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# Determining the Common External Tariff in a Customs Union: Evidence from the Eurasian Customs Union

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### Abstract

How do member states determine the Common External Tariff (CET) in a Customs Union? While a large theoretical literature studies the incentives faced by governments when negotiating the CET, empirical evidence is so far scant. This paper studies a large panel data set of tariff data from the Eurasian Customs Union and demonstrates the importance of *mutual protectionism*: member states bargain to expand to their partners the protection of goods that were protected nationally. Moreover, there is almost no evidence of exercising bargaining power to keep keep the CET down for goods where one of the member states would see large tariff increases. Thus countries bargain for mutual protection, rather than mutual liberalisation concessions. I show that the mutual protectionism finding emerges using three methodologies: analysis of variance using unique explanatory power of each variable, determining the Shapley value from analysis of variance and finally OLS regression. Furthermore, I develop a simple model to explain the mutual protectionism effect.

**Keywords:** customs union, common external tariff (CET), tariff setting,Russia, Belarus, Kazakhstan
**JEL Classifications:** F14, F15, F55

# 1   Introduction

Regional trade agreements, in particular FTAs but also CUs have been studied comprehensively in the literature[1]. The general theme of this literature is that a Customs Union allows member countries to internalise cross–border externalities, e.g. relating to profits arising from trade or terms of trade effects, that are ignored by policy–makers under MFN or FTA tariff setting. As a result of extending the tariff protection to partners, tariffs in a Customs Union tend to be higher than in a free trade area. When decision–makers are biased towards the interests of producers, this effect is particularly strong.

Much less is known about trade policy in a Customs Union empirically and performance of the theory in practice. This study makes its contribution by providing insights on these two areas for the case of the Customs Union of Russia, Belarus and Kazakhstan. This Customs Union is ideal to study how national tariffs are translated into a common external tariff of the CU for several reasons. First, the countries were all linked through FTAs before forming the CU with zero internal tariffs; and thus all the external tariff changes are attributed to the CU. Second, there is a high level of compliance with CU tariff and quick implementation of the common external tariff, so it is a "genuine" Customs Union. Third, the three members have rather similar GDP per capita, allowing to apply a theoretical model with symmetric consumer preferences.

I develop a theoretical model showing how pre-CU national tariff lines are related to post-CU CET lines through political economy factors and market structure. Theoretical considerations imply that the individual tariffs of the CU members prior to the agreement are determinants of the common external tariff in the CU. Indeed, all the forces that would impact the CU tariff are already behind the individual country tariff. These forces can be amplified or diminished in the CU due to changes in the market power or internalisation of cross-border effects. This may be reflected in the weight of one country's tariff lines in the determination of CET. Following this line of reasoning, this paper examines the CET of the Customs Union after its creation at the 6-digit level as an affine function of the national tariff profiles of the members prior to the CU.

Theoretical derivations of the common external tariff in a CU exhibit internalisation of cross-border profits, that is spillover of the domestic tariff protection to the CU partners. If the production profiles are different among members, then the country with the highest protection will push for the protection of its goods of interest. Thus empirically we should expect to observe a similar phenomenon, coined as mutual protectionism.

The analysis of the creation of the common external tariff (CET) and impacts each member had is done both on aggregate and specific sector types. Findings support qualitatively the theory in determining the weights of each national tariff in the CET. Most of the specifications attribute a lower weight to the Russian tariff than it is predicted by theory due its significantly larger economy. This suggests that Russia could have offered tariff concessions in negotiations in exchange for concessions non-tariff issues.

Interestingly, 40% of the tariff lines (HS 6 level) were identical prior to the Customs Union for all members and more lines have similar tariffs. In order to account for this, multiple regression

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[1]e.g. Freund and Ornelas [2010] provide a survey

analysis of variance is employed. In this regard two approaches of determining the relative weight of the variable is used. The first one hinges on analysing the difference between the full model and the model without the variable of interest. The second determines the relative weight of the variable by calculating the Shapley value of each variable in the common external tariff.

The main finding of the paper is the strong support for the phenomenon of mutual protectionism, - countries successfully extend their domestic protection of goods to the members. This result is found using the techniques of analysis of variance described above by looking at the groups of goods protected by each CU member.

There is relatively little empirical research on tariff setting in a Customs Union and its determinants. The world's largest Customs Union, the European Union, was established in 1958 and then referred to as European Economic Community; data availability is thus very limited. According to Magee and Lee [2001], the initial external tariff was set as a simple average of the previous national tariffs and was slightly decreased over the following 15 years. But little is known about the ex ante structure of national tariffs. The tariff policy in the Mercosur area has been studied more extensively (e.g Olarreaga and Soloaga [1998], Bohara et al. [2004],Roett [1999]). Compliance to to the common external tariff in Mercosur is limited, around 30% of tariffs are exempted, and similarly some goods are exempt from internal free trade [Esteradeordal et al., 2001].

Most closely related to this paper, Olarreaga et al. [1999] study the Mercosur external tariff. Using a cross section of industries – at both the HS6 and ISIC4 levels – they estimate a Tobit model of the CET. Using the bloc's market share in world imports as a proxy for export elasticity and various proxies for labour and capital lobbying respectively, they seek to disentangle terms of trade and political economy motivations in Mercosur tariff determination. Terms of trade motives are found to account for up to 28% of the variation in tariffs according to their estimates, lending some support to an efficiency rationale for customs unions. However, seeking to explain the determinants of tariffs - particularly at the fine level of disaggregation provided by HS6 - is a daunting task. An advantage of the present study is our ability to use previous years of national tariffs. Since these tariffs were presumably optimally set, they should contain all the relevant information driving *domestic* policy - be it lobbying or efficiency. This lets us focus on the more tractable problem how the formation of a Customs Union specifically influences tariff policy.

Estevadeordal et al. [2008] conduct an empirical study of preferential tariff liberalisation on MFN tariffs for Latin American countries. The authors regress the current MFN tariff on the preferential tariff for the same line in the previous year and on some control variables. Their main finding is that tariff complementarity of preferential tariff liberalisation is empirically supported for FTA, but not when the preferential tariff is granted in a Customs Union where no such effect rises. This kind of analysis, unfortunately, is not possible to do for the Customs Union of Russia, Belarus and Kazakhstan as prior to the Customs Union the countries were in an FTA with zero internal tariffs on practically all goods. Hence, virtually, no extra tariff preference was given since the creation of the CU.

The paper is organised in a following manner. It continues by providing an overview of key facts about the Customs Union in Section 2. The following Section 3 presents the data and summary statistics. Next, the paper continues with the theoretical model for the estimation strategy in Section 4. Section 5 turns to the empirical analysis of common tariff determinants and mutually protected sectors. Finally, the conclusion follows in Section 6.

# 2  The Customs Union at a Glance

Just 2 years prior to joining WTO, Russia formed the Eurasian Customs Union (ECU) with Belarus and Kazakhstan – pointing to a more regionally oriented trade approach. Since the Customs Union between Russia, Belarus and Kazakhstan (RBKCU) was ratified in November 2009, regional integration within this institution has proceeded at a rapid pace. A common external tariff was implemented in January 2010. Internal customs controls in the union were abolished in July 2010 (between Russia and Belarus) and July 2011 (between Russia and Kazakhstan). The Customs Union developed in May 2014 into the "Eurasian Economic Union", modeled after early European integration policies. There are current attempts to extend the membership of the Customs Union to other CIS countries, complicated by possible associated revision of WTO bound tariffs for the WTO members.

Membership: Current Customs Union members Russia, Belarus and Kazakhstan have an annual GDP exceeding $2trn. In PPP terms, Russia accounts for 86% of the block's GDP and 84% of its population. Kazakhstan accounts for 8% of GDP and 10% of population, while the Belorussian economy and population both amount to approximately 5% of the total.

Volume of Internal Trade: In the years prior to formation of the Customs Union, internal trade between the three countries amounted to $44bn., about 16% of total imports by the three countries. The bilateral flows are highly uneven: in 2009, Russian exports to Belarus and Kazakhstan respectively accounted for 46% and 24% respectively of the total. Belorussian exports to Russia made up another 18%, and Kazakh exports to the same destination 10%. Belorussian-Kazakh trade, at just over 1% of the total, was almost insignificant. This asymmetric trade pattern prompted concerns of trade diversion towards Russia [Tarr, 2012] as a result of the CU. Isakova and Plekhanov [2012] provide evidence for small CU impact on trade promotion and some evidence of trade diversion for the case of Kazakhstan. Similarly, Isakova et al. [2013] extends the analysis to include Russia and Belarus and find tariff increases lead to small positive impact on imports from Russia, and anticipating larger benefits to members could come from reduced internal trade costs.

Goods Traded Internally: The importance of energy exploitation in the region is reflected in its trade patterns. Petroleum and natural gas alone accounted for $11bn, or a third of internal trade, in 2009, largely driven by Russian transit exports to Belarus.

By 2011 trade in these two key resources had further grown - to $15.5bn - but, due to the overall increase in internal trade, their share had diminished to a quarter. Other sectors with large absolute increases were vehicles, iron, machinery and other equipment as well as dairy products. Some of this growth was due to new product lines being internally traded, which in the two Customs Union years rose approximately 10% to 4473.

Internal Tariffs: Even before the formation of the Eurasian Customs Union, internal tariffs between the members were largely eliminated. Data set records just 8 lines where Russia imposed tariffs on its partners - involving sugar, alcohol and tobacco - in the immediate pre-CU years. For Kazakhstan, there are 36 positive lines covering similar products and additionally some rice varieties. Our data set has no record of positive internal tariffs imposed by Belarus. From 2010 onwards, internal tariffs had been fully eliminated.

Most-Favoured Nation Tariffs: Even prior to the Customs Union, Russia and Belarus had similar tariff regimes - with average rates around 12%. By 2009, close to 80% of MFN tariff lines by the two countries already agreed. In contrast, Kazakhstan pursued a relatively liberal policy, imposing on average just a 6.5% tariff in 2009 (reflecting a period of liberalisation after 2007 that is apparent in the sample).

Common External Tariff: In 2010, the overwhelming majority of MFN tariffs - 4360 lines or 86% - were harmonised into the Common External Tariff, with many exceptions found in textiles. The CET mean a large tariff increase for Kazakhstan - to 10.29%, or nearly a 60% increase. But Russian tariffs fell to 10.7%, nearly a 20% cut, and Belorussian tariffs by 10%Shepotylo [2011] calculates the tariff changes of trade-weighted tariffs for Kazakhstan and finds an increase from 5.3% to 9.5%.

Other Trade Agreements and commitments: Existing bilateral free trade agreements between CIS countries are in place, notably with Ukraine. Russia's WTO accession negotiation is an important background part of the Customs Union's creation. The accession has been negotiated for many years, and the slow pace of the process could have contributed to Russia's interest in the regional integration. One has to also note the immediate impact of the Customs Union on the speeding up of Kazakhstan's accession to the WTO. Dragneva and Wolczuk [2012] discuss the impact of the Customs Union on the EU's relationship with eastern neighbours, in particular, Ukraine. The paper also mentions that EU has become associated with modernization and rules-based governance, promoting Russia to adopt similar approach for its regional policy.

Coronel et al. [2010] briefly review the CU experience of Kazakhstan in the context of an IMF country report, noting increase in tariff revenue of government, a result of higher tariffs. The paper argues that some trade diversion may arise towards CU partners away from non-member neighouring countries, especially Central Asian countries, but do not expect a strong impact on imports from China. Krotov [2011] presents a detailed discussion of the Customs Union's administration system, customs legislation and clearance. He finds that the CU is functional and the necessary institutions and legislation for Customs Union's work are at place. Carneiro [2013] is a good survey of the perspectives on ECU.

# 3   Data and Summary Statistics

Tariff Data: The tariff data was obtained from the ITC MacMap platform as it provides high–quality tariff data at various classification levels, including the ad valorem equivalents of specific tariffs. We were able to obtain applied tariffs at HS2007 6-digit level for Russia and Kazakhstan for 2007-2012 and for Belarus for 2009-2012.

Other Data: We also collected data on GDP and population from the IMF World Economic Outlook.

Descriptive Statistics: The members of the Customs Union, prior to its creation, had 40% of the tariff lines (HS 6 lines) harmonised, and in November 2009 they agreed on the Common External Tariff (CET). The CET was harmonising around 86% of the tariff lines.

Table 1 summarises the tariff averages of the members and the number of product lines with zero tariff. The tariff means are calculated as simple averages of the tariff lines of the HS6 disaggregation level. Russia and Belarus had similar tariff averages prior to the ECU while Kazakhstan had noticeably lower average tariff. The tariff harmonisation in the CU led to 1.5% and 1.2% decrease in mean MFN tariff for Russia and Belarus, respectively and 3.8% increase in mean MFN tariff for Kazakhstan.

Table 1: Trends in MFN Tariffs

| Year | All goods | Goods with zero MFN tariff | | | Mean MFN tariff (simple) | | |
|------|-----------|--------|---------|------------|--------|---------|------------|
| | | Russia | Belarus | Kazakhstan | Russia | Belarus | Kazakhstan |
| 2007 | 5052 | 369 | - | 914 | 12.12 | - | 8.26 |
| 2008 | 5052 | 420 | - | 1154 | 12.12 | - | 6.59 |
| 2009 | 5052 | 445 | 373 | 1164 | 12.18 | 11.81 | 6.49 |
| 2010 | 5052 | 554 | 554 | 712 | 10.67 | 10.60 | 10.30 |
| 2011 | 5015 | 547 | 547 | 655 | 11.07 | 10.99 | 10.82 |
| 2012 | 5205 | 550 | 550 | 641 | 10.94 | 10.87 | 10.74 |

The differences in the pre-CU trade policy of Russia and Belarus on one side and Kazakhstan on the other side is seen also through the number of 6-digit goods with zero tariff. In Kazakhstan 1164 product lines were subject to free trade prior to the ECU, almost three times more than in the partner countries. Furthermore, Kazakhstan negotiated a transition period to reduce that number over the course of several years.

# 4    Theoretical Background of Empirical Strategy

This section develops a model of trade under imperfect competition that gives rise and explains the mutual protectionism in the formation of customs unions. The model makes several predictions that will be addressed below. The model suggests that the level of political influence of a sector will transfer into the protection through a higher tariff. This will translate into a larger weight during common tariff bargaining. Thus, the most protected sectors will be mutually protected by the partners.

We follow the standard oligopoly model that is often employed in studies of regional agreements. Two countries, $X$ and $Y$, will be the potential trade agreement partners while rest of the world is denoted as $Z$. Each country produces two homogeneous goods under constant returns to scale and with marginal cost normalised to zero. The first good, $A$, set to balance the trade accounts, is traded in perfectly competitive markets, and each country has an arbitrary number of firms producing this good. The remaining $L$ goods are produced and sold in imperfectly competitive markets (firms compete a-la Cournot). National markets are segmented: a firm in country $i$ sets the output of good $l$ to sell to country $j$, $q_{ij}^l$, separately from the output it sells in country $k$, $q_{ik}^l$.

In general, each country has $n_i^l \geq 0$ firms producing good $l$. The representative consumer's utility is linear in the competitive good $A$, and linear-quadratic in imperfectly produced goods: $u(Q_i^l) =$

$\Gamma Q_i^l - (Q_i^l)^2/2)$ and associated inverse demand function $p_i^l = \Gamma - Q_i^l$ where $Q_i^l$ is the total output of good $l$ in country $i$.

Countries may have different number of consumers.

Each country $i$ may impose a per unit tariff on country $j$'s exports of good $l$, denoted by $t_{ij}^l$. Tariffs are set endogenously to maximise the objective function of the government.

**Governments.** In each country, government policies regarding trade are chosen to maximise a weighed sum of consumer surplus, tariff revenues and producer surplus - $CS_i^l$, $TR_i^l$ and $PS_i^l$, respectively, and its objective is denoted as $G_i^l$. In particular, due to lobbying or other contributions, the government may be subject to a political bias, $\alpha_i^l \geq 0$, which overweights producer interests in its objective:

$$G_i^l = CS_i^l + TR_i^l + (1 + \alpha_i^l)PS_i^l \tag{1}$$

There are three possible trade regimes: Most Favoured Nation setting where no trade agreement is in place, and each country is bound to set a non-discriminatory tariff $t_{ij} = t_{ik}$; a Free Trade Area setting where the members of the FTA $i$ and $j$ trade freely between themselves, $t_{ij} = 0$ and set independently their external tariff on the rest of the world; a Customs Union, or a cooperative setting, where the members trade freely between each other and have to set a common tariff on the rest of the world $t_{ij} = 0, t_{ik} = t_{jk}$.

The model is being solved backwards by first finding the market outcomes given the tariff and trade regime and then determining the optimal tariffs. The market outcomes stage is standard and is presented in the Appendix. The governments take as given the market response function of the last stage in their tariff setting.

**Tariff Setting.** In MFN the countries set up the trade policy non-cooperatively with the only restriction to apply non-discriminatory tariffs. If the two countries make a FTA, then they are constrained to have zero tariffs for internal trade. In FTA the members set tariffs applied to the rest of the world non-cooperatively, like in MFN.

Finally, if the two countries form a CU, they not only have to keep the internal zero tariffs but also set cooperatively the common external tariff. One way the two countries might set the cooperative tariff is through maximising the total government welfare (social welfare plus the bias component) as it is typically done in the literature.

The government objectives are as in equation (1) given the firm responses from the market outcomes stage. The optimal tariffs are found with the standard first and second order conditions. Below the optimal unit tariffs in each trade regime are presented. Note that the product superscripts are omitted for expositional clarity:

$$t_{ij}^{MFN} = t_{ik}^{MFN} = \Gamma \frac{1 + 2(1+\alpha_i)n_i}{(1 - 2\alpha_i n_i)(n_j + n_k) + 2(1 + n_i)^2}$$

$$t_{ij}^{FTA} = 0, \quad t_{ik}^{FTA} = \Gamma \frac{1 + 2(1+\alpha_i)n_i}{(1 - 2\alpha_i n_i + 2n_j)n_k + 2(1 + n_i + n_k)^2} \tag{2}$$

$$t_{ij}^{FTA} = 0, \quad t_{ik}^{CU} = \Gamma \frac{1 + 2(1+\alpha_i)n_i + (1+\alpha_j)n_j}{(1 - 2\alpha_j n_j - 2\alpha_i n_i)n_k + 2(1 + n_i + n_j)^2}$$

If the CU members $i$ and $j$ have different sizes $a$ and $b$, respectively, then the CU objective becomes $aG_i + bG_j$ and the common external tariff is:

$$t_{ij}^{FTA} = 0, \quad t_{ik}^{CU} = \Gamma \frac{a + b + 4bn_j(\alpha_j + 1) + 4an_i(\alpha_i + 1)}{(a + b - (4b\alpha_j + 2b - 2a)n_j - (4a\alpha_i + 2a - 2b)n_i)n_k + 2(1 + n_i + n_j)^2(b + a)}$$

The governments charge unit tariffs in the model while the dataset presents all tariffs, including unit tariffs in their ad valorem equivalents. So the optimal unit tariffs have to be converted into ad valorem, i.e. percentages. The ad valorem equivalent (AVE) tariff is the tax share of the price found as the ratio of the unit tariff to the equilibrium price:

$$\tau = \frac{t}{p}$$

Substituting in the formula of the ad valorem tariffs the equilibrium tariffs and price in each trade regimes gives equilibrium ad valorem equivalent tariffs:

$$
\begin{aligned}
\tau^{MFN} &= \frac{1 + 2n_i(1+\alpha)}{2(n_i + 1)} \\
\tau^{FTA} &= \frac{1 + 2n_i(1+\alpha)}{2(n_i + n_j + 1)} \\
\tau^{CU} &= \frac{1 + 2n_i(1+\alpha) + 2n_j(1+\alpha)}{2(n_i + n_j + 1)} \\
\tau^{CU} &= \frac{a(1 + 4n_i(1+\alpha_i)) + b(1 + 4n_j(1+\alpha_j))}{(a + b)2(n_i + n_j + 1)}
\end{aligned}
\tag{3}
$$

Note that $\tau^{FTA} < \tau^{MFN} < \tau^{CU}$. The AVE tariffs are easy to interpret - being the share of the price that is being taxed, they allow to determine trivially the prohibitive tariff - it is the level of bias $\alpha$ such that $\tau = 1$, i.e. the effective tariff rate is 100%.

Importantly for the empirical analysis, notice that the Customs Union tariff can be presented as an affine combination of either national MFN or FTA tariffs of the CU members. Below is the representation for countries of equal size:

$$\tau^{CU} = \tau_i^{MFN} \frac{1}{2} \frac{(n_i + n_j + 1)(1 + 4n_i(1 + \alpha_i))}{(n_i + 1)(1 + 2n_i(1 + \alpha_i))} + \tau_j^{MFN} \frac{1}{2} \frac{(n_i + n_j + 1)(1 + 4n_j(1 + \alpha_j))}{(n_j + 1)(1 + 2n_j(1 + \alpha_j))} \tag{4}$$

$$\tau^{CU} = \tau_i^{FTA} \frac{1}{2} \frac{1 + 4n_i(1 + \alpha_i)}{1 + 2n_i(1 + \alpha_i)} + \tau_j^{FTA} \frac{1}{2} \frac{1 + 4n_j(1 + \alpha_j)}{1 + 2n_j(1 + \alpha_j)}$$

If instead the countries have different number of consumers, in particular, country $i$ has $a$ consumers and country $j$ - $b$ consumers, the affine combination becomes:

$$\tau^{CU} = \tau_i^{MFN} \frac{a}{a + b} \frac{(n_i + n_j + 1)(1 + 4n_i(1 + \alpha_i))}{(n_i + 1)(1 + 2n_i(1 + \alpha_i))} + \tau_j^{MFN} \frac{b}{a + b} \frac{(n_i + n_j + 1)(1 + 4n_j(1 + \alpha_j))}{(n_j + 1)(1 + 2n_j(1 + \alpha_j))} \tag{5}$$

$$\tau^{CU} = \tau_i^{FTA} \frac{a}{a + b} \frac{1 + 4n_i(1 + \alpha_i)}{1 + 2n_i(1 + \alpha_i)} + \tau_j^{FTA} \frac{b}{a + b} \frac{1 + 4n_j(1 + \alpha_j)}{1 + 2n_j(1 + \alpha_j)}$$

The number of consumers, whenever a representative consumer exists, does not affect the non-cooperatively set tariff. However it is not the case for a cooperatively set tariff. Indeed, if the number of consumers is normalised to 1 or is equal in each country then the maximisation objective in the Customs Union is simply the sum of each consumer's problem corrected for governments' biases.

## 5 Empirical Analysis of Common External Tariff

The theoretical model above makes a number of predictions regarding the formation of the CET. There are several properties of this CU tariff as a function of individual FTA tariffs that can be tested empirically.

Testable hypotheses:

(a) The CET is well-represented as an affine combination of the national tariffs.

Table 2: Macroeconomic indicators: 2009

| Indicator | Share % | | |
|---|---|---|---|
| | Russia | Belarus | Kazakhstan |
| GDPpc PPP | 38.3 | 32.7 | 29 |
| GDP PPP | 87.5 | 5 | 7.5 |
| Population | 84.7 | 5.7 | 9.6 |

(b) Country $i$'s weight is proportional to $a/(a+b)$ while country $j$'s weight is lower and proportional to $b/(a+b)$. Everything else same, the larger country is expected to have higher weight. Note that this theoretical outcome comes from the assumption of equal $\Gamma$ across countries, an analog of the GDP per capita. The CU members are a really good fit for that as they have very close GDP per capita. As a result we can compare the empirically obtained weights with either GDP or population share, as they are very close.

Country size ratio: Using data on population and GDP from the IMF's *World Economic Outlook*, the model would predict the CET formation function to give a weight ratio for GDP and population as in Table 2, controlling for sectoral variation.

(c) Country's weight in the CU tariff is higher for goods that are protected by this country in FTA more than in partner country. This hypothesis is mutual protectionism.

(d) The sum of weights of individual tariffs should be higher than one, - CU is more protectionist than the FTA. In the remaining part we are conducting regression analysis based on several estimating strategies in order to explain the determination of the Customs Union tariff that later we will put together with the model's predictions.

## 5.1  Regression Results

As a starting point of empirical analysis of the common external tariff, we look at the harmonised tariffs in 2012 as a linear function of national tariffs in 2009 prior to Customs Union formation:

$$t_{ECU2012i} = \alpha + \beta_1 t_{RU2009i} + \beta_2 t_{BY2009i} + \beta_3 t_{KZ2009i} + e_i \tag{6}$$

The results are presented in column (1) in Table 3. This simple regression provides an adjusted R-squared of 95%, explaining very well the tariff variation. This exploratory regression is pooling the sectors, thus ignoring sectoral variation. The country coefficients correspond to the country weights obtained by averaging across all sectors. The sum of coefficients is 0.95, i.e. very close to 1, a property that will be observed in almost all of the specifications.

Russian tariffs enter with the coefficient 0.615 which corresponds to 65% of sum of the coefficients, a very large number but well below its 84.7% population share and 87.5% of total GDP share. Both Belarus and Kazakhstan thus have greater weights than their population or GDP shares would suggest, particularly the latter with 19.5%. Kazakhstan's tariff policy is significantly different from the policy of the other two members and the average tariff was much lower. Kazakhstan's share is higher in overall CU; even if we pull together Belarus and Russia due to their similarities prior to the CU, the result stands. As the more elaborate analysis below will show, this regression result probably comes from Kazakhstan being successful in achieving tariff spillover in the partner countries for goods it protects.

Table 3: CET in 2012 and national tariffs in 2009

| Dep. Variable | $t_{2012}$ | | | | |
|---|---|---|---|---|---|
| Model | (1) | (2) | (3) | (4) | (5) |
| $t_{RU2009}$ | 0.615*** | 0.616*** | 0.518*** | 0.633*** | 0.563*** |
| | (39.54) | (30.72) | (27.29) | (43.40) | (31.54) |
| $t_{BY2009}$ | 0.146*** | 0.128*** | 0.0596** | 0.196*** | 0.127*** |
| | (9.09) | (6.06) | (3.17) | (12.79) | (6.85) |
| $t_{KZ2009}$ | 0.187*** | 0.198*** | 0.158*** | 0.0758*** | 0.0565*** |
| | (19.35) | (14.50) | (15.67) | (6.63) | (4.81) |
| $t_{max2009}$ | | | 0.191*** | | 0.146*** |
| | | | (8.77) | | (6.69) |
| Constant | 0.603*** | 0.952*** | 0.568*** | 0.570*** | 0.525*** |
| | (8.47) | (7.20) | (8.04) | (8.37) | (7.70) |
| Coef. sum$^2$ | 0.95 | 0.94 | 0.93 | 0.90 | 0.89 |
| Fixed effects | | | | HS2 groups | HS2 groups |
| Observations | 4318 | 2447 | 4318 | 4318 | 4318 |
| Adjusted $R^2$ | 0.914 | 0.908 | 0.916 | 0.934 | 0.935 |

$t$ statistics in parentheses

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

The next specification, presented in column (2) of Table 3, considers the sub–sample of product lines for which the tariffs were not harmonised in 2009. As more than 40% of all tariffs were equal already in 2009, this specification excludes the lines that were equal as we are interested to assess the weights of individual country tariffs in determining the tariffs that actually had to be harmonised:

$$t_{ECU2012i} = \alpha + \beta_1 t_{RU2009NHi} + \beta_2 t_{BY2009NHi} + \beta_3 t_{KZ2009NHi} + e_i \tag{7}$$

The results are very similar to the first specification.

The specification in column (3) is aiming to capture the spillovers of protectionism from national level to partners in the CU. The tariffs in 2012 are regressed on national tariffs, like in the first

specification, and on a variable $tmax$. The latter variable equals to the highest tariff in 2009 among the three members for each product line. As theory predicts, the country will have a higher weight in the CU tariff for goods that it protected more than its partners in the FTA. The null hypothesis that the country receives no extra weight in goods that it protects more than the partners, would lead to an insignificant coefficient. However if the CET determination exhibits mutual protectionism effect – that is, spillover to partners, then the coefficient of variable $tmax$ is expected to be positive and significant.

$$t_{ECU2012i} = \alpha + \beta_1 t_{RU2009i} + \beta_2 t_{BY2009i} + \beta_3 t_{KZ2009i} + \beta_4 t_{max2009} + e_i \tag{8}$$

The column (3) in Table 3 summarises the estimation results; the $tmax$ coefficient is 0.19. This implies that on average the weight of each country is 20% higher for goods that it protects more than the partners, and these will be protected by all members in the Customs Union. The highest tariff charged by any member country enters with an additional effect: a 1% increase in the maximum tariff raises the common tariff by 0.2% on top of national tariff weight.

Interestingly, the inclusion of the maximum tariff decreases the weight of Belarus to 6.4%. Note that Russia and Belarus had very similar tariffs already prior to the CU which can be attributed to Belarus having extra weight in the pooled regression.

The specifications presented in columns (4) and (5) of Table 3 are analogous to (1) and (3), respectively, with the only difference that they control for the sectoral fixed effects at the 2 digit level:

$$t_{ECU2012i} = \alpha_j + \beta_1 t_{RU2009i} + \beta_2 t_{BY2009i} + \beta_3 t_{KZ2009i} + e_i \tag{9}$$

The results remain of the same magnitude with the sector dummies for Russia but are much lower for Kazakhstan. This specification gives the we country weights, controlling for differences in products, and thus is best fit to test the hypothesis b). Indeed, still well below the population and GDP share of Russia, its weight goes up to 70% while Kazakhstan's share decreases to 10%, much closer to its population and GDP share. Moreover, the number for Russia can be biased downward as its tariff is very similar to the one of Belarus and thus the regression can wrongly attribute to Belarus part of Russia's weight. To account for this, the next part is analysing the sample variance.

## 5.2 Mutually Protected Sectors

Table 4 presents the tariff averages prior and after the creation of the Customs Union for several groups of products for each member. The first row presents the means for all products, showing that in the process of harmonisation tariffs of Belarus and Russia went slightly down while Kazakhstan's tariffs increased.

Table 4: Tariff changes by product groups

| | No | Russia $t_{2009}$ | Russia $t_{2012}$ | Belarus $t_{2009}$ | Belarus $t_{2012}$ | Kazakhstan $t_{2009}$ | Kazakhstan $t_{2012}$ |
|---|---|---|---|---|---|---|---|
| All goods | 5052 | 12.18 | 10.94 ↓ | 11.81 | 10.87 ↓ | 6.49 | 10.74 ↑ |
| Protected goods | 901 | 24.42 | 19.74 ↓ | 22.20 | 19.35 ↓ | 12.61 | 19.82 ↑ |
| Protected by Russia | 405 | 40.86 | 29.53 ↓ | 30.84 | 28.74 ↓ | 14.97 | 29.71 ↑ |
| Protected by Belarus | 309 | 11.12 | 10.35 ↓ | 18.26 | 10.30 ↓ | 5.79 | 9.94 ↑ |
| Protected by Kazakhstan | 187 | 10.77 | 14.40 ↑ | 10.01 | 14.32 ↑ | 18.79 | 15.11 ↓ |

The following rows show the changes for the groups of protected goods. Following theory, goods protected in FTA more in one country, will be protected by all members of the CU. To test this hypothesis, let us look at goods that we protected in each country prior to the CU. For empirical purposes, a good is considered protected in country $i$ if the pre-CU tariff in this country is at least 1% higher than in the partner countries[3].

Across all protected goods, the picture is similar to that of mean all goods - noticeable decrease for Russia and Belarus and even more significant increase for Kazakhstan.

However the picture is very different for the last three rows where the protected goods are grouped by countries that protected these goods pre-CU in 2009. Although Kazakhstan saw a 65% increase in mean tariff (from 6.5% to 10.7%), it actually decreased tariffs for the goods the goods it protected more than the partners. And just the opposite is true for Belarus and Russia: the two countries had to decrease their tariffs on average (tariff down from around 12% to around 11%) and in the goods they protected, but in goods protected by Kazakhstan were 4% higher post-CU.

Similarly, Kazakhstan saw the mean tariff up by 65% but for the goods protected by partners, Russia and Belarus, - by 98% and 72%, respectively.

These findings confirm the hypothesis that the tariff determination in a CU is not only driven by the economic weights of its members but is an outcome of a process where each side is willing to concede to protect the partners' goods in exchange for similar protection.

Some example sectors. Closer look at the sectors with largest spillovers of protection from one member to partners reveals the following observations. Sector 4(Dairy products, eggs and etc) was one of the most protected sectors in Kazakhstan with tariff 25,78%, significantly higher than in Russia and Belarus, and the adopted average tariffs in 2010 in that sector are between 23-24% for these countries.

Instead, Russia was very successful in pushing up tariff for sector 02(Meat and edible meat offal). The meats sector was well-protected in all members prior to the CU, but way below Russia's 45% average tariff, however in 2010, all three countries adopted mean tariff rates 46% for meat. Other sectors where Russia and Belarus had very high tariffs in 2009 while Kazakhstan - moderate ones but then the protection was spilled over to Kazakhstan are: 44(Wood and etc), 48 (Paper and etc), 71(Pearls, precious stones, metals, coins, etc), 88(Aircrafts and etc).

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[3]The minimum margin of 1% was chosen to avoid arbitrary cases where all countries have same specific tariffs but when these are converted into ad valorem tariffs as they appear in the dataset, they might be slightly different.

We also note that there are many more sectors with mutual protectionism effect than sectors that saw liberalisation over the weighed average during CET determination. The most prominent liberalised sector is 22 (Beverages, spirits and vinegar), which had lines at HS 6 of more than 300% tariff. We believe that the extremely high tariffs for these few lines explain the outlier behaviour of that sector.

## 5.3    Analysis of Variance

The previous two subsections gave already a lot of insight into the CU tariff determination. However the relatively high level of tariff harmonisation of 40% prior to the CU gives an opportunity for biased weight estimators. The linear model can bias towards more equal weights. To determine the country weights, in particular for the protected goods, this subsection analyses the variance of multiple regression models. The basic idea of such analysis is comparing the explanatory power of the model with and without the variable of interest.

There are three explanatory variables in the full model under consideration: the three national tariffs in 2009. The unique explanatory power of each variable is then determined by exclusion test, that is, by looking at the difference of the explanatory power of the full model and without the variable in question. If such exclusion test is done for all three variables, the unique explanatory power of all variables will be found. The weight of each national tariff is then found as the ratio of its unique explanatory power to the sum of unique explanatory power of the three variables.

Table 5 presents the results of the analysis for the 2012 tariffs as functions of national 2009 tariffs. Note that the 2012 tariffs were highly harmonised but still below 100%. To avoid possible differences depending on which of the 2012 tariffs is used as depending variable, the results are shown for all three countries. As expected, for almost all cases the results are not too sensitive to that choice, with qualitative findings being intact.

Each country has a tremendous increase in its weight in the 2012 tariffs for the goods it protects. Russian tariffs' weight is $0.96 - 0.98$, for Belarus the weight is $0.19 - 0.31$ and for Kazakhstan $0.77 - 0.79$ for the groups protected by respective country.

For the full sample and for harmonised goods the country weights go closer to the economic size ratios. Kazakhstan's weight remains significantly higher than its economic size which is explained by its ability to extend the protection in the CU of goods it protected before the CU. Note that there are two samples of harmonised tariffs: fully harmonised and those were there is still difference but lower than 1%.

The analysis of unique explanatory of each variable is very useful in the case in hand where the explanatory variables had a lot in common. It allows to pick the extra bit added by each variable specifically.

It is useful, however, to determine the overall value added by each variable. Lipovetsky and Conklin [2001] demonstrate the advantages and consistency of using the Shapley value for identifying the relative importance of regressors in the presence of multicollinearity. To calculate a Shapley value

Table 5: Analysis of Variance based on Exclusion Test

| 2012 MFN tariff | Obs | $aR^2$ | Relative Importance | | |
|---|---|---|---|---|---|
| | | | $t_{RU2009}$ | $t_{BY2009}$ | $t_{KZ2009}$ |
| All goods | | | | | |
| $t_{RU2012}$ | 4876 | 92% | 0.73 | 0.05 | 0.21 |
| $t_{BY2012}$ | 4876 | 89% | 0.68 | 0.07 | 0.25 |
| $t_{KZ2012}$ | 4876 | 87% | 0.67 | 0.02 | 0.31 |
| Harmonised goods | | | | | |
| $t_{harm2012}$ | 4239 | 92% | 0.83 | 0.03 | 0.14 |
| $t_{harm2012}$ | 4318 | 91% | 0.77 | 0.04 | 0.19 |
| Protected by Russia | | | | | |
| $t_{RU2012}$ | 393 | 94% | 0.96 | 0.03 | 0.01 |
| $t_{BY2012}$ | 393 | 93% | 0.96 | 0.03 | 0.02 |
| $t_{KZ2012}$ | 393 | 91% | 0.98 | 0.01 | 0.01 |
| Protected by Belarus | | | | | |
| $t_{RU2012}$ | 306 | 84% | 0.67 | 0.19 | 0.15 |
| $t_{BY2012}$ | 306 | 86% | 0.57 | 0.31 | 0.12 |
| $t_{KZ2012}$ | 306 | 84% | 0.49 | 0.29 | 0.22 |
| Protected by Kazakhstan | | | | | |
| $t_{RU2012}$ | 183 | 85% | 0.10 | 0.14 | 0.77 |
| $t_{BY2012}$ | 183 | 85% | 0.11 | 0.00 | 0.89 |
| $t_{KZ2012}$ | 183 | 89% | 0.17 | 0.05 | 0.79 |

of a regressor, all possible combinations of explanatory variables should be considered. How much each variable is able to explain on its own, how much it adds when added to either of the other two and how much explanatory power it adds to both other two variables. Fur this task of finding the extra explanatory power of each variable in all possible combinations Shapley value for each variable is calculated. The Shapley value of explanatory variable $i$, $\phi_i(v)$, is (Shapley [1953]):

$$\phi_i(v) = \sum_{S \subseteq N \setminus \{i\}} \frac{|S|! \, (n - |S| - 1)!}{n!} (v(S \cup \{i\}) - v(S)) \tag{10}$$

where n is the number of explanatory variables in the full model (3 in this case), $N$ is the set of variables of full model, $S$ is set of variables included in a regression model and $v$ is the regression sum of squares.

Note that the Shapley value takes into account the extra explanatory power of the variable for each possible combination, including the empty set. And as each variable alone is able to predict the CU tariff rather well, the Shapley value will suggest less unequal weights than the analysis of variance by unique explanatory power of each variable.

The results are presented in Table 6.

Indeed, the weights determined by the Shapley values are close to each other. At the same the results point to the spillover of protectionism within the CU. In particular, the weight for Kazakhstan goes up to 37-38% for goods it protected in the FTA from 26-27% for all goods or all harmonised goods. Similarly, Belarus' weight reaches its peak of 37-39% in the common CU tariff of goods it protected in the FTA.

Note that Russia's tariff weight does not see such a spike in its weight for sample of goods it protects. Instead, Kazakhstan's tariff weight is slightly higher than for the sample of all goods and harmonised goods. This case is the only slight evidence of Kazakhstan's attempts to negotiate down the CET for the goods where it would have to make the most significant increases.

Table 6: Analysis of Variance based on Shapley Value

| 2012 MFN tariff | Obs | Shapley Value: Relative Importance | | |
|---|---|---|---|---|
| | | $t_{RU2009}$ | $t_{BY2009}$ | $t_{KZ2009}$ |
| All products | 4876 | 0.39-0.40 | 0.33-0.35 | 0.26-0.27 |
| $t_{harm2012}$ | 4239 | 0.39 | 0.35 | 0.26 |
| $t_{harm2012}$ | 4318 | 0.39 | 0.35 | 0.26 |
| Protected by Russia | 393 | 0.39 | 0.32 | 0.29 |
| Protected by Belarus | 306 | 0.41-0.43 | **0.37-0.39** | 0.19-0.21 |
| Protected by Kazakhstan | 183 | 0.32 | 0.30-0.29 | **0.37-0.38** |

## 5.4  Discussion

All the specifications are very simple and yet explain around 93-94% of variation in common external tariff. All estimations highlight the large role of Russian tariffs in 2009 in determining the common external tariff. However compared to the theoretical prediction where tariffs are driven by population (or GDP) share, the Russian weight is considerably lower (70% vs 87% ) and especially Kazakh influence is stronger (20% vs 8%). Thus the theoretical model that is used for structural support of the estimation strategy has a lot of embodied structure but still captures important patterns of common tariff determination in a Customs Union.

The Customs Union brought on average only a very modest increase of the tariffs above the weighted average but on sectoral level there is evidence of mutual protectionism.

We also found that there are large differences in the determination of common external tariffs among the two subgroups of ad valorem and specific tariffs. The former are on average much lower for all the three countries and for these lines Russia had a very strong, decisive, impact on common tariff. The latter tariffs are on average several times larger than ad valorem tariffs. In these lines Kazakhstan had on average much lower tariffs than Russia and Belarus prior to the CU, but also for these lines we found the strongest impact of Kazakh tariffs and, weaker than for ad valorem tariffs, impact of Russian tariff policy. The lower than predicted share of the coefficient of the Russian tariffs in the sum of all coefficients can be seen as evidence that Russia entered into compromises on the external tariff. This appears as a natural conclusion given that Kazakhstan in any case experienced large adjustments and increase in tariffs and in order to make the Customs Union participation incentive compatible for Kazakhstan, certain room for negotiation above the weight based on population size was available. Belorussian tariffs had the lowest impact on the determination of the CET, and that can be also potentially explained through transfers. Indeed, Belarus is located between the EU countries and Russia and thus a large part of the imports from the EU enter through Belarus. Positive externalities from transit could be a possible explanation why Belarus seems to have been the least active in tariff determination.

# 6    Conclusion

Customs Unions are perhaps among the most far-reaching preferential trade agreements, which naturally have consequences on external tariff policy. While extensive theoretical results are available, which largely predict Customs Unions to be more protectionist than Free Trade Areas, surprisingly little is known about the effects of CUs empirically. This paper seeks to fill the void through a detailed study of tariff policy in the newly-formed Eurasian Customs Union using a large panel data set.

Using three different methodologies, I show that mutual protectionism powerfully shapes tariff structure in a Customs Union. If a member state strongly protected an industry before the formation of the CU, this state is able to assure protection for the same industry after CU formation too - but extended also the partner countries. There is little evidence of a mutual liberalisation effect, where countries would bargain to keep previously low tariffs at similar levels after CU formation. These findings are consistent with a simple model of tariff formation in an imperfectly competitive setting.

Given the asymmetry of the members of the Eurasian Customs Union, it is of some interest to estimate the relative decision weights to given to each country in the determination of the CET. One of the most immediately noticed impacts of the Customs Union of Russia, Belarus and Kazakhstan was the rise of the import tariffs in Kazakhstan. Furthermore, suggestions were made that the common external tariff (CET) was dictated by Russia. We discuss in this work that as a larger market, Russia could be theoretically expected to have a large influence in the common tariff, even in the absence of any "power abuse". However I find that Russia had much lower impact in tariff determination than GDP-weighed bargaining would suggest. Depending on specification, Russian role varies roughly between 53-64%, even if we only look at the tariffs that were not harmonised prior to the Customs Union. As the 40% percent of tariff lines were identical for all three members prior to the Customs Union, counting the share of the lines of the CET that were equal to the Russian ones in 2009 overestimates Russia's influence. Having said that, Russia and Belarus both had more highly protected sectors than Kazakhstan. In the CET for most of these highly protected sectors we observe mutual protectionism - the sectors that were not protected before in partner markets, become protected.

Our tariff data includes years 2011 and 2012 and shows continuing harmonisation between members and the fall of CET. And although Russia joining the WTO only towards the end of 2012, the decrease in the CET could either be explained by further moderation of Russian and Belorussian tariffs with Kazakhstan's 2009 tariffs or requirements imposed by WTO accession protocol. Determining which of the two caused mild decreases of the CET in 2011 and 2012, though an interesting challenge, is left out of scope of this project.

# 7 Appendix

## 7.1 Market Outcomes

In the following superscript $l$ is omitted for expositional purpose The problem of any of the $n_i$ firms in country $i$ is given by

$$\max_{\{q_{ii}, q_{ji}, q_{ki}\}} = P(\overline{Q}_i, q_{ii})q_{ii} + \left(P(\overline{Q}_j, q_{ji}) - t_{ji}\right) q_{ji} \tag{11}$$
$$+ \left(P(\overline{Q}_k, q_{ki}) - t_{ki}\right) q_{ki}$$

where $\overline{Q}_j$ denotes the total quantity produced in the market by all other firms, and $Q_j$ denotes the market output.

And similarly for firms in the other countries, $j$ and $k$. To find the equilibrium in country $j$, sum the $3n$ first–order conditions for $q_{ii}, q_{ij}, q_{ik}$ respectively to find the equilibrium output for given tariffs:

$$0 = 3n(\Gamma - Q_i) - Q_i - nt_{ji} - nt_{jk}$$
$$Q_j^*(t_{ji}, t_{jk}) = \frac{3n\Gamma - n(t_{ji} + t_{jk})}{3n + 1}$$

and, again, symmetrically for the other countries. The output of the representative firm in each country is then given by

$$q_{jj}^* = \frac{\Gamma + n(t_{ji} + t_{jk})}{3n + 1} \tag{12}$$
$$q_{ji}^* = \frac{\Gamma - (1 - 2n)t_{ji} + nt_{jk}}{3n + 1} \tag{13}$$
$$q_{jk}^* = \frac{\Gamma + nt_{ji} - (1 + 2n)t_{jk}}{3n + 1} \tag{14}$$

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