

Time Zone Differences and Trade in Russia: The Regional Dimension

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It is well known in the literature on trade that proximity has a positive and significant effect on the bilateral exchange of goods and services. Proximity can be assessed via a number of measures, the simplest of them being the physical distance between countries, which stands for the cost of transportation, the existence and quality of infrastructure, geographical barriers, etc. Contiguity, shorter customs processing times, and trade agreements can also shorten the distance between countries. Moreover, cultural closeness as proxied by colonial ties, similar languages, and shared cultural values has been identified as a potential driver of bilateral trade flows.

This paper focuses on the time zone difference as another dimension of bilateral proximity and its effects on trade. Time differences can be both a barrier and a facilitator of trade. As barriers, they contribute to the increase in the transaction costs of the exchange of goods and services as they make communication between trading partners more difficult, especially when their working hours do not overlap. At the same time, multinational companies or companies involved in internationally fragmented production processes (especially in services) might take advantage of time zone differences to ensure that the global production process of their product does not cease at the end of a working day at a given location.

The literature on the trade effects of time zones is relatively small and has studied exclusively developed countries. Tomasik (2013) and Tomasik and Bista (2015) report a negative effect of time zone differences on overall trade in a sample of 20 OECD countries. Similarly, Wagner (2019) indicates that time zone differences lead to a decrease in exports of German companies, especially where small size companies and intermediate goods are involved. The positive effect of time zone differences for services trade of foreign affiliates of US companies is noted by Christen (2017). Moreover, in a theoretical study, Kikuchi (2009) shows that companies can derive a comparative advantage in services trade, if they can make use of time zone differences.

In contrast to previous research on cross-country samples, we explore the impact of time zone differences on the trade of Russian regions over the period 2014-2021. Russia represents a perfect case study as it has a large number of regions spread across 11 time zones. We study mainly the goods trade as data on services trade by region and trading partner is limited. But given the importance of time differences for services trade, we also investigate services using a small sample of regions that publish more detailed statistics.

This study makes three key contributions to the literature. First, it examines the effects of time zone differences on trade for a large emerging economy. The existing literature has focused mostly on cross-country studies using a sample of developed countries. Developing and emerging economies might exhibit different effects of time zone differences, especially when their economic activity oriented towards exports is spread over numerous time zones. Second, we study both goods and services trade across various model specifications. Previous research has emphasized the impact of time zones on services. Russia is one of the major natural resource exporters in the world, and it would be relevant to determine whether time zones matter in the case of such an industrial structure. Third, we employ regional level data which has not been done previously in the literature on time zones. This regional dimension allows us to derive important lessons for the interregional and international integration of local economies within Russia.

The empirical framework employed in this study is based on the gravity model, a standard approach in international economics introduced by Tinbergen (1962) and later given a theoretical foundation by Anderson (1979). We augment the standard model by adding time zone differences as the main independent variable of interest. It is measured as the absolute difference in time zones between the administrative center of a given Russian region and the capital of its trading partner. Furthermore, we conduct the empirical analysis for various specifications of the model. In particular, we use different combinations of distance and fixed effects to test the robustness of the results. In addition, we estimate the model for different aggregation levels of the sample of Russian regions. Lastly, we study a sample of three Russian regions for which data on services trade by partner country is available.

The results indicate that there is a negative and significant effect of time zone difference on the trade of Russian regions, confirming the findings in the literature on the regional level of an emerging economy. The results are largely robust across different models. There is some limited evidence on regional services trade from the small sample indicating a negative effect as well. This lack of positive effect as reported in previous studies might be due to the specific regional sample where transportation services were predominant.

These findings indicate that time zone differences matter for trade even for a resource-based economy like Russia's. Over the past two decades, the Russian government has changed the number of time zones several times and there have been several radical suggestions to reduce the number of time zones drastically for the sake of both economic integration within Russia and synchronization with major trading partners like China. The results of this paper support the synchronization argument for the sake of trade optimization, although such changes need to be fine-tuned to take into account other side effects of time change on the population.