Part of the Problem? The Eurasian Economic Union and Environmental Challenges in the former Soviet Union

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ABSTRACT

While there is a sizeable body of evidence linking greater economic freedom to better environmental outcomes, one of the outliers which persists is the ambiguous relationship of trade to the environment. Some theoretical approaches posit that trade would lead to a "race to the bottom," where firms would move to countries with the laxest regulations; on the other hand, the competitive effects of trade should force polluting firms to clean up in order to better serve their customers. But what occurs when trade expands among countries who already have shown – via policy and politics – that the environment is not a priority? Such an example comes from real life with the Eurasian Economic Union (EaEU), a collection of autocracies who have pursued integration but without any extensive, market-based liberalization. This paper examines the role of the EaEU in increasing trade among its member states and attempts to ascertain the effect this has had on the already-fragile environments in each of these countries. A theoretical examination, backed up with an empirical exercise, shows that the EaEU did indeed lead to more environmentally unfriendly production. I conclude that the EaEU needs to shift towards market-based liberalization in order to improve environmental quality within the group.

Keywords: Eurasian Economic Union; environmental policy; trade; regional integration

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I. Introduction

Economic activity of any form has an impact on the environment, although the precise relationship is unclear (Panayotou 2016), making the issue of the institutional drivers of both economic growth and environmental protection a crucial one (Hartwell 2016). There is a sizeable body of evidence linking greater political and economic freedom to better environmental outcomes (Barrett and Grady 2000; Coursey and Hartwell 2000; Bernauer and Koubi 2009; das Neves Almeida and García-Sánchez 2017; Adesina and Mwamba 2019), with property rights protection (as predicted by Coase [1960]) in particular allowing for better environmental outcomes. At the same time, broader economic freedom encourages environmental stewardship across most pollutants (Adesina and Mwamba 2019), while democratic accountability puts in place a series of checks and balances against environmentally destructive policies and enables environmental preferences to be codified (Farzin and Bond 2006). Even in countries which rely heavily on commodities for income and trade, the presence of both economic freedom and democracy encourages better stewardship than in authoritarian countries with reliance on natural resources (Hartwell 2016).

However, one of the outliers which persists is the ambiguous relationship of trade to the environment, both theoretically and empirically (Jayadevappa and Chhatre 2000; Managi *et al.* 2009; Halicioglu and Ketenci 2016). On the one hand, it is possible that trade could lead to a "race to the bottom," where firms would move to countries with the laxest regulations, creating "pollution havens" (Copeland and Taylor 2004; Sheldon 2006). On the other hand, the competitive effects of trade should force polluting firms to clean up in order to better serve their customers and remain relevant in global markets (Wheeler 2001; Madsen 2009; Saikawa 2013; Kim and Rhee 2019).

As politically and economically freer countries both trade more (Aidt and Gassebner 2010) and have better environmental quality (Obydenkova and Salahodjaev 2016; Obydenkova *et al.* 2016) – and given that trade itself can contribute to environmental improvement - an underexplored area of the trade-environment nexus relates to the impact of trade liberalization under an autocracy. What effects can be expected to a country's environment if an autocratic government within that same country opens itself to additional trade? While institutions mediate incentives within society and can thus channel resources into environmentally friendly (or environmentally unfriendly) activities, the outcome of autocratic trade liberalization on environmental outcomes is uncertain. The benefits of trade may be able to spur on economic changes independent of the political power structure, creating a race to the top for firms; however, the political interventions so pervasive in an autocracy may reduce any incentive firms have to become cleaner, as their own survival is dependent on the regime and not on pleasing eco-conscious consumers elsewhere, leading to misdirected efforts (Obydenkova and Salahodjaev 2017).[1]

A clue to solving this puzzle may come from an examination of the trade partners that the autocracy engages with and orients itself towards. While autocracies may need and benefit from the goods that come from advanced democracies (Arias *et al.* 2018), politically, they prefer to support fellow autocracies (Yakouchyk 2019) and could thus engage in greater trade integration with countries with similar governance structures. This behavior, coined "authoritarian regionalism" by Libman and Obydenkova (2018a:152), also means that "powerful authoritarian states frequently pursue different goals than do

[1] An additional fact in support of this thesis is that autocracies tend to have larger, state-owned firms, which have little incentive to become greener even as they internationalize (Clegg *et al.* 2018).

their democratic counterparts." Within the trade realm, this means that intra-authoritarian trade may remove the incentive for environmental upgrading due to the emphasis on political imperatives (Libman and Obydenkova 2018b) rather than marketplace signals, meaning that authoritarian leaders are the ones to be satisfied by trade patterns rather than consumers. This state of affairs would necessarily have negative ramifications for environmental quality, especially if one were to consider the materials use intensity of goods, which tends to be much worse (i.e., more inputs used per unit of output) in autocracies than in democracies (Hartwell 2016; Krausmann *et al.* 2016).

Fortunately, an example of expanded autocracy-autocracy trade comes from real life with the Eurasian Economic Union (EaEU), a collection of autocracies or near-autocracies (Russia, Belarus, Kazakhstan, Armenia, and Kyrgyzstan) who have pursued economic integration amongst themselves for various reasons (Libman and Obydenkova 2018b) but have mostly eschewed broad-based trade liberalization predicated on comparative advantage (Dragneva and Hartwell 2021). This process of Eurasian integration, beginning in 2010 with a Customs Union and through 2015 with the formation of the EaEU, has resulted in larger amounts of trade among members, as falling tariffs among the five (coupled with external stimuli such as sanctions on Russia from the West) have encouraged trade diversion from other markets (including the European Union). At the same time, the five member states of the EaEU share a common post-Soviet legacy with all that entails in terms of environmental protection: as noted elsewhere (Newell and Henry 2016), the communist system was not suited to nor was it geared towards protecting the environment, leaving its successor states with a series of environmental catastrophes that have, for the most part, not been addressed, either at the policy or the institutional level (Krausmann *et al.* 2016; Newell and Henry 2016).

This paper thus examines the role of an illiberal regional grouping, the EaEU – and of its immediate predecessor, the Customs Union of Russia, Belarus, and Kazakhstan – over the past decade in increasing trade among its member states and the effect such an increase (if any) in trade would have on the already-fragile environments in each of these countries.[2] The results of our theoretical and empirical examination are that production processes within the EaEU led to worse environmental outcomes after the institution of both the Customs Union and the EaEU. The channel in which this works, I surmise, is partially based on the fact that intra-EaEU trade is heavily dependent on primary commodities (such as mineral fuels) and petroleum and petroleum products, which are among the most polluting industries in each of these countries and which have been blamed for a whole host of ecological disasters across the EaEU space since the end of the Soviet Union (Coumel and Elie 2013).

However, as Ward *et al.* (2014), Hartwell (2016), and Farzanegan *et al.* (2018) show, democratic accountability is a major contributor to environmental cleanliness, even in resource rich countries (Congleton [1992] asserts that political institutions dominate resource abundance in determining environmental policy). Thus, it is the combination of autocracy and resource dependence in the EaEU, when combined with trade integration, which increases trade in primary commodities from industries which are simultaneously polluting and inefficient (i.e., they use much more material per unit of output). This then in turn may have a further deleterious impact on the environment over the long run. Only by shifting internal governance structures, which then alter the internal incentive frameworks of the EaEU countries, can the environmental safeguards which are needed arise organically from within. These results

[2] The issue of trade alone in the EaEU has been amply explored elsewhere, see for example Tarr (2016), Vinokurov (2017), or Knobel *et al.* (2019).

thus comport with the theoretical suppositions of Coursey and Hartwell (2000), mainly that countries with less economic and political freedom have poorer environmental protection across a whole host of metrics.

The paper proceeds as follows: the next section reviews the EaEU's trade arrangements and trade results more fully, while Section III outlines the environmental challenges within the Union. Section IV provides evidence on the effect that expanded EaEU had on a host of environmental quality metrics, while Section V offers some concluding thoughts.

II. The Eurasian Union and Trade

The Eurasian Economic Union of Russia, Belarus, Kazakhstan, Armenia, and Kyrgyzstan, began on January 1, 2015, and is arguably the most successful of a long line of integration schemes attempted since the fall of the Soviet Union (Dragneva and Wolczuk 2013). While previous integration efforts such as the Commonwealth of Independent States (CIS) or the Shanghai Cooperation Organization (SCO) have limped along as talking shops, but have not worked to generate new trade links, the EaEU and especially its precursors – the Russian-Belarusian Customs Union of 1995 and the Eurasian Customs Union of Russia, Belarus, and Kazakhstan in 2010 – have made strides at least in the process of trade integration.

The Customs Union, as the immediate precursor of the EaEU, made the greatest progress in removing formal trade and investment barriers among the three countries, but imposed Russia's external tariff as the Union's common tariff, a reality which fostered some trade amongst the three countries but via trade diversion rather than creation, increasing trade in lower-quality/higher-priced Russian goods (especially for Kazakhstan, see Tarr [2014]). At the same time, however, the extreme specialization of Russia and Kazakhstan in primary commodities (exacerbated by sanctions post-2014) led to continued development of trade outside of the Customs Union, in particular with the EU and China (Borodin and Strokov 2015). The real "winner" of the Customs Union, as predicted by Tochitskaya (2010), was Belarus, which saw customs charges flow into its coffers and expanded trade with Russia (and to a lesser extent, Kazakhstan), while Kazakhstan saw meager gains (Borodin and Strokov 2015; Khitakunov *et al.* 2017) and Russia saw most of its trade oriented elsewhere (Vinokurov 2017).[3]

The move towards the EaEU expanded the internal market of the Customs Union somewhat – although the addition of 2.97 million Armenians and approximately 6.3 million Kyrgyz paled in comparison to the 170 million already in the Customs Union - but more accurately represented a continued shift towards "integration without liberalization" (Dragneva and Hartwell 2021). Indeed, the essence of the economic integration that first, the Customs Union, and now, the EaEU has pursued has been a move towards lowering specific barriers within the economic space, but eschewing broad-based liberalization, especially when it comes to trade with external actors. As Dragneva and Hartwell (2021:204) put it, "despite tentative steps towards liberalization via integration, especially in the area of tariffs and free movement of people, developments to date have given rise to the reintroduction of internal customs controls, the omnipresence of [non-tariff barriers], the fragmentation of the customs union, and protectionist external agreements" within the EaEU.

[3] It is debatable whether Belarus was truly a "winner" in the Customs Union, but by the metrics of trade – and arrayed against the aims of the EaEU, namely for greater regional integration – Belarus has come out far ahead of other EaEU countries.

A consequence of the EaEU's move towards integration without political or extensive trade liberalization has been an increase in intra-bloc trade emphasizing primary commodities and petroleum products. Since the founding of the Customs Union and especially since the imposition of sanctions on Russia for its illegal annexation of Crimea and its invasion of eastern Ukraine, both Russia and Kazakhstan have become more reliant on hydrocarbon exports and have seen the diversification of their economies wane significantly. This state of affairs has necessarily filtered through to intra-EaEU trade, which has a plurality of its trade concentrated in mineral and chemical products: according to data from the Eurasian Economic Commission, through September of 2020, 34% of all intra-EaEU trade was comprised of these two categories, a similar result from the 37% it comprised in 2019, and oil and gas alone comprised 21.5% of all intra-EaEU trade by volume in 2019. As Vieria (2017) notes, the easier access to Russian (and to a lesser extent, Kazakh) oil and gas has been the main benefit of Eurasian Union membership for smaller countries, first of all Belarus. Indeed, when Russian President Vladimir Putin was attempting to "convince" Ukraine to join the EaEU and not sign an Association Agreement with the EU (Tsygankov 2015), one of the arguments put on the table by the Eurasian Union itself was that Ukraine would benefit from more access to Russian energy (Eurasian Development Bank 2012).

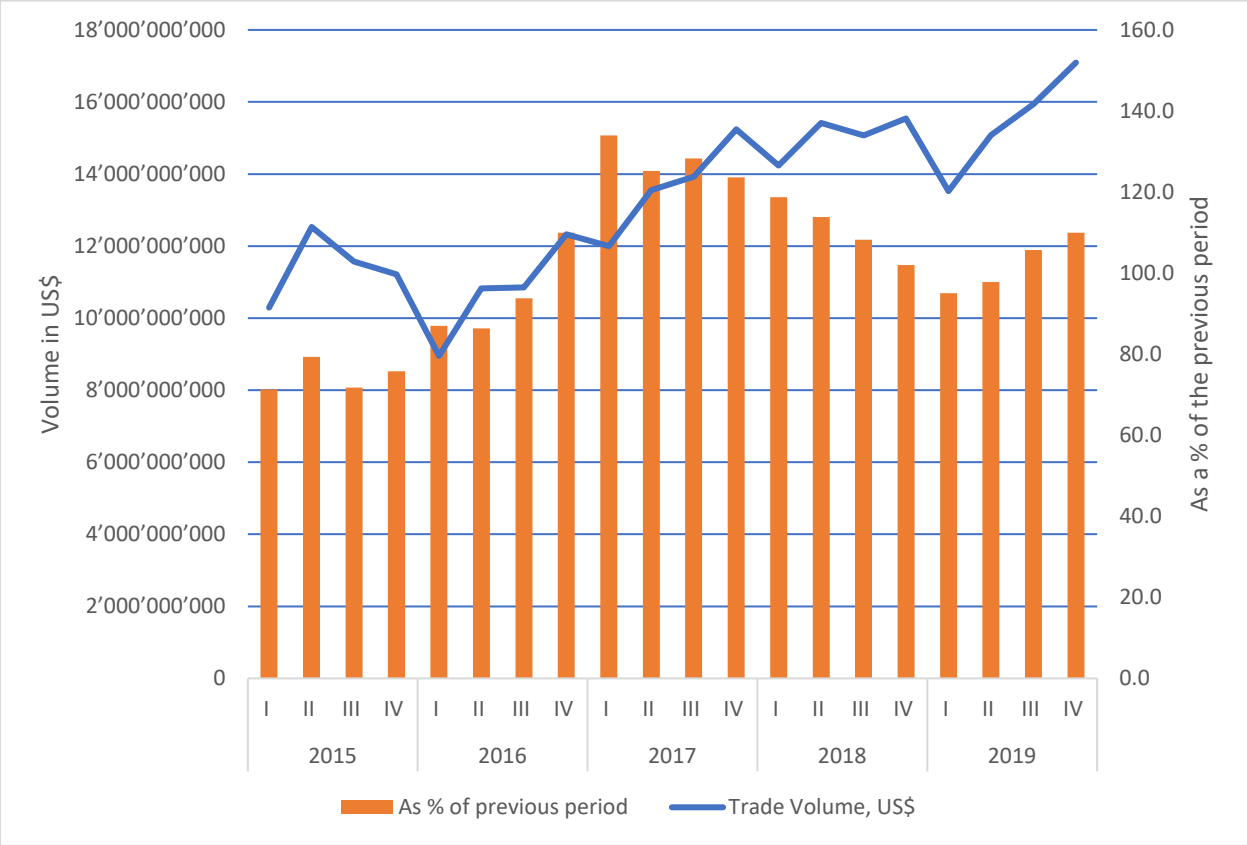
A further effect of this tightly controlled approach to trade integration has been its inability to address non-tariff barriers (NTBs) among its members, keeping in place a large variety of technical, safety, and even environmental barriers (in addition to the usual time and motion issues such as customs delays and bureaucracy). As catalogued by Vinokurov *et al.* (2015), the vast majority of NTBs in the EaEU are technical ones rather than those concentrating on health, related to standards and the testing and certification of products, with the smaller (i.e., non-Russia) members of the bloc assessing the impact of NTBs at raising the cost of goods between 25 and 30%.[4] While the value of these barriers on the state of the environment is debatable (and will be explored more in depth below), the effect of the pervasive NTBs has been further quantified by Vakulchuk and Knobel (2018), who showed that even a 50% reduction in NTBs could increase agricultural trade in the EaEU by as much as 40%, with the highest growth potential between Belarus and Kazakhstan (bypassing Russia altogether).

The lack of appetite for broader liberalization and the reliance on NTBs has meant that the Union has both underperformed in terms of its potential in fostering trade among its members (Gurova *et al.* 2018; Knobel *et al.* 2019) while at the same time erecting higher barriers to trade outside of the bloc (Khitakunov *et al.* 2017) and pursuing external trade agreements with so many caveats as to be highly restrictive (Dragneva and Hartwell 2021). And yet, despite these issues, trade did in fact increase within the EaEU countries (Figure 1), mainly due to the fact that Belarus, Kazakhstan, Kyrgyzstan, and (to a lesser extent) Armenia were already highly reliant on trade with Russia (Gurova *et al.* 2018), meaning any lowering of barriers was bound to improve already-existing links (Yarashevich 2020). While the EaEU continues to grapple with little domestic incentives for increased liberalization – mainly due to ongoing sanctions against Russia, political turmoil at home, conflict (in Armenia), and the uncertain outcome of the COVID-19 pandemic – it is likely that trade volumes will continue to creep upwards in the coming years, as they have done in the past. And if a concerted effort can be made to address NTBs, as Vakulchuk and Knobel (2018) showed, the

[4] Health NTBs are used by governments across the world to protect their citizens but also can be used as a form of protectionism. Technical barriers, on the other hand, have been shown to dampen trade (Disidier *et al.* 2008) and are often used first as a form of protectionism, especially in agriculture, and then only secondly as a way to protect the citizenry (Li and Beghin 2012).

payoffs to commerce in the region can be substantial. The question thus remains, what would *any* increase in trade among these autocracies mean for the environment of these states?

Figure 1 – Trade Among the EaEU countries, 2015-2019



Source: Compiled from Eurasian Economic Commission data. Shown is mutual trade among all five EaEU members, both in volume and as a percentage corresponding to the same quarter of the previous year.

III. Post-Soviet Environmental Challenges

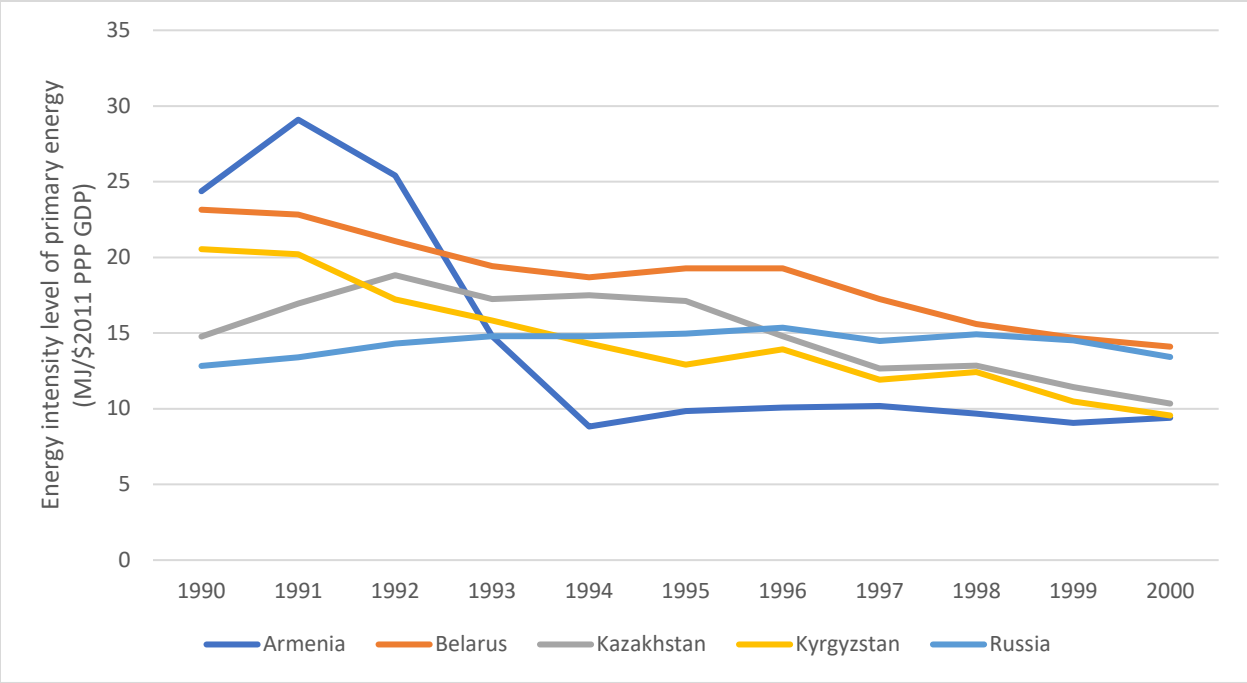
The legacy of the Soviet Union in environmental protection was an unhappy one: in the words of Bowers (1993:133), "Soviet policies, being ideologically grounded, were, by definition, environmentally sound," meaning that, at least in the early decades of the Union, an explicit focus on the environment was lacking. And when the environment did become an issue for the highest echelons of power in the USSR by the 1970s, resulting in legislation concerned with water (1970) and air (1980) pollution, it was implemented by a fragmented bureaucracy with little concern with the extensive environmental consequences of the planned economy (Kelley 1976). The results of this, as documented extensively over the past 30 years (Pryde 1991; Peterson 1993; Coumel and Elie 2013), was that environmental quality in the Soviet Union was substantially degraded, with natural resource extraction, industrialization, and/or defense imperatives elevated above all. This approach resulted in several well-known environmental disasters, including the Aral Sea (Small *et al.* 2001) along with the day-to-day of environmental degradation across

the Union, as the lack of accurate pricing and emphasis on the plan meant that environmental costs were not factored in (Pryde 1991).

Perestroika and the gradual opening of Soviet society in the 1980s led to an increase in environmental consciousness across the republics of the Union, and the ability to express one's mind (within constraints, of course) meant that environmental NGOs were permitted and even tolerated, drawing attention to the unfolding ecological legacy of communism (Carmin and Fagan 2010). As part of the move towards the west, as the Union began to break apart, constituent republics saw the adoption of international environmental agreements – and especially the copying of Western institutions dealing with the environment, notably a Ministry of the Environment (Henry and Douhovnikoff 2008) - as a key component of the economic transition. However, the transition itself, leaving newly independent states without largess from Moscow (and Russia itself preoccupied with a seemingly never-ending series of financial crises) meant that environmental protection (at least at the central level) was once again sidelined in favor of survival and growth. At the level of policymaking as well, the approach to the environment was one of bureaucracy and regulation rather than problem-solving, with Russia proving once again to be the trend-setter: "the law tends to be prescriptive and complex, articulating relatively high standards, but they are often not effectively implemented and enforced. [Additionally], there has been a high degree of instability with respect to which state agencies have the authority over the environment" (Gladun and Zakharova 2017: 60-61).

In terms of environment outcomes (a much different aspect of an economy than merely its policies), the environmental state of play in the former Soviet Union in the 1990s was also not a sanguine one, with much of the environmental improvement (in air quality, materials use intensity, and water pollution) coming about because of the collapse of industry (Newell and Henry 2016). While there were highlights across the expanse of Russia related to decentralized and local governance taking the place of command-and-control regulations written several time zones away (Glushenkova 1999), for the most part environmental improvement within the EaEU countries in the first decade and a half of transition was muted. Much of this could be attributed to the fact that the collapse of the Soviet Union did not immediately result in the economic and political liberalization which is correlated with environmental quality: in most countries, the leadership did not change nor were property rights protections instituted on a broad scale (Sonin 2003). As Henry and Douhovnikoff (2008:443) note about water quality in Russia, "in many cases, reservoirs are simultaneously used for municipal and industrial consumption, and both treated and untreated water are released back (returned) with little concern for downstream use." Similarly, air quality in Kazakhstan has deteriorated as a result of the state-directed and -controlled resources boom of the 1990s, leading to an (upper bound) estimate of as many as 25,000 excess deaths from air pollution (Kenessariyev *et al.* 2013); as shown in Dahl and Kuralbayeva (2001) in the oil producing region of Atyrau, respiratory disease prevalence is 5 to 6 times higher than in non-oil producing regions (Netalieva *et al.* 2005), while Kenessariyev *et al.* (2013) note that the human cost of poor air is higher in Kazakhstan than in Ukraine or even Russia. And the energy intensity of industry in the future EaEU countries stagnated or even worsened throughout the 2000s, showing more energy being utilized per unit of output in Russia and stagnation in Armenia after the post-Soviet collapse is accounted for (Figure 2).

Figure 2 – Energy use intensity in the future EaEU countries, 1990-2000



Source: Based on data from the World Bank World Development Indicators. Energy intensity is measured as level of primary energy inputs in megajoules per GDP (in 2011 constant US dollars).

With economic growth resuming in the early 2000s, environmental quality also began a slow recovery across the Eurasian space, evidenced mainly in materials use indicators; like the energy intensity data shown in Figure 2, materials use intensity refers to the amount of input utilized for each unit of output, with cleaner and more efficient production using less to do more. Across the future Eurasian Union countries, CO2 emissions per unit of GDP declined by 50% in Kazakhstan and Kyrgyzstan, and by 64% in Armenia and 65% in Belarus (based on World Bank WDI data), while coal intensity plummeted in Belarus, Kyrgyzstan, and Russia, but remained relatively high in Kazakhstan through the 2000s. Even taken at levels, there was an improvement in some areas of environmental protection, with CO2 emissions in Russia dropping 22% from their height in 1992 to 2012 and SO2 emissions dropping nearly 70% in Kyrgyzstan from 1989 to 2010 and a healthy 33% in the Russian Federation from 1992 to 2010.[5]

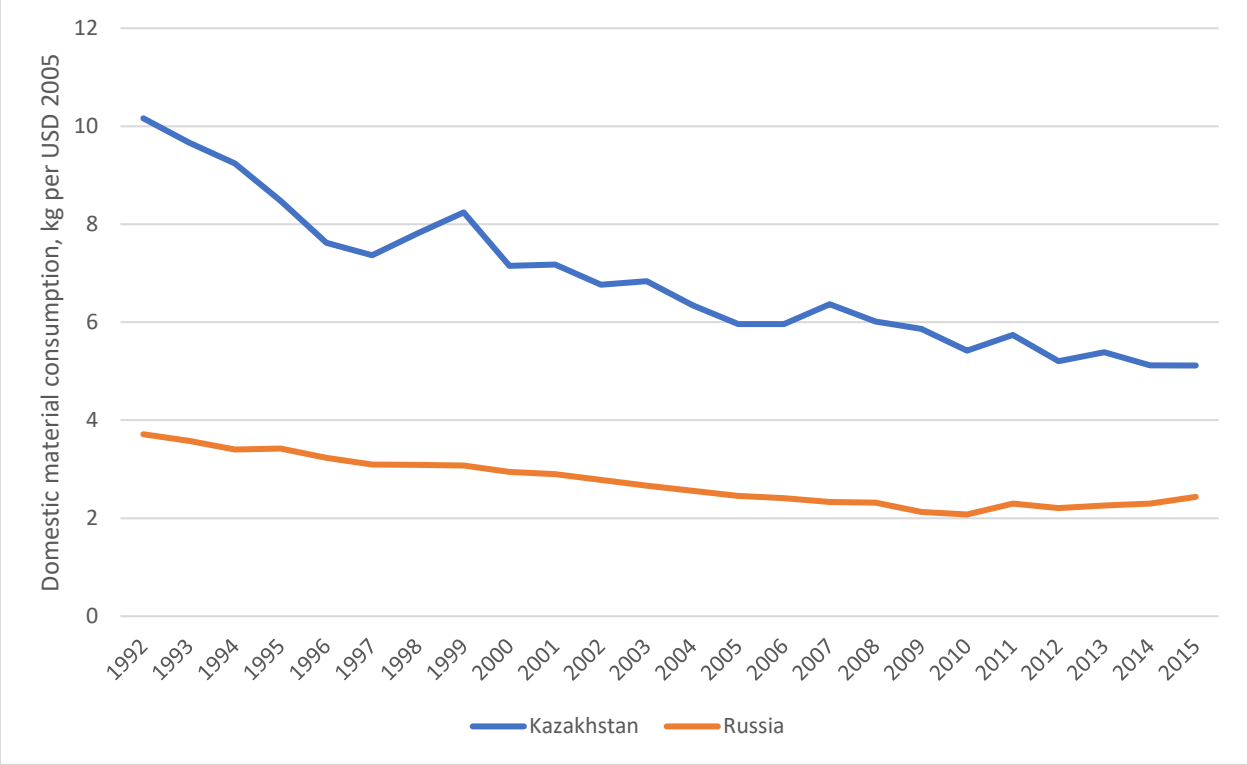
Despite this overall improvement from a low base, large-scale environmental challenges remain, although they are spatially differentiated across the vast physical space of the Union, with various components of the ecological system impacted differently according to their location and the prevailing mode of economic activity (Akopova *et al.* 2018). Groundwater contamination remains a major problem in Russia especially (including in Moscow, see Galitskaya *et al.* [2017]), and an estimated 11 million Russians (or 8% of the population) do not have access to safe drinking water; a recent and extreme example of this issue came over the summer of 2020 (and is ongoing), related to the failure of a fuel containment tank from mining company Nornickel in Norilsk, resulting in the spillage of 17,500 tons of diesel oil into the Daldykan River and surrounding land. Of course, such large-scale mining does not only have an impact on water quality, as the Russian Federal Statistics Service notes that Norilsk is the most polluted city in the country,

[5] Calculations done on data from the Hartwell and Coursey (2015) database.

with high concentrations of sulfur dioxide and heavy metals in the air along with rivers which occasionally run red (Korets *et al.* 2014; Lezhenin *et al.* 2016).

In Kazakhstan, the other member of the EaEU heavily reliant on primary commodities, the situation also has not improved substantially despite the strong growth of the 2000s (or perhaps because of it, see Nugumanova *et al.* [2017]). Studies have linked pollution associated with the country's state-owned commodities industry to increasing levels of breast cancer (Bilyalova *et al.* 2012), radioactive contamination (Russell *et al.* 2018), spoilage and increasing levels of lead in camel's milk (Konuspayeva *et al.* 2009), and heavy metals and carcinogenic materials pervading the air in most of the country's population centers (Aiman *et al.* 2018; Kenessary *et al.* 2019). Steps have been taken at the central level to consolidate environmental regulation (Russell *et al.* 2018), but the preponderance of strategic state-owned firms concerned with natural resource usage – much as in Russia – and the lack of market-based incentives to modernization continues to stymie efforts for environmental improvement. The result has been that, while overall materials use-intensity has improved since the 1990s, it has remained stagnant throughout the 2010s and is still well above the comparable metric for Russia (Figure 3); at the same time, the intensity of its energy use declined from 1992 to 2000 (as shown in Figure 2) but remains one of the highest in the world, having improved little since 2000 (Kerimray *et al.* 2018).

Figure 3 – Materials Use Intensity in Kazakhstan and Russia, 1992 to 2015



Source: Underlying data from the Global Material Flow dataset. Shown is the domestic material consumption of Kazakhstan and Russia in kilograms per constant 2005 US dollar.

Finally, in the smaller current EaEU states, namely Armenia, Belarus, and Kyrgyzstan, environmental issues remain (see Akopova *et al.* 2018 for an excellent summary) but are nowhere near the scale as seen in Russia and Kazakhstan 30 years after the demise of the Soviet Union. Armenia, as a country dependent upon mining (mainly copper and molybdenum), suffers some of the same issues as its larger Union-mates, including heavy metals in the air around capital Yerevan (Maghakyan *et al.* 2017) and in the soil around major mining sites (Gevorgyan *et al.* 2017), although there have been novel attempts to rectify these long-standing issues (Ghazaryan *et al.* 2019). In Belarus as well, the legacy of Soviet heavy industry, the radioactive contamination from Chornobyl, and the lack of economic restructuring has resulted in pollution in water reservoirs directly related to proximity to industrial sites (Vlasov and Gigevich 2006), although the country's lack of natural resources means it has avoided the worst of the pollution seen by other EaEU members. Indeed, the main progress in Belarus has been seen outside of industrial centers, where pollutants are less prevalent and have been on a downward trajectory since 2006, with industrial sites and Minsk remaining problematic (Aleksiayenak and Frontasyeva 2019). And in Kyrgyzstan, a country with ample gold reserves but little mining of its other resources, the environmental issues faced are mainly a product of its Soviet past, including uranium mining and industrial pollution (Karimov and Gainutdinova 1999; Gavshin *et al.* 2004) as well as improper storage of obsolete pesticides (Doolotkeldieva *et al.* 2018). While Kyrgyzstan's materials use intensity remains the highest in the EaEU by a factor of four (12.66 kg per US dollar of output in 2015, according to the Global Material Flow database), it has been on a slow downward drift, although much work is to be done.

IV. What Effect did EaEU trade have on the environment?

With these lingering environmental issues, one could expect the EaEU to emphasize common legislative approaches of effective implementation to protect the environment, either at the level of member states or at the Union level (Akopova *et al.* 2018). Yet, despite a host of treaties conducted between member states dating back to the 1990s promising international cooperation, "the EaEU Treaty is not a direct source in regulating the cross-border environmental management in the member states of the Eurasian Economic Union" (Antiufeeva *et al.* 2019:559). At the level of the organs of the EaEU, namely the Eurasian Economic Commission, there is a commitment to environmental protection as a matter of principle (see, for example, the report of the Commission on Achieving the Sustainable Achievement Goals from 2017).[6] However, practically, very little has actually been attained in terms of legislative harmonization (Selishcheva *et al.* 2018), perhaps due to the diverse nature of environmental issues across the EaEU or (more likely) due to the fact that the EaEU has left very little room for "regulatory competition" and thus environmental issues must be agreed upon by all members before moving forward (Klofat 2017).

Any progress made in the environmental framework has therefore been done at the level of the individual member state, a reality which has been based mainly on a top-down, legislative approach rather than one which recognizes the diversity of environmental issues in each country and engages local actors. Indeed, the history of environmental legislation in each of the EaEU countries has been in line with the development of their other political institutions, i.e., heavily centralized and controlled from the center, focused on inputs and regulation rather than on tangible improvements in environmental quality. This has

[6]Available at http://www.eurasiancommission.org/en/act/integr_i_makroec/Documents/%D0%A6%D0%A3%D0%A0%20_Eng.pdf.

proven to be unwieldly in the case of vast landmasses such as Russia, where environmental protection has been subsumed during the reign of Vladimir Putin into an omnibus Ministry overseeing with "natural resources;" this has led to a shift away from environmental protection and an emphasis on resource extraction (for a history of Russian environmental policymaking, see Hartwell *et al.* [2020]). As Libman and Obydenkova (2014) document in the context of Russian forestry policy, a shift towards a more polycentric form of environmental protection could be beneficial for the environment, not just in Russia but elsewhere in the region. Unfortunately, as of this writing, the command-and-control mentality, focused on legislation, treaties, and (especially) standards has dominated most of the thinking towards the environment in EaEU members (Newell and Henry 2016); combined with inadequate funding from the center and the ability of politically connected businesses to skirt regulations, the entire conceptual framework for environmental protection is rudimentary. And, as noted, the EaEU – as an institution – has not played any role thus far in pushing forward even harmonization of legislation in this realm (Akopova *et al.* 2018).

Given the lingering issues and procrastination of the EaEU towards the arduous task of fashioning a common national-level approach towards the environment, we return to our research question, namely, did the increased trade occasioned by the Customs Union/EaEU aid or hinder environmental outcomes? In the absence of legislative movement, did trade play an effective role in helping to improve the environment, or did the increase in (mainly) primary commodities lead to further environmental degradation? As noted in the introduction, there is some empirical evidence of a positive relationship between trade liberalization and environmental quality (Coursey and Hartwell 2000; Hartwell and Coursey 2015); even papers which posit an increase in pollution due to free trade note that "openness to international markets may mean less developed countries gain access to better pollution abatement technology and to international capital markets" (Copeland and Taylor 1994:759), a channel which has some backing from Reppelin-Hill (1999). At the same time, the "pollution haven hypothesis" has found very little empirical support (Cherniwchan *et al.* 2017), with more robust econometric modelling showing that, as trade is associated with economic growth (and growth with lower pollution, in line with the Environmental Kuznets Curve hypothesis), trade therefore is also a second-order determinant of environmental quality (Cole 2003).

However, the expansion of trade within the EaEU may have different effects than the earlier episodes of broader-based liberalization studied in the literature. For example, Bøås (2000) notes that regional integration may not necessarily improve environmental governance if all countries are not on board (as in the EaEU), while Ulph (1998) shows that gains may come from environmental harmonization among countries, but these gains may not be realized if trade policy is executed strategically. Similarly, the reliance of EaEU countries on mineral and fossil fuels, and the mere fact that the greatest integration economically has come within the energy market (Shadrina 2020), may mean that the competitive and innovative pressures that come with liberalized integration and which are crucial for environmental improvement are absent.

Perhaps most important, as noted above, the fact that integration within the EaEU is being undertaken as part of a managed integration, driven by autocratic interests, may be the key to understanding the effect of trade on environmental performance. The reality is that trade expansion in the EaEU has occurred in and because of political autocracies, with integration driven from the very top but narrowly circumscribed in areas which are of national and political interest to the leaders of each country (Dragneva and Hartwell 2021). There is already a body of work examining the fact that democracies have higher environmental

quality than autocracies (Congleton 1992; Coursey and Hartwell 2000; Bernauer and Koubi 2009), and recent work from Yasin *et al.* (2020) shows how quality institutions can mediate the trade-environment nexus. Building off of this literature, the reality that the EaEU's trade integration is not driven by comparative advantage (and corresponding competitive pressures) but instead is done in a piecemeal fashion in an autocracy may mean that the integration which is undertaken can be less-than-optimal (or even deleterious) for the environment.

To understand this relationship between the environment and trade in the EaEU, I thus undertake a brief empirical examination to ascertain if trade was able to deliver higher levels of environmental protection, or if the Union's integration without extensive liberalization meant that the worst possible effects from trade were realized instead of gains. As it is very difficult to disentangle the specific effects of trade on the environment, the specification used here is a standard difference-in-difference model with a full complement of controls, tracking the evolution of various pollutants before and after the founding of the Eurasian Union.

In order to create a second "difference" beyond the mere effects accruing due to EaEU membership, the EaEU countries will be compared against a "placebo" group of similarly situated countries, namely Moldova, Tajikistan, Ukraine, and Uzbekistan. This placebo group has disparate political institutions (Tajikistan and Uzbekistan remain mostly autocratic but Ukraine and Moldova have functioning democracies), but all are all former Soviet states with a similar environmental legacy. Most importantly, perhaps, none of these countries at present have joined any form of formal autocrat-driven Eurasian integration; while they may be reliant on the products of the EaEU (for a time, Ukraine was highly reliant on Russian energy, and Moldova is still linked closely with the energy markets of the EaEU), this energy trade is a) independent of their overall trade stance and b) independent of the internal incentive structure of their economies. By arraying the EaEU countries against this placebo group, we will be observing the processes which could contribute to improved (or worsened) environmental quality via production processes.[7]

With this in mind, the formal econometric model is thus:

$$(1)\quad y_{it} = \beta_0 + \beta_1 Time_i + \beta_2 (EaEUMember)_{it} + B_4 X'_{it} + \varepsilon_{it}$$

Where *y* is a specific measure of pollution, *time* is a time fixed effects dummy, and *EaEU Member* is the coefficient of interest, taking the value of 1 for the five EaEU members from 2015 onward and 0 for the non-EaEU members (this is the difference-in-difference effect). Given the short time of existence of the Eurasian Union (and the fact that much of our data only goes through 2018), we also include a separate model which measures environmental progress in Russia, Kazakhstan, and Belarus from the beginning of the Customs Union (2010) rather than the formation of the EaEU (2015).

The pollution measures used here include three important metrics to proxy for environmental degradation, including:

[7] The reality is, over such a short time span, we cannot observe changes in environmental quality and attribute them solely to policies, as environmental quality itself is a longer-term phenomenon and may not have moved substantially in five or ten years. It is for this reason why we look at the production processes which, taken cumulatively, would equate to a cleaner or a less clean environment.

- **CO2 intensity**, measured here as CO2 emissions in kilograms per purchasing power parity US dollars of GDP, and taken from the World Bank World Development Indicators;
- **Energy intensity**, measured in kilowatt-hours per person per unit of GDP per capita, measured as 2011 international dollars, and taken from the BP Statistical Review of World Energy; and
- **Total Greenhouse Gases (GHG)**, comprising emissions of carbon dioxide, methane, nitrous oxide, and F-gases summed up and measured in millions of tons of carbon-dioxide equivalents (CO_2e), sourced from the BP Statistical Review via the "Our World in Data" database. [8]

A key prerequisite for the use of the difference-in-difference technique is that the variable of interest must follow a parallel path for the two groups to be compared, thus ensuring that any variation in these paths after the intervention (in this case, the accession to the Customs Union or the EaEU) can be attributed solely to the treatment. As can be seen in Figure 4, a comparison of CO2 intensity for Customs Union and non-Customs Union countries, parallel paths are clearly evident, and this is true across all three of the Y variables listed above: in all of the post-Soviet countries examined here, intensity and/or emissions were incredibly high during the Soviet Union, collapsing in the early 1990s and seeing still-elevated levels of emissions or intensity gradually come down through the 2000s.

The X vector in Equation 1 represents a comprehensive set of covariates inspired by Gassebner *et al.* (2011) and can be plausibly considered as drivers of material intensity (see Table A1 in the Appendix for a full list of covariates and their source). In the first instance, income, income squared, and growth of income (represented by GDP and percentage change of GDP) are included to capture environmental Kunzets effects and overall economic activity. Digging deeper into the various economies here, we also use structural characteristics of the economy, including the industry value added and the percentage of land dedicated to agriculture, theorizing that both may be linked to higher levels of emissions and/or lower levels of intensity. Given the importance of energy sources and use to Eurasian Union countries, we also include the percentage of electricity derived from fossil fuels, with a higher percentage likely to be linked to more emissions and more inefficient use of materials (similar to Neumayer [2004]).

Other important controls included here are a country's capital to labor ratio, a measure of "capital deepening" but also a plausible proxy for technology (as higher levels of capital to labor are correlated with more past technological advances, see Fagerberg [1994]).[9] Additionally, foreign direct investment (Gassebner *et al.* 2011) is included, which may correlate with either higher emissions (if in heavy industry) or lower intensity (if bringing new technology), as well as overall trade openness, to separate out a country's total exposure to trade versus its specific trade with the Customs Union or EaEU countries. As the countries involved may also have vast overland distances to contend with, conditioning energy use, the X vector also includes important country size and population attributes, including population density (to proxy for dispersed populations) and urbanization (to proxy for concentration).[10] Finally, the error

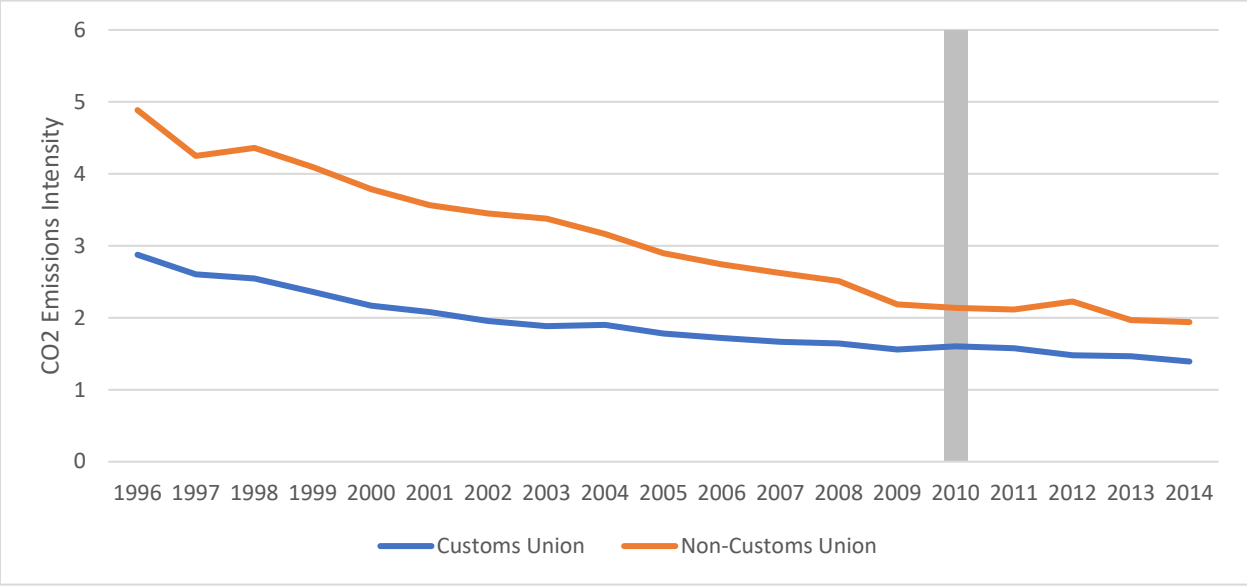
[8] Additional regressions were run with various permutations of NOx, including NOx total emissions, NOx per capita, and NOx per capita intensity. However, the relatively shorter time span of the data series and the model itself was problematic and highly unstable. Results available on request, but a more detailed and specific model for NOx emissions is apparently called for.

[9] Additional measures of technology were problematic in this set-up: for example, data on R&D expenditures had substantial gaps for EaEU countries and reduced the number of observations substantially, while adding an additional issue of collinearity (being highly correlated with income). Utilizing R&D data would have thus required taking out the Kuznets curve specification.

[10] Thanks to an anonymous referee for suggesting this point.

term in Equation 1 is a set of country-specific fixed effects with robust standard errors, clustered on the country variables, in order to avoid the issues with autocorrelation noted by Bertrand *et al.* (2004).

Figure 4 – CO2 Intensity in Customs Union and non-Customs Union countries, 1996-2014



Source: Based on data from the World Bank World Development Indicators database. Grey shaded line indicates the founding of the Customs Union in 2010.

Results

The results of this exercise are shown in Table 1, including both the environmental Kuznets Curve (EKC) effects and the effect of the regional trade grouping. For both the Customs Union and the Eurasian Union, and no matter which pollution output is utilized, there appears to be a statistically significant increase in either intensity or absolute values of various emissions. For example, as per the EKC, CO2 per unit of output theoretically should increase as a country becomes richer, but as expertise and cleaner technology become commonplace, firms can do more with less and thus intensity decreases. As shown in Columns 1 and 2, this effect is seen for all of the post-Soviet countries, with increases in CO2 emissions per unit of output alongside income gains but with an inverted U-curve path consistent with an EKC. More importantly, however, for countries in the Customs Union since 2010 and those in the Eurasian Union since 2015, they see additional increases in their CO2 emissions not accounted for by the increase in income. For Russia, Kazakhstan, and Belarus, there was an increase of a bit more than a third of a kilogram in CO2 emissions per output since 2010, while for Armenia and Kyrgyzstan an increase of 0.21 kilograms of CO2 is predicted since 2015. These increases are several orders of magnitude higher than the efficiencies which would be expected simply by the passage of time.

The same pattern can be seen in the energy per capita and total greenhouse gas models, although the Kuznets Curve relationship has less significance for energy intensity and, in fact, GHG emissions run in the other direction, with a statistically significant U-shaped curve. In both of these models, there is a statistically significant (at the 1% level) increase in energy use and total GHG emissions for Customs Union members, while the Eurasian Union saw a slightly less significant (both statistically and economically)

increase in the two metrics, but one which is still large in terms of relative magnitude (especially when compared to the experience effect proxied here by time). In any event, the results from this examination indicate support for the hypothesis that illiberal trade integration may actually harm the environment, as being a member of the Customs Union or the Eurasian Union resulted in worse environmental outcomes, even when accounting for any EKC effects. As this model is fashioned as a difference-in-difference – comparing the Customs/Eurasian Union members with other post-Soviet countries with similar trends in environmental progress – we can be fairly confident that the treatment effect of illiberal integration is what is driving these results.

Table 1 – Fixed Effects Model Results, Effects of the Customs/Eurasian Union on Pollutants

	CO2 Intensity		**Energy per Capita**		**GHG Total Emissions**	
	1	**2**	**3**	**4**	**5**	**6**
Customs Union Effect	0.34		1.20		31.30	
	*5.74****		*2.85****		*3.83****	
Eurasian Union Effect		0.21		1.12		26.12
		*3.31****		*1.99***		*2.82****
Income	5.52	6.31	8.81	11.77	-387.42	-314.72
	*5.33****	*5.07****	*1.71**	*1.98***	*2.78****	*2.30***
Income^2	-0.11	-0.13	-0.17	-0.24	10.94	9.28
	*4.85****	*4.76****	*1.59*	*2.04***	*3.86****	*3.27****
Time	-0.07	-0.06	-0.24	-0.20	-5.62	-4.70
	*5.32****	*3.64****	*5.03****	*3.23****	*4.67****	*3.35****
C	65.73	35.85	348.47	234.80	14823.58	12348.99
	*2.61****	*1.08*	*2.70****	*1.64**	*5.11****	*3.61****
n	183	183	179	179	183	183
Full Controls?	YES	YES	YES	YES	YES	YES
R-squared	0.18	0.18	0.12	0.11	0.57	0.68
F-test	22.35	43.01	6300.08	14560.61	55000.80	86000.60
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

Note: *** denotes significance at the 1% level, while ** and * denote significance at 5% and 10% respectively. List of controls shown in Table A1 in the Appendix.

V. Conclusion

Trade can be beneficial for the environment, but under a different set of circumstances, managed trade – and especially trade concentrated in primary commodities – can create additional environmental pressures and foster inefficiency. This paper has examined the role of increased trade among the five countries of the Eurasian Economic Union and its impact on the environment, finding that there was indeed a significant increase in CO2 emissions, energy use intensity, and greenhouse gas emissions accompanying regional integration. This is consistent with the emphasis of the three Customs Union members (and, to a lesser extent, the two additional members of the Eurasian Union) on primary

commodities and petroleum products, which are well-known for being both energy-intense and highly polluting.

There are several extensions which can be made with this paper as a starting point. In the first instance, more rigorous and formal modelling of the paths of the individual countries of the EaEU could help to shed light on the specific pollutants or emissions which have been problematic since the founding of either the Customs or the Eurasian Union – winnowing in on problematic pollutants can also help to tailor public policy within the EaEU and perhaps mitigate some of the issues that come with managed trade. Secondly, as years pass, more data will be available to make the EaEU modelling as strong as the Customs Union, allowing us to isolate the effects specifically from the Eurasian Union (and thus better explore what occurred in Armenia and Kyrgyzstan). Finally, as noted above, from the vantage point of environmental quality rather than outputs, researchers could also focus on metrics of environmental outcomes such as air quality or water pollution rather than these intermediate, first order steps.

From a policy vantage point, the way forward for the EaEU would appear to be a reform of its orientation away from illiberal regionalism and towards a much more conventional trade liberalization, one which allows for comparative advantage and competitive pressures to force polluting industries to adapt, and which can finally shake up old Soviet-era heavy industry (a point made in Hartwell [2013]). With broader liberalization taking place (especially in its removal of non-tariff barriers), the EaEU could utilize its large internal market and the advantages of choice for consumers to move away from reliance on primary commodities and petroleum products and shift towards cleaner production. This would include moves towards more polycentric decision-making if the EaEU cannot create agreement on environmental progress (and even if it can, polycentrism is still crucial for delivering environmental progress across the vast space of the EaEU, with its diverse environmental challenges). What is needed going forward is a more liberal integration focused on decentralization of environmental decisions and predicated on structural change, not more of the same, lest the EaEU continue being part of the problem.

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Appendix

Table A1 – List of Covariates

Variable	Description	Source	Rationale
Agricultural Land	Agricultural land (% of land area)	WDI	More agricultural land could lead to more use of fertilizers and more GHG emissions
Capital to labor ratio	Capital stock at current PPPs (in millions of 2011US$) divided by number of people in the labor force	Calculated from Penn World Tables data	A measure of efficiency, a more efficient labor force will emit less and pollute less.
Customs Union	An interaction dummy taking the value of 1 for each year past 2010 that a country was a member of the Customs Union, 0 otherwise	Author's calculations	See text.
Electricity Production	Electricity production from oil, gas and coal sources (% of total)	WDI	Countries with more electricity derived from fossil fuels are likely to be less clean.
Eurasian Union	An interaction dummy taking the value of 1 for each year past 2015 that a country was a member of the Eurasian Economic Union, 0 otherwise	Author's calculations	See text.
FDI net inflows	Foreign direct investment net inflows in % of GDP	WDI	FDI has been linked with cleaner environments in general for the same reason that trade is: competitive pressure.
GDP	Log of GDP in constant 2010 US dollars	WDI	The EKC hypothesis states that richer countries should pollute more…
GDP Growth	Annual change in GDP, in %	WDI	…even as they are growing…
GDP Squared	Square of log of GDP, to capture Kuznets Curve effects	Calculated from WDI data	…but that after a certain point they should become more efficient.
Industry Value Added	Industry (including construction), value added (% of GDP)	WDI	Higher values of industry may correlate with higher levels of pollution.
Population Density	People per sq. km of land area	WDI	High levels of density could be correlated with emissions and pollutants.

Trade Openness	Trade as a percentage of GDP	WDI	See text.
Urban population	Urban population as a % of total population	WDI	Urban areas are among the most polluted in the world and high levels of urbanization could suggestion higher levels of pollution.