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The Effects of changes in Tariff Rates on Imports: Evidence from Kazakhstan

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Abstract

This paper is the continuation of the research on the impact of Eurasian Customs Union policies on the economy of Kazakhstan. The study provides new evidence on the effects of Customs Unions on its members. In particular, this paper investigates the impact of tariff rate changes in Kazakhstan due to the establishment of the Eurasian Economic Union. Kazakhstan joined Eurasian Customs Union in 2010. Then the Eurasian Customs Union became the Eurasian Economic Union in May 2014. Since the establishment of the ECU, Kazakhstan's trade policy has experienced considerable change. The tariff rates in Kazakhstan with countries outside the ECU almost doubled, with average tariff rates increasing from 6.45 to 12.24%. This paper uses the dataset on bilateral trade flows between ECU countries and other 195 countries for 20 years from 2000 to 2019. An empirical analysis is performed on a country level, and panel data techniques are used to estimate whether the increase in the tariffs with non-members of CU will lead to trade diversion with suppliers outside the CU. The analysis demonstrated that the increase in tariff rates negatively affected imports to Kazakhstan from non-ECU countries. The effect of tariff increase, using the dynamic gravity model and GMM econometric technique, is estimated to be a 1.8% decrease in imports if the average external tariff rate of Kazakhstan increases by one percentage point (e.g. from 7% to 8%). Due to the increase in tariff rates, the overall estimated reduction of imports of Kazakhstan is 10.66%.

Keywords: Economics, Strategy, Tariff rates, Dynamic Gravity Model; International trade.

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Тариф ставкаларының өзгеруінің Қазақстан импортына әсері

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Түйін

Бұл мақала Еуразиялық Кедендік одақ саясатының Қазақстан экономикасына әсерін бағалайтын жарияланымдар топтамасының бір бөлігі. Бұл зерттеудің мақсаты тариф ставкаларының өзгеруінің елдің сауда ағынына әсерін зерттеу болып табылады. Қазақстан Еуразиялық Кедендік одаққа 2010 жылы қосылды. 2014 жылдың мамыр айында Еуразиялық Кедендік одақ елдері Экономикалық одақ құру туралы келісімге қол қойды. Осы сәттен бастап Қазақстанның сауда саясаты айтарлықтай өзгерістерге ұшырады: Еуразиялық Кедендік одақ елдері арасындағы тарифтік емес кедергілер төмендеді, Еуразиялық Кедендік Одаққа кірмейтін елдермен тарифтік мөлшерлемелер айтарлықтай өсті - 6,45-тен 12,24-ке дейін. %. Бұл зерттеу 2000 жылдан 2019 жылға дейінгі 20 жыл ішінде Еуразиялық Кедендік Одақ елдері мен басқа 195 ел арасындағы сауда ағындары туралы панельдік деректерді пайдаланады. Бұл талдау Еуразиялық Кедендік одаққа кірмейтін елдерден Қазақстанға импортталатын тауарларға баж мөлшерлемелерін көтеру кері әсерін тигізгенін көрсетті. GMM эконометрикалық әдісін қолданатын динамикалық гравитация моделінің бағалауларына сәйкес, елдің тарифтік мөлшерлемесін 1 пайыздық тармаққа арттыру (мысалы, 7%-дан 8%-ға дейін) импортты 1,8%-ға азайтады. Демек, Қазақстанның Еуразиялық Кедендік одаққа қосылуы нәтижесінде тариф ставкасының көтерілуі Еуразиялық Кедендік Одаққа кірмейтін елдерден келетін импортқа кері әсерін тигізіп, сайып келгенде, осы елдерден келетін импортты 10,6%-ға қысқартты.

Түйін сөздер: экономика, стратегия, тарифтік мөлшерлемелер, динамикалық гравитация моделі, халықаралық сауда.

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Влияние изменений тарифных ставок на импорт Казахстана

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Аннотация

Данная статья является частью серии публикаций, в которых проводится оценка влияния политики Евразийского таможенного союза на экономику Казахстана. Целью данного исследования является изучение влияния изменений тарифных ставок на торговые потоки страны. Казахстан присоединился к Евразийскому таможенному союзу в 2010 году. В мае 2014 года страны Евразийского таможенного союза подписали договор о создании Экономического Союза. С этого момента торговая политика Казахстана претерпела значительные изменения: снизились нетарифные барьеры между странами Евразийского таможенного союза, значительно увеличились тарифные ставки со странами, не входящими в Евразийский таможенный союз - с 6,45 до 12,24%. В данном исследовании используются панельные данные торговых потоков между странами Евразийского таможенного союза и другими 195 странами за 20 лет, с 2000 по 2019 год. Данный анализ показал, что повышение тарифных ставок негативно повлияло на импорт в Казахстан из стран, не входящих в Евразийский таможенный союз. По оценкам динамической гравитационной модели с использованием эконометрического метода GMM, увеличение тарифной ставки страны на 1 процентный пункт (например, с 7% до 8%) уменьшает импорт на 1,8%. Следовательно, повышение тарифной ставки в результате вступления Казахстана в Евразийский таможенный союз негативно сказалось на импорте из стран, не входящих в Евразийский таможенный союз, снизив, в итоге, импорт из этих стран на 10,6%.

Ключевые слова: экономика, стратегия, тарифные ставки, динамическая гравитационная модель; международная торговля.

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Introduction

This paper is the continuation of the research on the impact of Eurasian Customs Union (ECU) policies on the trade flows of Kazakhstan. This topic is especially relevant given the current situation with two of the current members of EEU. However, this research aims to determine the economic effect of the trade policy of ECU on the economy of Kazakhstan, leaving political considerations aside. Due to its admission to the ECU, the main changes in the trade policy of Kazakhstan were the decrease of non-tariff barriers between ECU countries and the increase of tariff rates for non-ECU countries. Aituar and Akhmediyarova analyzed the effect of the non-tariff barriers changes on Kazakhstan's economy [1]. This paper aims to examine the diverting trade effects of the increase of the common external tariff (CET) of Kazakhstan.

The increase in the CET with non-members of the ECU might lead to trade diversion as more efficient suppliers outside of the CU might be displaced by the less efficient ones from one of the partner countries. Viner has discussed both negative and positive outcomes of a CU [2]. He has concluded that a CU could lead to a sizable decrease in trade flows if tariff protection in member countries increases after the establishment of a CU. Kemp and Ohyama have found that it is possible to enhance welfare by adjusting the common external tariff (CET) at just the right level to get a Pareto improvement of trade flows [3,4].

It is, however, hard to believe that CU countries will consider the costs of non-members in setting up the CET. As Pomfret points out, the proposition of Kemp does not consider the negotiation costs and requires CU countries to care about the welfare of countries outside of the CU [3, 5]. Krugman models a world where every country is a member of one of the trading blocs [6]. He tried to find whether the formation of the trading blocs was good or bad for world welfare and suggested that a more significant CU would lead to higher CET. A large trading organization has more market power, which would eventually be used to improve the terms of trade via higher CET. Thus, the creation of the CU might lead to a higher CET. The motivation for higher tariffs is greater if a member has bargaining power and high import tariffs. Kennan and Riezman found that the most prominent member of the CU would set the CET, and smaller countries (which might be more liberalized) would eventually agree with the decision [7].

Kazakhstan indeed adopted tariff rates of a more enormous country – Russia. Two papers have calculated average tariff rates for Kazakhstan [8,9]. Jandosov and Sabyrova calculated the average tariff protection level in Kazakhstan before and after the CU, accounting for almost all of the exemptions, preferences, and temporary measures in place [8]. They referred to these as average tariffs and applied tariffs. This applied tariff protection level is an ad valorem equivalent (AVE) of tariff rates including specific and combined tariffs for all countries outside CIS. The CIS countries have bilateral free trade agreements with all three countries of the CU.

To compute applied tariff rates before and after the establishment of the CU, Jandosov and Sabyrova used the import data set for 2009 and applied CET before and after founding the CU [8]. They computed the average tariff rates for each sector and applied them to the determined sector's imports. Then, based on received values, average tariffs for the complete imports of Kazakhstan were calculated. They also considered transition period tariff rates negotiated by Kazakhstan for 2010-2014. The countries of the CU agreed that Kazakhstan would phase out lower tariff rates for 406 product lines during the transition period of 2010-2014.

Jandosov and Sabyrova concluded a significant increase in Kazakhstan's tariff protection level after its accession to the CU [8]; the simple average AVE tariff rate increased by 1.86 proportionately from 6.45% to 12.02%. Also applied, tariff protection increased further during the transition period from 12.02% in 2011 to 12.24% in 2014. Mkrtchyan and Gnutzmann looked at the data on tariffs of the CU countries before and after the establishment of ECU [9]. Kazakhstan had significantly lower tariff rates before the ECU, whereas the tariff rates of Belarus and Russia stayed almost the same. The tariff means are calculated as simple averages of ad valorem and ad valorem-equivalents of the tariff lines on the HS6 desegregation level.

Due to Kazakhstan's entry into the ECU, Kazakhstan's external tariffs increased significantly. The theory suggests that increasing tariffs above the optimal level might decrease the trade flows from more developed countries and decrease the country's welfare. The paper uses a dynamic gravity model and generalized method of moments (GMM) econometric technique to compare the trade flows of Kazakhstan before and after the establishment of new tariffs. To sum up: Section 2 reviews the literature on the effect of the increase in CET; section 3 explains the methodology and econometric technique; section 4 reports the estimation results; section 5 concludes with a discussion of the results.

Literature Review

Several scholars have analyzed the effect of the increase in CET on ECU economies [10,11, 12]. Vinhas de Souza argued that creating the Customs Union between Kazakhstan, Russia and Belarus could negatively affect GDP and the CU countries' trading balance [10]. He analyzed the effect of new tariffs using a computable general equilibrium model from the Global Trade Analysis Project (GTAP). The results are unequivocally negative for all three countries. Kazakhstan, the Russian Federation and Belarus lose 0.54, 0.66, and 2.77 percent of their GDP, respectively, and their trade balances get worse by 800, 11,000, and 600 million USD, respectively. Vinhas de Souza found that ECU countries were already integrated in trade terms (the countries already have an FTA with each other), so there was no trade creation arising from the establishment of the ECU. The introduction of the "trade tax wedge" (standard external tariffs) leads to the dislocation of trade flows to less efficient partners (ECU partners), which then will lead to a further decline in GDP and welfare trade diversion effects. Vinhas de Souza suggests that the results of the GTAP model are more indicative than prescriptive; thus, further research is required [10].

Iskakova and Plekhanov have calculated the tariffs' impact on Kazakhstan's import flows. They examined the structure as well as the volume of imports using data disaggregated at the six-digit level of the Harmonized System (HS). They took the import change between 2009 and 2010 (before and after CU tariffs became effective) for industry-country pairs (EU, CU, other CIS and China) and regressed it on the change in statutory taxes for the six-digit HS level between 2009 and 2010. Using the ITC Trade Map time series data and tariff rates from "Kazakhstanskaya Pravda" newspaper, they ran the following OLS regression, where the main variables are the change in the natural log of imports between 2009 and 2010; the change in the natural log of imports between 2009 and 2008 for industry-country pairs, the change in the statutory tariffs and other secondary variables, namely the log of change in imports between 2006 and 2008 and change in the log of imports between 2008 and 2010 [11].

The regression results suggest that in a worst-case scenario, a 2% change in tariff leads to a 2.8% decrease in imports from China, while there is no effect of a tariff increase on other parts of the world. Using the same model, Iskakova and Plekhanov extended their work to Belarus and Russia and found that the evidence does not support trade diversion about the change in tariffs for these countries [11].

The major drawback of these papers is that the researchers only used tariffs and imports of previous years to explain changes in imports before and after the establishment of the CU and do not consider other "natural" causes of trade, such as the size the of economy, distance, and exchange rates between trading partners. Gnutzmann-Mkrtchyan and Jules Hugot used the gravity model to estimate the effect of doubling tariff protection in Armenia after joining the EEU. They found that trade with non-EEU countries has decreased by 12% due to the increase in tariff rates. There are no papers that used gravity model analyze the effect of changes in tariff rates in Kazakhstan. This paper will analyze the effect of the increase in tariffs using the dynamic gravity model. The empirical strategy is to control as many "natural" causes of trade as possible, and to assess the effects of change of tariffs in the residual [12].

Methodology

The impact of an increase in external tariffs is considered using the dynamic gravity model structure. The gravity models aim to determine the potential for the development of trade between countries. Thus, we will use the panel data set of observations for 21 years from 2000 to 2019 for ECU countries' (reporting countries) imports from 195 countries (trading partners). A group of ECU countries was chosen to create data variability because those countries have strong economic ties with Kazakhstan.

Tariff data is obtained from Jandosov and Sabyrova [914]8], for Kazakhstan, it takes values of 6.45 for the years 2000-2010, after CU period – 12.02, 12.02, 12.04, 12.12 and 12.24 for 2010, 2011, 2012, 2013 and for the period after 2014. As Belarus and Russia had almost the same tariff structure before ECU, the tariff is 12.24 for all years. In addition, the tariff rates between ECU countries are 0 for all years, as they were in FTA since 1994. Data on GDP, population, and exchange rates is obtained from the World Bank's database. Data on imports and other gravity variables (distance, border, contiguity) is taken from Centre d'Etudes Prospective et d'Informations Internationales (CEPII) database.

The specification of the estimated model tested is the following:

$$\log(\mathrm{IM}_{ij})_t = a_o + \beta_1 \log D_{ij} + \beta_2 \log(Y_i Y_j)_t + \beta_3 \log(\mathrm{pop}_i \mathrm{pop}_j)_t + \beta_4 \mathrm{ComLang}_{jt} + \\ + \beta_5 \mathrm{ComCol}_{ij} + \beta_6 \mathrm{ComBOR}_{ij} + \beta_7 \mathrm{AvTar}_{ijt} + \varepsilon_{ijt} \quad (1)$$

where:

i and j - denote trading partners, t - denotes time, and the variables are defined as:

denotes the value of import trade between i and j at time t,

Y is GDP,

Pop is population,

D is the distance between i and j, (between capitals of the countries)

ComCol indicates the colonial ties between i and j,

ComLang shows whether at least 9% of population of the trading countries speak the same language

ComBor is a binary variable, which is unity if i and j has common border,

ε_{ijt} represents the other influences omitted on bilateral trade

This gravity model specification in this paper is similar to that of Gnutzmann-Mkrtchyan and Jules Hugot. However, we introduced the dynamics to the model, making it a dynamic gravity model. The static model assumes that the current trade between trading partners does not depend on the trade over the previous year [12]. This is a strong assumption since it is very likely that the current level of trade has a certain degree of dependence on the previous level due to the sunk costs invested by exporters in the importing countries and the importer country's customer habit formation [6, 13]. Moreover, empirical literature suggests that aggregate trade data have a strong persistence, and there is a tendency for countries that trade with each other at time t - 1 and t-2 to trade at time t [13]. Thus, the effect of 'lagged trade' is important in order to estimate current and future trade correctly, and ignoring this dynamic element will result in error. Trade flows are intrinsically dynamic, and it is important to draw measurable implications from the dynamic structural model of gravity.

The introduction of dynamics in a panel gravity model causes severe econometric problems due to the inconsistency of the estimators typically used in static panel data. The lagged dependent variable included on the right side of the equation will lead to the correlation between the lagged dependent variable and the error term. This correlation makes least squares estimates biased and inconsistent. Thus, the previously used OLS and Least Squares Dummy Variable (LSDV) estimation methods should not be used in the dynamic model [15].

The endogeneity problem in dynamic panel models has always been a significant issue and an instrumental variable (IV) method is often used to deal with this problem. Nevertheless, the IV method can be used only if the instruments are good (they should be highly correlated with the potentially endogenous variables, and they should be exogenous to the model). It is practical, when possible, to have more instruments than endogenous variables, as it provides the possibility of testing for instrument exogeneity and omitting less efficient instruments.

Two commonly used methods in IV estimation are two least-squares (TSLS) and the generalized method of moments (GMM). The GMM method produces identical results in TSLS for just identified models, but can give a more accurate assessment for over-identified models. In addition, the GMM method uses internal instruments in contrast to the TSLS method, where the appropriate external instruments should be found.

The GMM method was proposed by Hansen and Holtz-Eakin et al, and a particular development of interest is due to Arellano and Bond (hereafter AB), commonly referred to as "the difference" GMM" [16,17,18]. AB, derived a consistent estimator for the GMM model. They suggested that modifying the model into first differences removes unobserved fixed effects, which is estimated by a two-step GMM procedure [18]. The second and higher lags of the endogenous variable in levels are appropriate choices of instruments. This AB estimator has two drawbacks as follows:

• The first difference equation removes fixed effects thus if the variables of interest are time invariant, then difference GMM should not be applied;

• Blundell and Bond noted that: "the difference GMM estimator performs poorly in terms of precision, when it is applied to short panels (T dimension) with persistent time series [19]. Lagged levels that have unit root properties are weak instruments for subsequent first differences". As bilateral trade flows between most countries are expected to change slowly, there is then a possibility that trade flows have a unit root and thus, the lagged levels might not be appropriate instruments for subsequent first differences.

Based on the work of Arellano and Bover, Blundell and Bond developed a systems estimator, which uses first differences and variables' levels as instruments [19, 20]. Their method is termed as a system GMM estimator. It requires the panel-level effects to be uncorrelated with the first difference in the first observation of the dependent variable. It assumes that there is no autocorrelation in the idiosyncratic errors. The model adds a system of equations in levels to the equations in the first differences. Thus, in the "system" GMM there are twice as many observations as in the "difference" GMM (the first differences in the levels equation and levels in the first difference equation), and, therefore, the "system" GMM has greater efficiency in comparison with the "difference" GMM. The estimation results in Blundell and Bond have shown that the system GMM-estimator is more reliable than the difference GMM when one uses highly persistent data; however, in low persistence data both methods show very similar results [19]. System GMM adjusts the instrument bias and allows the presence of time invariant explanatory variables.

Bearing in mind these considerations, we used system GMM estimation for the dynamic gravity model designed for panel data, which takes the following conditions into account:

- relatively few periods, but a large number of country pairs;

- dynamics: lags of the dependent variable can be included as explanatory variables. The lagged dependent variable is instrumented by its lagged first differences, adding a system of equations where differenced dependent variables are instrumented by their lagged levels; thus, this method uses the observations twice and treats both of the system of equations as one equation.

- independent variables which are not strictly exogenous[1]. They can be endogenous[2] or predetermined[3]. If an explanatory variable x_{it} is endogenous, then the instrument vector is (y_{i1}, y_{i2},…,y_{it-2}); whereas if x_{it} is predetermined, then this vector would become (y_{i1}, y_{i2},…,y_{it-2}, x_{i1}, x_{i2},…,x_{it-2}, x_{it-1}); and in the case of exogeneity it would become (y_{i1}, y_{i2},…,y_{it-2}, x_{i1}, x_{i2},…,x_{iT}).

The GMM method was used for the dynamic gravity model shown by equation 2. One of the most critical conditions in using the system GMM approach is that all the explanatory variables (the right-hand-side variables of the equation) should be weakly exogenous relative to the variable being explained (in our case current trade). As in bilateral trade flows, exports from country i to country j are part of country's i GDP and vice versa, therefore, GDP as an explanatory variable can be correlated with the disturbance term and considered endogenous. Lagged GDP is used as an internal instrument to avoid the endogeneity problem.

The implementation of GMM used lags of order 3, as a serial correlation test for the regression analysis of the impact of the tariff rise in Kazakhstan, suggested 1st and 2nd order autocorrelation, but with no evidence of 3rd order autocorrelation. The literature on GMM estimation approach suggests [21] that the model should use as many instrumental variables as possible as it provides the possibility of testing for instrument exogeneity and omitting less efficient instruments. However, in finite samples the large number of instruments created by GMM could lead to biased estimates as they could over-fit endogenous variables [21]. In the system GMM the number of instruments can be reduced by decreasing the number of moment conditions used. Usually the number of instruments is determined by 2 factors: the Hansen test and the number of panel members. According to Roodman one should not take comfort when Hansen test's p value is below 0.1 and when the number of instruments exceeds the number of panel members [21].

Another important indicator that shows that results are unbiased is that the coefficient of the lagged dependent variable should fall within the range of OLS and fixed effects (FE) estimates. The OLS estimate of the lagged dependent variable is upward biased, as the lagged dependent variable is correlated with the unobserved fixed effect in the equation as. The FE estimate of the coefficient on the lagged dependent variable is downward biased as the lagged dependent variable and the transformed error term are correlated in the equation as.

The empirical strategy is to use as few instruments as possible with the estimated coefficient of the lagged dependent variable between coefficients of the lagged dependent variable estimated by FE and OLS; and with p value of Hansen test above 0.1.

Based on the three indicators mentioned above, we find that the best choice was to restrict the number of instruments to a maximum lag of 3. This is achieved through using the following instrumental variables: log of imports (3 lags); log of GDP (3 lags), and log of GDP per capita (3 lags). By using lagged trade and lagged GDP (3 lags) as instrumental variables, we avoid the endogeneity problem. Lagged GDP per capita (3 lags) is also used as an instrumental variable to capture the effect of lagged income on trade.

To account for any time series effects that are common across all countries in the sample, time dummies were included. According to Roodman, one should remove time-related shocks from the errors by estimating the model with time dummies, which would make it more likely that resulting errors are not correlated across (only within) individuals [21].

1 "Exogenous explanatory variable is an explanatory variable that is uncorrelated with the error term." [22]

2 "Endogenous explanatory variable is an explanatory variable in a multiple regression model that is correlated with the error term, either because of an omitted variable, measurement error, or simultaneity." [22]

3 Predetermined explanatory variable is an explanatory variable that is correlated with the previous error term. [22]

Results

The results of the static gravity model are presented in Table 1 below. The GDP coefficients for both trading partners as expected, have a positive sign; coefficients of the common border, common language, and colonial links are also positive and significant, which means that countries that share a common border, speak the same language and have colonial ties in the past on average trade more between each other. Distance has a negative and significant coefficient, which confirms its role as distance represents a natural resistance to trade [23, 24].

Table 1. Regression results from OLS (without introducing country-specific effects)

Dependent variable	log IM
GDP of ECU country (natural log)	0.965***
GDP of the partner country (natural log)	1.380***
Common language	1.115***
Colonial links	3.190***
Distance (natural log)	-0.011***
Border	2.317***
Average tariff rate	**-0.051*** **
Constant	-31.56***
Observations	8705
R^2	0.679

(1) *** denotes significance at the 1% level; **, at the 5% level; and *, at the 10% level.

(2) Time-specific effects are included in regression results.

The coefficient of average tariff rates is -0.051 and significant at the 1% level. The CET is a dummy variable which is 6.45 before and 12.04 -12.24 after the establishment of the ECU for non-CIS countries; and 0 for CIS countries. Thus, as the dependent variable is the log, the effect of the coefficient of this dummy is measured as a percentage change of the dependent variable (import) due to a unit increase, which is measured in percent (from 0 to 12.24), of the independent variable (CET rate). We have a log-linear model as our dependent variable, which is in natural logarithm form; and the dependent variable is continuous regressor; thus, the change in tariffs will be scaled by the exponent of average tariff rate coefficient. Hence the effect of a tariff increase is estimated to be a 5.2% [100*(e0.051-1) =5.2%] decrease in import flows to Kazakhstan if the average external tariff rate of Kazakhstan increases by one percentage point (e.g. from 7% to 8%).

Table 2 below demonstrates that if country fixed effects are introduced by creating a dummy for every country pair, the coefficient of the average tariff rate decreases from 5.2% to 5.4% [100*(e0.053-1)=9.2%], but both the sign and significance stay the same.

Table 2. Regression results from OLS with country-specific effects

Dependent variable	log IM
GDP of ECU country (natural log)	0.161***
GDP of the partner country (natural log)	0.796***
Common language	2.145***
Colonial links	-0.450
Distance (natural log)	-0.005***
Border	3.111***
Average tariff rate	**-0.053*** **
Constant	-6.97***
Observations	8705
R^2	0.896

(1) *** denotes significance at the 1% level; **, at the 5% level; and *, at the 10% level.

(2) Time and country specific effects are included in regression results.

Table 3 below shows the results of the dynamic gravity model. We begin interpreting the results in this table by examining some specifications or diagnostic tests.

First of all, the serial correlation test for the regression analysis of the impact of the tariff rise in Kazakhstan suggests 1st and 2nd order autocorrelation, but no evidence of 3rd order autocorrelation; hence 3rd order lags are used here.

Secondly, the Hansen J-statistic tests the null hypothesis of correct model specification and over-identifying restrictions. A rejection of the null hypothesis indicates that either or both the right model specification and over-identifying restrictions are questionable. Roodman [21] suggested that p-value of Hansen J statistic should be more significant than 0.1. The GMM model clearly passes the Hansen test of the over-identifying restrictions using the Roodman suggestion, as the p value of this test is 0.192. This suggests that the empirical analysis has valid instruments, as the null hypothesis was not rejected.

Thirdly, the system GMM can be biased if it has many instruments because they can be collectively invalid in finite samples and thus over-fit endogenous variables[4]. Roodman [21] suggests that the number of instruments should not

[4] 'For intuition, consider that in 2SLS, if the number of instruments equals the number of observations, the R-squared of the first-stage regressions are 1, and the second-stage results match those of (biased) OLS. This bias is present in all IV regressions and becomes more pronounced as the instrument count rises. [21]

exceed the number of panel members, which is adhered to in our case (146 instruments < 514 panel members for both analyses).

Estimation of the dynamic gravity model shows that current trade is affected by lagged trade. The lagged dependent variable has a significant positive coefficient (0.802), which is highly significant (at the 1% level of significance), suggesting that trade volumes last year had a positive significant impact on current trade. The coefficients of the lagged dependent variable estimated by GMM are within the range of its OLS and FE estimates. The results of GMM estimation suggest that coefficient of average tariff rate is significant (at the 10% significance level) and negative (-0.018), implying that the increase in tariff rates reduced Kazakhstan's imports. Hence, the effect of tariff increase is given by [100*(e0.018-1) =1.8%] decrease in imports if the average external tariff rate of Kazakhstan increases by one percentage point increase (e.g. from 7% to 8%).

Table 3. Regression results of GMM estimation

Dependent variable	log IM
Lag of dependent variable (natural log)	0.726***
Second lag of dependent variable (natural log)	0.050
GDP of ECU country (natural log)	0.205**
GDP of the partner country (natural log)	0.285**
Common language	0.138
Colonial links	-0.516**
Distance (natural log)	-0.02***
Border	0.421**
Average tariff rate	**-0.018***
Constant	-6.530**
Observations	7088
Number of groups	514
Number of instruments	146
Hansen test of overriding restric-tions(p-value)	0.193
Arellano-Bond test for autocorrelation of 1 order (p-value)	0
Arellano-Bond test for autocorrelation of 2 order (p-value)	0.012
Arellano-Bond test for autocorrelation of 3 order (p-value)	0.370
Does the coefficient of lagged dependent variable fall within the range of its OLS and fixed effects (FE) estimates?	Yes

(1) *** denotes significance at the 1% level; **, at the 5% level; and *, at the 10% level.

(2) Time specific effects are included in the regression model.

Discussion and conclusion

As the international community plans to strengthen sanctions against Russia and Belarus, the benefits of joining ECU for Kazakhstan were one of the most debated issues in the country. Since the establishment of the ECU, Kazakhstan's trade policy has experienced considerable change. The tariff rates in Kazakhstan with countries outside the ECU almost doubled, with average tariff rates increasing from 6.45 in 2009 to 12.02% in 2010 [8]. The positive side of the new trade policy was a decrease in NTB between ECU countries: countries abolished custom controls, adopted single system of phytosanitary norms and single system of customs procedures and regulations. However, Aituar and Akhmediyarova [1] showed that the decrease in non-tariffs barriers between ECU countries might not have exported to non-ECU of Kazakhstan. Thus, the paper's main question was whether the increase of CET would divert imports from non-ECU countries.

This paper has assessed how the increase in tariffs has affected the trade levels of the ECU countries, with the effect considered in a framework that controls for country-fixed effects using the OLS, GMM, and PMG estimation method of a gravity model. The impact of tariff increase, using the preferred dynamic gravity model, is estimated to be a 1.8% decrease in imports if the average external tariff rate of Kazakhstan increases by one percentage point increase (e.g. from 7% to 8%). As a result, the estimated decrease in imports of Kazakhstan, due to the rise in the tariff rates, is approximately 10.66% (1.8% multiplied by the change in average tariff rate from 6.45% to 12.24%). These results are comparable with those of Armenia, after they have doubled their tariffs their imports from non-EEU countries decreased by 12% [914]12].

These results confirm the World Bank report findings. Using a computable general equilibrium model for Kazakhstan, the World Bank found that the increase in the CET might have a negative impact on Kazakhstan's economy [27]. Aituar and Akhmediyarova have shown that Kazakhstan did not receive any benefits due to the decrease in non-tariff barriers, whereas it allowed other ECU to increase their exports to Kazakhstan [1]. Thus, these results suggest that the entrance of Kazakhstan negatively affected its economy and the country's government needs to reconsider the participation in the union or take a more active position in the union's non-tariff policy.

The analysis shows only the direct effects of changes in tariff policy (i.e. the effect on trade) and does not consider the effects of the policy on investment flows and the country's overall welfare. Therefore, one of the future research directions would be on the effect of the EEU policy on FDI flows to Kazakhstan and on general equilibrium welfare analysis which will combine the effects of the policy on the trade and investment flows to Kazakhstan. Another area of future research could be the use of case studies and surveys. This paper uses empirical approaches to the secondary data, which allow an accurate assessment of the effect of the EEU. However, case studies and surveys on changes in trade patterns at the firm level could provide a better understanding of the effect of the EEU.

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