1419

Note: Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Our second robustness check is to analyse the impact of common ethnic language on bilateral exports. Tables 7a and 7b show that *LAN_ETH* positively and significantly impacts bilateral exports in the EAEU. *LAN_ETH* shows more than a proportionate impact on bilateral exports. This impact is higher in the parts and components equation compared to machinery final goods. The results also show that cultural similarities foster bilateral trade relations between the two countries.

CONCLUSION

In this paper, we analyse the trade effects of the formation of EAEU, focusing on the ongoing phenomenon of global production sharing. We estimate an augmented gravity model of machinery exports of 5 members of the EAEU, with their 28 bilateral partners for 2010-17. To mitigate endogeneity issues, we employ the Hausman and Taylor Instrumental Variable approach in determining the trade effects of EAEU. Based on the empirical literature and stylised facts, we hypothesise that EAEU is fundamentally trade-diverting in nature. Further, the trends in trade indicate a possible reduction of trade within the union. The empirical analysis shows that the EAEU's bilateral trade patterns conform to the standard gravity analysis, as evident from the significance of market size and bilateral distance variables.

Our study finds a strong negative impact of the EAEU, indicating a significant decline in the internal exports of machinery final goods, parts and components following the union's formation. The magnitude of *EAEU* is similar for final goods, parts, and components. These two product categories generate a substantial share of parts and components. Slower growth in Russia, lower shares of re-exports in the region, and historical patterns of lower internal trade in the machinery sector are the prime reasons for the reduced intra-bloc trade (Mukhamediyev and Khitakhunov, 2018). Our estimates confirm the trade-diverting nature of the EAEU, as shown by the significantly negative coefficients throughout the analysis, which aligns with Tumanyan's findings (2018).

Table 7a: Effect of Ethnic Language: Machinery Goods

Variables	Fixed Effects		HTE	
	(1)	(2)	(3)	(4)
GDP_REP	2.616***	2.841**	2.038***	1.554***
	(0.761)	(1.319)	(0.406)	(0.278)
GDP_PAR	1.004	0.97	1.187**	1.088***
	(0.753)	(0.812)	(0.461)	(0.421)
DIS	-	-	-2.306***	-2.040***
			(0.673)	(0.579)
EAEU	-0.382***	-0.379**	-0.337***	-0.382***
	(0.129)	(0.146)	(0.12)	(0.143)
RoW	-	-	-3.498***	-2.778***
			(1.169)	(0.987)
TAF	0.00266	-0.00364	0.0164	0.0157
	(0.0568)	(0.0623)	(0.0576)	(0.0635)
DPG	-0.0733	-0.076	-0.0436	-0.0581
	(0.0488)	(0.0493)	(0.0626)	(0.0591)
RER	-0.1	-0.178	0.12	-0.194
	(0.532)	(0.584)	(0.462)	(0.357)
INDEX	1.367*	2.527	1.514**	1.295
	(0.746)	(1.949)	(0.687)	(1.579)
CE	0.0718	0.0887	0.0711	0.29
	(0.216)	0.32)	(0.215)	(0.267)
ADJ	-	-	-0.797	-0.0982
			(0.922)	(0.666)
LAN_ETH	-	-	1.46	1.726**
			(1.155)	(0.866)
Constant	-82.40***	-91.82**	-54.04***	-42.46***
	(19.53)	(41.47)	(9.416)	(10.71)
Time effects	No	Yes	No	Yes
Observations	1,242	1,242	1,242	1,242
Number of ids	160	160	160	160
Sargan Hansen J statistic $\chi^2_{(3)}$ =			1.780	12.958
p-value			0.6193	0.2261

Note: Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7b: Effect of Ethnic Language: Parts And Components

Variables	Fixed Effects		HTE	
	(1)	(2)	(3)	(4)
GDP_REP	1.408*	0.516	1.370***	1.118***
	(0.846)	(1.461)	(0.194)	(0.161)
GDP_PAR	0.39	0.444	1.036***	1.499***
	(0.705)	(0.793)	(0.39)	(0.353)
DIS	-	-	-1.570**	-2.224***
			(0.701)	(0.599)
EAEU	-0.266*	-0.304*	-0.303**	-0.383**
	(0.154)	(0.164)	(0.135)	(0.153)
RoW	-	-	-2.349**	-3.006***
			(1.161)	(1.061)
TAF	-0.037	-0.0545	-0.0317	-0.0734
	(0.072)	(0.0785)	(0.0713)	(0.0771)
DPG	-0.151*	-0.163*	-0.111*	-0.196**
	(0.0819)	(0.0831)	(0.0649)	(0.0871)
RER	0.518	0.58	0.26	-0.31
	(0.447)	(0.469)	(0.33)	(0.266)
INDEX	1.696	0.682	0.963	0.592
	(1.255)	(2.845)	(1.03)	(2.228)
CE	-0.0779	0.239	-0.031	0.13
	(0.27)	(0.361)	(0.26)	(0.356)
ADJ	-	-	0.902	0.414
			(0.791)	(0.791)
LAN_ETH	-	-	2.404**	2.055**
			(1.003)	(1.014)
Constant	-38.14	-16.71	-38.16***	-36.34***
	(24.03)	(51.3)	(8.696)	(13.4)2
Time effects	No	Yes	No	Yes
Observations	1,117	1,117	1,117	1,117
Number of ids	157	157	157	157
Sargan Hansen J statistic $\chi^2_{(3)}$ =			1.929	12.906
p-value			0.5873	0.2787

Note: Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Besides, we find that inter-country income and business-friendly climate differences are vital determinants of bilateral trade in the union. Further, we also show that the formation of the EAEU significantly affects bilateral exports, while the former customs union shows an insignificant impact on intra-bloc exports. We also find that cultural similarities drive internal trade, as the common ethnic language significantly impacts bilateral partners. However, EAEU's bilateral trade patterns do not conform to the natural trading partner hypothesis.

According to the empirical results, these countries should normalise the EAEU's common external tariff and bring it below the present level. The primary reason for trade diversion in the EAEU is the common external tariff lines applied based on the Russian tariff system. The rest of the member countries face significantly high tariffs due to the imposition of the Russian tariff, which diverts trade from outsider to member. The policy recommendation is that the EAEU members should normalise the common external tariff lines to bring it below Russia's tariff lines, particularly if the EAEU countries look for opportunities to expand their share in global production sharing. These countries are relatively less developed and require significant external support in terms of technology and investment.

Along with improving intra-union cooperation, countries should minimise their trade-diverting nature to maintain a better position in global value chains. Another way of doing the same is to significantly reduce non-tariff trade barriers, which impact the machinery sector compared to all other sectors.

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APPENDIX

List of Countries

EAEU members: Armenia, Belarus, Kazakhstan, Kyrgyz Republic and Russia.

Partner countries: Austria, Belgium, Canada, China, Czech Republic, Estonia, Finland, France, Germany, Hungary, India, Italy, Japan, Korea Republic, Lithuania, Netherlands, Poland, Romania, Slovakia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States, Vietnam.

Real Bilateral Exchange Rate Construction

We obtain the nominal exchange rates in local currency per US$, period average, from The International Monetary Fund Statistics Database and GDP deflators from the WDI database of the World Bank. Using them, we construct the real bilateral exchange rate as follows.

$$\text{Real bilateral exchange rate} = \frac{\text{Reporter's nominal exchange rate*Partner' GDP Deflator}}{\text{Partner's nominal exchange rate*Reporter's GDP Deflator}}$$

Following Florensa et al. (2015), we expect an increase in this variable indicates depreciation in the exchange rate and improvement in the exports.

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